Applicant’s Response to Hearing Request – Part 1

TCEQ DOCKET NO. 2025-1160-AIR

APPLICATION BY FORMOSA PLASTICS CORPORATION, TEXAS FOR AIR QUALITY PERMIT NOS. 140763, 19871, 91780, 19200, 19168, 107518, 20203, 40157, 19201, PSDTX1500M1, PSDTX1236M1, PSDTX1240M1, PSDTX1237M1 PSDTX1226M1, PSDTX1383M2 PSDTX1224M1, PSDTX1222M1 PSDTX1232M1, GHGPSDTX46M1 GHGPSDTX221, GHGPSDTX223 GHGPSDTX218, GHGPSDTX224 GHGPSDTX48M1, GHGPSDTX222 GHGPSDTX225, AND GHGPSDTX219, CALHOUN AND JACKSON COUNTIES, TEXAS	§ § § § § § § § § § § § §	**BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

APPLICANT FORMOSA PLASTICS CORPORATION, TEXAS'S RESPONSE TO HEARING REQUESTS

Applicant Formosa Plastics Corporation, Texas ("***FPC***" or "***Applicant***") files this Response to the San Antonio River Estuarine Waterkeeper's ("***Waterkeeper***") requests for a contested case hearing (the "***Requests***"[1]) on FPC's amendment applications (collectively, the "***Application***") at its chemical complex in Point Comfort, Calhoun and Jackson Counties, Texas (the "***Complex***"). The Draft Permits will authorize new and modified facilities to support Complex-wide compliance with more stringent federal standards for flare emissions. For the reasons set forth below, FPC requests that the Texas Commission on Environmental Quality ("***TCEQ***") Commissioners (the "***Commission***") find that Waterkeeper's member is not an affected person, deny the Requests, adopt the TCEQ Executive Director's (the "***TCEQ ED***") Response to Public Comment (the "***RTC***"), and issue the Draft Permits.

[1] *See* Waterkeeper's Public Meeting and Contested Case Hearing Request, filed in Docket (November 18, 2022) (the "***2022 Request***"); Waterkeeper's Contested Case Hearing Request, filed in Docket (May 30, 2025) (the "***2025 Request***"). This Response addresses both Requests.

EXECUTIVE SUMMARY

In 2021, FPC initiated a Flare Improvement Project to amend nine existing TCEQ air quality permits[2] (the "***Project***") to support compliance with more stringent federal standards for flare emissions recently finalized by the United States Environmental Protection Agency ("***EPA***"). The scope of the Application is limited to the proposed new and modified facilities (the "***Project Facilities***") in the draft permits prepared by the TCEQ ED ("***Draft Permits***"). FPC's existing facilities[3] at the Complex are already authorized.

FPC properly prepared the Application based on all applicable legal and technical requirements. The TCEQ ED conducted a technical review of the Application, including FPC's air dispersion modeling and impacts review, which clearly shows that the Application and the Draft Permits meet such requirements and are protective of human health and welfare. In its Requests, Waterkeeper raised concerns and interests of a single organizational member that (1) are substantively incomplete and incurable; (2) relate to recreational, aesthetic, and voluntary wastewater monitoring interests that are common to members of the public and unaffected by the Application; (3) fail to identify any protected interests recognized by applicable TCEQ rules and thereby lack any personal justiciable interest; and (4) do not satisfy requisite organizational standing requirements of an affected person and are not germane to the organization's purpose. In short and as demonstrated below, Waterkeeper's member is not an affected person and Waterkeeper is not entitled to a contested case hearing.

TCEQ "enjoys the discretion to weigh and resolve matters that may go to the merits of the underlying application, including the likely impact the regulated activity…will have on the health,

[2] TCEQ Permit Numbers 140763, 19871, 91780, 19200, 19168, 107518, 20203, 40157, 19201, PSDTX1500M1, PSDTX1236M1, PSDTX1240M1, PSDTX1237M1 PSDTX1226M1, PSDTX1383M2 PSDTX1224M1, PSDTX1222M1 PSDTX1232M1, GHGPSDTX46M1 GHGPSDTX221, GHGPSDTX223 GHGPSDTX218, GHGPSDTX224 GHGPSDTX48M1, GHGPSDTX222 GHGPSDTX225, and GHGPSDTX219.

[3] 30 TEX. ADMIN. CODE § 116.10(4) defines "facility" as a discrete or identifiable structure, device, item, equipment, or enclosure that constitutes or contains a stationary source.

safety, and use of property by the hearing requestor and on the use of natural resources."[4] To support the Commission's consideration and review of the Requests, FPC attaches four affidavits and related exhibits to this Response.[5] The Application representations, including the Air Quality Analysis ("***AQA***"), the attached affidavits and exhibits, and the TCEQ ED's thorough technical review of the Application and preparation of Draft Permits establish that potential impacts from proposed emissions to ambient air and members of the public, including Waterkeeper's member, will be indiscernible. Hence, Waterkeeper's member is unlikely to be impacted in a manner different from the general public.

If FPC has met the application requirements, TCEQ must issue the Draft Permits – denial is not discretionary.[6]

I. PROJECT DESCRIPTION

FPC operates the Complex pursuant to applicable authorizations, including TCEQ air quality permits and state and federal requirements. In 2020, in a mandatory review under the federal Clean Air Act ("***CAA***"), EPA updated certain National Emissions Standards for Hazardous Air Pollutants ("***NESHAP***") and the Maximum Achievable Control Technology ("***MACT***") regulatory standards.[7] The Miscellaneous Organic Chemical Manufacturing NESHAP (the "***MON***") and the Ethylene Maximum Achievable Control Technology MACT (the "***EMACT***") rules aim to ensure that air

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4 *Sierra Club v. Tex. Comm'n on Envtl. Quality*, 455 S.W.3d 214, 223-224 (Tex.App.—Austin 2014, pet. denied); *see also Tex. Comm'n on Envtl. Quality v. City of Waco*, 413 S.W.3d 409, 420-421 (Tex. 2013) (affirming TCEQ's discretion when making an affected person determination to rely on supporting documentation in the commission's administrative record, expert reports, affidavits, data, and the executive director's analysis and opinions).

5 *See* **Attachment A**, Affidavit of Tammy Lasater (the "***Lasater Affidavit***"); **Attachment B**, Affidavit of Eric J. Quiat, P.E. (the "***Quiat Affidavit***"); **Attachment C**, Affidavit of Arnold R. Srackangast (**the "*Srackangast Affidavit*"**); **Attachment D,** Affidavit of Lucy Fraiser, Ph.D, DABT (the "***Fraiser Affidavit***"). Attachments A, B, C, and D and attestations contained therein are incorporated by reference in their entirety in this Response as if fully set forth herein.

6 *See* TEX. HEALTH & SAFETY CODE § 382.0518(b).

7 EPA must perform a technology review every eight years to evaluate developments in practices, processes, or control technologies to determine whether they should be incorporated into the regulatory standards. 42 U.S.C. § 7412(d)(6).

pollution standards reduce emissions of hazardous air pollutants ("***HAPs***") from certain industrial sources to protect public health and the environment with an ample margin of safety.[8]

FPC retained POWER Engineers, Inc. ("***POWER***"), an engineering and environmental consulting firm, to prepare the Application, which FPC submitted to TCEQ on December 2, 2021. Each Draft Permit is comprised of a New Source Review ("***NSR***") permit, an associated Prevention of Significant Deterioration ("***PSD***") permit, and an associated Greenhouse Gas ("***GHG***") permit.[9] If granted, the Application would authorize construction of four new non-assisted Enclosed Ground Flares ("***EGFs***") to serve as additional control devices, pilot fuel gas piping for the EGFs, flexibility to control waste gases using any of the shared flare system (the EGFs and three existing elevated flares), and updated frequency of annual planned maintenance, startup and shutdown emissions at Olefins Units I, and II. The specific physical and operational changes to the Project Facilities represented in the Application comprise the scope of FPC's permitting project.

As explained in the affidavit of FPC's Corporate Air Permitting Director, Ms. Tammy Lasater, who has over four decades of experience in the chemical industry, a primary objective of the Project is to comply with the MON and EMACT federal requirements and increase the smokeless capacity of flares to reduce potential visible emissions from the Complex.[10] FPC chose to supplement its existing flares with EGFs to considerably enhance smokeless capacity and achieve better dispersion in some

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8 *See* 42 U.S.C. §§ 7412(d), (f)(2)(A) (requiring emission standards to provide an ample margin of safety to protect public health); Final Rule: National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing Risk and Technology Review, 85 Fed. Reg. 49084 (Aug. 12, 2020); Final Rule: Maximum Achievable Control Technology: Ethylene Maximum Achievable Control Technology Risk and Technology Review for Ethylene Production, 85 Fed. Reg. 40386 (July 6, 2020). The MON applies to miscellaneous organic chemical manufacturing facilities, while the EMACT applies to ethylene production units and includes revised flare operating and monitoring requirements. These rules implement section 112(d) of the federal CAA by requiring major sources to meet HAP emission standards. After finalizing the MON and EMACT rules in 2020, EPA reconsidered and promulgated revisions. *See* Reconsideration of the National Emission Standards for Hazardous Air Pollutants: Ethylene Production, Miscellaneous Organic Chemical Manufacturing, Organic Liquids Distribution (Non-Gasoline), and Petroleum Refineries Reconsideration, 89 Fed. Reg. 23840 (April 4, 2024).

9 The opportunity to request a contested case hearing in this matter only applies to the NSR and PSD permits. *See* TEX. HEALTH & SAFETY CODE § 382.05102(d) (clarifying no contested case hearing available for GHG permits).

10 Lasater Affidavit ¶¶ 5-6.

operating scenarios.[11] Operational flexibility and reliability updates to the flare system will allow for increased safety, backup capability, and functionality across the shared flare system at the Complex.[12] The Application does not request any physical changes or changes in the method of routine operations within FPC process units that would affect the nature or increase quantities of any routine flared waste gas stream currently generated within the Complex.

Mr. Eric Quiat, Senior Project Manager at POWER, is an experienced chemical engineer specializing in state and federal air quality NSR permitting and compliance who prepared the Application. In his affidavit, Mr. Quiat described how the design and technical components of the EGFs and modified elevated flares proposed in the Application support destruction of volatile organic compounds ("***VOC***") and lessen emissions from the Complex in a manner consistent with the MON/EMACT requirements and TCEQ permitting guidance.[13]

The proposed special conditions in the Draft Permits incorporate the MON and EMACT requirements, such as monitoring various parameters that ensure proper combustion of waste gases, including monitoring the net heating value in the combustion zone and measures that prevent over-assisting in 40 C.F.R. §§ 63.670-63.671 (the "***work practice standards***").[14] If issued, each of the special conditions in the Draft Permits will be incorporated into the applicable FPC Title V permits to ensure federal enforceability. To further support performance of its elevated flares in achieving required maximum tip velocity and minimum net heating value, FPC proactively replaced all flare tips on its elevated flares.[15] Replacing flare tips requires a flare to be offline and involves significant expense – a demonstration of FPC's commitment to ongoing compliance.

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11 *Id.*

12 *Id.*

13 Quiat Affidavit ¶¶ 3-4, 11; *see* TCEQ *New Source Review (NSR) Emission Calculations*, APD-ID (2021).

14 40 C.F.R. § 63.670 (providing specifications for minimum combustion zone net heating value, maximum tip velocity, and other various operating and monitoring requirements required for flares subject to EMACT).

15 *See* 40 C.F.R. § 60.18; Olefins I flare tip replacement via Registration No. 161950 (August 10, 2020), (April 19, 2023); Olefins II flare tip replacement via Registration No. 162757 (October 27, 2020); Olefins III flare tips A, B replacement via Registration No. 180073 (May 22, 2025); Olefins III C flare tip replacement Via Registration no. 167823 (February 18, 2022).

At the TCEQ ED's request, FPC submitted supplemental information to support the Application in response to EPA public comment.[16] In his affidavit, Mr. Quiat describes an example calculation comparison he prepared and submitted to the TCEQ ED to demonstrate how FPC's existing elevated flares and proposed EGFs will, as represented in the Application, achieve at least 99% destruction removal efficiency ("***DRE***") for VOCs with up to three carbons ("***C1-C3***") and 98% DRE for compounds with four or more carbons ("***C4+***") when FPC operates the flares in compliance with applicable flare requirements specified in the Draft Permits using TCEQ's recommended guidance (*i.e.*, 99% DRE for C1-C3 VOCs, and 98% DRE for C4+ VOCs).[17]

In the example calculation, Mr. Quiat first calculated VOC DREs for properly operated elevated flares and EGFs. The calculations show that:

(1) Properly operated elevated flares and EGFs will achieve at least 99% DRE for VOC compounds including C1-C3 VOCs, rather than only 98% DRE that EPA references in AP-42 Section 13.5 and in the preamble to the Refinery MACT rule, the Ethylene MACT rule, and other EPA guidance;[18] and

(2) Properly operated elevated flares and EGFs will achieve at least 99% DRE for all VOCs, including for C4+ VOCs rather than only for C1-C3 VOCs. Nevertheless, in the Application, the emissions calculations for the FPC flares conservatively assume 99% DRE only for C1-C3 VOCs.[19]

Mr. Quiat then used EPA's emission factor for elevated flares in AP-42 Chapter 13.5 (updated in 2018) to calculate estimated VOC routine and planned MSS emissions, which resulted in an estimated amount of 479.24 tons VOC per year.[20] He compared this result with the estimated emissions

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[16] Quiat Affidavit, **Exhibit EQ-5 (**January 24, 2025 Letter from Eric Quiat to Cara Hill (including emission calculation worksheets for each of FPC's nine permit applications describing and using an example AP-42 calculation methodology); EPA public comment (September 28, 2023), filed in Docket.

[17] Quiat Affidavit ¶ 11; **Exhibit EQ-6** (Sample VOC Calculations). *See also* RTC, Response 4 at 12 (describing Tier I Best Available Control Technology for flares), Response 5 at 14 (responding to EPA public comment related to VOC DRE for flares).

[18] Quiat Affidavit ¶ 11(g)(i); *see, e.g., National Emission Standards for Hazardous Air Pollutants: Generic Maximum Achievable Control Technology Standards Residual Risk and Technology Review for Ethylene Production,* 85 Fed. Reg. 40386 (July 6, 2020); *Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards,* 80 Fed. Reg. 75211 (December 1, 2015).

[19] Quiat Affidavit ¶ 11(f), (g)(ii).

[20] RTC, Response 4 at 16; **Exhibit EQ-5**.

represented in the Application, for which he used TCEQ's accepted guidance to calculate the same emissions, and which yielded a higher estimated amount of emissions: 1,189.54 tons VOC per year.[21] Similarly, Mr. Quiat's calculation of VOC emissions from the proposed EGFs using EPA's emission factor data set in AP-42 Chapter 13.5 yielded an average DRE of 99.99%, well above TCEQ's recommended guidance of 99% DRE for C1-C3 VOCs, and 98% DRE for C4+.[22] Mr. Quiat concluded that the FPC flares will achieve at least 99% DRE for C1-C3 VOCs when FPC operates them in compliance with the applicable flare requirements specified in the Draft Permits, and, thus, it is appropriate for FPC to assume 99% DRE in calculating emissions of C1-C3 VOCs and 98% DRE in calculating emissions of C4+ VOCs from the FPC flares.[23]

From the example calculation comparison, the TCEQ ED concluded that representing higher estimated VOC emissions in the Application ***results in a more conservative evaluation*** for federal applicability analysis and off-property impacts analysis.[24] The TCEQ ED also determined that compliance with the monitoring requirements in the Draft Permit special conditions (regarding the pilot flame, flow rate, and stream composition or heating value), in conjunction with compliance with the provisions of 40 C.F.R. 60.670 will ensure that the authorized emission limits are not exceeded.[25] Therefore, EPA's comments related to TCEQ's established flare guidance did not change the BACT analysis for FPC's Application.[26]

An AQA is an essential part of an NSR permit application. Its purpose is to demonstrate that

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21 *Id*.

22 *See* **Exhibit EQ-6**.

23 Quiat Affidavit ¶ 11(g)(i); *see, e.g., Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards,* 80 Fed. Reg. 75211 (December 1, 2015); *National Emission Standards for Hazardous Air Pollutants: Generic Maximum Achievable Control Technology Standards Residual Risk and Technology Review for Ethylene Production*, 85 Fed. Reg. 40386 (July 6, 2020).

24 RTC, Response 4 at 16.

25 *Id.*

26 RTC, Response 4 at 12 ("The Applicant proposed Tier I BACT for the flares, which is a minimum destruction and removal efficiency (DRE) of 99% for hydrocarbons containing three carbon atoms or less, and 98% for all other compounds. This is to be achieved through compliance with the operating requirements of 40 CFR Part 63, Subpart YY, Generic Maximum Achievable Control Technology Standards (Ethylene Production)".

the maximum allowable emissions proposed in the Application will not cause or contribute to an exceedance of a National Ambient Air Quality Standard ("***NAAQS***"), PSD Increment, a state property line standard ("***SPLS***"), or adversely affect human health and welfare.[27] Air permit applicants in Texas must prepare an AQA using site-specific air dispersion modeling to predict and evaluate maximum allowable concentrations of air contaminants from proposed new or modified facilities at off-property locations where the public could be exposed to an air contaminant in the ambient air ("***GLC**$_{max}$*").[28] Senior Scientist Arnold R. Srackangast, a scientist and meteorologist with more than four decades of experience in air dispersion modeling prepared the well-designed and thorough AQA.[29] Lucy Fraiser, Ph.D., DABT of Fraiser Toxicology Consulting LLC, a highly accredited toxicologist with expertise in evaluating air quality impacts, conducted a Health and Welfare Effects Evaluation of the AQA.[30]

The AQA includes the following analyses: PSD NAAQS Analysis, including a De Minimis Analysis and a Full NAAQS Analysis; PSD Increment Analysis; Additional Impacts Analysis; State NAAQS Analysis; SPLS Analysis; and a Health and Welfare Effects Evaluation. The TCEQ ED reviewed the AQA and determined it is acceptable for all review types and pollutants.[31] The results of those analyses demonstrate that the GLC_{max} of all proposed contaminants from the Project Facilities in the Application will not cause or contribute to a violation of any applicable NAAQS or SPLS, will not cause a violation of a PSD increment, and will not have adverse effects on soils, vegetation, or Class I areas. Accordingly, the proposed emissions from the Project Facilities will neither cause nor contribute to an air quality violation at FPC's fenceline or beyond.[32]

As discussed in detail below, the AQA is highly conservative. For example, Dr. Fraiser

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[27] Srackangast Affidavit ¶ 5; 30 TEX. ADMIN. CODE § 116.111(a)(2)(J).
[28] *See TCEQ Air Quality Modeling Guidelines*, APDG 6232 (June 2024); *TCEQ Modeling and Effects Review Applicability*, APDG 5874 (March 2018) ("***MERA***").
[29] Srackangast Affidavit ¶¶ 2-4; **Exhibit AS-2** (Air Quality Analysis Report).
[30] Fraiser Affidavit ¶¶ 3-4, 6.
[31] Srackangast Affidavit, **Exhibit AS-3** (TCEQ Modeling Audit Memorandum).
[32] *See id.;* RTC, Response 1 at 4.

explained that the emissions calculations for the Project Facilities used in the air modeling are based on worst-case maximum allowable emissions rates that are higher than what is expected to occur.[33] Similarly, maximum allowable emission rates were included in the analysis for all existing FPC sources Complex-wide and nearby offsite sources.[34] Notably, the AQA's use of FPC's monitoring data as ambient background is extremely conservative because FPC's air monitors provide a direct measurement of FPC's fenceline impacts from FPC and any nearby sources.[35] Thus, inclusion of FPC and nearby emissions into the full NAAQS analysis resulted in a ***double counting*** of hourly nitrogen oxides ("***NO_2***") emissions – once for maximum allowable hourly NO_2 emission rates from FPC's existing permitted emission sources, and again for hourly NO_2 measured by the adjacent downwind FPC monitor.[36] Moreover, all specific modeled non-criteria pollutant constituents were not only below but were ***less than 10%*** of TCEQ's conservative screening thresholds, the Effects Screening Levels ("***ESLs***").[37] These factors and the other bases Dr. Fraiser specified in her affidavit underscore why the GLC_{max} are conservative[38] and why the TCEQ ED properly determined that the emissions proposed to be authorized by the Permits are protective of human health and welfare and the environment.[39]

II. PROCEDURAL BACKGROUND

The Application was administratively complete on or after September 1, 2015, and is subject to the procedural requirements adopted pursuant to House Bill 801, 76th Legislature, 1999, and Senate Bill 709, 84th Legislature, 2015, codified in the Texas Government Code and TCEQ rules.

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33 Fraiser Affidavit ¶ 16(a).

34 Fraiser Affidavit ¶ 16(a); Srackangast Affidavit ¶ 13(b).

35 *See* **Exhibit AS-2**, Section 5.3 ("EPA guidance recommends excluding periods when sources at the site of the Project are expected to impact the concentrations measured at the monitor (EPA, 2014). Despite this guidance, FPC TX did not apply any procedures to reduce or remove FPC TX's sources' influence on ambient background concentrations from the FPC NW monitor. This yields a highly conservative background.").

36 Fraiser ¶ 16(f).

37 Fraiser ¶ 14; **Exhibit AS-4** (Electronic Modeling Evaluation Workbook), 13-7.

38 *See* Fraiser Affidavit ¶¶ 16-18.

39 RTC, Response 1 at 3.

The TCEQ Executive Director's RTC accurately describes the procedural background and development of the Application. The TCEQ ED declared the Application administratively complete on December 16, 2021. The TCEQ Chief Clerk (the "***Chief Clerk***") mailed the Notice of Receipt of Application and Intent to Obtain Air Permit on December 20, 2021, and FPC published that notice on January 6, 2022, in English in the *Port Lavaca Wave* and in Spanish in *Revista de Victoria*. The Chief Clerk mailed legislative notice on January 7, 2022, and September 23, 2022. The Chief Clerk mailed the Notice of Application and Preliminary Decision (the "***NAPD***") on September 30, 2022, and a revised NAPD on October 17, 2022. FPC published newspaper notice of the October 17, 2022, NAPD on October 19, 2022, in English in the *Port Lavaca Wave* and on October 26, 2022, in Spanish in *Revista de Victoria*. The Chief Clerk mailed notice of a public meeting on December 28, 2022, and held an in person public meeting on February 2, 2023, at the Bauer Community Center located at 2300 State Highway 35, Port Lavaca, Texas. At and prior to the public meeting, TCEQ received oral and written public comments on the Application.

Following the TCEQ ED's review of FPC's May 16, 2023 updated AQA and issuance of the TCEQ ED's July 25, 2023 AQA Audit, the Chief Clerk mailed notice of a second revised NAPD on July 28, 2023, and FPC published newspaper notice of the second revised NAPD in English in the *Port Lavaca Wave* on August 23, 2023, and in Spanish in *Revista de Victoria* on September 18, 2023. EPA submitted comments relating to flare VOC DRE on September 28, 2023. The public comment period following the second revised NAPD closed October 18, 2023. The TCEQ ED and her staff conducted a thorough technical review of the Application including a protectiveness evaluation, prepared draft amended permits, and made a preliminary decision to issue the amended Permits because the Application meets all legal and technical requirements.[40] The TCEQ ED issued her RTC and Decision of the Executive Director on May 1, 2025 (the "***Decision Letter***"), in which the TCEQ ED determined

[40] Notice of Application and Preliminary Decision (July 28, 2023).

that no changes to the Application or its AQA were warranted in response to public comments.[41] The TCEQ Chief Clerk mailed the RTC and Final Decision Letter on May 1, 2025, and the deadline to submit a hearing request or request for reconsideration ended June 2, 2025. The TCEQ Commissioners Integrated Database reflects that Waterkeeper's 2025 Request was filed May 30, 2025.

III. APPLICABLE LAW TO HEARING REQUESTS

A. The Commission Must Deny a Request That Does Not Comply with Applicable Regulatory Requirements.

Only the Commission, the TCEQ ED, the applicant, or an affected person—when authorized—may request a contested case hearing.[42] When a requestor asserts affected person status, the Commission must make a threshold finding regarding whether the requestor is entitled to a contested case.[43] To be granted, hearing requests must satisfy several specific administrative, procedural and substantive requirements.[44]

A contested case hearing request, made by an affected person, must be submitted in writing within 30 days of the Chief Clerk's transmission of the TCEQ ED's Final Decision and RTC and based on an issue raised by the requestor in a timely filed public comment that was never withdrawn.[45] A request must include an explicit statement requesting a contested case hearing,[46] and the "name, address, daytime telephone number, and, where possible, fax number" of the requestor.[47] In addition, a hearing request must substantially comply with the following requirements:

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41 30 TEX. ADMIN. CODE § 55.156(b)(1) (requiring the TCEQ ED to prepare a response to all comments received).

42 *See* 30 TEX. ADMIN. CODE § 55.201(b).

43 TEX. WATER CODE § 5.556(c); 30 TEX. ADMIN. CODE § 55.201(b)(4). *See also TCEQ v. City of Waco*, 413 S.W.3d at 410 ("[B]efore granting a contested case hearing . . . a threshold determination must be made as to whether the party is an "affected person" with standing to request such a hearing.").

44 The central statutory provisions and TCEQ rules controlling Commission decisions on requests for contested case hearings are TEX. GOV'T CODE § 2003.047; TEX. HEALTH & SAFETY CODE § 382.056; TEX. WATER CODE §§ 5.115, 5.556; and 30 TEX. ADMIN. CODE, ch 39, § 50.113 et seq., and § 55.200 et seq. Where multiple provisions contain duplicative requirements, this Response may only reference one source.

45 30 TEX. ADMIN. CODE §§ 55.201(a), (c).

46 *Id.* § 55.201(d)(3).

47 *Id.* § 55.201(d)(1).

> [I]dentify the person's personal justiciable interest affected by the application, including a brief, but specific, written statement explaining in plain language the requestor's location and distance relative to the proposed facility or activity that is the subject of the application and how and why the requestor believes he or she will be adversely affected by the proposed facility or activity in a manner not common to members of the general public; [48]
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> . . .
>
> [and] list all relevant and material disputed issues of fact that were raised by the requestor during the public comment period and that are the basis of the hearing request. To facilitate the commission's determination of the number and scope of issues to be referred to hearing, the requestor should, to the extent possible, specify any of the executive director's responses to the requestor's comments that the requestor disputes, the factual basis of the dispute, and list any disputed issues of law. . .[49]

The Decision Letter reiterated applicable substantive requirements discussed above and explicitly informed requestors that:

> It is important that your request include all the information that supports your right to a contested case hearing. Your hearing request must demonstrate that you meet the applicable legal requirements to have your hearing request granted. The commission's consideration of your request will be based on the information you provide.[50]

The Commission must deny a request where the requestor is not an affected person and thus does not have a personal justiciable interest sufficient to establish affected person status. If the only request submitted on an application is from a non-party individual or organization that has not demonstrated affected person status, the Commission does not have statutory authority to refer the asserted issues to SOAH for a contested case hearing.[51] This is true even if a hearing request successfully met all other requirements. The Texas Water Code defines an affected person as:

> [A] person who has a ***<u>personal justiciable interest</u>*** related to a legal right, duty, privilege, power, or economic interest affected by the [application]. An interest common to members of the general public does not qualify as a personal justiciable interest."[52]

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[48] *Id.* § 55.201(d).

[49] *Id.* § 55.201(d)(4)(B).

[50] Final Decision of the Executive Director, mailed May 1, 2025 at 2 (stating that any "request must demonstrate that you are an '**affected person**'" and requires requestors to specify (1) any of the ED's response to the requestor's comments that the requestor disputes, (2) the factual basis of the dispute; and (3) any disputed issues of law) (emphasis in original).

[51] TEX. WATER CODE § 5.556(c).

[52] TEX. WATER CODE § 5.115(a) (emphasis added); *see also* 30 TEX ADMIN. CODE § 55.203(a).

To determine whether a requestor has a personal justiciable interest sufficient to establish affected person status, the Commission must consider the following factors:

1. Whether the interest claimed is one protected by the law under which the application will be considered;
2. *__Distance restrictions__* or other limitations imposed by law on the affected interest;
3. Whether a reasonable relationship exists between the interest claimed and the activity regulated;
4. *__Likely impact__* of the regulated activity on the health and safety of the person, and on the use of property of the person;
5. *__Likely impact__* of the regulated activity on use of the impacted natural resource by the person;
6. For a hearing request on an application filed on or after September 1, 2015, whether the requestor timely submitted comments on the application that were not withdrawn; and
7. For governmental entities, their statutory authority over or interest in the issues relevant to the application.[53]

In its affected person evaluation, the Commission may review competing evidence and weigh and resolve disputed facts.[54] In doing so, the Commission may consider:

1. The merits of the underlying application and supporting documentation in the commission's administrative record, including whether the application meets the requirements for permit issuance;
2. The analysis and opinions of the executive director; and
3. Any other expert reports, affidavits, opinions, or data submitted by the executive director, the applicant, or hearing requestor.[55]

The Commission must deny a request where the potential harm is speculative and not supported by evidence before the Commission. *__A requestor "has the burden of making a minimum jurisdictional showing of a justiciable interest"__* and must do so by showing that "a concrete, particularized, actual or imminent injury faces him or her due to the decision; a hypothetical or speculative injury is not enough."[56] Texas appellate courts have confirmed that "[p]roof of *__some or any 'potential' for harm__*"

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53 30 TEX. ADMIN. CODE § 55.203(c) (emphasis added).

54 *Sierra Club v. TCEQ*, 455 S.W.3d at 223-24.

55 30 TEX. ADMIN. CODE § 55.203(d) (for requests on applications, such as those in this proceeding, filed after September 1, 2015.).

56 *TCEQ v. San Antonio Bay Estuarine Waterkeeper et al.*, 714 S.W.3d 270, 284 (Tex. App.—Austin 2025, pet. filed) [hereinafter *TCEQ v. Waterkeeper*] (citing *DaimlerChrysler Corp. v. Inman*, 252 S.W.3d 299, 304-05 (Tex. 2008)).

is insufficient[57] and alleged injuries which are "merely speculation" and "not supported by evidence before the Commission" cannot create a personal justiciable interest and establish standing as an affected person.[58] Further, where evidence of potential harm requires "knowledge and analysis of scientific matters beyond the competence of laymen," unsworn assertions by a nonexpert layperson "cannot support a reasonable inference that those facts exist."[59]

In this context, TCEQ has repeatedly reiterated that it only evaluates *the request* under the requirements of the applicable statutes and rules.[60] Information required in 30 Tex. Admin. Code § 55.201 must be provided *in the hearing request* and before the 30-day hearing request deadline specified in the Decision Letter.[61] TCEQ's rules explicitly require denial of hearing requests that fail to include requisite information, as well as requests filed after the filing deadline.[62]

A hearing requestor may not rehabilitate a deficient request by raising new information in the first instance in a reply brief. TCEQ rules provide the TCEQ ED, the TCEQ Office of Public Interest Counsel ("***OPIC***"), and the applicant an opportunity to respond in writing to any hearing request and allow the requestor to file a reply to those responses.[63] The rules neither contemplate nor allow the TCEQ ED, OPIC, or applicant to file a sur-reply. If a requestor waits until their reply brief to present

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57 *City of Waco v. TCEQ*, 346 S.W.3d 781, 805-06 (citing *Save Our Springs Alliance, Inc. v. City of Dripping Springs*, 304 S.W.3d 871, 883 (Tex. App.—Austin 2011)) (applying personal justiciable interest standing principles to TCEQ contested case hearing requests), *rev'd on other grounds*, 413 S.W.3d 409 (Tex. 2013); *Texas Disposal Sys. Landfill, Inc. v. Texas Comm'n on Envtl. Quality*, 259 S.W.3d 361, 363-64 (Tex. App.—Amarillo 2008, no pet.) (holding hearing requestor's purported injury was "mere speculation, and as such, [fell] short of establishing a justiciable interest and standing").

58 *TCEQ v. Waterkeeper*, 714 S.W.3d at 286 (citing *DaimlerChrysler Corp. v. Inman*, 252 S.W.3d 299, 304-05 (Tex. 2008); *Bonham State Bank v. Beadle*, 907 S.W.2d 465, 467 (Tex. 1995).

59 *Helena Chem. Co. v. Cox*, 664 S.W.3d 66, 75 (Tex. 2023) (explaining that complex scientific questions of causation require expert testimony); *City of Waco*, 346 S.W.3d at 826 (finding that layperson fact opinions do not provide sufficient evidence in affected person determination).

60 *See e.g.*, *TCEQ v. Bosque River Coalition*, 413 S.W.3d 403, 406 (Tex. 2013) (Commission evaluated hearing request requirements based only on information in the hearing request while supplemental filings were only "considered" when weighing evidence).

61 30 TEX. ADMIN. CODE § 55.201(a).

62 30 TEX. ADMIN. CODE §§ 55.211(b)(2) (If request fails to meet the requirements, the Commission must deny and act on application); 55.211(c)(2)(D) (Commission required to grant request only if it complies with § 55.201); 55.201(g) (Chief Clerk shall not process late filed requests and although the Commission can extend time allowed to file requests, it has not done so in this matter).

63 30 TEX. ADMIN. CODE § 55.209(d), (g).

any of the specific, required information for a hearing request ***for the first time***, the TCEQ ED, OPIC and the applicant are denied a fair opportunity to respond to potentially material information.

B. The Commission Must Deny an Organization's Request Where the Request Does Not Comply with Organizational Standing Requirements.

An organization is not an "affected person" unless it (1) has specifically identified a member who would be an affected person in their own right, (2) seeks to protect an interest that is germane to the organization's purpose, and (3) shows that neither the claim asserted nor relief requested requires participation of any individual members.[64] An organization's request must also include the name and physical address of a member who it asserts "would be an affected person in the person's own right."[65]

IV. APPLICATION OF THE LAW TO THE HEARING REQUESTS

In both Requests, Waterkeeper identified one member of the organization, Diane Wilson, and asserted that she is an affected person. Waterkeeper did not identify any protected interests affected by the Application, *i.e.*, "a personal justiciable interest related to a ***legal right, duty, privilege, power, or economic interest affected by the application***" as required in TCEQ's definition of affected person.[66] Instead, Waterkeeper's Requests describe two general categories of Ms. Wilson's activities and concerns about health and welfare of the natural environment, wildlife, and vegetation when she: (1) recreates and enjoys the aesthetic beauty of plant and animal life in and around Lavaca Bay, Indianola and Magnolia Beaches, and Cox Creek;[67] and (2) periodically participates in volunteer activities to monitor FPC's wastewater outfalls for compliance with an unrelated consent decree and clean up plastic in the water[68] (the "***Asserted Interests***").[69] Neither Asserted Interest is based on any legal right,

64 30 TEX. ADMIN. CODE § 55.201(b); *see also* TEX. WATER CODE § 5.115(a)(2)(A).
65 TEX. WATER CODE § 5.115(a)(2)(A).
66 30 TEX. ADMIN. CODE § 55.103.
67 2025 Request at 2.
68 2025 Request at 2-3.
69 To whatever extent Ms. Wilson also asserts an economic interest in the waterways near the facility, the Requests state that Waterkeeper is a volunteer-run organization and Ms. Wilson is retired from her career as a commercial fisherwoman. 2022 Request at 2 (Waterkeeper "is a volunteer-run . . . non-profit organization"); 2025 Request at 2 (same); *TCEQ v. Waterkeeper*, 714 S.W.3d at 279.

duty, privilege, power, or economic interest of Ms. Wilson's that could be affected by the Application and Ms. Wilson did not identify any such basis. Ms. Wilson would not be affected any differently than other members of the public who have the same ability and access to partake in the Asserted Interest activities described in the Requests. Waterkeeper's Asserted Interests are therefore not personal justiciable interests.

A. Waterkeeper's Requests are Substantively Incomplete and Incurable.

The Requests simply stated that Waterkeeper[70] "requests a contested case hearing on Formosa's Amendments."[71] The Requests identified and provided the address of Diane Wilson as the purported member with affected person status. The 2022 Request did not identify a telephone number for Waterkeeper and the 2025 Request identifies the address and telephone number for Mariah Harrod as the point of contact for Ms. Wilson, rather than Waterkeeper. FPC does not dispute that Waterkeeper timely submitted comments on the Application that were not withdrawn.[72]

As discussed above in Section III.A., the failure of any hearing request to meet the specific requirements of TCEQ rules[73] renders the hearing request incurably deficient. The Requests are completely devoid of any asserted rationale or explanation ***why or how*** Ms. Wilson would be adversely affected by proposed emissions from the Project Facilities in a manner not common to members of the general public. The Requests failed to specify any of the TCEQ ED's responses in the RTC that Waterkeeper disputes or any factual basis for such disputes that 30 Tex. Admin. Code §

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[70] While Waterkeeper's Requests claim Diane Wilson to be an affected person, Diane Wilson did not request a contested case hearing as an individual. Any contested case hearing request filed after June 2, 2025, would be untimely under 30 TEX. ADMIN. CODE § 55.201(a) and the Chief Clerk is prohibited from processing such requests. 30 TEX. ADMIN. CODE § 55.201(g)(1).

[71] 2022 Request at 2; 2025 Request at 2.

[72] *See* Waterkeeper's Public Meeting and Contested Case Hearing Request, filed in Docket (November 18, 2022); Waterkeeper's public comment, filed in Docket (February 2, 2023).

[73] *Davis v. Morath*, 624 S.W.3d 215, 227 (Tex. 2021) (citing *TGS-NOPEC Geophysical Co. v. Combs*, 340 S.W.3d 432, 438 (Tex. 2011)) ("An agency must follow 'the clear, unambiguous language of its own regulations.'") (emphasis added).

55.201(d)(4)(B) requires. The Requests only listed proposed disputed issues without any factual support or claim as to their relevance, materiality, or connection to Waterkeeper's public comments. The deadline to request a hearing expired on June 2, 2025. Thus, any attempt by Waterkeeper to cure substantive deficiencies on reply by asserting new evidence or other justification to support an affected person argument after that date would be an unfair manipulation of TCEQ's established process and rules and tantamount to filing a late request.[74] Because the Requests failed to describe a personal justiciable interest they are incurably deficient and Waterkeeper cannot rehabilitate its Requests in a reply.

B. Waterkeeper's Group Member Does Not Have a Personal Justiciable Interest and is not an Affected Person.

Because Waterkeeper asserts affected person status through Ms. Wilson as a member of the organization, the Commission must first determine whether Ms. Wilson is an affected person by evaluating the factors in 30 TEX. ADMIN. CODE § 55.203, described above.[75] Again, neither of Ms. Wilson's Asserted Interests presents a legally protected interest. Ms. Wilson's Asserted Interests are activities available to and that occur in areas that are accessible by any member of the general public and thus are not personally justiciable.

1. Ms. Wilson's Asserted Interests are Common to the General Public.

a. Recreational and Aesthetic Enjoyment are Activities Common to the General Public.

A claimed recreational, environmental, or aesthetic interest unrelated to an exclusive property interest cannot be a personal justiciable interest because such interests are common to the general public.[76]

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74 *TCEQ v. Waterkeeper*, 714 S.W.3d at 287 ("The Water Code clearly outlines the statutory procedure the Commission must follow in determining affected-person status, and the Commission has no authority to depart from this procedure").

75 *See* infra at Section III(A).

76 30 TEX. ADMIN. CODE § 55.103. *See also Save our Springs Alliance, Inc. v. City of Dripping Springs*, 304 S.W. 3d 871, 880 (Tex. App.—Austin 2010, pet. denied).

That the public cannot be excluded from the perennial waters of the state, even when they cut through private property, is a long-established principle in Texas.[77] The Third Court of Appeals affirmed TCEQ's determination in 2012 that the general public could recreate in the waterways without needing to seek permission from anyone and denial of hearing requestors' claimed recreational interests in waterways near an applicant's power plant to support their affected person assertion.[78] In that case, the State Office of Administrative Hearings ("***SOAH***") determined that since no member of the public has "an exclusive right to recreate" on the water, the requestors' interests vis-à-vis the permit application were affected in the same way as any other member of the general public.[79] The SOAH Administrative Law Judge in that case was "not aware of any decision by a Texas court holding that a claimed recreational interest by itself is sufficient to establish that someone is an affected person entitled to a contested case hearing,"[80] and FPC is unaware of such a case to this day.

In 2022, TCEQ denied Ms. Wilson's individual hearing request and Waterkeeper's hearing request in the air quality permit amendment application for Max Midstream Texas, LLC's Seahawk Terminal in Calhoun County near Point Comfort.[81] In that case, Ms. Wilson asserted recreational interests when she swims, boats, and walks in and around Lavaca Bay and Matagorda Bay waterways near the Seahawk Terminal and expressed concern over her increased exposure to air pollutants if TCEQ granted the application.[82] Following TCEQ's denial of Ms. Wilson's hearing request, in February 2025, the Fifteenth Court of Appeals concluded that TCEQ's determination was supported

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77 *See* Op. Att'y Gen. of Tex. No. S-208 (1956).

78 *See Application of Southwestern Electric Power Company*, TCEQ Docket No. 2011-2199-IWD, 2012 TX Comm'n on Envtl. Quality LEXIS 682, ¶¶ 39-45 (Dec. 10, 2012) (SOAH affected person determination)**,** *aff'd*, *Sierra Club v. Tex. Comm'n on Envtl. Quality,* 2016 Tex. App. LEXIS 3244 (March 31, 2016) (affirming TCEQ decision to issue permits).

79 *Id.*

80 *See Proposal for Decision, Application of Southwestern Electric Power Company,* TCEQ Docket No. 2011-2199-IWD, 2012 TX SOAH LEXIS 354, at *19 (Aug. 21, 2012).

81 *In the Matter of Application by Max Midstream Texas, LLC for Air Quality Permit No. 162941 for the Seahawk Crude Condensate Terminal in Calhoun County, Texas*, TCEQ Docket No. 2022-0157-AIR.

82 *See* Hearing Request of San Antonio Bay Estuarine Waterkeeper, et al., filed in TCEQ Docket 2022-0157-AIR, at 6-7 (Nov. 12, 2020).

by substantial evidence in the record.[83] Ms. Wilson "did not meet her burden to show that her enjoyment of recreational activities and aesthetic beauty was not common to members of the general public"[84] in the Max Midstream case and she does not meet it here.

Waterkeeper claims that Ms. Wilson has recreational interests when she swims and walks along the beach at Indianola and Magnolia Beaches and kayak and motorboats in northern Lavaca Bay and Cox Creek.[85] Each of the locations identified in the Requests are publicly shared lands and waterways that are open and accessible to all members of the public. Under the Texas Water Code, the water bodies of Lavaca Bay, Matagorda Bay, San Antonio Bay, and Cox Creek are owned by the state, open to public and recreational boating, and generally accessible by anyone.[86] And the Texas Open Beaches Act identifies the beaches Ms. Wilson purports to visit as public land with unrestricted access.[87] Ms. Wilson has no greater or lesser privilege to use the public waterways of Cox Creek, Lavaca Bay, or any others referenced in the Requests. Where any member of the public has the right and ability to access and recreate and enjoy aesthetic beauty on publicly owned or open land, the requestor cannot reach affected person status.[88] Ms. Wilson's Asserted Interests in recreational and aesthetic enjoyment activities are therefore not sufficient to establish affected person status.

b. Monitoring Interests are Voluntary, Unrelated to the Application, and Not Protected by a Legal Right, Duty, Privilege, Power, or Economic Interest.

Ms. Wilson's Asserted Interest in voluntarily monitoring FPC outfalls for compliance with an unrelated consent decree is an interest common to members of the general public. Waterkeeper claims

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83 *TCEQ v. Waterkeeper*, 714 S.W.3d at 285-86.
84 *Id.*
85 2025 Request at 2 (naming Lavaca Bay and Cox Creek); 2022 Request at 2 (naming Lavaca, Matagorda, and San Antonio Bays).
86 TEX. WATER CODE § 11.021 (defining State Water); *see also San Antonio Bay Estuarine Waterkeeper v. Formosa Plastics Corp.*, 2019 U.S. Dist. LEXIS 108082, at *5 (S.D. Tex. 2019).
87 Texas Open Beaches Act of 1959, 2 TEX. NAT. RES. CODE § 61.011(a). *See also* Texas Coasts, https://www.txcoasts.com/ (last visited September 12, 2025) (listing Magnolia Beach Park and Indianola Park as public beaches with public amenities).
88 30 TEX. ADMIN. CODE § 55.203(a).

that Ms. Wilson visits areas near FPC's stormwater and wastewater outfalls along Lavaca Bay and Cox Creek to monitor Formosa's water quality compliance with the consent decree entered in *San Antonio Bay Estuarine Waterkeeper v. Formosa Plastics, Texas,* No. 6:17-cv-00047 (S.D. Tex. 2019) (the "***2019 CD***").[89] The 2025 Request asserts that Ms. Wilson participates in plastic clean up events, environmental protests, tracks FPC's environmental compliance, and "generally watchdog[s] Formosa."[90] Waterkeeper states that Ms. Wilson is concerned about her exposure to air pollution during those activities.

Ms. Wilson's activities on Lavaca Bay and Cox Creek are not related to any legal duty, privilege, or power to complete compliance monitoring, nor does she assert a property or economic interest in monitoring stormwater and wastewater compliance activity at the FPC Outfalls. Ms. Wilson's desire to continue her voluntary monitoring of the FPC outfalls on Cox Creek is a choice fully within her discretion. Feeling compelled and inspired to monitor wastewater compliance does not create an interest that is a "legal right, duty, privilege, power, or economic interest affected by the application" necessary to be an affected person.[91] Because Ms. Wilson's monitoring interests are completely voluntary and not tied to any legal right, duty, or privilege, the Commission cannot conclude such interests are personally justiciable.

Privately owned waterways and shore areas that Ms. Wilson has visited are not excluded from public access and use when determining whether an area of interest is common to the general public.[92] As discussed above, both Lavaca Bay and Cox Creek are navigable waters of the United States and thus open and accessible to the public.[93] Although located on FPC property, the shores of smaller non-

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89 2022 Request at 2; 2025 Request at 3-4.
90 2025 Request at 4.
91 30 TEX. ADMIN. CODE § 55.203(a).
92 *See e.g.*, Op. Att'y Gen. of Tex. No. S-208 (1956); *Proposal for Decision, Application of Southwestern Electric Power Company,* TCEQ Docket No. 2011-2199-IWD, 2012 TX SOAH LEXIS 354, at *19 (Aug. 21, 2012).
93 *See San Antonio Bay Estuarine Waterkeeper v. Formosa Plastics Corp.*, 2019 U.S. Dist. LEXIS 108082, at *5.

navigable Cox Creek tributaries in proximity to the Complex are likewise accessible to the public.[94]

As shown on the map included in Waterkeeper's 2025 Request, the FPC Complex Map (**Exhibit EQ-4**), and as discussed in Ms. Lasater's Affidavit, FPC's stormwater and wastewater outfalls are all located north of Highway 35 approximately parallel to Cox Creek, and none is on Lavaca Bay as Waterkeeper claims.[95] Although FPC restricts access to the Complex by fencing and no trespassing signs, as Ms. Lasater attested, the outfall areas lie on FPC-owned land outside the Complex's fenced perimeter.[96] Contrary to Waterkeeper's assertion, the water's edge of neither Lavaca Bay nor Cox Creek "abut[s]" the Complex[97]; instead, a strip of walkable land lies between the Complex fence and the shore.[98] A person who frequents Cox Creek and the outfalls would be knowledgeable of these facts. Even where a section of fencing extends off the perimeter fence near Outfall 006 towards the shoreline, the fence end can be bypassed by boat or on foot.[99] Since all Cox Creek shorelines and tributaries are accessible to the public either on foot or by boat. Ms. Wilson has the same ability to access the land along the Cox Creek shore outside of the Complex as any member of the public.[100]

TCEQ rules allow any person to voluntarily report "possible violations of law" implicating environmental concerns when they choose to do so.[101] Likewise, Ms. Wilson's decision to monitor FPC compliance with the publicly available 2019 CD or any other environmental requirement, is a choice available to any member of the public.[102] In the Max Midstream case, the 15th Court of Appeals considered Ms. Wilson's volunteer outfall monitoring and recreation, environmental, and aesthetic

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94 Lasater Affidavit ¶ 8(e); **Exhibit EQ-4** (FPC Complex Map).

95 2025 Request at 3 (referring to a "wastewater outfall in Lavaca Bay"); Quiat Affidavit, **Exhibit EQ-4**; Lasater Affidavit ¶ 8(c).

96 Lasater Affidavit ¶ 8(c).

97 2025 Request at 3.

98 Lasater Affidavit ¶ 8(b).

99 Lasater Affidavit ¶ 8(d).

100 Lasater Affidavit ¶ 8(a)-(d); *see* 40 C.F.R. § 50.1(e) (defining "ambient air" as "that portion of the atmosphere, external to buildings, to which the general public has access").

101 *See generally*, 30 TEX. ADMIN. CODE § 70.4.

102 *See* 2019 CD ¶ 37 (explicitly providing that "Plaintiffs ***or other concerned citizens***" may report documentation of plastics found in or along the relevant waterways) (emphasis added).

interests and concluded that she did not meet her burden to establish that she would be affected differently than members of the general public.[103] Ms. Wilson has the same ability to access unrestricted shore areas near FPC outfalls as any other member of the public. Therefore, Ms. Wilson's voluntary compliance monitoring of stormwater and wastewater outfalls near the Complex is not tied to any "legal right, duty, privilege, power, or economic interest" that would distinguish her from the general public.

2. Ms. Wilson's Asserted Interests Are Not Sufficient to Establish Affected Person Status.

a. Ms. Wilson's Property Interest is More than 20 Miles from the Nearest Project Facility.

The Commission must consider whether there are any "[d]istance restrictions or other limitations imposed by law on the affected interest."[104] The applicable requirements for the Application do not impose a distance restriction between the Project Facilities and a person's affected (legal right, duty, privilege, power, or economic) interest. But TCEQ may consider the distance from a requestor's property location to the proposed permitting activity when determining whether a requestor is an affected person.[105] The Requests state that Ms. Wilson's residence is at 600 Ramona Road, in Seadrift – more than 20 miles from the nearest Project Facility.[106] At this distance from the Project Facilities, Ms. Wilson will not be affected any differently than the general public.[107] The Requests are silent as

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[103] *See TCEQ v. Waterkeeper*, 714 S.W.3d at 279, 285-86; 30 TEX. ADMIN. CODE § 55.203(a) ("an interest common to members of the general public does not qualify as a personal justiciable interest.").

[104] 30 TEX. ADMIN. CODE § 55.203(c)(2).

[105] *See, e.g., Tex. Comm'n on Envt'l Quality v. Sierra Club*, 455 S.W.3d 228, 239 (Tex. App.—Austin 2014, pet. denied) (demonstrating that even in cases where no legal limitations imposed on affected person analysis, a hearing requestor's distance is still a consideration to weigh); *TCEQ v. Waterkeeper*, 714 S.W.3d at 287-88 (despite no distance restriction provided by law, the factors required by the Administrative Code allow for consideration of distance when reviewing all factors together without creating an arbitrary distance rule).

[106] 2022 Request at 2; 2025 Request at 2; *compare* Quiat Affidavit ¶ 7 (measuring a distance greater than 20 miles between Ms. Wilson's residence and the nearest Project Facility); **Exhibit EQ-2** (HR Location Map) (showing the location of Ms. Wilson's property and distance from the nearest Project Facility based on review of Calhoun and Jackson Counties Appraisal District records).

[107] Fraiser Affidavit ¶ 21 (concluding that potential impacts at locations farther away from the Complex like Ms. Wilson's residence would be even less discernable than potential impacts nearer to the Complex that are indiscernible to members of the general public).

to whether Ms. Wilson is concerned about the potential impact of emissions from the Project Facilities on the use of her property in Seadrift. Waterkeeper did not identify any other property interest belonging to Ms. Wilson and certainly not any near the Complex.

Waterkeeper asserts that Ms. Wilson swims at beaches approximately nine miles from the Complex, at Indianola and Magnolia Beaches on Lavaca Bay, and motorboats and kayaks in Lavaca Bay and Cox Creek.[108] But Ms. Wilson does not have a property interest on the state-owned beaches and waterways. The Requests vaguely allege that Ms. Wilson's volunteer activities on behalf of Waterkeeper occur at "sites very close to" the FPC Complex at areas "less than 0.15 miles" from the Complex.[109] Waterkeeper claims that during a volunteer cleanup event sometime in the past, Ms. Wilson was situated within an estimated distance of 30 feet of existing FPC Complex equipment outside the FPC fenceline.[110] Even if Ms. Wilson was within the claimed estimated distance to the Complex fenceline, she does not have a property interest in Formosa's property or any other property near the Complex.

b. The Application's Potential Health and Welfare Effects Will Be Indiscernible to the General Public, Including Ms. Wilson.

The Commission must consider the "[l]ikely impact of the regulated activity on the health and safety of the person, and on the use of property of the person"[111] and the "likely impact of the regulated activity on use of the impacted natural resource by the person."[112] Claims in a hearing request cannot presume a permit violation or activity unrelated to the Application to demonstrate likely impact of the regulated activity on the health, safety, and use of property of the person or on use of the impacted natural resource by the person.[113] Two Courts of Appeal have determined that it is reasonable for the

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108 2025 Request at 2.
109 *See* 2025 Request at 4.
110 2025 Request at 2.
111 30 TEX. ADMIN. CODE § 55.203(c)(4).
112 30 TEX. ADMIN. CODE § 55.203(c)(5).
113 *Collins v. TNRCC*, 94 S.W.3d 876, 883 (Tex.App.—Austin 2022); 30 TEX. ADMIN. CODE § 55.203(c)(4)-(5).

Commission to conclude that hearing requestors are not affected persons if the proposed activity will have a minimal effect on their health, safety, use of property, and use of natural resources.[114]

The TCEQ ED and FPC technical experts have evaluated and audited the potential health and welfare impacts of the Application. The Application, the Draft Permits, RTC, and technical affidavits attached to this Response collectively present an intensive assessment and well-supported conclusion that the emissions authorized by the Draft Permits are protective of human health and welfare and the environment.[115] In contrast, Waterkeeper presented conjectural layperson and hearsay assertions that lack substantiation and fall short of a hearing requestor's demonstration requirement. Waterkeeper's complaints in the Requests lack any alleged protected interest within the scope of 30 Tex. Admin. Code § 55.203(a) and fail to demonstrate how the proposed emissions in the Application could have a ***likely impact*** to Ms. Wilson's health, property, or use of ambient air.

i. The Air Quality Analysis for the Application Is Protective of Human Health and Welfare and Meets Applicable Requirements.

The AQA Report evaluated the maximum offsite impacts of the air contaminants proposed to be emitted from the Project Facilities. As summarized in Mr. Srackangast's Affidavit, the modeling results demonstrate that proposed emissions of all constituents from the Project Facilities will not violate any NAAQS, any PSD increment, any SPLS, will not have adverse effects on soils, vegetation, or Class I areas, and do not exceed TCEQ's conservative health or welfare-based ESLs used in TCEQ's permitting process.[116] As Dr. Fraiser articulated, the NAAQS are federal standards in the federal Clean Air Act designed to protect public health and welfare, including protecting the health of sensitive populations.[117] In her review of the AQA, Dr. Fraiser determined that potential impacts of proposed

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114 *TCEQ v. Waterkeeper,* 714 S.W.3d at 285; *Tex. Comm'n on Envtl. Quality v. Sierra Club,* 455 S.W.3d 228, 240 (Tex. App. – Austin 2014) (emphasis added).

115 *See* RTC, Response 1 at 3; Srackangast Affidavit ¶ 18, **Exhibit AS-2**, **Exhibit AS-3**; Fraiser Affidavit ¶ 20-21.

116 Srackangast Affidavit ¶ 18.

117 Fraiser Affidavit ¶¶ 8, 17; 42 U.S.C. 7409(a)-(b) (requiring setting primary and secondary NAAQS based on air quality criteria and a margin of safety to protect public health and welfare).

air emissions from the Project Facilities are expected to be indiscernible.[118] The TCEQ ED's Air Dispersion Modeling Team (the "***ADMT***") audited the AQA and approved FPC's demonstration as acceptable for all review types and pollutants in a memorandum dated July 25, 2023.[119]

Mr. Srackangast conducted a NAAQS De Minimis analysis by comparing maximum off-site ground level concentrations ("***GLC$_{max}$***") associated with hourly and annual carbon monoxide ("***CO***") and annual NO_2 emissions increases to their respective Significant Impact Levels ("***SILs***").[120] Projects whose GLC_{max} are less than the SIL for a pollutant are deemed to have an insignificant impact on air quality and the demonstration of compliance with the applicable NAAQS is complete.[121] The GLC_{max} from the proposed emissions increases of annual NO_2 emissions and hourly and annual CO were below their respective SILs.[122] Therefore, the proposed changes will not cause or contribute to an exceedance of the hourly and annual CO or annual NO_2 NAAQS and a full impacts NAAQS analysis for hourly and annual CO and annual NO_2 was not required. The results of the De Minimis or SILs analysis are set out in the following table:

Pollutant	Averaging Time	GLC_{max} (µg/m^3)	De Minimis (µg/m^3)
NO_2	1-hr	34	7.5
NO_2	Annual	0.1	1
CO	1-hr	358	2000
CO	8-hr	143	500
O_3	8-hr	2.03[a]	1[a]

[a] parts per billion (ppb).

Because the modeling results indicated that predicted concentrations of hourly NO_2 and ozone ("***O$_3$***") precursor project emissions exceeded their respective *de minimis* concentrations, Mr.

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118 Fraiser Affidavit ¶¶17, 21.

119 Srackangast Affidavit, **Exhibit AS-3**.

120 *See* 40 C.F.R. § 51.165(b)(2) ("A proposed source can demonstrate that they do not cause or contribute to a violation [of the NAAQS] by showing that the ambient air quality impacts resulting from the proposed source's emissions would be less than the SIL concentration levels.").

121 Srackangast Affidavit ¶ 13(a).

122 *Id*.

Srackangast conducted a full NAAQS impacts analysis consistent with EPA's Guideline on Air Quality Models (the "***Guideline***").[123] The "total predicted concentrations" for the full NAAQS analysis conservatively included: (1) maximum allowable hourly NO_2 emission rates from the Project Facilities, (2) emissions from site-wide FPC emissions sources based on existing permitted Maximum Allowable Emission Rate Tables in FPC's existing air permits for the Complex, (3) unaltered ambient background concentrations from the site-specific FPC NW Site monitor located immediately downwind of the Complex, and (4) contributions from emission sources from all off-property permitted stationary sources within 50 kilometers of the Project.[124] For O_3, Mr. Srackangast evaluated precursor emissions of NO_X and VOC from the Project Facilities based on a Tier 1 demonstration approach consistent with the Guideline. Total worst case predicted O_3 concentrations from such emissions combined with representative monitored background concentrations from the FPC NW Site monitor are less than the O_3 NAAQS.[125] ADMT confirmed that the total concentrations of hourly NO_2 and O_3 were predicted to be below the NAAQS.[126] The results of the full NAAQS analysis are set out in the following table:

Pollutant	Averaging Time	GLCmax	Background	Total Conc. = [Background + GLCmax]	Standard
NO_2	1-hr	181 μg/m^3	Included[a]	181 μg/m^3	188 μg/m^3
O_3	8-hr	2.03 ppb	63.9 ppb	65.93 ppb	70 ppb

[a] Background concentrations were input directly into the model run by season and hour. The model determined the appropriate background to add for the given season and hour of the analysis.

The AQA included a PSD increment analysis for annual NO_2.[127] The PSD increment analysis for annual NO_2 concluded that proposed emissions from the Project Facilities were below the SIL, so a PSD Increment demonstration was not required.[128] Mr. Srackangast also performed a PSD additional

123 *Id*. ¶¶ 13(a)-(b)., 17; **Exhibit AS-3** at 3; 40 C.F.R. Part 51, Appendix W.
124 Srackangast Affidavit ¶ 13(b); **Exhibit AS-2**, 6-2.
125 Srackangast Affidavit ¶ 13(b)(ii).
126 *Id.* ¶ 13; **Exhibit AS-3**, Tables 4-5 at 3-4.
127 *Id.* ¶ 15 ("A PSD increment is the maximum increase in ambient concentrations allowed to occur above a baseline concentration for a criteria pollutant").
128 *Id*.

impacts analysis consisting of a growth analysis, a soil and vegetation analysis, a visibility impairment analysis, and a visibility impairment analysis for Class I and Class II areas. Each of these analyses confirmed that possible adverse effects are not expected from the Project Facilities.[129]

The AQA included a $PM_{2.5}$ Secondary Formation Analysis from precursor emissions of NO_X and SO_2 conducted consistent with EPA guidance. The GLC_{max} for the 24-hour and Annual $PM_{2.5}$ NAAQS were less than the corresponding NAAQS De Minimis levels or SILs.[130] As shown in the table below, the Modeling results for the SPLS and minor NSR De Minimis analyses were far below *de minimis* levels.[131]

Pollutant	Averaging Time	GLCmax (μg/m^{3})	De Minimis (μg/m^{3})
SO_2	1-hr SPLS	0.17	20.42
SO_2	1-hr NAAQS	0.2	7.8
SO_2	3-hr NAAQS	0.1	25

Mr. Srackangast performed a Health and Welfare Effects Evaluation of 46 chemical compounds proposed to be emitted from the Project Facilities.[132] In a Health and Welfare Effects Evaluation, modeled GLC_{max} are compared to TCEQ-derived ESLs, which are health and/or welfare-based screening levels used in the TCEQ permitting process. ESLs are guidelines or screening levels that TCEQ sets at concentrations that correspond to a "no significant risk level."[133] Consistent with applicable TCEQ guidance, when maximum predicted concentrations are less than 10% of an ESL, no further analysis is required or needed for such chemical compounds, which was the case for each of the 46 chemical compounds proposed to be emitted from the Project Facilities.[134]

Mr. Srackangast concluded that the Modeling predicts air quality concentrations from maximum allowable emissions for all contaminants from the Project Facilities will not violate any

129 *Id*. ¶ 16.
130 *Id*. ¶ 13(d).
131 *Id*. ¶¶ 13(c), 14.
132 *Id*.¶ 17; **Exhibit AS-4**.
133 Fraiser Affidavit ¶ 13; *see also*, *id.* ¶ 18 (discussing reasons why ESLs are highly conservative).
134 *Id*.¶ 13; MERA at 6.

SPLS, NAAQS, any PSD increment, and will not have adverse effects on soils, vegetation, or Class I areas.[135] Dr. Fraiser's detailed evaluation and toxicological analysis of the Modeling concluded that potential impacts of the air emissions from the Project are expected to be indiscernible to members of the general public due to the conservative design in setting primary and secondary NAAQS and ESLs.[136]

ii. The Application is Unlikely to Affect Ms. Wilson's Health, Safety, or Her Use of Ambient Air Differently Than the General Public.

Waterkeeper's stated concerns about potential negative impacts to Ms. Wilson's physical health and welfare are speculative and unsupported. Waterkeeper presented anecdotal statements of Ms. Wilson experiencing odors when she was present near the Complex and offered unattested second-hand accounts of former FPC employees becoming ill.[137] The Requests also state without evidence that Ms. Wilson, having read the Application, believes that she will be exposed to higher amounts of air pollutants – including carcinogenic compounds – and is experiencing increased anxiety towards her wellbeing as a result.[138] Waterkeeper's description of Ms. Wilson's complaints of unpleasant noise and temperature while near the Complex ***in the past*** are similarly unattested, unrelated to the proposed Project Facilities, and not relevant to the Application before the Commission.[139] While the Requests say that Ms. Wilson estimates she was recently within 30 feet from "the flares", TCEQ does not have jurisdiction to regulate noise or ambient temperature,[140] and the Requests lack specificity of a location or identity of the generically referenced "flares."[141] As described above, Texas courts have held that potential for harm, speculatively alleged injuries not supported by evidence before the Commission,

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135 Srackangast Affidavit ¶ 18.
136 Fraiser Affidavit ¶ 21.
137 2025 Requests at 4.
138 *Id.* That Ms. Wilson "feels compelled" to visit FPC's outfalls is not a legal right, duty, privilege, power or economic interest within the scope of TCEQ's definition of an affected person.
139 *See* 2025 Requests at 4.
140 *See, e.g.*, *TCEQ v. Sierra Club*, 455 S.W.3d at 240 (holding that concerns related to issues outside of TCEQ jurisdiction are not reasonably related to permit).
141 *See* 2025 Requests at 4.

and layperson fact opinions do not provide sufficient evidence in affected person determinations.[142]

Unreliable statements in the Requests such as Ms. Wilson's concern about local wildlife are not verified or based in science,[143] and do not demonstrate any likelihood that proposed emissions will impact Ms. Wilson greater than the general public. As explained in the Srackangast Affidavit and further supported by the Fraiser Affidavit, the Application will not cause any exceedances to the NAAQs or ESLs, which are protective of both health and welfare effects.[144] Secondary NAAQS are set to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. ESLs are intended to protect local flora and prevent nuisance level odors, and also indirectly ensure protection of pets, livestock and wildlife.[145] The TCEQ ED's professional staff and the Applicant's technical experts who performed appropriate modeling and analysis and extensive review each conclude that proposed emissions of the Project Facilities will comply with the visibility and welfare requirements of the Secondary NAAQS and that potential impacts are far below applicable ESLs and unlikely to affect Ms. Wilson differently than another member of the general public.[146]

According to the Requests, the frequency and duration of Ms. Wilson's presence near the Complex is intermittent and sporadic. In its the 2022 Request, Waterkeeper claimed that Ms. Wilson visits areas near FPC's stormwater and wastewater outfalls in Lavaca and Cox Bay for several hours "by kayak, motorboat, or on foot" at least once a week and as frequently as three time a week, but the 2025 Request states that such "monitoring" visits occur only "at least once every few weeks" since

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142 *City of Waco v. TCEQ,* 346 S.W.3d at 805-06, 826 ; *TCEQ v. Waterkeeper,* 714 S.W.3d at 286; *see also Helena Chem. Co. v. Cox,* 664 S.W.3d at 75 (explaining that where evidence of potential harm requires "knowledge and analysis of scientific matters beyond the competence of laymen" unsworn assertions by a nonexpert layperson "cannot support a reasonable inference that those facts exist.").

143 *See* Fraiser Affidavit ¶ 20(f) (concluding 2009 cattle study to be highly questionable and irrelevant to whether Ms. Wilson is an affected person since she did not claim to own reportedly evaluated cattle).

144 Srackangast Affidavit ¶¶ 17-18; Fraiser Affidavit ¶¶ 9-14.

145 Fraiser Affidavit ¶ 20(e).

146 *See* RTC, Response 1 at 3-9 (summarizing review of the AQA); Fraiser Affidavit ¶ 20(c).

2016 for a non-specified duration.[147] Waterkeeper asserted that Ms. Wilson visits around rain events, but did not substantiate the frequency or duration of those instances other than to say that Ms. Wilson visited on May 3, 2025.[148] As Ms. Lasater has observed, the frequency of Ms. Wilson's visits to the outfalls has declined since the CD became effective in 2019.[149]

The Application's proposed emissions will have the same minimal impact on Ms. Wilson's health and safety as to the health and safety of a member of the general public. In her affidavit, Dr. Fraiser explained that any potential health and welfare effects to Ms. Wilson when she recreates and monitors outfalls in and around Lavaca Bay, Matagorda Bay, and Cox Creek would be ***indiscernible*** for members of the general public, including Ms. Wilson.[150]

The concentration of an air contaminant to which a member of the public is potentially exposed is critical to determining whether adverse health or welfare effects will occur.[151] Based on Dr. Fraiser's analysis of the AQA, none of the constituents sought to be authorized in the Application is expected to cause any discernible health or welfare impacts during Ms. Wilson's activities, even those within close proximity of the Complex.[152] Dr. Fraiser explained why Ms. Wilson's infrequent, intermittent potential exposure is unlikely to negatively affect her health or the health of any other member of the public:

> Importantly, the health and welfare-protective annual NAAQS and ESLs, to which long-term maximum-modeled impacts (GLC_{max}) are compared during the permit review process, assume continuous exposure (24 hours/day, 7 days/week) over a lifetime (*i.e.*, 100% of the potentially exposed person's time is assumed to be spent at the GLC_{max}) and short-term NAAQS and ESLs assume near worst-case (i.e., maximum, 4th high, 98th percentile) exposures. Not only do Ms. Wilson's potential exposures not occur at the GLC_{max} 100% of the time (and perhaps none of the time she is near the Complex). Her exposures are also discontinuous (*i.e.*, intermittent and periodic), making it unlikely that she would be present at the specific time for which worst-case concentrations were modeled.[153]

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147 2022 Request at 2; 2025 Request at 2.
148 2025 Request at 3.
149 Lasater Affidavit ¶ 8(g).
150 Fraiser Affidavit ¶¶ 20(a), (d), 21.
151 Fraiser Affidavit ¶ 6.
152 *Id.* ¶¶ 20-21.
153 *Id.* ¶¶ 20(c), (d).

Although the modeling in the AQA included the areas where Ms. Wilson has visited Lavaca Bay, Cox Bay, or Cox Creek near FPC's stormwater and wastewater outfalls,[154] the AQA results demonstrate that a person recreating or monitoring outfalls near the Complex is unlikely to be affected differently than a member of the public.[155]

The Requests are speculative, unsupported, and unreliable and Ms. Wilson does not spend 24 hours a day, seven days a week, near the proposed Project Facilities. Based on the sporadic frequency and temporary duration of her presence near the Complex and the conservative nature of the NAAQS and ESLs, Ms. Wilson's potential exposures are expected to be far lower than exposures assumed in the Application and AQA.[156] TCEQ is vested with discretion to consider evidence and conclude that Waterkeeper is not an affected person because the permitted activity is likely to be indiscernible for members of the general public, including Ms. Wilson.[157] Even if Ms. Wilson had a legally protected interest necessary to be an "affected person" under 30 TEX. ADMIN. CODE § 55.203(a) – which she does not, as discussed above – the application of conservative procedures in setting NAAQS and ESLs ensures that the likelihood of adverse health and welfare effects below such levels is exceedingly small.[158] Ms. Wilson and any other member of the public who visits areas near the Complex is ***unlikely*** to experience any negative health or welfare effects.[159]

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[154] *Id.* ¶ 20(c); Srackangast Affidavit ¶ 9; **Exhibit AS-2**, Figure 11-5.

[155] Srackangast Affidavit ¶ 18 (concluding that maximum allowable emissions of all proposed contaminants from Project Facilities in the Application will not cause or contribute to a violation of any applicable NAAQS, SPLS, PSD Increment, and will not have adverse effects on soils, vegetation, or Class I areas at FPC's fenceline or beyond); *see* **Exhibit AS-2** at 13-1.

[156] *Id.* ¶ 20(c), (d).

[157] Fraiser Affidavit ¶ 21; *see also TCEQ v. Waterkeeper*, 714 S.W.3d at 288 (upholding TCEQ's denial of Ms. Wilson's and Waterkeeper's hearing requests based on air dispersion modeling in areas accessible to the public where adverse public health and welfare impacts depend on exposure concentrations and where infrequent and short duration of proximity to a terminal would be indiscernible).

[158] Fraiser Affidavit ¶ 21.

[159] *Id.*

C. Waterkeeper's Requests Should Be Denied Because Ms. Wilson is Not an Affected Person and the Asserted Interests Are Not Germane to the Organization's Purpose.

TCEQ's rules lay out specific requirements for a hearing request submitted by a group or organization. For applications filed on or after September 1, 2015, like FPC's Application, the Commission may not grant a request if the organization does not meet any of the following requirements:

1. Comments on the application are timely submitted by the group or association;
2. The request identifies, by name and physical address, one or more members of the group or association that would otherwise have standing to request a hearing in their own right;
3. The interests the group or association seeks to protect are germane to the organization's purpose; and
4. Neither the claim asserted nor the relief requested requires the participation of the individual members in the case.[160]

Although Waterkeeper filed timely comment on the Application, the organization failed to identify a group member who is an affected person and the interests Waterkeeper seeks to protect related to the Application are not germane to the organization's purpose. The Commissioners must deny the Requests because Waterkeeper has not met each of the requirements for organizational standing based on a plain application of TEX. ADMIN. CODE § 55.205(b).

1. Ms. Wilson Does Not Have Standing to Request a Hearing in Her Own Right.

Waterkeeper's Requests cannot be granted because the organization has not demonstrated that its claimed member is an affected person. The Requests identify one Waterkeeper member, Ms. Diane Wilson, and her physical address, but the Requests do not demonstrate that Ms. Wilson has standing to request a hearing in her own right, as discussed in depth above. Because Ms. Wilson is not an affected person and is the only organization member identified in the Requests, Waterkeeper does not meet the requirement in 30 TEX. ADMIN. CODE § 55.205(a)(1) for a group or organization to request a contested case hearing request. Waterkeeper failed to: (1) identify any legally protected interest that

160 30 TEX. ADMIN. CODE § 55.205(b).

would be affected by granting the Application; and (2) substantiate how Ms. Wilson would be impacted in any manner that differs from a member of the general public. Because Ms. Wilson is not an affected person, neither she nor Waterkeeper is entitled to a contested case hearing.

2. Interests That Waterkeeper Seeks to Protect Are Not Germane to the Organization's Purpose.

Waterkeeper's Asserted Interests are not "germane to the organization's purpose" of protecting and preserving local wetlands and waterways and educating the public about ecologically important estuarine systems. In a general assertion, the Requests claim that the interests Waterkeeper seeks to protect – "the health, safety, and natural beauty of Lavaca and Cox Bays" – are germane to its purpose of "protecting public health and the environment by combatting pollution."[161] Waterkeeper made no effort to demonstrate why or how Ms. Wilson's Asserted Interests are relevant to the organization's stated mission of protecting the Bays and "educat[ing] the public about these ecologically important estuarine systems to ensure clean healthy natural resources for public health and wildlife."[162] The Requests state that Waterkeeper also "promotes the preservation of local wetlands and waterways for recreational uses, such as fishing, swimming, boating, and other watersports, to encourage appreciation and restoration of these areas."[163]However, Waterkeeper's descriptions presented in the Requests omit the organization's foundational purpose. Waterkeeper is an affiliate member of the national Waterkeeper Alliance organization.[164] Waterkeeper Alliance's vision is "for clean, healthy, and abundant water for all people and the planet." [165] The organization's mission is to "protect our right to clean water in communities around the world."[166] According to Waterkeeper Alliance, membership

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161 2025 Request at 4-5.
162 2022 Request at 2; 2025 Request at 2.
163 *Id.*
164 *See Find Your Waterkeeper*, Waterkeeper Alliance, https://waterkeeper.org/findyourwaterkeeper/ (last visited September 12, 2025). *See also About*, San Antonio Bay Estuarine Waterkeeper, https://sanantoniobaywaterkeeper.org/about/ (last visited September 12, 2025) (including a "Waterkeeper Alliance Member" logo on the website").
165 *See Who We Are*, Waterkeeper Alliance, https://waterkeeper.org/about-us/ (last visited September 12, 2025).
166 *Id.*

groups, like Waterkeeper, are advocates in the "shared mission to protect the right to clean water."[167]

Waterkeeper's Asserted Interests in the Requests are disconnected from the mission of preserving and protecting local waterways for access to clean water. Instead, the Asserted Interests relate to concerns about the general health and safety of one member. Waterkeeper's attempt to generalize the organization's purpose cannot succeed. The Application is exclusive to air quality – not water quality – and Waterkeeper's water quality concerns are not relevant to the Commission's review of the Application. Although Waterkeeper raises concerns about air pollutants in its Requests, the organization's purpose has no relevance to air contaminants. The Commission should not grant the Requests Waterkeeper's Asserted Interests are not germane to the organization's purpose.

V. WATERKEEPER'S ASSERTED ISSUES ARE IMPERMISSIBLE

The Commission may not refer an issue to SOAH for a contested case hearing unless the issue:

1. Involves a disputed question of fact or a mixed question of law and fact;
2. Was raised during the public comment period, and, for applications filed on or after September 1, 2015, was raised in a comment made by an affected person whose request is granted; and
3. Is relevant and material to the decision on the application.[168]

A hearing request must identify all relevant and material disputed issues of fact or mixed questions of law and fact raised by the requestor during the comment period that form the basis of the request for a contested case hearing.[169] Questions that are purely legal in nature should be resolved by the Commission without a contested case hearing.[170]

The Commission only has the authority to review issues of fact and mixed issues of fact and

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[167] *See Find Your Waterkeeper*, Waterkeeper Alliance, https://waterkeeper.org/findyourwaterkeeper/ (last visited September 12, 2025).
[168] 30 TEX. ADMIN. CODE § 50.115(c); *see also* TEX. WATER CODE § 5.556(d)(1)-(3).
[169] 30 TEX. ADMIN. CODE § 55.211(c)(2)(A)(ii).
[170] *Id.* § 55.211(b)(3)(B).

law that are within its jurisdiction.[171] Factual disputes that do not implicate TCEQ's authority to approve or deny FPC's Application cannot be resolved through a contested case hearing because they are not "relevant and material to the commission's decision on the application."[172] Any purely legal disputes may be resolved by TCEQ without a contested case hearing.[173]

The 2025 Request summarily addressed the TCEQ ED's responses in the RTC by asserting that the RTC "did not resolve the issues identified [by public comment], instead stating that the Application met applicable legal requirements and that no changes had been made to the draft permit as a result of public comment."[174] Waterkeeper's broad brush comment does not fulfil the requirement in 30 TEX. ADMIN. CODE § 55.201(d)(4)(B) and the Chief Clerk's Decision Letter that a hearing request specify ED's response(s) to comments the requestor disputes, provide a factual basis for any such dispute, or list any disputed issues of law or policy. Despite providing bulleted lists of disputed issues in both Requests, Waterkeeper did not provide any factual basis for any asserted disputes nor respond to the TCEQ ED's detailed and comprehensive rationale articulated in the RTC.

TCEQ rule 30 TEX. ADMIN. CODE § 55.201(d)(4)(B) requires a hearing request to list all relevant and material disputed issues of fact ***raised by the requestor*** during the public comment period that are the basis of the hearing request. Five of Waterkeeper's 18 asserted disputed issues in the 2025 Request[175] lack any connection to Waterkeeper's public comments.[176] Those five asserted issues[177]

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[171] *See, e.g., TCEQ v. Sierra Club*, 455 S.W.3d at 240 (concerns over traffic increases and train accidents resulting in spilled radioactive materials was not "reasonably related to the disposal of those materials at the [] site because TCEQ has no jurisdiction over the transportation of radioactive materials and because the permit does not allow [applicant] to receive radioactive material by rail."); TCEQ, *Requesting a Contested Case Hearing for Wastewater, Waste, or Air Permits*, Office of the General Counsel, DI-649 (2024).

[172] 30 TEX. ADMIN. CODE § 55.211(b)(3)(A).

[173] *Id.* § 55.211(b)(3)(B).

[174] 2025 Request at 1.

[175] The 2025 Request abandoned one of the 2023 Request disputes. *See* 2022 Request at 3 (bullet point 9 related to BACT for GHG controls); 2025 Request at 5-6 (adding six new disputes in bullet points 11, 14-18).

[176] *See* Waterkeeper's public comments, filed in Docket (February 2, 2023).

[177] *See* 2025 Request at 5-6 (describing issues relating to VOC destruction removal efficiency, VOC emission rates, enforceability of destruction removal efficiency rates, and monitoring, recordkeeping, and reporting to ensure compliance with flare emission caps).

were not included in the 2022 Request and are not based on issues raised in Waterkeeper's public comments in this Docket. Instead, the five issues are based on EPA comments submitted during the public comment period, which the TCEQ ED addressed in the RTC.[178] Neither Waterkeeper's 2022 Request, filed during the public comment period, nor its February 2, 2023 public comments mention the five issues raised in EPA's public comment. The Commission should therefore exclude such assertions because they were not based on Waterkeeper's comments as required by 30 TEX. ADMIN. CODE § 55.201(d)(4)(B).

Additionally, FPC agrees with the RTC's determination that two of the issues Waterkeeper asserted in its 2022 Request (and that were repeated in the 2025 Request) are not material or relevant to the TCEQ Commissioners' decision on the Application. First, the RTC found that comments about cumulative risks under TEX. WATER CODE § 5.130 are issues "regarding water quality or discharge and the handling of waste . . . [and] are not within the scope of this review."[179] The RTC correctly stated that only issues surrounding "the control and abatement of air emissions" are relevant to the Application. Second, the RTC states that concerns related to environmental justice are neither relevant nor material because the permit review process does not call for TCEQ to consider "the socioeconomic or racial status of the surrounding community."[180]

FPC agrees with the RTC's implication that the Requestor's asserted issue regarding public involvement and access to information during the Application process is a question of law. The RTC stated that the 30 TEX. ADMIN. CODE § 39.405 notice requirements are clear and that FPC made all application materials available for public review.[181] FPC agrees that this issue is purely a question of law that is not appropriate for a contested case hearing.[182]

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178 *Compare* 2025 Request at 3 (bullet points 14-18) *with* RTC, Responses 5-7.

179 RTC, Response to Comment 11 at 21; *see* 2022 Request at 3 (bullet point 5).

180 RTC, Response to Comment 15 at 25; *see* 2025 Request at 3 (disputed issues of fact, bullet point number 12).

181 RTC, Response to Comment 10 at 19; *see* 2025 Request at 3 (disputed issues of fact, bullet point number 13).

182 *See* TEX. GOV'T CODE 2003.047(e-1)-(2) (limiting issues for consideration to only factual questions or mixed questions of fact and law).

FPC disputes Waterkeeper's ten remaining listed issues relating to potential impacts to health, safety, and welfare of the community, hypothetical violations of proposed emissions, and sufficiency of analysis, methodologies, and controls in the draft Permits.[183] FPC reiterates that Waterkeeper was obligated by 30 TEX. ADMIN. CODE § 55.201(d)(4)(B) and the Chief Clerk's Decision Letter to provide factual support for those disputed issues and failed to do so. FPC does not dispute that the ten remaining issues are potentially relevant and material to the Application and within the TCEQ Commissioners' jurisdiction to consider based on mixed questions of fact and law. Regardless, Ms. Wilson is not an affected person and the Requests must be denied.

VI. CONCLUSION AND PRAYER

The TCEQ ED's comprehensive evaluation of the Application, in addition to the attached factual and technical affidavits demonstrates that the Application fully satisfies all applicable legal and technical requirements. This includes a demonstration that maximum concentrations of proposed emissions from the Project Facilities will be protective of public health and welfare at and beyond the fenceline. Waterkeeper's Requests failed to satisfy administrative, procedural, and substantive legal requirements and did not identify a protected interest or assert any rationale for how Ms. Wilson would be adversely affected differently than the general public. Based on the factors in TCEQ rules applicable to an affected person determination, considering the unlikely impact to Ms. Wilson at her residence 20 miles away and during intermittent visits near the Complex, any impact to Waterkeeper's organizational member will be indiscernible. Waterkeeper has not demonstrated any personally justiciable interests for its sole named member and is therefore not entitled to a contested case hearing. FPC respectfully requests that the Commission deny the Requests, adopt the Executive Director's Response to Public Comment, and issue the Draft Permits.

183 *See* 2025 Requests at 5-6.

Respectfully Submitted,

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ATTORNEYS FOR
FORMOSA PLASTICS CORPORATION, TEXAS

CERTIFICATE OF SERVICE

I hereby certify that I filed a true and correct copy of the foregoing Formosa Plastics Corporation, Texas's Response to Hearing Requests through TCEQ's efile system and served a copy on the following persons via electronic mail on September 15, 2025:

/s/ Lisa Uselton Dyar
Lisa Uselton Dyar

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ATTACHMENT A

Affidavit of Tammy Lasater

TCEQ DOCKET NO. 2025-1160-AIR
AFFIDAVIT OF TAMMY LASATER
FORMOSA PLASTICS CORPORATION, U.S.A.

STATE OF TEXAS §
COUNTY OF TRAVIS §

BEFORE ME, the undersigned authority, on this day personally appeared Tammy Lasater, who after being duly sworn upon her oath stated as follows:

1. "My name is Tammy Lasater. I am the Corporate Environmental Director for Formosa Plastics Corporation, U.S.A. ("***FPC U.S.A.***"). I have personal knowledge of the facts stated in this affidavit, and they are true and correct.

2. FPC U.S.A. is headquartered in Livingston, New Jersey, and oversees petrochemical facilities in Point Comfort, Texas, and Baton Rouge, Louisiana. Formosa Plastics Corporation, Texas ("***FPC Texas***") operates several olefins and other manufacturing units at the Point Comfort chemical complex located in Calhoun and Jackson Counties, Texas (the "***Complex***").

3. I have worked in the chemical industry for over 47 years, and I have a Bachelor of Science in Chemical Engineering from The University of Kansas. I began working for FPC U.S.A. in July 2000. Through my work as a corporate air permitting expert for FPC U.S.A., I regularly interact with company representatives at the FPC Texas Complex.

4. As part of my job duties, I am responsible for directing and overseeing FPC Texas air quality permitting activities, including New Source Review permits and Title V operating permits. I am responsible for identifying and complying with air quality permitting requirements for FPC Texas projects. If air quality authorizations are needed, I am responsible for coordinating the efforts to obtain those authorizations and communicate the requirements of the authorizations to FPC Texas affected personnel.

5. On December 2, 2021, FPC Texas submitted applications to TCEQ to amend existing permit authorizations[1] for a Flare Improvement Project (collectively, the "***Application***"). The Application would authorize permit changes to implement updated requirements imposed by EPA final rules for the Ethylene Production and Miscellaneous Organic Chemical Manufacturing source categories following EPA residual risk and technology reviews. FPC Texas retained POWER Engineers, Inc., an engineering and environmental consulting firm, to prepare the Application. I am personally familiar with the Application and *Formosa Plastics Corporation, Texas's Response to Hearing Requests* and its attached

[1] The Application proposes to amend TCEQ Air Quality Permit Nos. 140763, 19871, 91780, 19200, 19168, 107518, 20203, 40157, 19201, PSDTX1500M1, PSDTX1236M1, PSDTX1240M1, PSDTX1237M1 PSDTX1226M1, PSDTX1383M2 PSDTX1224M1, PSDTX1222M1 PSDTX1232M1, GHGPSDTX46M1 GHGPSDTX221, GHGPSDTX223 GHGPSDTX218, GHGPSDTX224 GHGPSDTX48M1, GHGPSDTX222 GHGPSDTX225, and GHGPSDTX219 (the "***Permits***").

affidavits of senior permitting engineer Eric Quiat, senior scientist and meteorologist Arney Srackangast, and toxicologist Lucy Fraiser.

6. The specific physical and operational changes to new and modified facilities proposed in the Application (the "***Project Facilities***") include:

- Two new non-assisted enclosed ground flares ("***EGFs***") in each of the OLI and OLII units (a total of four new EGFs) to efficiently increase each flare system's smokeless capacity. EGFs can considerably enhance smokeless capacity and achieve better dispersion in some operating scenarios.

- New piping fugitives to provide pilot fuel gas to the new EGFs and to accommodate C3 Buffer Drums that will support stabilization for OLI and OLII.

- Post-project flexibility and reliability within the flare system to direct upstream process vent gas streams to any four of the EGFs (EPNs: EGF-1, EGF-2, EGF-3, and/or EGF-4) or to any of the Olefins Units elevated flares (EPNs: 1018, 1067, and/or OL3-FLRA/B/C). These updates will improve safety, backup capability, and operational flexibility.

- Updates to permit representations of annual planned maintenance, startup and shutdown emissions for the Olefins I and Olefins II Units, which will provide additional frequency of planned maintenance, startups and shutdown activities to support resiliency at those units.

7. I reviewed various supporting documents for the Application, including:

a. The Air Quality Analysis Report, prepared by Mr. Srackangast;

b. Memoranda prepared by the TCEQ ED staff, such as the Air Quality Analysis Audit, revised Air Quality Analysis Audit, Technical Review Summary, and the TCEQ Executive Director's Response to Public Comment;

c. The TCEQ Executive Director's May 1, 2025 final decision letter to "all interested persons" including the TCEQ Executive Director's Response to Public Comment and the associated mailing list for the Application;

d. Public comments and the requests for hearing on the Application filed in this Docket on November 18, 2022, February 2, 2023, and May 30, 2025 on behalf of the San Antonio Bay Estuarine Waterkeeper ("***Waterkeeper***");

e. Verbal comments by members of the public at the public meeting TCEQ held and that I attended in Point Comfort, Texas, on February 2, 2023;

f. The Area Map, Hearing Request Location Map, and the FPC Complex Map that Mr. Quiat prepared and included as **Exhibits EQ-2**, **EQ-3**, and **EQ-4**, respectively, in his affidavit attached to *Formosa Plastics Corporation, Texas's Response to Hearing Requests* ("***Quiat Affidavit***"). The FPC Complex Map depicts the real property parcels near the Project Facilities (**Exhibit EQ-4** in the Quiat Affidavit).

8. In my role at FPC U.S.A., I spend a significant amount of time at FPC U.S.A. plant sites, including the FPC Texas Complex. Through my work at the Complex, I have personal knowledge of the following facts:

   a. The Complex is located between Lavaca Bay to the west and Cox Creek to the east. Members of the public have unrestricted access to Lavaca Bay and Cox Creek.

   b. Contrary to statements in Waterkeeper's May 30, 2025, hearing request that Cox Creek "runs along much of Formosa's fenceline" and "abut[s] Formosa," the Complex fenceline is not adjacent to Cox Creek or Lavaca Bay. Portions of land separate the Complex fenceline from Lavaca Bay on the west side and from Cox Creek on the east side. As depicted in the FPC Complex Map (**Exhibit EQ-4**), FPC Texas owns some real property parcels in all directions from the Complex, including real property north of Highway 35 along both sides of Cox Creek. Physical access to FPC Texas's real property outside the Complex fenceline on the western shore of Cox Creek is not restricted by fencing.

   c. I am familiar with the locations of the FPC Texas TPDES stormwater and wastewater outfalls near the Complex, which are accurately depicted on the FPC Complex Map (**Exhibit EQ-4**). As shown on that map, all FPC Texas TPDES stormwater and wastewater outfalls are located just outside the Complex fenceline. None are located along Lavaca Bay. Although the outfalls are located on FPC Texas property, members of the public are not physically restricted from accessing the outfalls.

   d. At the southeast corner of the Complex near Outfall 006, the southern border of the Complex fenceline extends east past the intersection with the eastern border of the Complex fenceline to the shoreline of Cox Creek. During periods of high rainfall, the fence segment ends at or in the creek, while during drier periods a few feet of land may separate the end of the extended fence from the water. In any weather, the creek and shoreland behind the fence segment is accessible to the public either by boat or by stepping around the end post.

   e. The Consent Decree entered in *San Antonio Bay Estuarine Waterkeeper v. Formosa Plastics, Texas,* No. 6:17-cv-00047 (S.D. Tex. 2019) (the "***2019 CD***") required FPC Texas to allow the plaintiffs in that case — Waterkeeper and Diane Wilson — unrestricted access to monitor FPC Texas's wastewater and stormwater outfalls and nearby shores along Cox Creek outside the Complex fenceline, subject to signing a full release and indemnification of FPC from any and all liability resulting from such access. The wastewater and stormwater outfalls and Cox Creek shores outside the Complex fenceline have always been accessible to the public. The CD did not change the public's ability to access the outfalls.

   f. As required by the CD, on January 18, 2020, Ms. Wilson signed a complete release and indemnity agreement protecting FPC from liability related to Ms. Wilson's presence on FPC property. After the 2019 CD became effective, Ms. Wilson accessed the outfalls and shore areas along Cox Creek either by walking around the end of the fence or launching a kayak into the creek from under the Highway 35 bridge and paddling upstream.

g. When Ms. Wilson visits the outfalls for monitoring, FPC Texas employees sometimes accompany her. FPC Texas is aware of Ms. Wilson's unaccompanied visits from camera footage showing the outfalls and shore areas. The frequency of monitoring visits has declined over the years since the 2019 CD was issued.

h. Recent tree removal along the creek of which Ms. Wilson complains in the May 28, 2025 hearing request was performed consistent with the requirements arising from the CD and *with Waterkeeper's express approval*. The plants removed were invasive huisache trees and brush. Restoration work left live oak and pecan trees intact. FPC replanted more than 200 trees and a variety of aquatic plants in place of the removed trees.

i. On a recent tour of Cox Creek outside the FPC fenceline by truck and on foot, I observed a lush and beautiful landscape. I witnessed a variety of wildlife including large and small wild hogs, numerous deer, alligators, and a diverse range of birds.

Further affiant sayeth not."

Tammy Lasater

Tammy Lasater
Corporate Air Permitting Manager
Formosa Plastics Corporation, Texas

This instrument was acknowledged before me, the undersigned authority, this 11th day of September 2025, by Tammy Lasater, Corporate Air Permitting Manager for Formosa Plastics Corporation, U.S.A.

CHRISTA FRENCH
Notary Public, State of Texas
Comm. Expires 05-04-2026
Notary ID 133742244

Christa French

Notary Public in and for the State of Texas

ATTACHMENT B

Affidavit of Eric J. Quiat, P.E.

TCEQ DOCKET NO. 2025-1160-AIR
AFFIDAVIT OF ERIC J. QUIAT, P.E.

STATE OF COLORADO §
COUNTY OF LARIMER §

BEFORE ME, the undersigned authority, on this day personally appeared Eric J. Quiat, P.E., who after being duly sworn upon his oath stated as follows:

1. My name is Eric Quiat, P.E. I am over 21 years of age, am of sound mind, and am fully competent to make this affidavit. Each statement contained in this affidavit is based upon my personal knowledge and is true and correct.

2. I am a chemical engineer and am employed as a Senior Project Manager at POWER Engineers, Incorporated ("***POWER***"). My education includes a Bachelor of Science in Chemical Engineering from Texas A&M University. I am a licensed Professional Engineer in the State of Texas (No. 103715).

3. I have more than 19 years of professional experience regarding state and federal air quality New Source Review ("***NSR***") permitting and compliance. During my career, I have prepared, or supervised the preparation of, approximately 64 state and/or federal NSR air quality permit applications, including calculating distances and preparing maps and figures in connection with such applications. As a result of my work experience, I have developed a good understanding of and expertise regarding the technical aspects of elevated flares and enclosed ground flares ("***EGFs***"); the ability of such flares to destroy volatile organic compounds ("***VOC***") in the vent gas streams combusted in such flares, usually referred to as a flare's "destruction and removal efficiency" ("***DRE***")[1] and the U.S. Environmental Protection Agency's ("***EPA***") Compilation of Air Emissions Factors from Stationary Sources ("***AP-42***") Section 13.5, which relates to industrial flares, including elevated flares and EGFs. My professional experience and qualifications are further described in my resume, which is included in this affidavit as **Exhibit EQ-1**.

4. I prepared the applications to amend TCEQ Air Quality Permit Nos. 140763, 19871, 91780, 19200, 19168, 107518, 20203, 40157, 19201, PSDTX1500M1, PSDTX1236M1, PSDTX1240M1, PSDTX1237M1 PSDTX1226M1, PSDTX1383M2 PSDTX1224M1, PSDTX1222M1 PSDTX1232M1, GHGPSDTX46M1 GHGPSDTX221, GHGPSDTX223 GHGPSDTX218, GHGPSDTX224 GHGPSDTX48M1, GHGPSDTX222 GHGPSDTX225, and GHGPSDTX219 (collectively, the "***Application***") that Formosa Plastics Corporation, Texas ("***FPC***") submitted to the Texas Commission on Environmental Quality ("***TCEQ***") for its flare improvement project ("***Flare Improvement Project***" or the "***Project***"). The Application requests permit amendments to support FPC's Project to comply with recent EPA Miscellaneous Organic Chemical Manufacturing and

[1] For flares, the terms "destruction efficiency" and "destruction and removal efficiency" effectively mean the same thing and are often used interchangeably.

Ethylene Maximum Achievable Control Technology ("***MACT***") Residual Risk and Technology Review rulemakings. The emission calculations in the Application were prepared using maximum production rates, and accepted TCEQ permitting practices and guidance.

5. In preparing this Affidavit and coordinating with colleagues at POWER, I directed preparation of three maps for illustration purposes. For all mapping work described in this Affidavit that I did not personally conduct, I verified that such work was conducted properly by my POWER colleagues. As further described below, **Exhibit EQ-2** provides a high-level view of the various bays located between Point Comfort and the Gulf. **Exhibit EQ-3** shows the distance between Diane Wilson's residential property and the nearest Project Facilities (20.67 miles). **Exhibit EQ-4** depicts informational context to aid decisionmakers in understanding locations of the Project Facilities, the Complex fenceline boundary, outfall locations, Cox Creek, and real estate parcels near the Complex.

6. The "Area Map," included with this Affidavit as **Exhibit EQ-2,** depicts the water bodies described in San Antonio Bay Waterkeeper's ("***Waterkeeper***") hearing request in relation to the FPC Complex. In preparing the Area Map, I used Environmental Systems Research Institute, Inc. ("***ESRI***") ArcPro mapping software and the Google Earth aerial basemap to represent the location of the FPC Complex and relative distances to land and water bodies in the areas where the hearing requestor purportedly recreates and volunteers. Distances of the nearest shorelines of water bodies referenced in Waterkeeper's hearing requests from the proposed new and modified facilities in the Application (the "***Project Facilities***") at the FPC Complex are summarized in Table 1 below. These distances are also illustrated on the Area Map (**Exhibit EQ-2**). Lavaca Bay, Matagorda Bay, and San Antonio Bay are 0.6 miles, 9 miles, and 22 miles, respectively, from the Project Facilities.

Water Body (Name)	Distance of Nearest Shoreline to Project Facilities (miles)
Lavaca Bay	0.6
Cox Bay	3.39
Keller Bay	6.70
Chocolate Bay	8.07
Matagorda Bay	9.04
Espiritu Santo Bay	19.6
San Antonio Bay	21.9

7. The "Hearing Request Location Map," included with this Affidavit as **Exhibit EQ-3,** illustrates the respective distance between the nearest Project Facilities in the Application and the Waterkeeper member's residence. In preparing the Hearing Requestor Location Map, I used information from the Calhoun County Appraisal District's and the Jackson County Appraisal District's electronically available property ownership records to identify

the distance between the hearing requestor's residential property and the nearest Project Facility proposed in the Application. As shown in **Exhibit EQ-3**, Diane Wilson is the only hearing requestor, and she resides more than 20.6 miles from the FPC Project Facilities.

8. The "FPC Complex Map," included with this Affidavit as **Exhibit EQ-4,** depicts the Project Facilities in the Application and the real property immediately surrounding the FPC Complex. In preparing the FPC Complex Map, I used ESRI ArcPro software, aerial imagery and client design layouts to identify the location of the Project Facilities proposed in the Application and the area surrounding the locations of those facilities. I worked with FPC to obtain GPS coordinates of the fence in place around the FPC Complex and locations of FPC's wastewater discharge outfalls permitted via FPC's National Pollution Discharge Elimination System Permit No. WQ0002436000. I used information from the Calhoun County Appraisal District's and the Jackson County Appraisal District's electronically available property ownership records to identify parcel boundaries near the FPC Complex. As shown in **Exhibit EQ-4**, the Project Facilities in the Application are adjacent to and near FPC-owned property that extends up to 3.3 miles in some directions. The Modeling does not indicate any locations shown on **Exhibit EQ-4** where any contaminant proposed to be authorized would be above any state or federal air quality standard. The Modeling also does not indicate any chemical compounds over their respective ESLs at locations shown on **Exhibit EQ-4**.

9. In my work related to the Application, I reviewed various documents, including:

   a. TCEQ and EPA permitting guidance materials;
   b. The Application and related documents;
   c. Public comments and hearing requests on the Application filed in this Docket on November, 18, 2022, February 2, 2023, and May 30, 2025 on behalf of Waterkeeper, and filed behalf of the EPA on September 28, 2023;
   d. *Formosa Plastics Corporation, Texas's Response to Hearing Requests*, including the attached affidavits of FPC corporate environmental director Tammy Lasater, senior scientist and meteorologist Arney Srackangast, and toxicologist Lucy Fraiser.

10. I have also reviewed the TCEQ Executive Director's ("***ED***") May 1, 2025, final decision letter and Response to Public Comments ("***RTC***") for the Application, including the following ED conclusions and stated bases:

    a. The ED concluded that:

       i. Emissions that would be authorized by the Application are protective of human health and the environment.
       ii. FPC's proposed modified elevated flares and proposed new EGFs ("***the FPC flares***") will achieve at least 99% DRE for the VOCs containing three carbons or less ("***C1-C3 VOCs***") that are or will be combusted in such flares when they are operated in compliance with the applicable flare requirements specified in the draft FPC amended permits, and
       iii. It is appropriate for FPC to assume 99% DRE in calculating the emissions of C1-C3 VOCs from the FPC flares.

b. The bases for the ED's conclusions are as follows:

i. The application demonstrates that it satisfies all applicable statutes, rules and regulatory requirements.
ii. The proposed new and modified facilities will meet Best Available Control Technology.
iii. Emission rates were calculated correctly, consistent with applicable methodologies and TCEQ-published emission factors.

Based on my experience and qualifications and review of the RTC, I concur with those ED conclusions and bases for them as described in the RTC.

11. Based on my experience and qualifications, I identified additional reasons why the FPC flares will achieve at least 99% DRE for C1-C3 VOCs and, thus, why it is appropriate for the FPC flare emissions calculations of C1-C3 VOCs in the Application to assume 99% DRE. I submitted this information to the TCEQ Executive Director on January 24, 2025 during its technical review of the Application, included with this Affidavit as **Exhibit EQ-5,** in response to the ED's request for site-specific information supporting the proposed DRE used in the Application.

a. EPA's AP-42 is the primary compilation of emissions factors and related information for more than 200 air pollution source categories, including industrial flares. AP-42 emissions factors are widely utilized by air permitting authorities such as TCEQ and EPA as appropriate factors to use in calculating emissions.

b. The February 2018 version of AP-42 Section 13.5[2] provides the current EPA-developed emissions factors and related information for industrial flares like the FPC flares. The emission factors were developed by EPA using the best available quality-assured flare emissions test data obtained from a variety of tested flare sources.

c. Based on the emissions factor grade or representativeness descriptors for the VOC emissions factors for industrial flares in AP-42 Section 13.5, the VOC emissions factors for elevated flares and EGFs (like the proposed new and existing flares within scope of the Project) that have the best grades or representativeness descriptors are in AP-42 Table 13.5-1. Such emissions factors and other relevant information from Table 13.5-1 are summarized in Table 1 below.

[2] https://www.epa.gov/sites/default/files/2020-10/documents/13.5_industrial_flares.pdf.

Table 1
Relevant Emissions Factor Information from EPA AP-42 Table 13.5-1

Flare Type	Flare Operating Condition	THC Emission Factor (lb/MMBtu)	Emissions Factor Grade or Representativeness
Elevated Flare	All	0.14	B
Enclosed Ground Flare	Low Load	0.00388	Moderately
Enclosed Ground Flare	Normal/High Load	0.00120	Moderately

d. According to the February 2018 version of AP-42 Section 13.5, the EPA-developed VOC emissions factors in Table 1 are to be applied only to properly operated elevated flares and EGFs. When EPA updated these emissions factors in 2018, "properly operated" elevated flares and EGFs were those that operated in compliance with the then-applicable flare requirements in 40 C.F.R. § 63.670 and 63.671, including the flare minimum net heating value in the combustion zone and maximum tip velocity.

e. To determine what DREs are equivalent to the EPA-developed VOC emissions factors for elevated flares and EGFs in Table 1, I calculated the DRE for each of 20 VOCs common to petrochemical processes like FPC's using those emissions factors and the averages of those calculated DREs for elevated flares and EGFs. My calculations are summarized in **Exhibit EQ-6** to this affidavit. I calculated each of the individual DREs as follows:

i. I calculated the hourly mass flow rate (lb/hr) of each VOC combusted in an elevated flare and an EGF, respectively, assuming the VOC is combusted in the flare at a generic rate (basis) of 1 million British thermal units of heat input ("***MMBtu/hr***"). I calculated each hourly mass flow rate by dividing 1 MMBtu/hr by each VOC's lower heating value (in Btu/lb).[3] The calculated hourly mass flow rates are shown on **Exhibit EQ-6** in the column titled "Hourly Rate Combusted in Flare at 1 MMBtu/hr Basis."

ii. I then calculated the hourly emission rate of each VOC combusted in an elevated flare and an EGF, respectively, assuming the VOC is combusted in the flare at a rate of 1 MMBtu/hr. I calculated each hourly emission rate by multiplying the VOC emissions factor for elevated flares in Table 1 or the highest VOC emissions factor for EGFs in Table 1 (in lb/MMBtu), respectively, by 1 MMBtu/hr. The calculated hourly emissions rates for an elevated flare are shown on **Exhibit EQ-6** in the column titled "Hourly Emissions Rate for Elevated Flare Based on AP-42 Emissions Factor of

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[3] Lower heating values (sometimes referred to as net heating values) were used instead of higher heating values primarily because footnotes for the AP-42 Section 13.5 emissions factors state that the emissions factors were developed using lower heating values.

0.14 lb/MMBtu and 1 MMBtu/hr Hourly Combustion Basis." The calculated hourly emissions rates for an EGF are shown on **Exhibit EQ-6**, in the column titled "Hourly Emissions Rate for EGF Based on AP-42 Emissions Factor of 0.00388 lb/MMBtu and 1 MMBtu/hr Hourly Combustion Basis".

iii. I then calculated the DRE for each VOC from an elevated flare and an EGF, respectively, by (1) dividing the VOC's calculated hourly emission rate (lb/hr) by its hourly mass flow rate combusted in the flare (lb/hr based on 1 MMBtu/hr), (2) subtracting that quotient from 1.0, and (3) multiplying that difference by 100%.[4] The calculated DREs for individual VOCs are shown for an elevated flare in the "DRE for Elevated Flare" column of **Exhibit EQ-6** and for an EGF in the "DRE for EGF" column of **Exhibit EQ-6**.

iv. I also calculated the average of the individual VOC DREs for elevated flares and for EGFs, which are also displayed in **Exhibit EQ-6** at the bottom of the "DRE for Elevated Flare" and "DRE for EGF" columns, respectively.

f. The calculated DREs displayed in **Exhibit EQ-6** show that:

i. For properly operated elevated flares, the calculated DREs for individual VOCs range from 99.70% to 99.76%, and the average of those DREs is 99.73%.

ii. For properly operated EGFs, the calculated DREs for individual VOCs range from 99.992% to 99.993%, and the average of those DREs is 99.993%. These DREs are consistent with the statement in AP-42 Table 13.5-1, Footnote h that the EGFs' "emission factor data set had an average DRE of 99.99%."

g. Accordingly, the DREs for individual VOCs and the average DREs in **Exhibit EQ-6** for properly operated elevated flares and EGFs demonstrate the following:

i. Properly operated elevated flares and EGFs will achieve at least 99% DRE for VOC compounds including C1-C3 VOCs, rather than only 98% DRE that EPA references in AP-42 Section 13.5 and in the preamble to the Refinery MACT rule, the Ethylene MACT rule, and other EPA guidance.[5]

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[4] 1.0 has no unit associated with it. 1.0 would be the DRE in fraction form if the flare destroyed 100% of each VOC that is combusted in the flare such that the flare emitted none of that VOC. Subtracting the quotient determined by dividing "the VOC's calculated hourly emissions factor by its calculated hourly rate combusted in the flare at 1 MMBtu/hr" from 1.0 equals the flare's DRE in fraction form, and multiplying the number from that subtraction by 100% puts that DRE in % form.

[5] *See, e.g., Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards,* 80 Fed. Reg. 75,211 (December 1, 2015); *National Emission Standards for Hazardous Air Pollutants: Generic Maximum Achievable Control Technology Standards Residual Risk and Technology Review for Ethylene Production,* 85 Fed. Reg. 40,386 (July 6, 2020).

ii. Properly operated elevated flares and EGFs will achieve at least 99% DRE for all VOCs, rather than only for C1-C3 VOCs. Nevertheless, in the Application, the emissions calculations for the FPC flares conservatively assume 99% DRE only for C1-C3 VOCs.

h. Further, those two demonstrations are even more certain for the FPC flares for the following reasons:

i. For the FPC flares to be "properly operated," they must meet the flare requirements specified in the draft FPC amended permits, which are those in 40 C.F.R. §§ 63.670-63.671. These requirements are more stringent than the flare requirements in 40 C.F.R. § 60.18 that the elevated flares and EGFs that EPA tested to develop the February 2018 emissions factors in AP-42 Section 13.5 and that I used in calculating the DREs in **Exhibit EQ-6** (***"AP-42 elevated flares and EGFs"***) for such flares to be "properly operated."

ii. Therefore, the FPC flares should achieve DREs for C1-C3 VOCs that are no lower than the DREs of the AP-42 elevated flares and EGFs.

iii. Accordingly, my calculations summarized in **Exhibit EQ-6** demonstrate that the AP-42 elevated flares and EGFs achieve at least 99% DRE for C1-C3 VOCs. This analysis shows that if any elevated flare or EGF, including one of FPC's, is operated properly, i.e., in compliance with the applicable flare requirements in EPA rules and in the Permits, the flare will achieve at least 99% DRE for C1-C3 VOCs. Therefore, it is even more certain that the FPC flares do and/or will achieve at least 99% DRE for C1-C3 VOCs.

j. For these reasons, I conclude that:

i. The FPC flares will achieve at least 99% DRE for C1-C3 VOCs when FPC operates them in compliance with the applicable flare requirements specified in the draft FPC amended permits, and, thus,

ii. It is appropriate for FPC to assume 99% DRE in calculating emissions of C1-C3 VOCs from the FPC flares.

Further, affiant sayeth not.

Eric J. Quiat, P.E.

This instrument was acknowledged before me, the undersigned authority, this 12th day of September 2025.

Notary Public in and for the State of Colorado

TEJ BAHADUR GURUNG
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20194016450
MY COMMISSION EXPIRES 07/31/2029

Affidavit of Eric J. Quiat, P.E.

Exhibit EQ-1

Eric J. Quiat, P.E. CV

Eric Quiat, P.E.

Senior Project Manager

19 YEARS OF EXPERIENCE

EDUCATION

» B.S., Chemical Engineering, Texas A&M University

LICENSING

» P.E., Chemical: Texas, Colorado

AREAS OF EXPERTISE

» Air quality permitting (NSR and Title V)
» Greenhouse gas (GHG) permitting
» MACT, NSPS, and NESHAP compliance
» GHG reporting compliance
» Environmental auditing
» Emission inventory reporting
» Regulatory analysis

PUBLICATIONS

» "Texas Two-Step: Navigating Air Permitting of EGUs in the Wake of the TCEQ and EPA Duel", Energy, Utility and Environment Conference, February, 2011
» "Greenhouse Gas Permitting Challenges: What to Do When EPA Becomes the Permitting Authority", Energy, Utility and Environment Conference, January, 2012

AFFILIATIONS

» Air and Waste Management Association, Central Texas Chapter

EXPERIENCE SUMMARY

Mr. Quiat is an experienced engineer with 19 years of expertise in air quality permitting and compliance. Mr. Quiat has focused experience in air quality permitting and auditing for chemical, oil and gas, electric utility, refining, and manufacturing facilities in Texas, including developing permits for major plant expansions, greenfield plants, new gas-turbines, the largest proposed ethanol plant in North America, conversion of an industrial coal-fired boiler system to an electric utility source, and emission control device replacements.

During his career as an environmental compliance consultant, Mr. Quiat has engaged clients as the technical point-of-contact, providing answers and logical solutions to practical problems that have resulted from implementation of capital projects, plant decommissioning, regulatory corrective actions, disclosures of non-compliance, new regulations, and Agency initiatives.

Air Quality Permitting Experience

Mr. Quiat has guided Texas-based chemical and manufacturing clients through the NSR, Title V, and PSD permit application processes, including initial permit strategy development, PSD evaluation, permit application preparation, and Agency correspondence. He has prepared NSR and Title V permit applications for both greenfield (new) chemical plants as well as plant expansions involving new chemical manufacturing units and new emissions control devices. The evaluation and permitting of control devices included the application of flares for more than three dozen permit applications, several of which required Federal NSR permitting (PSD or NNSR). These flares include elevated flares as well as enclosed ground flares.

Mr. Quiat has lead air permitting efforts for several Texas power generation facilities, including the installation of new gas-fired turbines, conversion of an industrial coal-fired power plant to an electric utility, and permit modifications at existing steam-electric utility plants. These projects have included both Prevention of Significant Deterioration (PSD) and minor New Source Review (NSR) permit applications, air dispersion modeling, permit negotiation with TCEQ, Greenhouse Gas (GHG) permitting through EPA Region 6 and Title V, Acid Rain and CAIR permitting.

Mr. Quiat prepared an air quality permit application and dispersion modeling for the largest proposed ethanol plant in North America. The project scope included development of plant material balances and emission calculations to

POWER ENGINEERS

account for several distinct operating scenarios that provided maximum operational flexibility and economic resilience.

In response to Texas' Maintenance, Startup and Shutdown (MSS) permitting initiative, Mr. Quiat prepared MSS permit applications for two carbon black plants, eight electric utility plants, and more than ten dozen oil and gas production sites.

Air Quality Compliance Support

Mr. Quiat has provided air quality support services to various clients on an ongoing basis. These services have included Title V deviation reporting efforts, periodic environmental audits and corrective action implementation efforts, emission inventory and GHG reporting, GHG monitoring plan development, CEMS emission data review and analysis, and MSS compliance support.

In addition, he has supported clients in responding to state agency request for further information and detailed air dispersion modeling related to emission events, including those from elevated flares.

Mr. Quiat has developed MON (miscellaneous organic NESHAP) compliance guidance documents for batch chemical plants which included Startup, Shutdown, Malfunction Plans (SSMPs), a wastewater sampling plan, process vent group determinations, and monitoring, reporting, and recordkeeping timelines and agendas. In addition, he supported a client's evaluation and response to an EPA Section 114 data request for the HON NESHAP and chemical sector NSPS regulations.

Mr. Quiat was the technical lead for GHG monitoring rule implementation projects at two refineries in the Gulf Coast region. He assisted clients by providing oversight of source applicability determinations, evaluation of monitoring, analytical, and record keeping systems, and identification of critical gaps. He diligently informed clients of emerging issues associated with rule implementation and EPA determinations. Mr. Quiat worked with refinery management to prepare monitoring extension requests and initial monitoring plans without established guidance from EPA.

He prepared an evaluation tool for a refinery to assess applicability and requirements related to a new, potentially applicable New Source Performance Standard. The evaluation tool identified potential triggering events and associated new, more stringent requirements (e.g., emission limitations, monitoring).

Mr. Quiat also prepared a guidebook for refinery operations personnel to evaluate future capital project applicability to an existing NSPS standard for wastewater systems. The guidebook featured forms for documenting negative applicability and a compliance roadmap for use when the standard was triggered.

Auditing Experience

Mr. Quiat led a ten-person team to conduct environmental, health, and safety compliance audits at more than 1,200 oil & gas production sites in Texas, Louisiana, and Arkansas under Attorney-client privilege and state Audit Privilege Acts. He also performed focused air quality audits of liquid management assets at four west Texas gas processing plants.

Mr. Quiat has also assisted a client with reasonable inquiry review of monitoring, testing, and compliance documentation for eight compressor stations and three gas processing facilities in preparation for Title V deviation reporting.

He also led several focused environmental audits at Texas manufacturing and chemical production facilities, several located in ozone nonattainment areas, providing clients with a comprehensive snapshot of compliance health and options for correcting gaps.

Mr. Quiat has also participated as the air quality lead auditor for due diligence reviews of a batch chemical manufacturing facility located in southeast Texas (including coordination with reviews at sister facilities located overseas), two commodity petrochemical manufacturing facilities located in the Houston/Galveston area, and six compressor and pump manufacturing facilities located in Texas.

Mr. Quiat has conducted NSPS Subpart QQQ applicability and compliance auditing for a major U.S. refinery at seven locations under the auspices of a Consent Decree. He provided over three years of post-audit corrective action support for one refinery and provided input during the capital project design phase at another refinery to ensure corrective action measures would meet regulatory requirements.

He has led Benzene Waste Operations NESHAP (BWON) compliance auditing for a major U.S. refinery at eight locations under the auspices of a Consent Decree. He led BWON compliance and verification audits at two refineries for another major U.S. refinery and served on a MACT Subpart CC audit team, under terms of a Consent Decree, for a refinery in the Midwest.

Affidavit of Eric J. Quiat, P.E.

Exhibit EQ-2

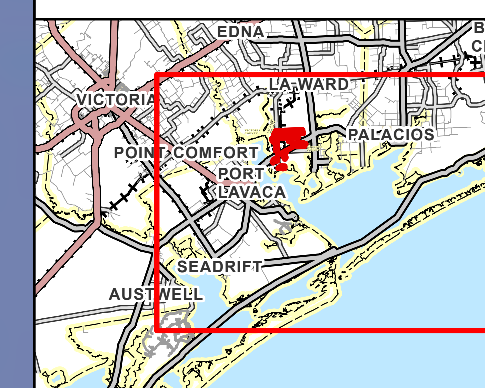
Area Map

FORMOSA PLASTICS CORP. TEXAS

AREA MAP

FPC
CALHOUN AND JACKSON COUNTIES, TEXAS

FPC Property Boundary
Project Facilities Border
1-Mile Distance from Project Facilities
Stream or River



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Miles

POWER ENGINEERS

Date: 6/23/2025

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Affidavit of Eric J. Quiat, P.E.

Exhibit EQ-3

Hearing Request Location Map

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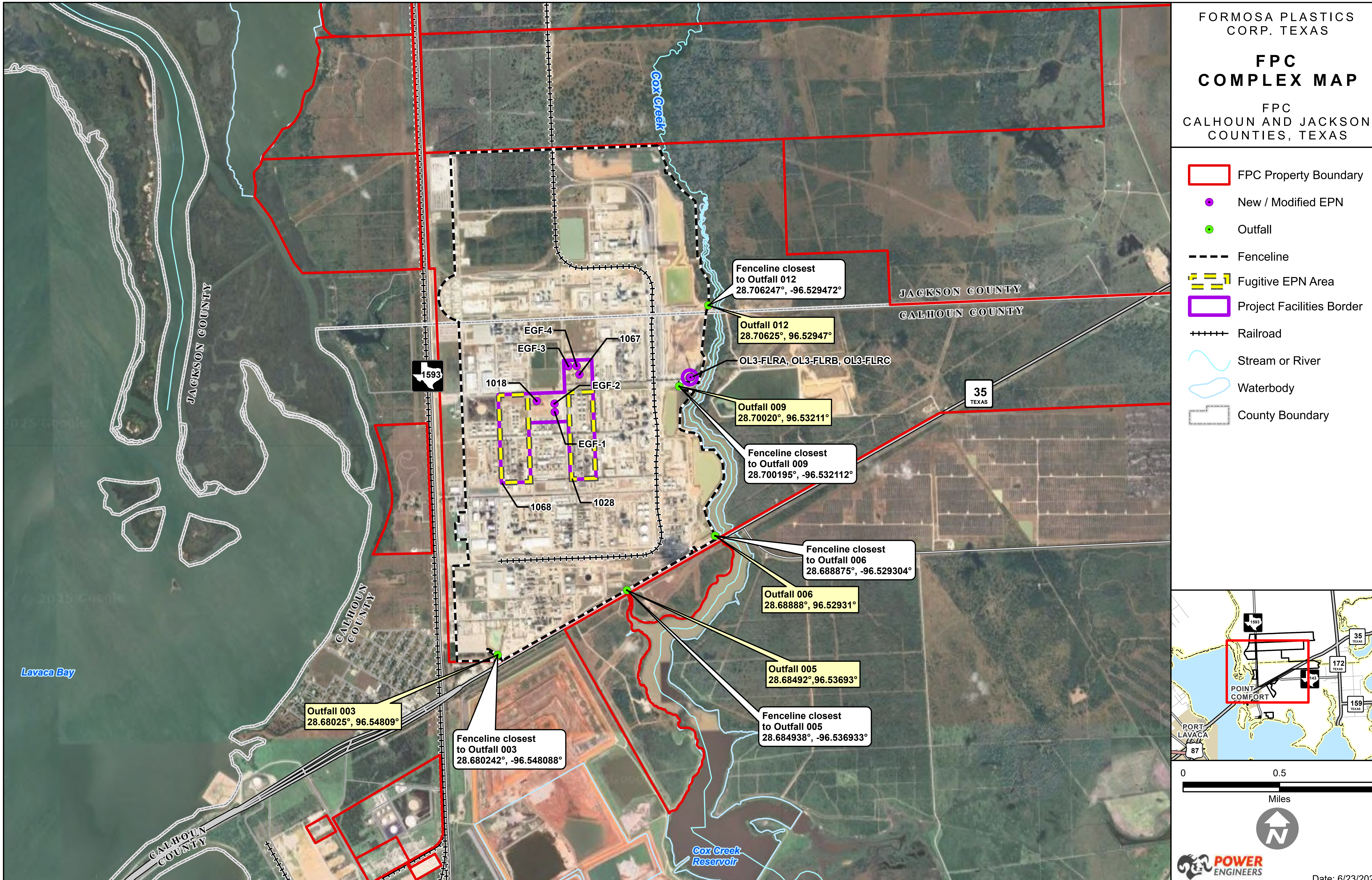
Affidavit of Eric J. Quiat, P.E.
Exhibit EQ-4

FPC Complex Map



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Affidavit of Eric J. Quiat, P.E.

Exhibit EQ-5

January 24, 2025 FPC Letter to TCEQ
Supporting DRE in Application

POWER ENGINEERS

POWER ENGINEERS, INC.

2600 VIA FORTUNA
SUITE 450
AUSTIN, TX 78746 USA

PHONE 512-329-5544
FAX 512-329-8253

January 24, 2025

Ms. Cara Hill via Email
Texas Commission on Environmental Quality
Air Permits Division, MC 163
P.O. Box 13087
Austin, TX 78711-3087

Subject:
Formosa Plastics Corporation, Texas, CN600130017; RN100218973
Flare Improvement Project Permit Applications, TCEQ Project Nos. 336048, 336049, 336050, 336051, 336052, 336053, 336054, 336055, and 336056
Supplemental Information Supporting Flare VOC DRE

Dear Ms. Hill:

Formosa Plastics Corporation, Texas received your request for additional information to support flare destruction removal efficiency (DRE) representations for volatile organic compounds (VOC) specific to Formosa's permit amendment applications for its Flare Improvement Project. Consistent with the TCEQ-accepted destruction efficiencies and emission factors in TCEQ's *New Source Review (NSR) Emission Calculations* guidance,[1] Formosa represented 99% DRE for C1-C3 VOCs, and 98% DRE for C4+ VOCs in proposed changes to existing steam-assisted elevated flares and proposed new low-pressure enclosed ground flares (EGF) in the permit applications. The following supplemental information and related enclosed documentation illustrate the conservatism in Formosa's calculations of VOC emissions from flares included in its Flare Improvement Project permit applications.

As you know, EPA's Compilation of Air Pollutant Emission Factors, known as AP-42, is the primary compilation of emissions factors and related information for more than 200 air pollution source categories, including industrial flares. AP-42 emissions factors are widely utilized by air permitting authorities such as TCEQ and EPA as appropriate factors to use in calculating emissions estimates.

The February 2018 version of AP-42 Section 13.5[2] provides the current EPA-developed emissions factors and related information for industrial flares like the flares in the Flare Improvement Project applications. In developing the AP-42 emission factors, EPA used the best available quality-assured flare emissions test data obtained from a variety of tested flare sources.

Based on the emissions factor grade or representativeness descriptors for the VOC emissions factors for industrial flares in AP-42 Section 13.5, the VOC emissions factors for elevated flares and EGFs like the flares in the Flare Improvement Project applications that have the best grades or

[1] https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss_calc_flares.pdf
[2] https://www.epa.gov/sites/default/files/2020-10/documents/13.5_industrial_flares.pdf.

representativeness descriptors are in AP-42 Table 13.5-1. Such emissions factors and other relevant information from Table 13.5-1 are summarized in Table 1 below.

Table 1 Relevant Emissions Factor Information from EPA AP-42 Table 13.5-1

Flare Type	Flare Operating Condition	THC Emission Factor (lb/MMBtu)	Emissions Factor Grade or Representativeness
Elevated Flare	All	0.14	B
Enclosed Ground Flare	Low Load	0.00388	Moderately
Enclosed Ground Flare	Normal/High Load	0.00120	Moderately

According to the February 2018 version of AP-42 Section 13.5, the VOC emissions factors in Table 1 are to be applied only to properly operated elevated flares and EGFs. At the time EPA developed the emissions factors in Table 1, “properly operated” elevated flares and EGFs were those that operated in compliance with the then-applicable flare requirements in 40 C.F.R. § 63.670 and 63.671, including the flare minimum net heating value in the combustion zone and maximum tip velocity.

To illustrate the conservatism of TCEQ’s required flare DRE calculation method (the “DRE methodology”) used in the Flare Improvement Project applications, Formosa calculated VOC emission rates from flare emission points in the Flare Improvement Project using EPA AP-42 emission factors (the “AP-42 methodology”). Emission calculation worksheets for each of Formosa’s nine permit applications corresponding to TCEQ Project Nos. referenced above using the AP-42 methodology are enclosed and a description of the calculation methodology is provided below.

First, Formosa used the heat release (MMbtu/year) from the combustion of VOC flare gas constituents for routine and planned MSS flare gas streams, which is based on the mass flow rate (tons/yr) and lower heating values (Btu/lb) of VOC components in the waste gas streams sent to the flare. Second, Formosa multiplied the heat release (MMbtu/yr) by the worst-case (highest) Flare THC Emission Factor from Table 1 above (0.14 lb/MMbtu) and divided by 2,000 lbs/ton to obtain the VOC tons/year. The resulting VOC flare emissions for the Flare Improvement Project (routine and planned MSS emissions) are 479.24 tons VOC/year using the above AP-42 emission factor methodology, versus 1,189.54 tons VOC/year using the DRE methodology presented in the permit applications. This result shows that the DRE methodology is conservative and results in worst-case (i.e, larger) VOC emission rates.

Sincerely,
POWER Engineers, Inc.

Eric Quiat, P.E.
Project Manager

Enclosure

Formosa Plastics Corporation, Texas
Point Comfort, Texas
Olefins I Plant
Permit No. 19168

Flare Emissions During Routine Operations - Olefins I
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No	-	-	-	-	-
Methane	No	-	-	-	-	-
Ethane	No	-	-	-	-	-
Ethylene	Yes	437.25	20,627	18,038.35	0.14	1.26
Propylene	Yes	57.57	19,511	2,246.35	0.14	0.16
Propane	Yes	63.19	19,757	2,497.07	0.14	0.17
Hexene	Yes	5.75	19,106	219.75	0.14	0.02
Methyl Styrene	Yes	82.02	17,530	2,875.46	0.14	0.20
Ethyl Toluene	Yes	57.26	17,690	2,026.00	0.14	0.14
Trimethyl Benzene	Yes	52.83	17,640	1,863.74	0.14	0.13
Indane	Yes	25.10	17,327	869.73	0.14	0.06
n-Hexane	Yes	1.43	19,233	54.92	0.14	3.84E-03
Butylbenzene	Yes	17.76	17,827	633.25	0.14	0.04
Ethylbenzene	Yes	14.87	17,593	523.22	0.14	0.04
Dihydrodicyclopentadiene	Yes	15.26	17,800	543.10	0.14	0.04
Dimethyl Ethylbenzene	Yes	6.80	17,803	242.04	0.14	0.02
Tetrahydrodicyclopentadiene	Yes	6.37	17,800	226.88	0.14	0.02
Propyl Benzene	Yes	13.86	17,724	491.25	0.14	0.03
Xylene	Yes	12.86	17,545	451.25	0.14	0.03
Toluene	Yes	27.34	17,421	952.58	0.14	0.07
Benzene	Yes	46.61	17,256	1,608.52	0.14	0.11
					Totals =	2.55

Formosa Plastics Corporation, Texas
Point Comfort, Texas
LLDPE Plant
Permit No. 20203

Flare Emissions During Routine Operations - LLDPE
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas 1:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Ethylene	Yes	268.80	20,278	10,901.45	0.14	0.76
Butene-1	Yes	76.20	19,450	2,964.18	0.14	0.21
Butane	Yes	12.60	19,623	494.50	0.14	0.03
Hexene-1	Yes	18.00	19,350	696.60	0.14	0.05
Hexene-2	Yes	0.60	19,350	23.22	0.14	1.63E-03
Pentane	Yes	16.20	19,481	631.18	0.14	0.04
Isobutane	Yes	1.80	19,623	70.64	0.14	4.94E-03
Hexane	Yes	9.60	19,393	372.35	0.14	0.03
					Totals =	1.13

Formosa Plastics Corporation, Texas
Point Comfort, Texas
LLDPE Plant
Permit No. 20203

Flare Emissions During Routine Operations - LLDPE

Waste Gas 2:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Acetylene	Yes	0.10	20,753	4.15	0.14	2.91E-04
Ethylene	Yes	37.60	20,278	1,524.91	0.14	0.11
Propylene	Yes	0.20	19,678	7.87	0.14	5.51E-04
Propane	Yes	0.10	19,922	3.98	0.14	2.79E-04
Butene	Yes	21.90	19,450	851.91	0.14	0.06
Butane	Yes	2.00	19,623	78.49	0.14	5.49E-03
Pentane	Yes	1.90	19,481	74.03	0.14	5.18E-03
Hexene	Yes	4.80	19,350	185.76	0.14	0.01
n-Hexane	Yes	0.40	19,393	15.51	0.14	1.09E-03
Nitrogen	No					
					Totals =	0.19

Formosa Plastics Corporation, Texas
Point Comfort, Texas
HDPEI Plant
Permit No. 19201

Flare Emissions During Routine Operations - HDPEI
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Nitrogen	No					
Water	No					
Oxygen	No					
Hydrogen	No					
Methane	No					
Ethane	No					
Ethylene	Yes	1,347.93	20,272	54,651.45	0.14	3.83
1-Butene	Yes	323.24	19,476	12,590.74	0.14	0.88
Hexane	Yes	576.52	19,236	22,180.34	0.14	1.55
Octane	Yes	147.17	19,100	5,621.94	0.14	0.39
Decane	Yes	84.10	19,022	3,199.30	0.14	0.22
					Totals =	6.88

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPI Plant
Permit No. 19200

Flare Emissions During Routine Operations - PPI
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Propylene	Yes	1,477.32	19,683	58,156.37	0.14	4.07
Propane	Yes	174.11	19,929	6,939.73	0.14	0.49
Ethylene	Yes	156.07	20,276	6,328.80	0.14	0.44
Heptane	Yes	17.31	19,315	668.68	0.14	0.05
Nitrogen	No					
					Totals =	5.05

Formosa Plastics Corporation, Texas
Point Comfort, Texas
Traffic Facility
Permit No. 19871

Flare Emissions During Routine Operations - Traffic
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Isobutane	Yes	2.87	19,598	112.48	0.14	7.87E-03
					Totals =	0.01

Formosa Plastics Corporation, Texas
Point Comfort, Texas
Olefins II Plant
Permit No. 19168

Flare Emissions During Routine Operations - Olefins II
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas Composition	VOC	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Methane	No					
Ethane	No					
Acetylene	Yes	5.71	20,751	236.86	0.14	0.02
Ethylene	Yes	447.84	20,276	18,160.88	0.14	1.27
Propadiene	Yes	1.43	19,849	56.68	0.14	3.97E-03
Propylene	Yes	136.59	19,675	5,374.83	0.14	0.38
Propane	Yes	130.22	19,929	5,190.38	0.14	0.36
Butadiene	Yes	21.32	19,143	816.33	0.14	0.06
Butene	Yes	15.69	19,467	611.01	0.14	0.04
Butane	Yes	1.27	19,655	49.93	0.14	3.50E-03
Benzene	Yes	3.25	17,442	113.37	0.14	7.94E-03
					Totals =	2.14

Formosa Plastics Corporation, Texas
Point Comfort, Texas
OL3 & PDH Plant
Permit No. 107518

Flare Emissions During Routine Operations - OL3 &PDH
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

OL3 Stage 1 Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Nitrogen	No					
Carbon Monoxide	No					
Carbon Dioxide	No					
Hydrogen Sulfide	No					
Methane	No					
Ethylene	Yes	3,278.01	20,272	132,905.62	0.14	9.30
Ethane	No					
Propadiene/Methylacetylene	Yes	<0.001	19,923	<0.01	0.14	3.67E-12
Propylene	Yes	6,005.13	19,678	236,333.03	0.14	16.54
Propane	Yes	26.70	19,923	1,063.84	0.14	0.07
Butadiene/C4 Acetylene	Yes	<0.001	19,156	<0.01	0.14	1.25E-16
Butylenes	Yes	<0.001	19,476	<0.01	0.14	3.45E-14
Butanes	Yes	8.54	19,680	336.06	0.14	0.02
Pentanes	Yes	4.41	19,340	170.74	0.14	0.01
Benzene	Yes	<0.001	17,261	<0.01	0.14	3.66E-19
Hexanes	Yes	3.53	19,236	135.78	0.14	9.50E-03
					Totals =	25.97

Formosa Plastics Corporation, Texas
Point Comfort, Texas
OL3 & PDH Plant
Permit No. 107518

Flare Emissions During Routine Operations - OL3 &PDH
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

OL3 Stage 2 Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Nitrogen	No					
Carbon Dioxide	No					
Methane	No					
Ethane	No					
Propane	Yes	1.20	19,923	47.97	0.14	3.36E-03
Butanes	Yes	0.56	19,680	21.86	0.14	1.53E-03
Pentanes	Yes	0.29	19,340	11.11	0.14	7.78E-04
Hexanes	Yes	0.23	19,236	8.84	0.14	6.19E-04
					Totals =	6.28E-03

Formosa Plastics Corporation, Texas
Point Comfort, Texas
OL3 & PDH Plant
Permit No. 107518

Flare Emissions During Routine Operations - OL3 &PDH
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

PDH Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Methyl Acetylene	Yes	0.03	19,851	1.17	0.14	8.19E-05
Propylene	Yes	63.18	19,678	2,486.41	0.14	0.17
Propane	Yes	68.30	19,923	2,721.66	0.14	0.19
1,3-Butadiene	Yes	3.59	19,156	137.54	0.14	9.63E-03
1-Butene	Yes	6.99	19,476	272.40	0.14	0.02
Butanes	Yes	0.07	19,680	2.71	0.14	1.89E-04
Cyclopentadiene	Yes	<0.01	18,184	0.14	0.14	9.72E-06
Isoprene	Yes	<0.01	18,838	0.27	0.14	1.87E-05
1-Pentene	Yes	0.02	19,189	0.59	0.14	4.10E-05
Pentanes	Yes	6.76	19,340	261.31	0.14	0.02
					Totals =	0.41

Formosa Plastics Corporation, Texas
Point Comfort, Texas
HDPEII Plant
Permit No. 40157

Flare Emissions During Routine Operations - HDPEII
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Nitrogen	No					
Methane	No					
Ethane	No					
Ethylene	Yes	62.37	20,278	2,529.53	0.14	0.18
Propane	Yes	1.62	19,922	64.57	0.14	4.52E-03
IsoButane	Yes	699.14	19,590	27,392.13	0.14	1.92
N-Butane	Yes	5.12	19,658	201.48	0.14	0.01
N-Hexane	Yes	18.22	19,393	706.71	0.14	0.05
Hexene	Yes	182.12	19,120	6,964.28	0.14	0.49
C8+	Yes	58.91	19,256	2,268.78	0.14	0.16
					Totals =	2.81

Formosa Plastics Corporation, Texas
Point Comfort, Texas
NGL Fractionator Unit
Permit No. 19168

Flare Emissions During Routine Operations - FRACII
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas Composition	VOC	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Carbon Dioxide	No					
Methane	No					
Ethane	No					
Propane	Yes	9.23	19,930	367.75	0.14	0.03
Iso-Butane	Yes	<0.01	19,610	0.04	0.14	2.82E-06
N-Butane	Yes	<0.01	19,670	<0.01	0.14	6.26E-07
Iso-Pentane	Yes	<0.01	19,450	<0.01	0.14	3.45E-09
N-Pentane	Yes	<0.01	19,500	<0.01	0.14	6.64E-10
N-Hexane	Yes	<0.01	19,240	<0.01	0.14	3.56E-11
N-Heptane	Yes	<0.01	19,160	<0.01	0.14	4.93E-15
N-Octane	Yes	<0.01	19,100	<0.01	0.14	1.03E-17
N-Nonane	Yes	<0.01	19,051	<0.01	0.14	1.58E-20
N-Decane	Yes	<0.01	19,020	<0.01	0.14	2.19E-23
Methyl Mercaptan	Yes	0.67	11,050	14.82	0.14	1.04E-03
Ethyl Mercaptan	Yes	<0.01	12,050	<0.01	0.14	1.39E-23
Carbonyl Sulfide	Yes	1.63	3,920	12.75	0.14	8.93E-04
Carbon Disulfide	Yes	<0.01	6,239	<0.01	0.14	7.13E-24
Water	No					
					Totals =	0.03

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPII Plant
Permit No. 91780

Flare Emissions During Routine Operations - PPII
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Trains 1 & 2 Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Propylene	Yes	384.80	19,683	15,148.19	0.14	1.06
Propane	Yes	14.78	19,929	589.22	0.14	0.04
Ethylene	Yes	213.91	20,276	8,674.44	0.14	0.61
Hexane	Yes	3.29	19,391	127.52	0.14	8.93E-03
Triethyl Aluminum	Yes	<0.01	19,000	<0.01	0.14	7.98E-09
Di-isopropyl-dimethoxysilane	Yes	<0.01	19,000	<0.01	0.14	2.66E-07
Nitrogen	No					
					Totals =	1.72

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPII Plant
Permit No. 91780

Flare Emissions During Routine Operations - PPII

Train 3 Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Nitrogen	No					
Ethylene	Yes	150.18	21,504	6,459.13	0.14	0.45
Propylene	Yes	270.17	19,476	10,523.55	0.14	0.74
Propane	Yes	10.38	19,834	411.66	0.14	0.03
Hexane	Yes	2.31	18,976	87.60	0.14	6.13E-03
Di-isopropyl-dimethoxysilane	Yes	<0.01	19,000	<0.001	0.14	1.87E-07
					Totals =	1.22

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPII Plant
Permit No. 91780

Flare Emissions During Routine Operations - PPII

Hexane Tank Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hexane	Yes	0.54	19,391	21.10	0.14	1.48E-03
					Totals =	<0.001

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPII Plant
Permit No. 91780

Flare Emissions During Product Grade Transition Operations - PPII
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Trains 1 & 2 Product Grade Transition VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Propylene	Yes	348.87	19,683	13,733.70	0.14	0.96
Propane	Yes	22.82	19,929	909.52	0.14	0.06
Ethylene	Yes	15.42	20,276	625.27	0.14	0.04
Nitrogen	No					
					Totals =	1.07

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPII Plant
Permit No. 91780

Flare Emissions During Product Grade Transition Operations - PPII

Train 3 Product Grade Transition VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Hydrogen	No					
Nitrogen	No					
Ethylene	Yes	10.79	21,504	464.19	0.14	0.03
Propylene	Yes	244.21	19,476	9,512.47	0.14	0.67
Propane	Yes	15.97	19,834	633.63	0.14	0.04
					Totals =	0.74

Formosa Plastics Corporation, Texas
Point Comfort, Texas
Utilities 3 (UT3) Plant
Permit No. 140763

Flare Emissions During Routine Operations - UT3
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Routine VOC Emissions:

Waste Gas Composition	VOC?	VOC Waste Gas to Flare	Lower Heating Value, LHV	Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
		tpy	Btu/lb	MMBtu/yr	lb THC/MMBtu, LHV	tpy
Pentane	Yes	0.38	19,340	14.53	0.14	1.02E-03
					Totals =	1.02E-03

Formosa Plastics Corporation, Texas
Point Comfort, Texas
LLDPE Plant
Permit No. 20203

Flare Emissions - LLDPE Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC Emission Calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
LLDPE Planned MSS Waste Gas	746.50	43,463.20	0.14	3.04

Formosa Plastics Corporation, Texas
Point Comfort, Texas
Olefins I Plant
Permit No. 19168

Flare Emissions - Olefins I Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC Emission Calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
OLI Planned MSS Waste Gas	27,525.23	1,835,151.52	0.14	128.46

Formosa Plastics Corporation, Texas
Point Comfort, Texas
Olefins II Plant
Permit No. 19168

Flare Emissions - Olefins II Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
OLII Planned MSS Waste Gas	23,951.65	1,619,624.82	0.14	113.37

Formosa Plastics Corporation, Texas
Point Comfort, Texas
NGL Fractionator Unit
Permit No. 19168

Flare Emissions - FRACII Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (Fractionator Startup Shutdown and Fractionator MSS Purging):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
FRACII Planned MSS Waste Gas	108.70	6,528.44	0.14	0.46

Formosa Plastics Corporation, Texas
Point Comfort, Texas
Olefins 3 Plant
Permit No. 107518

Flare Emissions - Olefins 3 Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
OL3 Planned MSS Waste Gas	29,694.37	2,050,207.50	0.14	143.51

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PDH Plant - Air Permit Amendment
Permit No. 107518

Flare Emissions - PDH Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
PDH Planned MSS Stream	1,120.32	55,691.46	0.14	3.90

Formosa Plastics Corporation, Texas
Point Comfort, Texas
HDPEI Plant
Permit No. 19201

Flare Emissions - HDPEI Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
HDPEI Planned MSS Waste Gas	835.00	57,142.86	0.14	4.00

Formosa Plastics Corporation, Texas
Point Comfort, Texas
HDPEII Plant
Permit No. 40157

Flare Emissions - HDPEII Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
HDPEII Planned MSS Waste Gas	386.00	199,595.96	0.14	13.97

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPI Plant
Permit No. 19200

Flare Emissions - PPI Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
PPI Planned MSS Waste Gas	2,603.45	149,978.44	0.14	10.50

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPII Plant Trains 1&2
Permit No. 91780

Flare Emissions - PPII Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
PPII Planned MSS Waste Gas - Trains 1&2	1,627	61,923.22	0.14	4.33

Formosa Plastics Corporation, Texas
Point Comfort, Texas
PPII Plant Train 3 - Air Permit Amendment
Permit No. 91780

Flare Emissions - PPII Planned MSS
Supplemental Information Supporting Flare VOC DRE: AP-42 Based Flare VOC Emission Calculations

Planned MSS VOC emission calculations (SU, SD and Maintenance):

Waste Gas Description	VOC to Flare	Waste Gas Heat Release, Based on LHV	AP-42 Emission Factor	VOC Emission Rate
	tpy	MMBtu/yr	lb THC/MMBtu, LHV	tpy
PPII Planned MSS Waste Gas - Train 3	579.33	25,173.67	0.14	1.76

Affidavit of Eric J. Quiat, P.E.

Exhibit EQ-6

Example VOC DRE Calculations

Calculated VOC DREs for Elevated Flares and Enclosed Ground Flares ("EGF") Based on AP-42 Table 13.5-1 Emissions Factors						
VOC Being Flared	**Lower Heating Value (Btu/lb)**	**Hourly Rate of VOC Combusted in Flare at 1 MMBtu/hr (lb/hr)**	**Hourly Emissions Rate for Elevated Flare Based on AP-42 Emissions Factor of 0.14 lb/MMBtu Assuming 1 MMBtu/hr Hourly Combustion Rate (lb/hr)**	**Hourly Emissions Rate for EGF Based on AP-42 Emissions Factor of 0.0388 lb/MMBtu Assuming 1 MMBtu/hr Hourly Combustion Rate (lb/hr)**	**DRE for Elevated Flare**	**DRE for EGF**
Acetylene	20,769	48.15	0.14	0.00388	99.71%	99.992%
Ethylene	20,275	49.32	0.14	0.00388	99.72%	99.992%
Propylene	19,687	50.79	0.14	0.00388	99.72%	99.992%
Propane	19,937	50.16	0.14	0.00388	99.72%	99.992%
Isobutene	19,376	51.61	0.14	0.00388	99.73%	99.992%
n-Butene	19,493	51.30	0.14	0.00388	99.73%	99.992%
Butane	19,678	50.82	0.14	0.00388	99.72%	99.992%
Isobutane	19,628	50.95	0.14	0.00388	99.73%	99.992%
n-Pentene	19,359	51.66	0.14	0.00388	99.73%	99.992%
Isopentane	19,459	51.39	0.14	0.00388	99.73%	99.992%
n-Pentane	19,507	51.26	0.14	0.00388	99.73%	99.992%
Benzene	17,451	57.30	0.14	0.00388	99.76%	99.993%
n-Hexane	19,415	51.51	0.14	0.00388	99.73%	99.992%
Toluene	17,672	56.59	0.14	0.00388	99.75%	99.993%
n-Heptane	19,160	52.19	0.14	0.00388	99.73%	99.993%
Ethylbenzene	17,600	56.82	0.14	0.00388	99.75%	99.993%
Xylene	17,760	56.31	0.14	0.00388	99.75%	99.993%
n-Octane	19,100	52.36	0.14	0.00388	99.73%	99.993%
n-Nonane	19,050	52.49	0.14	0.00388	99.73%	99.993%
n-Decane	19,020	52.58	0.14	0.00388	99.73%	99.993%
	Averages				**99.73%**	**99.993%**

Applicant’s Response to Hearing Request – Part 2

ATTACHMENT C

Affidavit of
Arnold R. Srackangast

TCEQ DOCKET NO. 2025-1160-AIR
AFFIDAVIT OF ARNOLD R. SRACKANGAST

STATE OF TEXAS §
COUNTY OF BLANCO §

BEFORE ME, the undersigned notary public, on this day personally appeared Arnold R. Srackangast, known to me to be the person whose name is subscribed below, and after being duly sworn by me upon his oath stated as follows:

1. My name is Arnold R. Srackangast. I am over 21 years of age, am of sound mind, and am fully competent to make this affidavit. Each statement contained in this affidavit is based upon my personal knowledge, and each statement is true and correct.

<u>EXPERIENCE</u>

2. I am a scientist and meteorologist with over 39 years of experience in managing, performing, and peer reviewing atmospheric dispersion modeling evaluations in support of new source review permit applications. My education includes a Bachelor of Science in Meteorology awarded from Texas A&M University in 1985. I spent the first 17 years of my career as a senior scientist/meteorologist for an engineering and environmental consulting firm, Radian/URS Corporation in Austin, Texas, which was later acquired and is now known as AECOM. For the past 22 years, I have been a full-time independent contractor with my own air quality consulting business, AS1MET Services, where I have worked either sole-source, or as a subcontractor to engineering consulting firms and state agencies. I have developed specialized experience during my career, including preparing, leading, and conducting air quality analyses for petrochemical and other industries in Texas and the Gulf Coast, as well as locations in several other states. I have conducted or overseen hundreds of complex air dispersion modeling analyses in support of air quality permit applications. I have also served as an independent reviewer and auditor of air quality analyses conducted by others.

3. In my career, I have worked extensively with Texas Commission on Environmental Quality ("***TCEQ***") Executive Director (the "***ED***") staff members in preparing modeling protocols and reviews of air dispersion modeling performed for air quality permit applications. I am very familiar with and knowledgeable of the air dispersion models TCEQ accepts in the air permitting process (*e.g.*, AERMOD, SCREEN3, ISCST3, and ISC-PRIME). I have extensive experience conducting air dispersion modeling using those models and preparing summaries and analysis of the results. My professional experience and qualifications are further described in my curriculum vitae, included in this affidavit as **Exhibit AS-1**.

BACKGROUND

4. POWER Engineers, Incorporated ("***POWER***") prepared applications to amend nine of Formosa Plastics Corporation, Texas's ("***FPC's***") existing permits[1] (collectively, the "***Application***") to support the company's Flare Improvement Project (the "***Project***") described in *FPC's Response to Hearing Request* and the Affidavit of Tammy Lasater (the "***Lasater Affidavit***"). In my role as Contract Senior Scientist for POWER, I prepared the air quality analysis for the Application.

5. An Air Quality Analysis ("***AQA***") is an essential part of a new source review air permit application. The purpose of the AQA is to demonstrate that the maximum allowable emissions proposed in the Application will not cause or contribute to an exceedance of a National Ambient Air Quality Standard ("***NAAQS***"), a Prevention of Significant Deterioration ("***PSD***") Increment, exceed a state property line standard, or adversely affect human health and welfare.

6. In my work related to the Application, I developed the modeling protocol, conducted the air dispersion modeling, and prepared the Air Quality Analysis Report (the "***AQA Report***") that FPC submitted to TCEQ during technical review of the Application. I prepared a single AQA Report for the proposed increased emissions from new and modified facilities in the Application (the "***Project Facilities***"). I also prepared responses to the TCEQ ED staff's comments and requests for information raised during their technical review of the AQA.

7. In my work on the modeling protocol, conducting modeling, and preparing the AQA Report for the Application, I reviewed various documents, including:

   a. TCEQ and EPA modeling guidance materials;

   b. The application materials for the Permits; and

   c. Memoranda prepared by the TCEQ ED staff related to the staff's audits of the AQA Report for the Application.

8. I reviewed the public comments and hearing requests on the Application filed in this Docket on November 18, 2022, February 2, 2023, and May 30, 2025 on behalf of San Antonio Bay Estuarine Waterkeeper. I considered comments by members of the public at the public meeting TCEQ held and I attended in Point Comfort, Texas, on February 2, 2023 and I reviewed the TCEQ Executive Director's Response to Public Comment dated May 1, 2025. I also reviewed *Formosa Plastics Corporation, Texas's Response to Hearing Requests*.

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[1] TCEQ Air Quality Permit Nos. 140763, 19871, 91780, 19200, 19168, 107518, 20203, 40157, 19201, PSDTX1500M1, PSDTX1236M1, PSDTX1240M1, PSDTX1237M1 PSDTX1226M1, PSDTX1383M2 PSDTX1224M1, PSDTX1222M1 PSDTX1232M1, GHGPSDTX46M1 GHGPSDTX221, GHGPSDTX223 GHGPSDTX218, GHGPSDTX224 GHGPSDTX48M1, GHGPSDTX222 GHGPSDTX225, and GHGPSDTX219 (the "***Permits***").

AIR DISPERSION MODELING ANALYSIS

9. I conducted site-specific air dispersion modeling using AERMOD Version 22112 to calculate predicted maximum off-site[2] ground level concentrations ("***GLC_{max}***") of each regulated air contaminant that is proposed to be emitted from the new and modified facilities in the Application (the "***Project Facilities***") for each relevant averaging period (the "***Modeling***"). The Modeling and related analysis is described in the AQA Report submitted to TCEQ on May 16, 2023, which is attached to this affidavit as **Exhibit AS-2**. The Modeling supersedes the first air dispersion modeling analysis FPC Texas submitted to TCEQ on July 7, 2022. The Modeling includes additional receptors, including receptors on Cox Creek, an updated 1-hour nitrogen oxides ("***NO_2***") NAAQS modeling demonstration, updated meteorological data, and updated NO_2 and ozone ("***O_3***") background concentration data compared to the first air dispersion modeling analysis I prepared for the Application.

10. The Modeling was conducted in accordance with current standard and accepted modeling guidance and procedures used by TCEQ and the U.S. Environmental Protection Agency. I followed such guidance in modeling worst-case maximum emissions from each of the Project Facilities in the Application. The TCEQ Air Dispersion Modeling Team ("***ADMT***") performs an important role in supporting the TCEQ Air Permits Division in technical review of New Source Review air permit applications. The ADMT routinely conducts audits of AQAs, including a peer review process by ADMT staff members, before a team leader approves an AQA for a permit application. The ADMT conducted such an audit of the Modeling and determined it is acceptable for all review types and pollutants.

11. TCEQ's Air Quality Analysis Audit memorandum dated July 25, 2023 (the "***Modeling Audit***") is attached to this Affidavit as **Exhibit AS-3** and summarizes the May 16, 2023 Modeling and AQA Report results and the TCEQ Executive Director's approval.

12. In preparing the AQA, I conducted several modeling analyses, including the following, each discussed below:

    a. NAAQS Analyses for each pollutant to which one or more NAAQS applies
        i. PSD De Minimis Analysis
        ii. Full NAAQS Analysis
        iii. Minor Source De Minimis Analysis
    b. State Property Line Analysis
    c. PSD Increment Analysis
    d. Additional Impacts Analysis
    e. Health and Welfare Effects Evaluation

13. NAAQS Analysis.

    a. PSD De Minimis Analysis. Also known as a Preliminary Impacts Analysis, a de minimis analysis evaluates whether the GLC_{max} for a criteria pollutant is less than EPA de minimis thresholds or significant impact levels ("***SILs***"). Projects whose GLC_{max} are less than the SIL are deemed to have an insignificant impact on air

[2] "Off-site" means all areas beyond the FPC Texas Complex fenceline.

quality and the demonstration of compliance with the NAAQS is complete. In the Application, NO_2, carbon monoxide ("***CO***"), and O_3 are compounds subject to PSD review. As indicated in Tables 1 and 2 of the Modeling Audit, the GLC_{max} for the 1-hour CO NAAQS, the GLC_{max} for the 8-hour CO NAAQS, and the GLC_{max} for the annual NO_2 NAAQS are each less than their respective SILs, which means these compounds have an insignificant impact, so no further analysis is required or needed for those pollutants. The GLC_{max} for the two other NAAQS subject to PSD review ─ 1-hour NO_2 and O_3 ─ are greater than the respective SILs and are therefore subject to further analysis using required information of surrounding sources and a representative monitored background concentration for the Project Facilities in the Application (i.e., a full NAAQS analysis).

b. Full NAAQS Analysis. A full NAAQS analysis considers a broader inventory of emissions sources ─ all emissions at the site under review, emissions from nearby sources, and background concentrations. I obtained background concentrations for hourly NO_2 and O_3 from the FPC NW Site monitor. The FPC NW Site monitor is reasonable and conservative since it is located approximately 2 km downwind of the Complex. The "total predicted concentrations" consist of the FPC NW Site monitor background concentrations, emissions from existing permitted Complex-wide emission sources based on permitted maximum allowable emission rates, emissions from all off-property permitted stationary sources within 50 kilometers of the Project and predicted GLC_{max} of the Project Facilities.

   i. For 1-hour NO_2, the GLC_{max} in the Modeling is greater than the SIL and therefore requires a full NAAQS analysis. The total predicted concentrations indicated in Table 4 of the Modeling Audit reflect that the full NAAQS analysis for 1-hour NO_2 resulted in a GLC_{max} less than the 1-hour NO_2 NAAQS standard.

   ii. For O_3, I conducted an ozone analysis using the proposed maximum precursor emissions (NO_X and VOC) from the Project Facilities and EPA's Tier 1 demonstration tool consistent with the EPA's Guideline on Air Quality Models. The Tier 1 tool, referred to as Modeled Emission Rates for Precursors ("***MERPs***") uses data associated with a worst-case source for NO_X and VOCs to predict the Project's O_3 concentrations. This analysis exceeded the applicable SIL, thus requiring a full NAAQS analysis. For the full NAAQS analysis, I added the Project's estimated O_3 formation to the representative monitored background concentration from the FPC NW Site monitor to demonstrate predicted impacts are less than the O_3 NAAQS, as indicated on Table 5 of the Modeling Audit.

c. Minor Source De Minimis Analysis. Sulfur dioxide ("***SO_2***") emissions proposed in the Application are subject to Minor NSR review rather than PSD review. As indicated in Table 7 of the Modeling Audit, the GLC_{max} for 1-hour and 3-hour SO_2 NAAQS averaging periods are each less than the respective SILs, so no further analysis is required or needed for SO_2.

d. $PM_{2.5}$ Secondary Formation Analysis. A minor source De Minimis analysis requires assessing Project impacts from direct primary $PM_{2.5}$ emissions[3] and from potential secondary formation of $PM_{2.5}$ from precursor emissions of NO_X and SO_2. I conducted a Tier 1 demonstration using EPA's established worst-case MERP values for NO_X and SO_2 consistent with EPA guidance. The GLC_{max} for the 24-hour and Annual $PM_{2.5}$ NAAQS were less than the corresponding NAAQS De Minimis levels or SILs.

14. State Property Line Analysis. In the Modeling, I conducted the required State Property Line Analysis for SO_2. As indicated in Table 6 of the Modeling Audit, the GLC_{max} for SO_2 was less than 2% of the State Property Line Standard; therefore, the Modeling results showed that no further evaluation or modeling was required or needed to meet this state standard.

15. PSD Increment Analysis. The PSD increment is the maximum allowable increase in ambient concentrations allowed to occur above a baseline concentration for a criteria pollutant. Since the GLC_{max} for annual NO_2 in the Modeling is less than the annual NO_2 SIL, a PSD Increment demonstration was not required.

16. Additional Impacts Analysis. As required for a PSD AQA, I conducted an Additional Impacts Analysis, which includes a growth analysis, soils and vegetation analysis, and visibility impairment analysis for Class I and Class II areas. The growth analysis demonstrates that the population will not significantly increase because of the Project. The soils and vegetation analysis demonstrates that all evaluated criteria pollutant concentrations are less than their respective secondary NAAQS. The Class II visibility impairment requirement analysis demonstrates that compliance with opacity requirements in 30 Tex. Admin. Code Chapter 111 will meet visibility requirements. In the Modeling Audit, ADMT concluded that the Additional Impacts Analyses in the AQA are reasonable and possible adverse impacts are not expected from the Project. The ADMT's Class I evaluation of predicted concentrations of NO_2 and SO_2 for all averaging times are less than de minimis levels at 14 kilometers from the Project Facilities. In the Modeling Audit, ADMT concluded that emissions from the Project Facilities are not expected to adversely affect the nearest Class I area, Caney Creek Wilderness, which is located approximately 570 kilometers from the FPC Complex.

17. Health and Welfare Effects Evaluation. I performed a required Health Effects Review Evaluation of the Project Facilities' emissions of chemical compounds for which a NAAQS or State Property Line Standards ("***SPLS***") does not apply as part of the Modeling. For this evaluation, I evaluated total maximum predicted concentrations for each of 46 chemical compounds proposed to be emitted from the Project Facilities. As indicated in the AQA Report and identified on the May 15, 2023 Electronic Modeling Evaluation Workbook, which is included in this affidavit as **Exhibit AS-4**, the total maximum predicted concentrations for the chemical compounds evaluated met Step 3 of the TCEQ's Air Permit Reviewer Reference Guide Number 5874, *Modeling and Effects Review Applicability* (the "***MERA***"). Maximum predicted concentrations of chemical compounds satisfy criteria of

[3] The enclosed ground flare facilities proposed in the Application do not have any primary $PM_{2.5}$ emissions. Secondary $PM_{2.5}$ review is required because emissions of $PM_{2.5}$ precursors (NOx and SO_2) exceed the PSD significant emissions rate (SER) of 40 tons per year.

Step 3 of the MERA analysis when the concentrations are less than 10% of the TCEQ-established Health and welfare-based Effects Screening Level ("***ESL***") used in TCEQ permitting for a chemical compound. Under the MERA, each contaminant is evaluated on an individual chemical species basis. When a contaminant meets the criteria of a step, the review of human health and welfare effects is complete. In other words, when maximum predicted concentrations are less than 10% of the respective ESL, no further analysis is required or needed for such chemical compounds, which was the case for each of the chemical compounds proposed to be emitted from the Project Facilities for the Health Effects Screening Levels Evaluation in the Modeling.

18. In conclusion, the Modeling demonstrates that air quality concentrations from maximum allowable emissions of all proposed contaminants from the Project Facilities in the Application will not cause or contribute to a violation of any applicable NAAQS or SPLS, will not cause a violation of a PSD increment, and will not have adverse effects on soils, vegetation, or Class I areas. As such, the AQA demonstrates that proposed emissions from the Project Facilities will neither cause nor contribute to an air quality violation at FPC's fenceline or beyond.

Further affiant sayeth not."

Arnold R. Srackangast

Arnold R. Srackangast
AS1MET Services

This instrument was acknowledged before me, the undersigned authority, this 12th day of September 2025, by Arnold R. Srackangast.

TAMMY HOCUTT
Notary Public, State of Texas
Comm. Expires 05-17-2028
Notary ID 134907430

Tammy Hocutt

Notary Public in and for the State of Texas

Arnold R. Srackangast Affidavit

Exhibit AS-1

Arnold R. Srackangast CV

Arnold R. (Arney) Srackangast
Meteorologist
586 Viento Cove
Blanco, TX 78606
Phone (210) 573-6485
Email: as1met2@msn.com

Education

B.S., 1985, Cum Laude, Meteorology, Texas A&M University, College Station, TX.

Employment History

Independent Contractor/Sole Proprietor, AS1MET Services, Blanco, TX, 2002-present
Senior Staff Meteorologist, AECOM/URS/Radian International, Austin, TX, 2000-2002.
Senior Meteorologist/Scientist, AECOM/URS/Radian International, Austin, TX, 1995-2000.
Group Leader, Atmospheric Sciences, Radian Corporation, Austin, TX, 1992-1994.
Staff Meteorologist/Scientist, Radian Corporation, Austin, TX, 1990-1992.
Meteorologist/Scientist, Radian Corporation, Austin, TX, 1985-1990.
Undergraduate Research Assistant, Department of Meteorology, Texas A&M University, 1984-1985.
Student Research Collaborator, Brookhaven National Laboratory, Upton, L.I., NY, 1984.
Meteorological Technician, Department of Meteorology, Texas A&M University, 1981-1982.

Fields of Experience

Mr. Srackangast has over 39 years of experience in managing, performing, and peer reviewing atmospheric modeling studies in support of federal and State air quality evaluations. Mr. Srackangast is a recognized expert on the development, application, and use of atmospheric dispersion models, as well as other air quality topics, including ambient monitoring, emission inventory development, and air quality impact evaluations. Mr. Srackangast routinely interacts with both State and federal regulatory agencies to develop thorough modeling methodologies which yield representative results. He also implements regulatory and other as-needed changes to the Fortran computer code of the models, both on PC-compatible computers and UNIX workstation computers.

Mr. Srackangast has served at every level of project execution for modeling efforts. His experience and depth of knowledge regarding modeling fundamentals, protocols, and computer hardware and software assure consistent and quality project execution. The result is an extremely high-quality product completed in a consistent and efficient manner. His management experience includes assembling and directing teams comprised of two to eight junior engineers and scientists; and, developing and tracking task expenses and budgets. He also routinely devises innovative, comprehensive, stream-lined strategies to achieve project milestones under challenging timelines.

Mr. Srackangast also has considerable expertise in applying complex computing techniques to analyze large databases and provide solutions to a variety of air quality issues. Some of these techniques and tools include the use of scientific and statistical programming languages (SAS®, Fortran 95, Visual Basic), database software (Microsoft Access, Corel Paradox), computer graphics (Golden Surfer, Grapher, ArcView GIS), and extensive use of UNIX workstation and personal computers.

Dispersion Modeling

Mr. Srackangast has led and conducted over 150 air quality analyses in support of federal Prevention of Significant Deterioration (PSD) permit applications, nonattainment/State Implementation Plan (SIP), National Emissions Standards for Hazardous Air Pollutants (NESHAPs) and State air quality permitting efforts, as well as ambient monitor siting and exposure analyses (i.e., health risk assessments). He has quantified emissions and performed dispersion modeling using both short and long-term regulatory models including AERMOD, ISCST3, ISCLT3, ISCEV3, ISC-PRIME, CALPUFF, CALINE4, CAL3QHC, HYSPLIT, SCREEN3, VISCREEN, and OCD. He has performed photochemical dispersion modeling using OZIPM, RPMII, and RPMIISS to assess area-wide and point source VOC impacts in various cities. Brief descriptions of a few of these projects follow:

Air Permitting

- Major Expansion, Petrochemical Complex, Southeast, TX. Managed and conducted the air quality analysis for a multi-billion dollar expansion at a southeast Texas petrochemical complex approved by the Texas Commission on Environmental Quality (TCEQ) and U.S. Environmental Protection Agency (EPA) Region VI. The project involved nearly 100 new emission sources including furnaces, boilers, turbines, reactors, flares, storage tanks, and fugitives. The project triggered federal Prevention of Significant Deterioration (PSD) review for five pollutants: nitrogen oxides (NOx); volatile organic compounds (VOCs); particulate matter (PM_{10}, $PM_{2.5}$), and carbon monoxide (CO). The analysis required demonstrating compliance with the National Ambient Air Quality Standard (NAAQS), including the new standards for NO_2 1-hour, SO_2 1-hour, and $PM_{2.5}$ annual NAAQS. Developed the approved modeling protocol. Conducted several air dispersion modeling scenarios using AERMOD Version 12345 with five years of meteorological data (2006-2010), as well as locating/deriving suitable background concentrations to add to modeled impacts. Evaluatied proposed emissions against Significant Impact Levels (SILs). For compounds exceeding their respective SILs, a full NAAQS analysis of all sources within the area of significant impact (AOI) was conducted to demonstrate compliance with the NAAQS.
- ATSDR Health Consultations. Lead dispersion modeler for an air quality analysis of four industrial facilities in Midlothian, Texas for ATSDR using the U.S. EPA-recommended AERMOD dispersion model (AERMOD Version 11059). Developed the modeling protocol outlining the model selection, proposed setup, meteorological data, and modeling assumptions. Performed model setup, source inputs, meteorological data selection, receptor grid development, terrain processing using AERMAP, as well as model execution and analysis of output.
- Fort Worth Air Quality Study. Lead dispersion modeler for the Fort Worth Air Quality Study. This study, sponsored by the City of Fort Worth, focused on characterizing emissions and air impacts from natural gas drilling stations in the Barnett Shale located within the city limits. The modeling portion of the study determined maximum short-term and long term impacts of approximately 60 compounds of interest emitted from equipment associated with wellheads and compressor stations, and assisted the City in establishing setback distances from drilling stations such that public health is protected. Assisted with the design and preparation of AERMOD inputs for a number of different site layouts and scenarios that conservatively estimated local impacts. The results of the modeling were compared against ATSDR and TCEQ Effects Screening Level (ESL) concentrations, summarized graphically using isopleths, and a full report was prepared describing model inputs, assumptions, and outputs.
- Valero Refining, Inc. Lead dispersion modeler responsible for conducting an air quality analysis of increases in speciated VOC emissions (benzene, crude oil, refinery heavies, refinery lights, MDEA) associated with a permit amendment (TCEQ Permit No. 6825A/PSD-TX-49/N65) for the Port Arthur Refinery. Performed all aspects of the analysis including developing sitewide model inputs, conducting the BPIP-PRIME building downwash analysis, locating meteorological data, and submittal to the regulatory agency (TCEQ), and responses to agency questions.
- Air Quality Analysis of Maintenance, Startup/Shutdown Emissions. Lead dispersion modeler responsible for conducting the air quality analysis of Maintenance, Startup, Shutdown (MSS) emissions for a large petrochemical complex in Texas, as well as two other large refineries. Evaluated emissions of criteria pollutants (NOx, SOx, CO, PM_{10}), as well as air toxics for comparison to the Texas Effects Screening Levels (ESLs). Responsible for setup and conducting the air dispersion modeling using AERMOD, as well as generating the report and responding to comments from the TCEQ. For the petrochemical complex, also performed a comprehensive analysis of ambient monitoring and meteorological data collected during maintenance events in order to compare monitoring concentrations with maintenance events.
- Lead dispersion modeler in charge of conducting the air quality analysis for a new 300 MW Circulating Fluidized Bed (CFB) petroleum coke-fired energy unit at the Formosa Plastics facility in Point Comfort, Texas (TCEQ Air Permit 76044, PSD-TX-1053). Pollutants subject to PSD included nitrogen oxides (NO_x), sulfur dioxide (SO_2), particulate matter/particulate matter of 10 microns or less (PM/PM_{10}), volatile organic compounds (VOC), carbon monoxide (CO), sulfuric acid (H_2SO_4), and fluorides. Trace metals were evaluated against TCEQ Effects Screening Levels (ESLs).

- Conducted an independent third-party audit of Asarco Incorporated's (ASARCO's) air quality analysis performed in support of the renewal of TCEQ Air Permit 20345 for the El Paso Smelter (TCEQ Docket No. 2004-0049-AIR). Served as an independent expert as part of an Interim Agreed Order between ASARCO and TCEQ.

- Lead technical reviewer of the air quality analysis portion of the Panda Gila River Project, a 2100 MW natural gas-fired cogeneration project sited near Gila Bend, AZ, for the Maricopa County Environmental Services Depaxrtment (MCESD) in Phoenix, AZ. The project consisted of eight combustion turbines and four steam turbines. Performed technical peer review of the modeling protocol and application, including federal Class I and Class II impacts, as well as participated in public hearing support.

- Task leader in charge of conducting the air quality analysis for two Reliant Energy (formerly HL&P) projects. The utility proposed to modify a 590 MW coal-fired, steam electric generating unit located in Fort Bend County, TX, to allow co-firing of petroleum coke. Although this project ultimately was not permitted, a boiler re-rating project was performed and approved for all four units at the plant. These projects required modeling of the boilers and all ancillary emission sources including fuel handling, limestone handling, and waste handling. The projects required PSD modeling for SO_2, NO_x, PM_{10}, and CO, as well as evaluation of certain metals for TCEQ ESLs. Site-wide modeling of all sources within 70 kilometers of the plant was performed, which included a large portion of Harris County.

- Task leader in charge of conducting the air quality analysis for three, grass-roots, coal-fired 500MW projects: two sited in Wyoming; and, one in Louisiana. Conducted all components of the air quality analysis, including air dispersion modeling and additional impacts analysis. The projects required PSD modeling for SO_2, NO_x, PM_{10}, and CO. Wyoming projects required assessment of federal Class I AQRVs, PSD Increment consumption, and visibility using the CALPUFF model.

- Task member for the air quality analysis portion of Texaco's Sunrise Power Company Application for Certification (98-AFC-4) of a 320 MW Cogeneration and Power Project near Fellows, CA. Served as internal technical consultant and peer review on air dispersion modeling and meteorological processing. Provided expert testimony regarding meteorological data processing and representativeness at public hearings before the California Energy Commission (CEC).

- Subcontractor for the University of Texas Center of Energy and Environmental Resources (UT/CEER) on a contract with the Texas Commission on Environmental Quality (TCEQ) to provide air dispersion modeling support under the TCEQ Permit Timeline Reduction Initiative. Conducted air dispersion modeling for six facilities in order to expedite the permitting process for RCRA hazardous waste combustion facilities. Performed modeling using EPA's Industrial Source Complex model (ISCST3) in accordance with the procedures described in the USEPA guidance document entitled "Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities" (EPA530-D-98-001; July 1998).

- Task leader in charge of performing full NAAQS and PSD analysis for five Tier II Gasoline projects in the Gulf Coast Region: ExxonMobil Baton Rouge Refinery; ExxonMobil Baytown Refinery; Citgo Lake Charles Refinery; Tosco Alliance Refinery; and, Motiva Norco Refinery. Comprehensive facility information was gathered and compiled, including sitewide building downwash information, as well as developing PSD baseline and current emission rates for increment analyses. Off-site emission retrievals were reviewed for errors and omissions.

- Task leader for three separate, successful PSD permitting efforts for the ExxonMobil Baytown Refinery: 1) a PSD amendment to allow alternate fuel firing in the Catalytic Light Ends Unit Furnace 3; 2) the PSD permit amendment application to modify the Flexicoker's 82 MMBtu/hr process heater to increase its capacity up to 110 MMBtu/hr (high heating value basis); and, 3) a PSD permitting effort to install a new process heater to fire Low-BTU (LBG) and Refinery Blend Gas (BG), and to increase the firing rates of four grandfathered process heaters, and two permitted process heaters. Directed and performed all aspects of the air quality analysis task for these projects, including conducting meetings with TCEQ modeling staff, preparing the PSD modeling protocol, and performing the air quality dispersion modeling analysis using the SCREEN3, ISCST3, ISCEV2, and ISCLT2 models. The air quality analyses consisted of modeling for comparison against various Federal and State ambient standards. For particulate matter, a plant-wide modeling analysis was conducted for comparison with the 1-hour and 3-hour TCEQ Regulation I property-line standards, and with the PM_{10} NAAQS for the 24-hour and annual averaging periods. CO emissions were modeled for comparison with the NAAQS. For SO_2, a plant-wide analysis was performed for comparison with the TCEQ short-term SO_2 standard, and a full NAAQS and PSD increment analysis was conducted in accordance with Federal PSD requirements. Over 1100, off-site emission sources were included and evaluated for these PSD analyses.

- Task leader of a major expansion project for a Shell Oil refinery in the Texas Gulf Coast region. Project required PSD and TCEQ permits for constructing a 150 MW cogeneration facility, two 200 long-ton per day sulfur recovery units, a 60,000 bbl/day coker facility, a gas-oil hydrotreater, and barge loading operations. Directed and performed all aspects of the air quality modeling analysis for the project including conducting meetings with TCEQ modeling staff, preparing the PSD modeling protocol, and performing the air quality dispersion modeling analysis using the SCREEN, ISCST2, ISCEV2, and ISCLT2 models. Project required analysis of SO_2 and NO_x emission sources in Harris County and a refinery-wide building downwash analysis. Cartographic information for the entire Harris County area, including facility boundaries, stack locations, and stack parameters, were entered into the INFOCAD® Geographic Information System (GIS) to facilitate quality assurance of the TCEQ Point Source Data Base (PSDB).
- Task leader of a pending PSD and TCEQ permit for a 67MM Btu/hr thermal oxidation facility to be constructed at a large Texas Gulf Coast petrochemical company. Performed and directed all dispersion modeling efforts including PSD significance determinations, NAAQS compliance, and TCEQ Effects Screening Level (ESL) determinations. Prepared an approved modeling protocol and conducted meetings with TCEQ modeling staff on behalf of the client.
- Task leader of a project to obtain numerous air quality construction permits for a major plastics manufacturing facility being built in the Texas Gulf Coast region. Wrote software to minimize receptor locations based on emission source orientation within the property line. Approach led to modeling and analysis time being reduced by 50 percent.
- Task member on the RCRA Part B Air Addendum permits for hazardous waste incinerators at four Gulf Coast chemical plants. Performed the emissions characterization and dispersion modeling for one of the plants, and assisted in the modeling and analysis of three other facilities.
- Task member on a permit application for a Gulf Coast waste storage facility. Developed a hazardous waste database from an air toxics list from the RCRA, Appendix VIII, CERCLA, and Texas Air Control Board listings of hazardous compounds.

NESHAPs

- Task leader for the Radiological Air Emissions Management project at a Department of Energy National Laboratory. Performed radiological dose assessment modeling using CAP88PC to develop millirem per curie factors and the potential effective dose equivalent from each potential radiological release point at the Lab for compliance demonstrations with the National Emissions Standard for Hazardous Air Pollutants (NESHAP) for radionuclides. Coordinated the development of an integrated modeling environment that accesses stack parameters and emissions databases and develops CAP88PC inputs, runs the model, and places model results directly back into the database, all in a run-time application. Also developed a database of the nearest public receptor point and appropriate meteorological data to be used by the model for every Technical Area and permanent building at the Lab.
- Provided dispersion modeling support for beryllium NESHAP permitting efforts at a Department of Energy National Laboratory.
- Project director for a site-specific risk assessment performed to evaluate/demonstrate compliance of a large Texas Gulf Coast refinery with the benzene waste NESHAP. Project involved quantifying and modeling all waste benzene emission sources (over 1000 sources) and demonstrating compliance with risk-based standards.

Emission Inventories

Mobile Sources

- California On-Road Emissions Inventory Support (EMFAC). Task leader for a contract with the California Air Resources Board (CARB) to enhance and optimize their on-road mobile source emissions inventory model (EMFAC2002). Designed, coded (Fortran 95), and tested a "what-if" scenario generator, including the dialogs for the graphical user interface (GUI). Also, optimized the program for speed and memory allocation. Additional enhancements being incorporated include updated fuel correction factors, Inspection/Maintenance schedule changes/updates.

- California Off-Road Emissions Inventory Support (OFFROAD). Incorporated the results of analyses into the State's OFFROAD emissions inventory estimation model (coded in Fortran language). Performed modifications to the population and usage estimates contained in the model as well as developing a new graphical users interface (GUI) to facilitate the execution of the model in both default and scenario modes. Leading all tasks requiring code modifications, database construction, and data analysis.
- Western Governor's Association Mexico Emissions Inventory Program. Lead programmer for the development of a version of the U.S. EPA NONROAD model for Mexico. Applied data and coding (Fortran) updates for agriculture and construction emissions.
- Task member of an evaluation of the inspection and maintenance (I/M) plan for the State of Connecticut. Maintained a large database of the vehicle fleet and created much of the statistical data samples used in characterizing the Connecticut vehicle fleet and evaluating its I/M program. Used SAS programming language for the analysis.
- Task member of a California Bureau of Automotive Repair (BAR) project to enhance the California Motor Vehicle Emissions Factor Model (CALIMFAC Version 1.13b) to incorporate and simulate the equivalency determination for the California Pilot I/M program. Performed extensive Fortran coding, analysis, and testing. Also, modified the program to operate on personal computers instead of Unix computers only.
- Task member on a U.S. EPA project to estimate motor vehicle toxic emissions, exposure, and risk in 13 urban areas. Designed the Input File Builder, a Visual Basic program, which created over 1000 Mobil 5a runstreams by calendar year, season, I/M program, toxic compound, and city.

Ambient Air Quality Monitoring

- Task leader for an ambient air monitoring plan for a Louisiana refinery. Performed the air quality impact analysis, compared these impacts to significant monitoring concentrations to determine monitoring needs, performed site selection of the monitors, and assisted in the report presentation.
- Task leader on eight different ambient monitoring projects. Provided auditing support, determined representativeness of the meteorological data and performed data validation. Also, hand-determined mixing layer heights and atmospheric stability classes based on data taken by an acoustic sounder.

Air Quality Studies

- Task leader for a major analysis of the formation and transport of ozone in the Houston, Texas area. Research led to the development of an ozone climatology of the region. Responsibilities included analyzing and correlating meteorological conditions during ozone episodes, performing air quality and meteorological data analyses, designing and development of computer generated graphics for data presentation, and the upgrade and maintenance of a large 5-year air quality database of 33 continuous air monitoring stations in the Houston area. Also developed forward and back trajectories to determine the transport of ozone on individual days.
- Task member in an exposure analysis and risk assessment for a large Southern California refinery. Performed air quality modeling to determine worker and populations exposure to carcinogenic and non-carcinogenic compounds. Quantified impacts from soil contaminated by tank leaks from underground storage tanks.
- Task leader in an exposure analysis for two CERCLA Superfund site in the Texas Gulf Coast region. Performed air quality modeling to determine populations exposure to carcinogenic and non-carcinogenic compounds from remediation activities.
- While at Brookhaven National Laboratory, participated in residential woodburning, and acid rain, impact studies while a summer intern in the Energy Analysis branch of the lab. Performed statistical analyses on meteorological parameters and air quality data for research into the effects of residential woodburning in various regions of the U.S. Used SAS statistical programming language and Fortran language for data analysis. Ran Gaussian dispersion and diffusion computer models for urban point source studies of SO_2.

Meteorological Data Processing

- Task member for meteorological preprocessing to construct CALMET datasets necessary to assess visibility impacts using CALPUFF on a proposed 33MW peaking unit for the Public Service Company of Colorado.
- Task leader of a project for the Lake Charles Area Industrial Alliance (LAIA) to collect and process annual on-site meteorological data from two ambient air monitoring stations, as well as National Weather Service observations, into the format for input to the AERMOD, ISC, and CDM dispersion models.
- Developed computer programs for various meteorological and air quality applications. Responsible for the processing of meteorological data into the proper format needed for performing dispersion modeling, and maintaining a database of these files. Wrote the Fortran programs to transform multiple data files from various ambient air monitors into one continuous file and create alternative meteorological PREP files for use in dispersion modeling. Task member on a project to process 20 years of temperature data from various cities around the country into joint frequency distributions for use in assessing mobile source evaporative emissions. Processed on-site meteorological data, including hourly mixing heights measured with an acoustic sounder, into PREP files.
- As an undergraduate research assistant, worked for the Office of the State Climatologist updating climatological records for stations in Texas. Assisted in the preparation of the weather summary portion of the 1985-1986 Texas Almanac. Also, participated in Mesoscale Convective Complex research. Worked as a research assistant to another professor. Plotted meteorological data for surface analysis, and charted hourly rainfall amounts.
- As a Meteorological Technician, worked on a NASA sponsored project to validate weather satellite observations using radiosondes. Responsibilities included launching and tracking of radiosondes, taking surface observations, and preparing sounding results for computer entry and analysis.

Environmental Assessment

- Task member in a study of the environmental impacts of alternative electrical power generation technologies. Participated in an evaluation of the environmental and economical aspects of potential replacement scenarios to a 1000 MW nuclear power plant. Alternatives studied were western coal, lignite, and cogeneration plants. Quantified the resource use and emissions from all aspects of the fuel cycle and plant operation for the nuclear alternative. In addition, quantified the emissions from the mining and transportation of equivalent coal amounts for the western coal and lignite alternatives.

Professional Registrations/Certifications

Texas Department of Transportation (TxDOT), Precertified in Air Quality (Category 2.2.1, No. 6753)
Air and Waste Management Association
American Meteorological Society (AMS)
    Central Texas Chapter President 1989-1993
    Central Texas Chapter Vice President 1987-1989
    Central Texas Chapter Secretary/Treasurer 1986, 1995-2000
Chi Epsilon Pi Meteorological Honorary Society
Sigma Gamma Epsilon Geosciences Honorary Society

Publications

Srackangast, Arnold R., AS1MET Services, *Independent Third Party Audit of the Air Quality Analysis for ASARCO Incorporated El Paso Smelter Plant, Renewal of TCEQ Permit 20345*, TCEQ Docket No. 2004-0049-AIR, April 2007.

Balentine, H.W. and A.R. Srackangast, "Development of an Ozone Climatology for Harris County, Texas," 80th Annual APCA Meeting, Paper 87-113.2, New York, NY, 1987.

Balentine, H.W. and A.R. Srackangast, "Case Studies of Two Unusual High Ozone Days in Harris County, Texas," 80th Annual APCA Meeting, Paper 87-113.3, New York, NY, 1987.

Lipfert, F.W., L.R. Dupuis, M. Daum, and A. Srackangast, "Empirical Analysis of Residential Woodburning Impacts," BNL 51829, Brookhaven National Laboratory, October 1984

Arnold R. Srackangast Affidavit

Exhibit AS-2

FPC Air Quality Analysis Report

July 2022
Revised May 16, 2023

AIR QUALITY ANALYSIS

In Support of NSR Permits
Formosa Plastics Corporation, Texas (FPC TX)
Flare Improvement Project
NSR Permit Nos. 19168, 19200, 19201, 19871, 20203, 40157, 91780, 107518, 140763,
Calhoun County and Jackson County, Texas

Customer Reference No. CN600130017
Regulated Entity No. RN100218973

Submitted To:
Texas Commission on Environmental Quality
Air Division
12100 Park 35 Circle
Austin, Texas 78753

PROJECT NUMBER:
172608.02.01

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POWER ENGINEERS

EXECUTIVE SUMMARY

Formosa Plastics Corporation, Texas (FPC TX) is undertaking a Flare Improvement Project (Project) that entails installing four new non-assisted Enclosed Ground Flares (EGFs) within the boundary limits of the Olefins Plant (OLI and OLII). The EGFs are being installed to prevent or minimize visible emission (i.e., "smoking"). The new EGFs will assist/augment FPC TX's currently authorized existing Olefins Plant elevated flares to ensure complex-wide flaring activities comply with the new Residual Risk and Technology Review (RTR) requirements from recently-promulgated Miscellaneous Organic Chemical Manufacturing (MON) and Ethylene Maximum Achievable Control Technology (MACT) RTR rulemakings.

These four new EGFs will support routine flaring and maintenance, startup, and shutdown (MSS) flaring events (up to their smokeless design capacities). The new EGF control devices are being incorporated into nine (9) different New Source Review (NSR) applications that cover eleven (11) different affected FPC TX process units. However, the only permit changes required are limited to how the new EGFs and/or the existing Olefins elevated flares will, post-RTR, control aggregate waste gas streams generated in each affected process unit. To be clear, in these permit applications:

- FPC TX is establishing NOx, CO, and VOC routine and MSS annual flaring emission CAPs in each permit which allow for waste gas to be flared at any of the four EGFs and/or any of the three elevated flares.
- FPC TX is incorporating NOx, CO, and VOC annual flaring emission increases for the Olefins elevated flares (EPNs 1018, 1067, OL3-FLR A/B/C) associated with revised MSS flows. These requested increases were provided to TCEQ on March 4 and March 8, 2022;
- This single air quality analysis (AQA) supports incorporating the EGFs into all nine (9) affected NSR applications; and,
- The procedures detailed in this document were used to demonstrate the Project will neither cause nor contribute to an air quality violation at or in the vicinity of the FPC TX complex.

Due to changes to the flare emissions units, this Project triggers Prevention of Significant Deterioration (PSD) review for VOC, NOx, CO, secondary $PM_{2.5}$ and greenhouse gases (GHGs). The GHG emissions associated with the new and existing flares are existing emissions that simply must be quantified for this Project.

The Project Impacts Assessment includes the four new EGFs. Three existing Olefins elevated flares are also included due to changes to the allowable annual emission rates. Table ES-1 summarizes the PSD and State criteria pollutants that were evaluated. State criteria pollutants, as well as toxics emissions are also addressed in the Emissions Modeling Evaluation Workbook (EMEW), which is submitted concurrently with this AQA.

Modeling procedures for this Project were originally proposed in November 2021 (POWER, 2021d), approved by TCEQ, and subsequently applied in the initial AQA submittal dated July 7, 2022 (POWER, 2022). This revised AQA includes procedures for performing additional or revised analyses to further demonstrate that the Project will meet all federal and State air quality standards and guidelines. The procedures which differ from the original AQA submittal are highlighted in blue text, as shown here, and throughout this document. A bulletized summary follows:

- Additional receptors were included in the modeling to demonstrate that maximum model-predicted ground level concentrations at such receptors will also meet federal and state air quality standards and guidelines. Additional receptors were placed in the following areas:

  - Cox Creek: Receptors were added along and within the portion of Cox Creek that resides inside FPC TX property.

  - Alcoa Property immediately west of FPC TX's Plant: Receptors were added in a narrow north-south parcel of property immediately west of FPC TX's Plant along FM 1593 that is owned by Alcoa.

  - Expanded area of impact (AOI): The modeled receptors (1km spacing) were conservatively expanded from the original 25 km to 50km to fully encapsulate the region of influence (ROI).

- A revised 1-hour NO_2 "full" NAAQS modeling demonstration was conducted. This analysis included modeling the emissions of all permitted FPC TX site-wide sources as well as offsite sources found within 50 km of the Project. Further discussion on the inventory and detailed procedures is provided in highlighted portions of Sections 6 and 7.

- The revised AQA used the latest regulatory version of AERMOD and available meteorological data processed with AERMET.

  - AERMOD Version 22112 was used instead of AERMOD Version 21112.

  - AERMET Version 22112 preprocessed meteorological data for 2017-2021 released by TCEQ in December 2022 for Jackson County was used instead of the AERMET preprocessed meteorological data for 2014-2018 that was used in the previous modeling.

- Ambient NO_2 and ozone background concentrations were updated to reflect the most recent three-year period (2020-2022) from FPC TX's NW ambient monitor. See Section 5.3 for further discussion.

- The ozone analysis was reperformed to incorporate updated background concentrations (2020-2022). Such analysis involved no revisions to the ozone precursor emissions.

- Secondary $PM_{2.5}$ impacts were not reevaluated because *plant-wide* EGF $PM_{2.5}$ precursor emission totals (for NOx and SO_2) are unchanged.

TABLE ES-1 PSD AND STATE CRITERIA IMPACT SUMMARY ($\mu g/m^3$)

COMPOUND	AVERAGING PERIOD	PRELIMINARY IMPACTS ANALYSIS / AREA OF IMPACT (AOI)			SIGNIFICANT MONITORING CONCENTRATION (SMC)	NAAQS OR CHAPTER 112 STATE PROPERTY LINE STANDARD					PSD INCREMENT		
		IMPACT ($\mu g/m^3$)	SIL[1] ($\mu g/m^3$)	DIST[2] (KM)	STANDARD ($\mu g/m^3$)	IMPACT ($\mu g/m^3$)	BACKGROUND ($\mu g/m^3$)	TOTAL ($\mu g/m^3$)	STANDARD ($\mu g/m^3$)	PCT (%)	IMPACT ($\mu g/m^3$)	STANDARD ($\mu g/m^3$)	PERCENT (%)
CO	1-hr	357.8	2000	< *SIL*	--	< *SIL*	< *SIL*	< *SIL*	40,000	< *SIL*		--	
	8-hr	143.1	500	< *SIL*	575	< *SIL*	< *SIL*	< *SIL*	10,000	< *SIL*		--	
NO_2	1-hr	34.3 [5]	7.5 [4]	30.5 [2]	--	181.4 [6]	included [7]	181.4	188	96.5%		--	
	Annual	0.12	1	< *SIL*	14	< *SIL*	< *SIL*	< *SIL*	100	< *SIL*	< *SIL*	25	< *SIL*
VOC (ozone)	8-hr	2.03 ppb	1 ppb	*NA*	*NA*	2.03 ppb	63.9 ppb	65.9 ppb	70 ppb	94%			
$PM_{2.5}$ SECONDARY [7]	24-hr	0.24	1.2 [3]	< *SIL*	--	< *SIL*	< *SIL*	< *SIL*	35	< *SIL*			
	Annual	9.9E-3	0.3 [3]	< *SIL*	--	< *SIL*	< *SIL*	< *SIL*	12	< *SIL*			
SO_2	30-min[8]	0.17	20.42 [8]	*NA*	--	< *SIL*	< *SIL*	< *SIL*	1021	< *SIL*	*NA*	*NA*	*NA*
	1-hr	0.16	7.8 [4]	< *SIL*	--	< *SIL*	< *SIL*	< *SIL*	196	< *SIL*	*NA*	*NA*	*NA*
	3-hr	0.14	25	< *SIL*	--	< *SIL*	< *SIL*	< *SIL*	1300	< *SIL*	*NA*	512	*NA*

[1] Significant Impact Level (SIL), or *de minimis* concentration.
[2] Maximum distance from center of Project emission sources to edge of AOI.
[3] EPA recommended value of 1.2 $\mu g/m^3$ for the 24-hour average. Annual value of 0.3 $\mu g/m^3$ from 40 CFR 51.165(b)(2). Justification for these values presented in Section 5.2.
[4] Interim SIL. Justification for this value is provided in Section 5.2.
[5] NO_2 1-hour 1st-highest daily maximum preliminary impact averaged over the five years modeled from source group "ALLMD" using Tier 2 NO_2 formation. The ALLMD source group represents the "mid-load" case (EGFs at 50% load exhaust parameters and 50% of max emissions). ALLMD modeled NO_2 1-hr impacts were found to be higher than source group ALLMX, where ALLMX represents the "max" load case with 100% design limits and emission rates.
[6] The full NAAQS impact was determined/modeled using NO_2 Tier 2 formation for source group ALL according to the methodology presented in Section 7.2.3. The modeled form of the "full" NAAQS standard is the 8th-highest maximum 1-hour daily impact.
[7] The background concentration to add to the modeled impact was determined directly within the model run by season and hour from data summarized in Table 5-4.
[8] There are no direct/primary $PM_{2.5}$ emissions for this Project, only precursors. (see Table 7-1 for secondary formation calculation).
[9] Per TCEQ guidance, the model-predicted 1-hour concentration is compared to the 30-min net property line standard.

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1.0 PROJECT IDENTIFICATION INFORMATION

Applicant:	Formosa Plastics Corporation, Texas
Permit Numbers:	19168 / PSDTX1226 107518 / PSDTX1383 19201 / PSDTX1232 40157 / PSDTX1222 19200 / PSDTX1237 91780 / PSDTX1240 20203 / PSDTX1224 140763 / PSDTX1500 19871 / PSDTX1236
Regulated Entity Number:	RN100218973
TCEQ Account Number:	CB-0038-Q
Customer Reference Number:	CN600130017
Nearest City and County	Point Comfort; Calhoun, Jackson Counties
Applicant's Modeling Contact	Arney Srackangast, AS1MET Services Ph: 210-573-6485 Email: as1met2@msn.com
Applicant's Permit Application Contact	Eric Quiat, POWER Engineers, Inc. Ph: 512-579-3823 Email: Eric.Quiat@powereng.com

2.0 PROJECT OVERVIEW

2.1 Project Description

Formosa Plastics Corporation, Texas (FPC TX) currently operates several chemical manufacturing process units at their chemical complex near Point Comfort, in Calhoun and Jackson Counties, Texas. Calhoun and Jackson Counties are both designated as attainment/unclassifiable with respect to the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. The FPC TX chemical complex is an existing Prevention of Significant Deterioration (PSD) and Title V major stationary source.

FPC TX is subject to Environmental Protection Agency (EPA)'s new Residual Risk and Technology Review (RTR) requirements in (1) the Ethylene Maximum Achievable Control Technology (MACT) rule (40 CFR 63 Subpart YY), as promulgated in the July 6, 2020 *Federal Register*, and (2) the Miscellaneous Organic Chemical Manufacturing (MON) National Emissions Standards for Hazardous Air Pollutants (NESHAP) MACT rule (40 CFR 63 Subpart FFFF), as promulgated in the August 12, 2020 *Federal Register*. To comply with these new RTR requirements, FPC TX is seeking authorization to enhance the current steam-assisted elevated flare systems. The proposed Flare Improvement Project involves the installation of four new non-assisted Enclosed Ground Flares (EGFs) to increase the smokeless design capacities of the overall flare systems which are/will be physically located in the Olefins I (OLI) and Olefins II (OLII) process units.

The sole purpose of the Flare Improvement Project is to meet recently-promulgated RTR flare requirements. FPC TX is not requesting any physical changes or changes in the method of operation outside of the boundary limits of the OLI and OLII Plants. The specific physical and operational changes being proposed for the OLI and OLII flare systems as part of this permit amendment include:

- Two new non-assisted EGFs will be installed in each of the OLI and OLII Plants (a total of **four** new EGFs) to increase each flare system's smokeless capacity. Each EGF has a smokeless design capacity of 220,000 pounds per hour (lb/hr) of waste vent gas.
- New fuel gas (natural gas) piping fugitives will be installed to provide pilot fuel gas to the new EGFs. New piping fugitives will also result from the installation of new C3 Buffer Drums.
- Post-Project vent gas flows for the OLI and OLII units can either be directed to any four of the EGFs or to any of the Olefins units elevated flares [Emission Point Numbers (EPNs): EGF-1, EGF-2, EGF-3, EGF-4, 1018, 1067, and/or OL3-FLRA/B/C).
- The Olefins 3 (OL3) plant's elevated flare is being authorized to serve as an alternate control device to control waste gases from the Olefins Plant (i.e., the OLI and OLII units). The OL3 elevated flare system is authorized by New Source Review (NSR) Permit No. 107518. The OL3 elevated flare EPNs are being added as an authorized EPN in the Olefins Plant Maximum Allowable Emission Rate Table (MAERT) with this Project.
- As part of the Flare Improvement Project, this same flexibility (for OL3 flare disposition of waste gases in flare header) is being added to all other polyolefins plants at the Point Comfort complex via amendments to their respective NSR permits.
- Note that there was a previous increase in the smokeless design capacities of the OLI and OLII steam-assisted elevated flares from 100,000 lb/hr to 400,000 lb/hr. This RTR-driven change was permitted separately under Texas Commission on Environmental Quality (TCEQ)'s Pollution Control Standard Permit and is not a part of the current permitting action.

2.2 Type of Permit Review

Table 2-1 shows the requested potential to emit increases across all the applications. The Flare Improvement Project emission increases trigger PSD review for the NSR-regulated pollutants NOx, CO, VOC, secondary $PM_{2.5}$ and GHGs. Project emissions of criteria pollutants were evaluated under Major NSR (i.e., PSD) review. Note that Table 2-1 shows there are no direct particulate matter emission increases and that the Project's SO_2 increases are not subject to PSD review. As shown in Table 2-1, permit-wide VOC emissions will increase from currently authorized limits due to the Flare Improvement Project. Speciated VOCs are subject to TCEQ Health Effects Screening Level (ESL) criteria.

2.3 Air Contaminants to be Evaluated

The criteria pollutants that were evaluated and the applicable standards are summarized in Table 2-2. NOx and CO emissions were evaluated by modeling proposed *plant-wide* EGF allowable emission rates. There are no direct PM_{10} or $PM_{2.5}$ emissions from the flares (Project sources) affected by this Project, and SO_2 emissions are not subject to PSD review. Secondary $PM_{2.5}$ emissions were evaluated due to precursor (NOx) emissions exceeding the significant emissions rate (SER) of 40 tons per year (tpy) for secondary $PM_{2.5}$. See Section 6.0 for further discussion.

State criteria pollutants (SO_2), as well as toxics emissions are also identified and addressed in the Emissions Modeling Evaluation Workbook (EMEW) submitted with the original AQA. Aside from revised receptors, updated meteorological data, and version of the dispersion model, information related to SO_2 and air toxics is unchanged from those used in the initial AQA. An updated final EMEW accompanies this revised AQA to present updated impacts.

TABLE 2-1. ANNUAL POTENTIAL-TO-EMIT (PTE) EMISSION CHANGES FOR THE FLARE IMPROVEMENT PROJECT

Plant	NSR Permit No.	EPN(s)		EGF PTE Changes (tpy): Routine + MSS				
		Existing System / MAERT	New[2]	NOx tpy	CO tpy	SO_2 tpy	VOC tpy	$PM_{2.5}$ tpy
OLI	19168	1018	FLARECAP MSSFLARE CAP	155.51	386.91	0.02	6.17E-03	-
OLII	19168	1067		72.83	221.96	-	-	-
FRACII	19168	1018		-	1.67	2.64	4.86E-04	-
OL3 & PDH	107518	OL3-FLRA/B		236.84	2,334.67	3.00	263.48	-
HDPEI	19201	1018/1067		0.33	21.69	-	-	-
HDPEII	40157	1018/1067		-	54.17	0.01	-	-
PPI	19200	1018/1067		6.80	25.08	0.01	1.70E-03	-
PPII	91780	1018/1067		5.23	26.38	0.01	-	-
LLDPE	20203	1018/1067		2.69	-	-	-	-
UT3[1]	140763	OL3-FLRA/B		-	-	-	-	-
Traffic[2]	19871	1018		-	-	-	-	-
EGF Project Total Increase/ Decrease (tpy)				***481.41***	***3,073.52***	***5.70***	***263.55***	***-***
PSD Major Modification threshold (tpy)				*40*	*100*	*40*	*40*	*10*
PSD?				*YES*	*YES*	*No*	*YES*	*YES[3]*

Notes:
[1] Plant does not have any MSS emissions that are flared using the elevated flares or enclosed ground flares.
[2] FLARECAP consists of the four new ground flares (EPNs: EGF-1, EGF-2, EGF-3, EGF-4); and the three existing elevated flares (1018, 1067, OL3-FLRA/B/C). MSSFLARECAP represents MSS emissions CAP (EGF-1, EGF-2, EGF-3, EGF-4, 1018_MSS, 1067_MSS, OL3MSSFLR).
[3] Due to precursor emissions only.

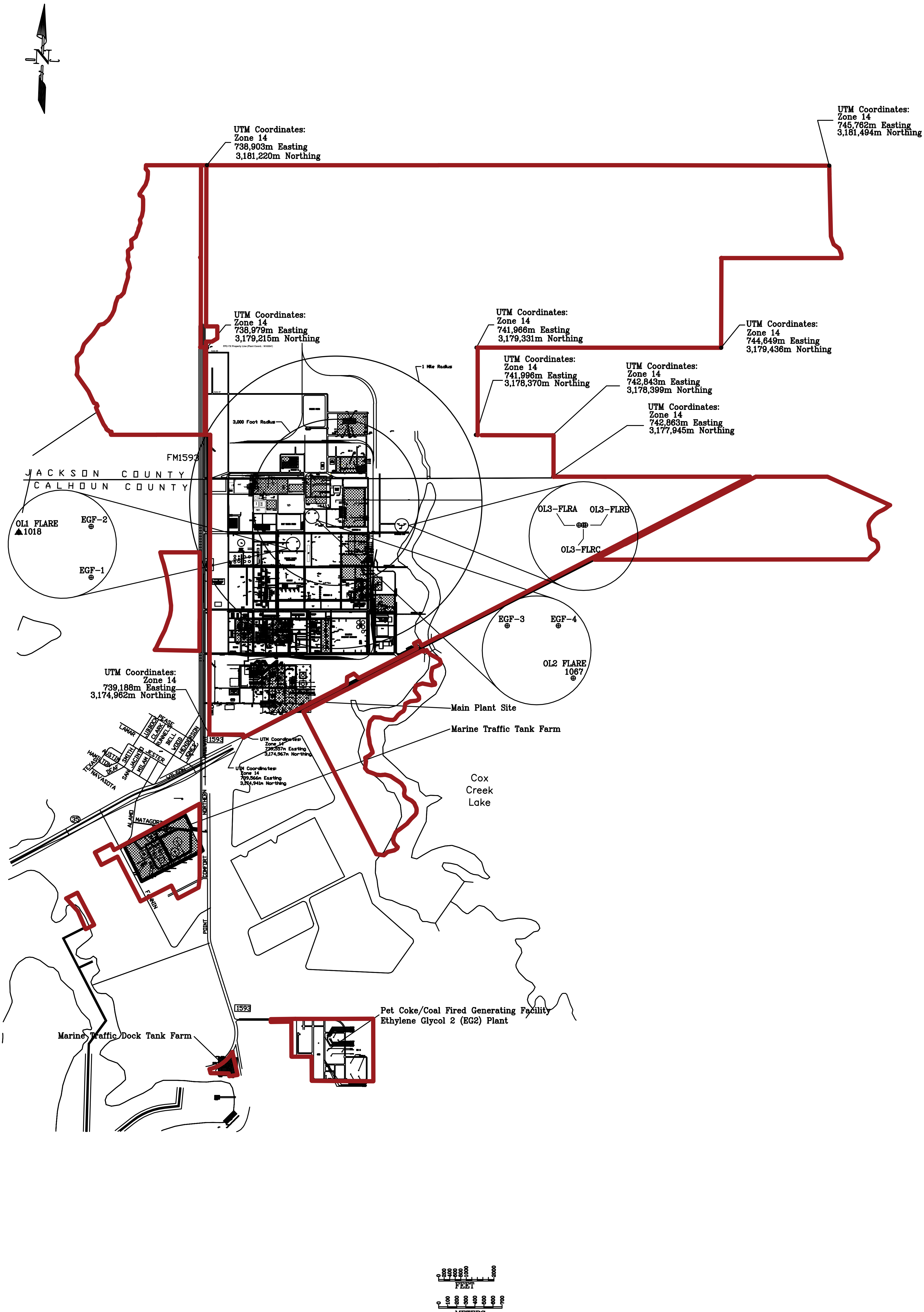
TABLE 2-2. AIR CONTAMINANTS TO REVIEW - CRITERIA

COMPOUND	REVIEW	AVERAGING TIME	SIL	SMC	NAAQS PRIMARY[1]	NAAQS SECONDARY[1]	PSD INCREMENT
			(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)
CO	Major NSR (PSD)	1-hour	2,000	--	40,000	--	--
		8-hour	500	575	10,000	10,000	--
NO_2	Major NSR (PSD)	1-hour	7.5 [2]	--	188	--	--
		Annual	1	14	100	100	25
$PM_{2.5}$ (secondary)	Major NSR (PSD)	24-hr	1.2 [3]	--	35	35	9
		Annual	0.3 [3]	--	12	15	4
VOC (ozone)	Major NSR (PSD)	8-hour	1 ppb	--	70 ppb	70 ppb	--
SO_2	Ch. 112	30-min	20.42	--	--	--	--
	Minor NSR	1-hour	7.8 [4]	--	196	--	--
		3-hour	25	--	--	1300	512

[1] Primary standards provide public health protection, including protecting the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.
[2] Justification for the NO_2 interim 1-hour SIL is provided in Section 5.2.
[3] Justification for the $PM_{2.5}$ SILs is provided in Section 5.2.
[4] Justification for the SO_2 1-hour SIL is provided in Section 5.2.

3.0 PLOT PLANS

A copy of the plot plan from the permit application is provided at the end of this section.



Formosa Plastics

DESCRIPTION: OVERALL VIEW SHEET LAYOUT			PROJECT: FPC TX Area Map–Overall Plot Plan.
DRAWN BY : DWD	SCALE: PER TABLE ABOVE	REFERENCE FILES	CLIENT: FORMOSA PLASTICS CORP. TEXAS
CHECKED BY: J.C.	DATE: 9/14/2021		
APPROVED BY: C.GU	JOB NO. PC95-042		

SHEET 1 OF 1

4.0 AREA MAP

4.1 Location

The four EGFs will be located at the FPC TX Main Plant Site within the OLI and OLII battery limits near the existing elevated plant flares. This area is immediately east of Farm Road 1593, West of Cox Creek and north of State Highway 35 in Calhoun County and Jackson County, Texas.

4.2 Area Map and Land Use

The nearest non-industrial receptors outside the FPC TX Site are the residential and commercial areas of the City of Point Comfort, which are located immediately north of State Highway 35 and immediately west of Farm Road 1593. No schools are located within 3,000 feet of this facility. Figure 4-1 presents the area map for the FPC TX Site.

Formosa owns a significant portion of the land within 5km of the Main Plant Site. Land use along the northern and eastern boundary of the FPC TX Site is principally ranch land. Industrial facilities and marine loading facilities are located south of the Main Plant and State Highway 35.

4.3 Class I Areas

The nearest PSD Class I Areas are Big Bend National Park, located 385 miles (620 kilometers) west of Point Comfort in Brewster County, and the Caney Creek Wilderness Area, located over 415 miles (670 kilometers) north-northeast of Point Comfort in southwestern Arkansas. Since no PSD Class I areas exist within 62 miles (100 kilometers) of the FPC TX Point Comfort Plant, no map of the nearest PSD Class I areas is presented.

4.4 Topography

The FPC TX Point Comfort Plant resides in the Texas Gulf Coast region where flat terrain prevails. No complex terrain exists within 31 miles (50 kilometers) of FPC TX; consequently, terrain elevations are not warranted, and flat terrain was modeled.

4.5 Nonattainment Areas

The FPC TX Point Comfort Plant is located in Calhoun and Jackson Counties, which are currently designated as attainment/unclassified for all criteria pollutants. Figure 4-2 presents a 2016 map of all nonattainment areas in Texas and was obtained from the TCEQ website.

4.6 Meteorological Monitoring Stations

No National Weather Service (NWS) surface or upper air observation stations are located in Calhoun or Jackson Counties. The nearest surface observations are taken at an Automated Surface Observation Stations (ASOS) located at the Palacios Municipal Airport (Identifier KPSX), located in Matagorda County, 17 miles (27 kilometers) away from FPC TX. Other nearby ASOS stations include Victoria Regional Airport (Identifier KVCT), in the city of Victoria, 28 miles (46 kilometers) northwest of the facility, and Rockport-Fulton/Aransas County Airport (Identifier KRKP), 52 miles (84 kilometers) away.

All of these surface stations meet data collection criteria suitable for PSD air quality modeling analyses, and have been used by TCEQ in preparing meteorological data sets suitable for input to dispersion models. The nearest NWS upper air observations station is located at the Corpus Christi International Airport, 86 miles (139 kilometers) southwest of Point Comfort.

4.7 Ambient Air Monitoring Stations

The nearest TCEQ ambient monitoring station is CAMS 87, located in Victoria, 29 miles (46 kilometers) northwest of FPC TX. This station only monitors ozone.

Since April 21, 2015, FPC TX has operated a network of two ambient monitoring stations for criteria pollutants (NOx, $PM_{2.5}$, ozone). These are referred to as the southwest site (FPC SW) and northwest (FPC NW) site. FPC SW collects $PM_{2.5}$ samples and is located southwest of the main facility in the City of Point Comfort. FPC NW is located on FPC TX property northwest of the Main Plant and collects $NO/NO_2/NOx$, $PM_{2.5}$, ozone, and meteorological variables from a 10-meter tower (wind speed average, wind direction average, wind speed resultant, wind direction resultant, and ambient temperature).

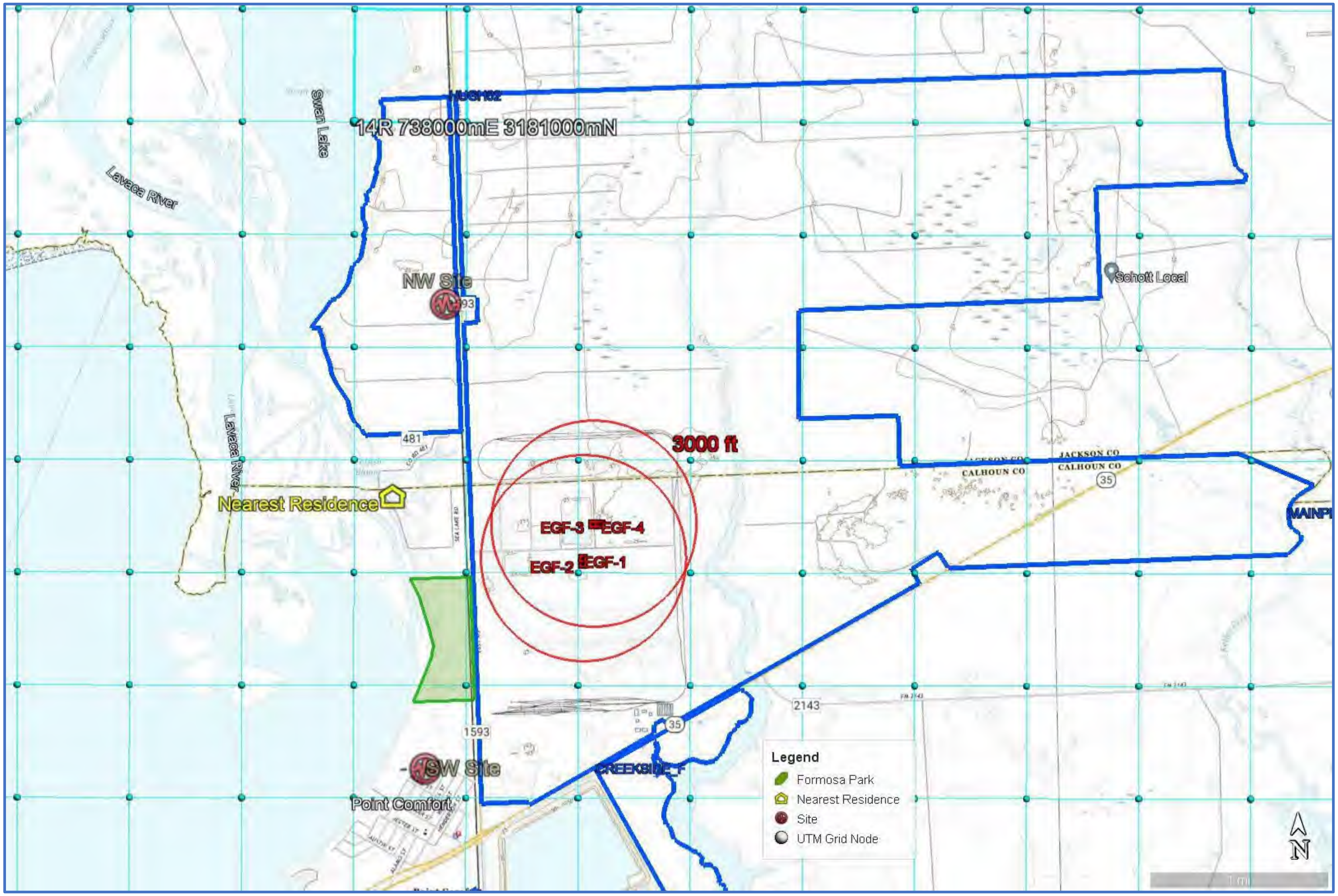
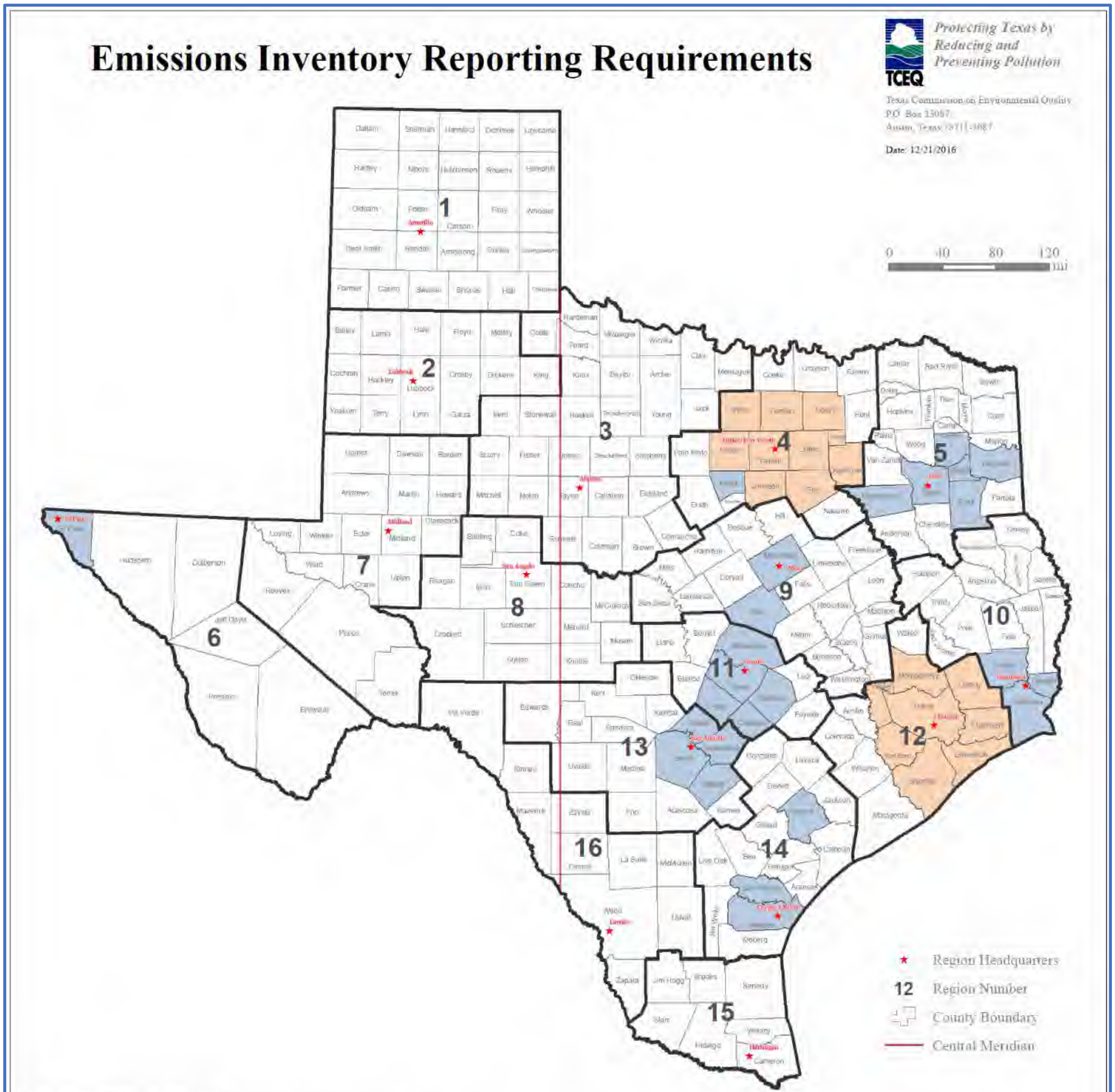


FIGURE 4-2. AREA MAP



Emissions Inventory Reporting Requirements

Summary of Reporting Requirements (tpy) for 30 TAC Section 101.10

Note: For ozone nonattainment areas, the more stringent or severe classification (where applicable) is used to determine reporting requirements for ozone precursor potential emissions.

County	VOC		NOx		Other		Individual HAP		Aggregated HAP	
	Actual	Potential	Actual	Potential	Actual	Potential	Actual	Potential	Actual	Potential
Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller **MODERATE / OZONE**	10	100	25	100	100	100	10	10	25	25
Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, Wise **MODERATE / OZONE**	10	100	25	100	100	100	10	10	25	25
See county listing** SPECIAL INVENTORY REPORTING THRESHOLDS FOR OZONE PRECURSORS	10	100	25	100	100	100	10	10	25	25
All Other Counties	100	100	100	100	100	100	10	10	25	25
Statewide	**Lead (Pb) Actual**					**Lead (Pb) Potential**				
REPORTING THRESHOLDS FOR LEAD (All counties)	0.5					10				

Note: If an account's emissions meet or exceed the tons per year (tpy) thresholds listed in this table, an emissions inventory questionnaire must be submitted to the TCEQ. This table is not the actual rule. If a discrepancy exists between the table and rule 30 TAC Section 101.10 and 30 TAC Section 116.12 (Major Stationary Source Definition) then the rule will take precedence.

**SPECIAL INVENTORY COUNTIES FOR OZONE PRECURSORS Bastrop, Bell, Bexar, Caldwell, Comal, El Paso, Gregg, Guadalupe, Hardin, Harrison, Hays, Henderson, Hood, Jefferson, McLennan, Nueces, Orange, Rusk, San Patricio, Smith, Travis, Upshur, Victoria, Williamson, Wilson.

Note for special inventory requests: Regulated entities must complete and submit an EI if they meet the thresholds explained in the "Special Inventory Request" section in Chapter 1 and the TCEQ has initiated a formal written request.

FIGURE 4-3. NONATTAINMENT AREAS

FIGURE 4-4. FPC TX AMBIENT MONITORING LOCATIONS

5.0 AIR QUALITY MONITORING DATA

This section presents ambient air quality data to satisfy preconstruction monitoring requirements. The purpose of this information is to justify use of the NO_2, $PM_{2.5}$, and SO_2 Significant Impact Levels (SILs), and provide ambient background concentrations to put modeled data into context. Note: none of this section differs from the 2020 Propylene Dehydrogenation (PDH) Amendment AQA.

5.1 Preconstruction Monitoring Requirements

Because the Project is subject to PSD review, preconstruction (also referred to as pre-application) monitoring requirements must be addressed. Project impacts exceed the SILs for NO_2, but are less than the significant monitoring concentration (SMC). Thus, preconstruction monitoring data are not specifically required to be gathered/provided in support of the application.

However, since April 2015, FPC TX has operated a real-time air monitoring program which adequately serves as preconstruction monitoring data for the application. The data shows that net values at specified locations do not exceed the NAAQS, and the potential pollutant increments from planned expansion will not exceed the NAAQS (see Figure 4-3).

Measurements of NO_2 and ozone are made from the predominant downwind location from FPC TX (FPC NW site) as hourly averages to determine potential impacts from the facility. Measurements of $PM_{2.5}$ concentrations are made at two locations (FPC NW site, FPC SW site) as hourly averages to determine potential net impact from FPC TX. Meteorological data is collected (wind speed, wind direction, ambient temperature, barometric pressure) on a five (5)-minute basis at the FPC NW site, which is the dominant downwind location.

5.2 Justification of SILs

5.2.1 Recommended SILs for $PM_{2.5}$

As mentioned, the Project will not directly emit $PM_{2.5}$; however, the Project triggers PSD because $PM_{2.5}$ precursor emissions (i.e., NOx) will exceed the SER of 40 tpy. An evaluation of only secondary $PM_{2.5}$ formation only was performed (see Section 7.6) and compared to the appropriate $PM_{2.5}$ SILs.

In April 2018, EPA issued "non-binding" guidance which establishes EPA's current recommended $PM_{2.5}$ SILs to be used in the PSD permitting program (EPA, 2018a). The guidance recommended a $PM_{2.5}$ 24-hour SIL of 1.2 micrograms per cubic meter ($\mu g/m^3$), which was the same as the prior recommended value listed in 40 CFR 51.165(b)(2). EPA recommended a new $PM_{2.5}$ annual SIL of 0.2 $\mu g/m^3$, which was lower than the prior-recommended value of 0.3 $\mu g/m^3$ listed in 40 CFR 51.165(b)(2). The "non-binding" guidance means a permitting authority can use its discretion to establish SIL values at, or less than, the newly-recommended SILs, but no higher than prior-recommended SILs listed in 40 CFR 51.165(b)(2).

Accordingly, the $PM_{2.5}$ 24-hour SIL of 1.2 $\mu g/m^3$ was used to determine whether the Project has a significant impact for this averaging period. For annual modeling, the prior-recommended annual SIL of 0.3 $\mu g/m^3$ listed in 40 CFR 51.165(b)(2) was used to determine whether the Project has a significant impact. Use of these proposed SILs was presented with the modeling protocol for this Project (POWER, 2021d) and supporting justifications have been discussed with, and presented to, TCEQ on several occasions, including the January 24, 2019 PDH pre-application meeting, the April 2019 PDH air dispersion modeling protocol, the March 2021 OL3 As-Built modeling protocol, and June 2021 OL3 As-Built AQA. The justification is repeated in the remainder of this section, below.

TCEQ's guidance (TCEQ, 2019b) states that applicants can justify use of the recommended $PM_{2.5}$ SILs by stating EPA's April 2018 guidance. TCEQ also stated that applicants may request the prior-recommended 0.3 µg/m^3 annual SIL listed in 40 CFR 51.165(b)(2), as long as TCEQ's Air Dispersion Modeling Team (ADMT) is notified of the intent to do so prior to submittal of the AQA, and provide additional justification. The protocol provided the requested notification.

Justification of these $PM_{2.5}$ SIL values is substantiated based on direct measurement of FPC TX's $PM_{2.5}$ design values from ambient monitors located next to the Plant. Since these are direct measurements from well-sited monitors, use of these values is fully representative and justified. This evaluation is presented in Table 5-1. Table 5-2 shows, for both the $PM_{2.5}$ 24-hour and annual average, the difference between the NAAQS and the design value is substantially greater than the recommended SILs. Therefore, the $PM_{2.5}$ 24-hour and annual SILs are deemed suitable to be used in the NAAQS form, and PSD Increment form of the SIL modeling evaluations.

To justify use of the 0.3 µg/m^3 for the annual increment form of the SIL analysis, a conservative $PM_{2.5}$ annual concentration is used to represent the baseline ambient concentration in 2010 for comparison to the current air quality concentrations in the region. FPC TX did not begin $PM_{2.5}$ ambient monitoring until April 2015; therefore, an alternate site was sought to serve as the baseline concentration. The Dona Park monitor (EPA ID 483550034) in Corpus Christi was selected to establish the baseline air quality concentration. This monitor is located in a much more urban and industrial mix of nearby sources than are present near the FPC TX site. The design value for 2010-2012 for this site was 9.4 µg/m3. Since this value is higher than FPC TX's current 2019-2021 annual design value of 7.8 µg/m^3, there is no indication of increment consumption, and the use of the 0.3 µg/m^3 annual $PM_{2.5}$ SIL does not significantly affect the demonstration of compliance.

5.2.2 Interim SIL for 1-hour NO_2

EPA interim NO_2 1-hour SIL values: 4 parts per billion (ppb) (7.5 µg/m^3).

EPA believes this to be a reasonable interim value because it equates to 4% of the respective 1-hour NAAQS. This 4% value is consistent with assumptions used to define SERs for pollutants subject to PSD (45 Federal Register 52676, August 7, 1980). The EPA defined SERs for PM as the emission rate that resulted in an ambient impact equal to 4% of the applicable short-term NAAQS. Copies of the EPA memoranda that set forth the interim SILs are provided in Appendix A.

Additional justification is based on data provided in Table 5-3. Similar to the $PM_{2.5}$ justification, the FPC TX NO_2 monitored data shows design values considerably less than the NAAQS, thereby indicating that existing air quality would not be significantly affected by use of the interim SIL.

5.2.3 Interim SIL for 1-hour SO_2

EPA interim SO_2 1-hour SIL value: 3 ppb (7.8 µg/m^3)

EPA also believes the SO_2 1-hour SIL to be reasonable interim value because it equates to 4% of the respective 1-hour NAAQS. This 4% value is consistent with assumptions used to define SERs for pollutants subject to PSD (45 Federal Register 52676, August 7, 1980). The EPA defined SERs for SO_2 as the emission rate that resulted in an ambient impact equal to 4% of the applicable short-term NAAQS.

5.3 Ambient Background Concentrations

Table 5-3 summarizes concentrations obtained from FPC TX's ambient monitoring network and shows the existing air quality surrounding the facility to be less than the NAAQS. These data have all been updated to the latest three-year period (2020-2022) for this revision. FPC TX NO_2, $PM_{2.5}$, and ozone monitoring data all meet the quarterly 75% EPA completeness guidelines for all quarters within the 3-year period. These data serve as ambient background concentrations.

EPA recognizes that there are a number of ways that monitored background concentration data can be combined with the maximum offsite ground level concentration from the full NAAQS analysis modeling to determine compliance with the NAAQS, and that the selection of nearby sources whose emissions should be input into such modeling and the representative background monitor requires sound professional judgement (EPA, 2014).

The FPC NW monitor was used to provide ambient background concentrations for the 1-hour NO_2 full NAAQS analysis. This monitor is site-specific, as it is located just 2km downwind of the Project (see Figure 4-4). This is well within the suggested distance of 10km for selecting a representative monitor (EPA, 1987; TCEQ, 2019).

According to TCEQ guidance, the purpose of including representative background concentrations in the analysis is to account for natural background and the impact of sources whose emissions are not explicitly modeled in the air quality analysis (TCEQ, 2019). Site-wide FPC TX allowable emissions were included in the modeling. Given its location, 1-hour NO_2 concentrations from the FPC NW monitor already include the impacts from emissions from existing FPC TX sources. EPA guidance recommends excluding periods when sources at the site of the Project are expected to impact the concentrations measured at the monitor (EPA, 2014). Despite this guidance, FPC TX did not apply any procedures to reduce or remove FPC TX's sources' influence on ambient background concentrations from the FPC NW monitor. This yields a highly conservative background.

The 1-hour NO_2 monitored design value concentration used in the 1-hour NO_2 full NAAQS analysis is based on the calculated 98th percentile of the most recent three-year (2020-2022) NO_2 1-hr concentrations from the FPC NW monitor by season and hour of the day. This represents the average of the seasonal highest 3rd high value for each hour for the three-year period (EPA, 2014). This selection is based on EPA guidance which states, "*..we believe that an appropriate methodology for incorporating background concentrations in the cumulative impact assessment for the 1-hour NO_2 standard would be to use multiyear averages of the 98th-percentile of the available background concentrations by season and hour-of-day, excluding periods when the source in question is expected to impact the monitored concentration*" (EPA, 2014).

The background concentrations input to AERMOD by season and hour of the day are shown in Table 5-4. Supporting data are provided electronically in Appendix G.

TABLE 5-1. AMBIENT MONITORING DESIGN VALUES (2020-2022)

POLLUTANT	POLLUTANT	PURPOSE OF MONITORING DATA	AVERAGING PERIOD	DESIGN VALUE CONCENTRATION (µg/m³)	RANK OF CONCENTRATION
$PM_{2.5}$	$PM_{2.5}$	Defense of $PM_{2.5}$ SIL, SMC, Ambient Background	24-hour	23.2	For each year, 98th percentile. For design value, average of 98th percentile values over the 3-year period.
			Annual	7.6	For each year, annual average. For design value, average of the annual average values over the 3-year period.
NO_2	NO_2	Defense of NO_2 SIL, SMC, Ambient Background	1-hour	56.3	For each year, 98th percentile. For design value, average of 98th percentile values over the 3-year period.
			Annual	6.5	For each year, annual average of all observations. For design value, annual average values over the most recent year.
O_3	O_3	Defense of O_3 SIL, SMC, Ambient Background	8-hour	63.9 (ppb)	For each year, 4th-highest value. For design value, average of 4th-highest values for the 3-year period.
SO_2	SO_2	Defense of SO_2 SIL	1-hour	5 (ppb) [1] 13 µg/m³	For each year, 99th percentile daily maximum. For design value, average of the 99th percentile daily maximum values over the 3-year period. The 1-hour design concentration conservatively used for the 3-hour averaging period.

https://www.epa.gov/system/files/documents/2022-05/SO2_DesignValues_2019_2021_FINAL_05_25_22.xlsx. Highest design value reported by EPA for Nueces County, for the most recent three-year period available (2019-2021). This concentration was measured at Corpus Christi State School, Airport Rd, AIRS ID: 483550025. Design values for 2022 will not be available until Summer 2023.

TABLE 5-2. COMPARISON OF DESIGN VALUES AND NAAQS WITH SILS

COMPOUND	AVG. PERIOD	DESIGN VALUE (2020-2022) (µG/M³)	NAAQS (µG/M³)	NAAQS MINUS DESIGN VALUE (µG/M³)	PROPOSED SIL (µG/M³)	DIFFERENCE GREATER THAN SIL?
$PM_{2.5}$	24-hour	23.2	35	11.8	1.2	YES
	Annual	7.6	12	4.4	0.3	YES
NO_2	1-hour	56.3	188	131.7	7.5	YES
SO_2	1-hour	13 [1]	196	183	7.5	YES
OZONE	8-hour	63.9 ppb	70 ppb	6.1 ppb	1.0 ppb	YES

[1] EPA design value for Nueces County for the most recent three-year period available (2019-2021). This concentration was measured at Corpus Christi State School, Airport Rd, AIRS ID: 483550025. Design values from EPA for 2022 will not be available until Summer 2023.

TABLE 5-3. SUMMARY OF AMBIENT BACKGROUND CONCENTRATIONS

POLLUTANT	SELECTED MONITOR	PURPOSE	AVERAGING PERIOD	2020 CONC. (µg/m³)	2021 CONC. (µg/m³)	2022 CONC. (µg/m³)	DESIGN VALUE CONC. (µg/m³)	RANK OF CONCENTRATION
NO_2	FPC NW (downwind)	NAAQS Compliance Ambient Background	1-hour	58.3	54.7	56.0	56.3	For each year, 98th percentile daily maximum. For design value, average of the 98th percentile daily maximum values over the 3-year period
			Annual	6.7	6.5	7.6	7.6	Annual mean (most recent complete year)
$PM_{2.5}$	FPC NW (downwind)	NAAQS Compliance Ambient Background	24-hour	24.0	20.9	24.8	23.2	For each year, 98th percentile daily maximum. For design value, average of the 98th percentile daily maximum values over the 3-year period
			Annual	7.7	7.7	7.5	7.6	Annual mean, averaged over 3-years
	FPC SW (upwind)	NAAQS Compliance Ambient Background	24-hour	23.3	18.0	22.9	21.4	For each year, 98th percentile daily maximum. For design value, average of the 98th percentile daily maximum values over the 3-year period
			Annual	6.0	6.2	7.0	6.4	Annual mean, averaged over 3-years
O_3	FPC NW (downwind)	NAAQS Compliance Ambient Background	8-hour	61.6 (ppb)	67.4 (ppb)	62.6 (ppb)	63.9 (ppb)	For each year, high 4th-high (H4H). Design value is average of H4H over 3-years

TABLE 5-4. NO2 1-HR AMBIENT BACKGROUND CONCENTRATIONS BY SEASON AND HOUR (PPB)

SEASON >>	WINTER	SPRING	SUMMER	FALL
HOUR*	PPB	PPB	PPB	PPB
Hr 1	23.9	17.4	11.0	7.4
Hr 2	21.0	15.5	10.8	7.3
Hr 3	17.4	15.7	9.3	10.0
Hr 4	15.4	15.7	8.0	10.5
Hr 5	16.6	15.0	8.9	11.4
Hr 6	19.2	15.9	10.9	12.0
Hr 7	20.1	15.9	9.6	11.8
Hr 8	21.8	15.7	8.3	14.8
Hr 9	17.9	14.0	5.9	9.7
Hr 10	17.1	10.9	5.4	7.6
Hr 11	12.5	9.5	4.6	6.2
Hr 12	11.5	8.2	4.8	5.9
Hr 13	10.9	8.8	4.6	5.3
Hr 14	8.4	7.7	4.5	6.0
Hr 15	9.6	9.4	5.4	6.4
Hr 16	12.9	10.0	6.4	6.7
Hr 17	16.6	10.6	6.0	8.2
Hr 18	18.0	11.3	8.1	9.7
Hr 19	23.7	11.4	7.3	12.1
Hr 20	23.6	13.9	8.8	12.4
Hr 21	23.8	17.0	9.4	12.3
Hr 22	18.8	15.9	10.6	10.7
Hr 23	17.7	15.7	13.0	11.4
Hr 24	25.5	17.7	11.8	8.4

* Hr 1 in AERMOD corresponds to midnight to 1am. Hr 2 is 1am to 2am, etc.

6.0 MODELING EMISSIONS INVENTORY

6.1 Project Sources

Table 6-1 provides a summary of the Project inventory, which consists of the four proposed new EGFs; the three existing Olefin Plants elevated flares (annual cap adjustments only); and, OLI and OLII fugitives (EGF VOC only). The modeled emission rates are based on the worst-case maximum allowable emission rates across all nine NSR applications. For the short-term analysis, the maximum allowable emission rate was modeled from each EGF. The modeled annual rates are a compilation/summation of the annual allowable rates across the nine NSR applications.

Annual emission caps were modeled either by equally dividing the emission rate amongst the four EGFs, or amongst the three existing Olefins (OLI, OLII, OL3) plant flares. This is a reasonable representation for an annual average assessment.

Table 6-2 provides a cross-reference of the modeled pollutants and analyses for criteria pollutants.

Table 6-3 itemizes the modeled criteria emission rates for the Project. Note that Table 6-3 contains emission rates for multiple load scenarios (max, mid, low; see Section 6.7) which were used to determine worst-case impacts. Table 6-4 presents modeled point source release parameters for the multiple load scenarios, as well. Justification for these release parameters is provided in Section 6.6. Flare diameter calculations for the elevated flares are provided in Appendix B. Table 6-5 presents the area source parameters; note, however, that these are VOC sources only, which are addressed in the EMEW.

The NO_2 1-hour NAAQS SIL modeling analysis was conservatively modeled assuming short-term MSS activities are continuous (i.e., 8,760 hrs/yr). The evaluation did not evaluate, nor rely, on EPA's NO_2 1-hour intermittency guidance.

6.2 Contemporaneous Sources

There were two minor projects in the contemporaneous period for this project that require modeling as part of this Project. These were included with Table 2F and Table 3F which were included with the permit application. These sources are identified/included on Table 6-3 and Table 6-4. Note that only annual emissions are provided on Table 2F and Table 3F. Short-term emission rates were determined by converting the tpy rates to average lb/hr rates.

6.3 Other FPC TX Sources

Project impacts exceeded the NO_2 1-hr NAAQS SIL but not for the NO_2 annual SIL. As such, a 1-hr NO_2 full NAAQS analysis was required but neither an annual full NAAQS nor PSD Increment analysis was required. The preliminary CO impacts were also less than the SIL; therefore, full NAAQS modeling was not required for CO.

For the 1-hour NO_2 full NAAQS analysis, permitted FPC TX sources were modeled using permit allowable emission rates. These rates came from existing Maximum Allowable Emission Rate Tables (MAERTs).

EPA guidance for intermittent sources allows use of annualized emission rates for intermittent sources such as emergency engines and diesel generators (EPA, 2011). Further, TCEQ guidance (TCEQ, 2019) has deemed use of annualized emission rates for intermittent sources as appropriate when NO_2 Tier 1 or 2 conversion is being modeled. Since Tier 2 NO_2 conversion was modeled (see Section 7.5), annualized emission rates were used for FPC TX's intermittent sources: emergency generators, diesel generators, fire water pumps, and temporary portable vapor combustors. The summary of intermittent emission rates is presented in Table 6-6. The modeled locations of the portable vapor combustors were generally taken from the proximity of the closest vessel or equipment to the property line. Emission scalars were used for routine testing for emergency generators, as this activity occurs for a single hour each week between the hours of 8am and 5pm. These scalars are presented in Section 6.8.

A summary of the modeled site-wide inventory included in the 1-hour NO_2 full NAAQS analysis is provided in Appendix C.

6.4 Off-Property Sources

EPA guidance for demonstrating compliance with the 1-hour NO_2 NAAQS specifically states, "…*the number of nearby sources needed in cumulative modeling is expected to be far fewer than the past practice following section IV.C.1 of the EPA's draft New Source Review manual, which specified an inventory that included all sources within the radius of influence plus 50 km (U.S. EPA, 1990)"* (EPA, 2014). As noted in Section 5.3, the site-specific FPC TX NW monitor was used for the 1-hour NO_2 ambient background concentrations that were included in the 1-hour NO_2 full NAAQS analysis. Since the FPC TX NW monitor is located downwind of the FPC TX site, and since the nearest off-property sources of NO_2 emissions are over 6 km away from the Project, including *any* off-property sources of NO_2 emissions in the 1-hour NO_2 full NAAQS analysis modeling is highly conservative as it results in double-counting.

Regardless of the conservatism, an off-property 1-hour NO_2 emissions inventory was developed that includes all permitted stationary sources within 50 km of the project, and such emissions were input into the modeling for the NO_2 1-hr full NAAQS analysis. The TCEQ Air Permits Allowable Database (APAD) provided an inventory of such off-property sources, which included permitted, PBR and exempt emission sources. That inventory contains permit allowable emission rates and stack parameter information for such off-property sources located within 50 kilometers of the Project. An inventory of such off-property sources was developed using the TCEQ APAD system and a review of the TCEQ air permit files.

A review of the TCEQ public files was conducted for sources included in the APAD retrieval. APAD emission rates were compared with the permit information obtained from the TCEQ public files and updated, as necessary. Again, it should be emphasized that review and inclusion of these sources is not warranted given the site-specific ambient background concentration.

An effort was made to incorporate new emissions from nearby permitted sources. TCEQ databases were reviewed to determine if permitted off-site sources located within 10 km of the Project have been issued new or amended permits. The new emissions from any such sources were added to the off-property 1-hour NO_2 emissions inventory, and existing source emissions were modified as dictated by the new/modified permits. A 10 km distance was used because the significant concentration gradient due to the Project and FPC TX is very close to FPC TX's fenceline; therefore, the off-property sources located within 10 km of FPC TX's site are the ones most likely to influence 1-hour NO_2 concentrations at locations where the Project is potentially significant.

Also, as allowed by Table 8-2 of 40 CFR Part 51, Appendix W, emissions input into the modeling for formerly grandfathered compressor engines at the Edna Compressor Station were based on their actual operating conditions for the most recent two-year period available (2020-2021). These refinements were justified based on infrequent operations and discussed and verified with TCEQ in advance.

The compilation and summary of the off-site inventory is provided in Appendix D.

6.5 EPN/Model ID Correlation

Table 6-1 includes the EPN and Model ID cross-reference for the Project sources.

6.6 Stack Parameter Justification

The EGFs were modeled as point sources with a specified flue gas volumetric flow rate and exhaust temperature. This is justified, as the EGFs are combustion sources with vertical stacks and physical release parameters. The enclosed ground flares also emit controlled MSS emissions from startup, shutdowns, turnarounds, and vessel openings. A load analysis was performed and determined that exhaust parameters corresponding to the maximum smokeless design capacity of the EGFs yielded worst-case modeled impacts (see Section 6.7). Elevated flares were modeled using TCEQ guidance for flare parameters (exhaust temperature of 1000 °C, exhaust velocity of 20 m/s, and the calculated effective diameter based on the heat flow rate and molecular weight of the combusted stream.

6.7 Load Analysis

Because the EGF stack velocity and flue gas temperature decrease as the waste gas load to the EGF decreases, three EFG operating loads (low, middle and high loads) were modeled to determine the worst-case operating condition from a dispersion modeling perspective. This is consistent with the standard modeling approach taken for boilers and other sources that can operate at reduced load conditions. A load analysis was conducted to examine three operating modes and determine which operating mode results in worst-case impacts.

- MAX – maximum emission rate based on the maximum design smokeless capacity of 220,000 lb/hr of waste gas flow. The corresponding stack exhaust flows and exit temperatures for this maximum case are high. This typically represents MSS-type of events.
- LOW – operation of the EGFs under a “low load” scenario, with the EGFs operating at a small fraction of the maximum smokeless capacity (~11,000 lb/hr waste gas flow). The emission rates, corresponding stack exhaust flows and exit temperatures for this maximum case are low.
- MID – this represents certain routine MSS type events and plant-wide routine emissions, but maximum waste gas flows are split among the EGFs, instead of routing to just a single EGF (110,000 lb/hr waste gas flow across multiple EGFs). Corresponding emission rates, stack exhaust flows and exit temperatures were based on 50% load.

For NO_2 both Tier 1 and Tier 2 conversion were evaluated (see Section 7.5). For NO_2 1-hr (Tier 2 conversion) and CO 8-hr, the worst-case impact was determined to be from the MID case (50% load). For NO_2 1-hr (Tier 1 conversion) and CO 1-hour impacts, the worst-case impact from the load analysis was determined to be from the MAX case.

6.8 Emission Scalars

Emission scalars (HRDOW7) were used for routine engine testing (emergency engines, fire water pumps), as this activity occurs for a single hour each week between the hours of 8am and 5pm, Monday through Friday. Although HRDOW7 was selected, scalars were applied to all 7 days of the week, which is equivalent to scalars for HROFDY.

TABLE 6-1. PROJECT INVENTORY SUMMARY

PERMIT/PLANT	EPN	MODEL_ID	SOURCE TYPE	STATUS	SOURCE DESCRIPTION	COMPOUNDS TO MODEL
19168, 107518, 19201, 40157, 19200, 91780, 20203, 140763, 19871	EGF-1	EGF1	POINT	New	Enclosed Ground Flare 1	NOx, CO, SO_2, VOC (Ozone, ESL)
19168, 107518, 19201, 40157, 19200, 91780, 20203, 140763, 19871	EGF-2	EGF2	POINT	New	Enclosed Ground Flare 2	NOx, CO, SO_2, VOC (Ozone, ESL)
19168, 107518, 19201, 40157, 19200, 91780, 20203, 140763, 19871	EGF-3	EGF3	POINT	New	Enclosed Ground Flare 3	NOx, CO, SO_2, VOC (Ozone, ESL)
19168, 107518, 19201, 40157, 19200, 91780, 20203, 140763, 19871	EGF-4	EGF4	POINT	New	Enclosed Ground Flare 4	NOx, CO, SO_2, VOC (Ozone, ESL)
19201	1018	1018	FLARE	Existing	Olefins I Elevated Flare (Cap Revision)	NOx
19168	1067	1067	FLARE	Existing	Olefins II Elevated Flare (Cap Revision)	NOx
107518	OL3-FLRA/B/C	OL3FLRA	FLARE	Existing	Olefins 3 Elevated Flare (Cap Revision)	NOx
107518	OL3-MAINT, PDH-MAINT	OL3MSSFLR	FLARE	Existing	Olefins 3 Elevated Flare MSS Emissions (April 2022 Revision)	NOx, VOC (ozone, ESL)
19168, 107518, 19201, 40157, 19200, 91780, 20203, 140763, 19871	FLARECAP[1]	FLARECAP	FLARE or POINT	New and Existing	Flare System Cap (Elevated and Enclosed Ground Flares)	NOx, CO, VOC (Ozone, ESL)
19168, 107518, 19201, 40157, 19200, 91780, 20203, 140763, 19871	MSSFLARECAP[2]	MSSFLCAP	FLARE or POINT	New and Existing	Flare System Cap (Elevated and Enclosed Ground Flares) – MSS Only	NOx, CO, SO_2, VOC (Ozone, ESL)
19201	1028	1028WG	FUGITIVE	Existing	Waste Gas Fugitives from EGF 1&2 (Olefins I)	VOC (Ozone, ESL)
19168	1068	1068WG	FUGITIVE	Existing	Waste Gas Fugitives from EGF 3&4 (Olefins II)	VOC (Ozone, ESL)

[1] FLARECAP: Routine emissions cap for the four enclosed ground flares (EGF-1, EGF-2, EGF-3, EGF-4) and Olefins elevated flares (1018, 1067, OL3-FLR)
[2] MSSFLARECAP: MSS emissions cap for the four enclosed ground flares (EGF-1, EGF-2, EGF-3, EGF-4) and Olefins elevated flares (1018_MSS, 1067_MSS, OL3MSSFLR)

TABLE 6-2. MODELED POLLUTANT ID CROSS-REFERENCE – CRITERIA

<table>
<tr><th>POLLUTANT</th><th>POLLUTANT ID</th><th>AVG PERIOD</th><th>MET YEARS</th><th>METEOROLOGICAL DATA FILE(S)[1]</th><th>ANALYSIS</th></tr>
<tr><td rowspan="2">CO</td><td rowspan="2">CO</td><td>1-hr</td><td>5 (individual)</td><td>JACKSON_VCTCRP??M.* [2]</td><td>PSD SIL Analysis</td></tr>
<tr><td>8-hr</td><td>5 (individual)</td><td>JACKSON_VCTCRP??M.* [2]</td><td>PSD SIL Analysis</td></tr>
<tr><td rowspan="4">NO_2</td><td rowspan="2">NO2</td><td rowspan="2">1-hr</td><td>5 (combined)</td><td>JACKSON_VCTCRP1721M.*</td><td>PSD NAAQS SIL Analysis,</td></tr>
<tr><td>5 (combined)</td><td>JACKSON_VCTCRP1721M.*</td><td>PSD Full NAAQS Analysis</td></tr>
<tr><td rowspan="2">NO2</td><td rowspan="2">Annual</td><td>5 (individual)</td><td>JACKSON_VCTCRP??M.* [2]</td><td>PSD NAAQS SIL Analysis</td></tr>
<tr><td>5 (individual)</td><td>JACKSON_VCTCRP??M.* [2]</td><td>PSD Increment SIL Analysis</td></tr>
<tr><td rowspan="3">SO_2</td><td>SO_2_ST</td><td rowspan="2">1-hr</td><td>1 (individual)</td><td>JACKSON_VCTCRP20M.*</td><td>Chapter 112 SIL Analysis</td></tr>
<tr><td>SO_2</td><td>5 (combined)</td><td>JACKSON_VCTCRP1721M.*</td><td>Minor NSR NAAQS SIL Analysis</td></tr>
<tr><td>SO_2_ST</td><td>3-hr</td><td>1 (individual)</td><td>JACKSON_VCTCRP20M.*</td><td>Minor NSR NAAQS SIL Analysis</td></tr>
</table>

[1] * = AERMET file extensions (SFC and PFL).
[2] ?? = 17, 18, 19, 20, 21 (individual calendar years 2017, 2018, 2019, 2020, 2021)

TABLE 6-3. MODELED EMISSION RATES FOR PROJECT SOURCES – CRITERIA

EPN	Model ID	Modeling Scenario	Pollutant	Standard Type	Review Context	Short-term Emission Rate [lb/hr]	Long-term Emission Rate [tpy]	Emission Rate Basis (Short-term)	Emission Rate Basis (Long-term)
EGF-1	EGF1LO	Low	NOx	NAAQS	Major NSR SIL analysis	32.14	-	Low-load (11,000 lb/hr waste gas)	
EGF-2	EGF2LO	Low	NOx	NAAQS	Major NSR SIL analysis	32.14	-	Low-load (11,000 lb/hr waste gas)	
EGF-3	EGF3LO	Low	NOx	NAAQS	Major NSR SIL analysis	32.14	-	Low-load (11,000 lb/hr waste gas)	
EGF-4	EGF4LO	Low	NOx	NAAQS	Major NSR SIL analysis	32.14	-	Low-load (11,000 lb/hr waste gas)	
EGF-1	EGF1MX	Max	NOx	NAAQS	Major NSR SIL analysis	870.60	183.44	Design Max (220,000 lb/hr waste gas)	Plant-wide PTE (FLARECAP+MSSFLARECAP per EGF)
EGF-2	EGF2MX	Max	NOx	NAAQS	Major NSR SIL analysis	870.60	183.44	Design Max (220,000 lb/hr waste gas)	Plant-wide PTE (FLARECAP+MSSFLARECAP per EGF)
EGF-3	EGF3MX	Max	NOx	NAAQS	Major NSR SIL analysis	870.60	183.44	Design Max (220,000 lb/hr waste gas)	Plant-wide PTE (FLARECAP+MSSFLARECAP per EGF)
EGF-4	EGF4MX	Max	NOx	NAAQS	Major NSR SIL analysis	870.60	183.44	Design Max (220,000 lb/hr waste gas)	Plant-wide PTE (FLARECAP+MSSFLARECAP per EGF)
EGF-1	EGF1MD	Mid	NOx	NAAQS	Major NSR SIL analysis	435.30	183.44	Mid-load (110,000 lb/hr waste gas)	Plant-wide PTE (FLARECAP+MSSFLARECAP per EGF)
EGF-2	EGF2MD	Mid	NOx	NAAQS	Major NSR SIL analysis	435.30	183.44	Mid-load (110,000 lb/hr waste gas)	Plant-wide PTE (FLARECAP+MSSFLARECAP per EGF)
EGF-3	EGF3MD	Mid	NOx	NAAQS	Major NSR SIL analysis	435.30	183.44	Mid-load (110,000 lb/hr waste gas)	Plant-wide PTE (FLARECAP+MSSFLARECAP per EGF)

EPN	Model ID	Modeling Scenario	Pollutant	Standard Type	Review Context	Short-term Emission Rate [lb/hr]	Long-term Emission Rate [tpy]	Emission Rate Basis (Short-term)	Emission Rate Basis (Long-term)
EGF-4	EGF4MD	Mid	NOx	NAAQS	Major NSR SIL analysis	435.30	183.44	Mid-load (110,000 lb/hr waste gas)	Plant-wide PTE (FLARECAP+MSSFLARECAP per EGF)
EGF-1	EGF1LO	Low	CO	NAAQS	Major NSR SIL analysis	64.16	-	Low-load (11,000 lb/hr waste gas)	No annual standard
EGF-2	EGF2LO	Low	CO	NAAQS	Major NSR SIL analysis	64.16	-	Low-load (11,000 lb/hr waste gas)	No annual standard
EGF-3	EGF3LO	Low	CO	NAAQS	Major NSR SIL analysis	64.16	-	Low-load (11,000 lb/hr waste gas)	No annual standard
EGF-4	EGF4LO	Low	CO	NAAQS	Major NSR SIL analysis	64.16	-	Low-load (11,000 lb/hr waste gas)	No annual standard
EGF-1	EGF1MX	Max	CO	NAAQS	Major NSR SIL analysis	3467	-	Design Max (220,000 lb/hr waste gas)	No annual standard
EGF-2	EGF2MX	Max	CO	NAAQS	Major NSR SIL analysis	3467	-	Design Max (220,000 lb/hr waste gas)	No annual standard
EGF-3	EGF3MX	Max	CO	NAAQS	Major NSR SIL analysis	3467	-	Design Max (220,000 lb/hr waste gas)	No annual standard
EGF-4	EGF4MX	Max	CO	NAAQS	Major NSR SIL analysis	3467	-	Design Max (220,000 lb/hr waste gas)	No annual standard
EGF-1	EGF1MD	Mid	CO	NAAQS	Major NSR SIL analysis	1733.5	-	Mid-load (110,000 lb/hr waste gas)	No annual standard
EGF-2	EGF2MD	Mid	CO	NAAQS	Major NSR SIL analysis	1733.5	-	Mid-load (110,000 lb/hr waste gas)	No annual standard

EPN	Model ID	Modeling Scenario	Pollutant	Standard Type	Review Context	Short-term Emission Rate [lb/hr]	Long-term Emission Rate [tpy]	Emission Rate Basis (Short-term)	Emission Rate Basis (Long-term)
EGF-3	EGF3MD	Mid	CO	NAAQS	Major NSR SIL analysis	1733.5	-	Mid-load (110,000 lb/hr waste gas)	No annual standard
EGF-4	EGF4MD	Mid	CO	NAAQS	Major NSR SIL analysis	1733.5	-	Mid-load (110,000 lb/hr waste gas)	No annual standard
EGF-1	EGF1MD	Mid	SO2	NAAQS	Minor SIL analysis	1.81	-	Mid-load (110,000 lb/hr waste gas)	No annual standard
EGF-2	EGF2MD	Mid	SO2	NAAQS	Minor NSR SIL analysis	1.81	-	Mid-load (110,000 lb/hr waste gas)	No annual standard
EGF-3	EGF3MD	Mid	SO2	NAAQS	Minor NSR SIL analysis	1.81	-	Mid-load (110,000 lb/hr waste gas)	No annual standard
EGF-4	EGF4MD	Mid	SO2	NAAQS	Minor NSR SIL analysis	1.81	-	Mid-load (110,000 lb/hr waste gas)	No annual standard
1018	1018_MSS	MSS	NOx	NAAQS	Major NSR SIL analysis	--	155.5	No short-term increase	Flare Cap Increase (MAERT Allowables Basis)
1067	1067_MSS	MSS	NOx	NAAQS	Major NSR SIL analysis	--	72.8	No short-term increase	Flare Cap Increase (MAERT Allowables Basis)
OL3-FLRA/B/C	OL3FLRA	Routine	NOx	NAAQS	Major NSR SIL analysis	--	126.9	No short-term increase	Flare Cap Increase (MAERT Allowables Basis)
OL3-FLRA/B/C	OL3MSSFLR	MSS	NOx	NAAQS	Major NSR SIL analysis	--	121.5	No short-term increase	OL3 MSS Increase (MAERT Allowables Basis)
1087	1087	Routine	NOx	NAAQS	Major NSR SIL Analysis	2.88	12.63	Table 3F (tpy increase as short-term)	Table 3F – Contemporaneous Creditable Increase

EPN	Model ID	Modeling Scenario	Pollutant	Standard Type	Review Context	Short-term Emission Rate [lb/hr]	Long-term Emission Rate [tpy]	Emission Rate Basis (Short-term)	Emission Rate Basis (Long-term)
8003B	8003B	Routine	NOx	NAAQS	Major NSR SIL Analysis	1.33	5.817	Table 3F (tpy increase as short-term)	Table 3F – Contemporaneous Creditable Increase
1087	1087	Routine	CO	NAAQS	Major NSR SIL Analysis	1.57	-	Table 3F (tpy increase as short-term)	No annual standard
8003B	8003B	Routine	CO	NAAQS	Major NSR SIL Analysis	4.29	-	Table 3F (tpy increase as short-term)	No annual standard

TABLE 6-4. PROJECT POINT SOURCE EMISSION PARAMETERS

EPN	Model ID	Modeling Scenario	Source Description	Point Source Type	Point Source Justification	Easting X [m]	Northing Y [m]	Base Elevation [m]	Rel. Height [ft]	Exit Temp [F]	Exit Velocity [ft/s]	Diameter [ft]
EGF-1	EGF1LO	Low	EGF-1 Low Load: OLI/PEI/PPI/LLDPE/Traffic	POINT	Vertical stack	740058.69	3177124.25	0	101.5	250	9.22	50
EGF-2	EGF2LO	Low	EGF-2 Low Load: OLI/PEI/PPI/LLDPE/Traffic	POINT	Vertical stack	740061.25	3177058.75	0	101.5	250	9.22	50
EGF-3	EGF3LO	Low	EGF-3 Low Load: OLII/OL3/PEII/PPII/Utilities routine	POINT	Vertical stack	740190.56	3177436.75	0	101.5	250	9.22	50
EGF-4	EGF4LO	Low	EGF-4 Low Load: OLII/OL3/PEII/PPII/Utilities routine	POINT	Vertical stack	740256.06	3177439.50	0	101.5	250	9.22	50
EGF-1	EGF1MX	Max	EGF-1 Max MSS Event (220k pph waste flow)	POINT	Vertical stack	740058.69	3177124.25	0	101.5	1550	99.83	50
EGF-2	EGF2MX	Max	EGF-2 Max MSS Event (220k pph waste flow)	POINT	Vertical stack	740061.25	3177058.75	0	101.5	1550	99.83	50
EGF-3	EGF3MX	Max	EGF-3 Max MSS Event (220k pph waste flow)	POINT	Vertical stack	740190.56	3177436.75	0	101.5	1550	99.83	50
EGF-4	EGF4MX	Max	EGF-4 Max MSS Event (220k pph waste flow)	POINT	Vertical stack	740256.06	3177439.50	0	101.5	1550	99.83	50
EGF-1	EGF1MD	Mid	EGF-1 Mid MSS Event (110k pph waste flow)	POINT	Vertical stack	740058.69	3177124.25	0	101.5	930	47.13	50
EGF-2	EGF2MD	Mid	EGF-2 Mid MSS Event (110k pph waste flow)	POINT	Vertical stack	740061.25	3177058.75	0	101.5	930	47.13	50
EGF-3	EGF3MD	Mid	EGF-3 Mid MSS Event (110k pph waste flow)	POINT	Vertical stack	740190.56	3177436.75	0	101.5	930	47.13	50
EGF-4	EGF4MD	Mid	EGF-4 Mid MSS Event (110k pph waste flow)	POINT	Vertical stack	740256.06	3177439.50	0	101.5	930	47.13	50

EPN	Model ID	Modeling Scenario	Source Description	Point Source Type	Point Source Justification	Easting X [m]	Northing Y [m]	Base Elevation [m]	Rel. Height [ft]	Exit Temp [F]	Exit Velocity [ft/s]	Diameter [ft]
1018	1018_MSS	MSS	OLI Elevated Flare MSS	FLARE	Vertical stack	739971	3177109	0	335	1832	65.6	155
1067	1067_MSS	MSS	OLII Elevated Flare MSS	FLARE	Vertical stack	740279	3177366	0	380	1832	65.6	155
OL3-FLRA/B/C	OL3FLRA	Routine	OL3 Elevated Flare Routine	FLARE	Vertical stack	741216.09	3177347.46	0	450	1832	65.6	29.6
OL3-FLRA/B/C	OL3MSSFLR	MSS	OL3 Elevated Flare MSS	FLARE	Vertical stack	741216.09	3177347.46	0	450	1832	65.6	81.0
1087	1087	Routine	Olefins 2 Tank Flare	FLARE	Vertical stack	740263	3177311	0	40	1832	65.6	4.51
8003B	8003B	Routine	GHU Vapor Combustor	VCU	Vertical stack	739968.66	3177140	0	40	1500	65.6	4.00

TABLE 6-5. PROJECT AREA SOURCE EMISSION PARAMETERS

EPN	Model ID	Modeling Scenario	Easting: X [m]	Northing: Y [m]	Base Elevation [m]	Modeled Release Height [ft]	Length X [ft]	Length Y [ft]	Rotation Angle [deg]	Area Source Size Justification	Area Source Release Height Justification	Source Description
1028	1028WG	Routine	739,624	3,176,460	0	10	247.1	108.8	-2.80	Area that encompasses the fugitive emissions	Approximate average height of the fugitive emissions	EGF 1&2 (OLI) Fugitives
1068	1068WG	Routine	740,212	3,176,494	0	10	277.0	92.66	-2.80	Area that encompasses the fugitive emissions	Approximate average height of the fugitive emissions	EGF 3&4 (OLII) Fugitives

TABLE 6-6. INTERMITTENT NO_X EMISSIONS SUMMARY (FPC TX SITE-WIDE)

ACTIVITY	NO OF SOURCES	EPN	MODEL ID	MAX HOURLY RATE (PER SOURCE)	# TIMES/DAY	# TIMES/YR	NUMBER OF YEARS (I.E., EVERY 5 YEARS, ETC.)	DURATION OF OPERATION (HOURS)	ANNUAL HOURS	CONSECUTIVE HOURS	STANDALONE OR SIMULTANEOUS OPERATION [1]	AVERAGE HOURLY RATE (INTERMITTENT)	ROUTINE HOURLY RATE	REMARK
Temporary Portable Combustor (MSS)	1	OL1-TEMP	OL1_TEMP	1.37	1	1	[2]	[2]	[2]	[2]	Simultaneous	1.37	--	MAERT (MSS) rate modeled. Location based on nearest vessel to property line
	1	OL2-TEMP	OL2_TEMP	1.37	1	1	[2]	[2]	[2]	[2]	Simultaneous	1.37	--	
	1	LLDPE-TMP	LLDPETMP	79.1	1	1	26 hrs per year	1	26	26	Simultaneous	0.237	--	Intermittent rate modeled. Full MSS rate (79.1 lb/hr) modeled from LI-01. Location based on largest vessel.
Diesel Emergency Generator Test	1	OL3-GEN	OL3GEN	11.69	1	100	100 hrs per year	1	100	1	Standalone	0.133	-	Intermittent Rate for Emergency Generators
	1	PDH-GEN	PDHGEN	11.64	1	100	100 hrs per year	1	100	1	Standalone	0.133	-	
	1	LD-002	LD_002	12.77	1	100	100 hrs per year	1	100	1	Standalone	0.146	-	
Emerg Gen Test	1	PC-EG01	PC_EG01	8.87	1	52	100 hours per year	1	100	1	Standalone	0.10	-	NSR 17030. F6 Black Start Diesel Generator
Emerg Pump Test	1	FPM-02A	FPM_02A	8.36	1	52	100 hours per year	1	100	1	Standalone	0.10	-	NSR 19166. Diesel Fire Water Pump Engine
Emerg Pump Test	1	FPM-02B	FPM_02B	8.36	1	52	100 hours per year	1	100	1	Standalone	0.10	-	NSR 19166. Diesel Fire Water Pump Engine
Emerg Pump Test	1	FPM-02C	FPM_02C	8.36	1	52	100 hours per year	1	100	1	Standalone	0.10	-	NSR 19166. Diesel Fire Water Pump Engine
Emerg Pump Test	1	FPM-02D	FPM_02D	8.36	1	52	100 hours per year	1	100	1	Standalone	0.10	-	NSR 19166. Diesel Fire Water Pump Engine
Emerg Pump Test	1	FPM-02E	FPM_02E	8.36	1	52	100 hours per year	1	100	1	Standalone	0.10	-	NSR 19166. Diesel Fire Water Pump Engine

ACTIVITY	NO OF SOURCES	EPN	MODEL ID	MAX HOURLY RATE (PER SOURCE)	# TIMES/DAY	# TIMES/YR	NUMBER OF YEARS (I.E., EVERY 5 YEARS, ETC.)	DURATION OF OPERATION (HOURS)	ANNUAL HOURS	CONSECUTIVE HOURS	STANDALONE OR SIMULTANEOUS OPERATION [1]	AVERAGE HOURLY RATE (INTERMITTENT)	ROUTINE HOURLY RATE	REMARK
Emerg Pump Test	1	UP-F02A	UP_F02A	8.36	1	52	100 hours per year	1	100	1	Standalone	**0.10**	-	NSR 19166. Diesel Fire Water Pump Engine
Emerg Pump Test	1	UP-F02B	UP_F02B	8.36	1	52	100 hours per year	1	100	1	Standalone	**0.10**	-	NSR 19166. Diesel Fire Water Pump Engine
Emerg Pump Test	1	UP-F02C	UP_F02C	8.36	1	52	100 hours per year	1	100	1	Standalone	**0.10**	-	NSR 19166. Diesel Fire Water Pump Engine
Emerg Gen Test	1	7900LJD	7900LJD	13.40	1	26	100 hours per year	1	100	1	Standalone	**0.15**	-	NSR 19168. Diesel Emergency Generator
Emerg Gen Test	1	N7900LJD	N7900LJD	9.13	1	26	100 hours per year	1	100	1	Standalone	**0.10**	-	NSR 19168. Diesel Emergency Generator
Emerg Pump Test	1	8FP-D20A	8FP_D20A	14.88	1	52	100 hours per year	1	100	1	Standalone	**0.17**	-	NSR 19871. Diesel Fire Water Pump
Emerg Pump Test	1	8FP-D20B	8FP_D20B	14.88	1	52	100 hours per year	1	100	1	Standalone	**0.17**	-	NSR 19871. Diesel Fire Water Pump
Emerg Gen Test	1	EG-01	EG_01	20.96	1	52	100 hours per year	1	100	1	Standalone	**0.22**	-	NSR 76305. Diesel Engine for Standby Power
Emerg Gen Test	1	EG-02	EG_02	20.96	1	52	100 hours per year	1	100	1	Standalone	**0.22**	-	NSR 76305. Diesel Engine for Standby Power
Emerg Gen Test	1	EG-03	EG_03	16.59	1	52	100 hours per year	1	100	1	Standalone	**0.19**	-	NSR 76305. Diesel Engine for Standby Fire Water Pump

ACTIVITY	NO OF SOURCES	EPN	MODEL ID	MAX HOURLY RATE (PER SOURCE)	# TIMES/DAY	# TIMES/YR	NUMBER OF YEARS (I.E., EVERY 5 YEARS, ETC.)	DURATION OF OPERATION (HOURS)	ANNUAL HOURS	CONSECUTIVE HOURS	STANDALONE OR SIMULTANEOUS OPERATION [1]	AVERAGE HOURLY RATE (INTERMITTENT)	ROUTINE HOURLY RATE	REMARK
Emerg Gen Test	1	EG-04	EG_04	16.59	1	52	100 hours per year	1	100	1	Standalone	**0.19**	-	NSR 76305. Diesel Engine for Standby Power

Values in **bold red** represent modeled emission rates used for the NAAQS analysis.
[1] Standalone refers to the operation relative to the other intermittent operations in this table.
[2] Hourly and annual emissions from MSS control devices OL1-TEMP, and OL2-TEMP will not exceed the total hourly and annual MSS emissions authorized for EPNs 1018, 1051, 1067, 1087, and 8003B. No more than 1 portable thermal oxidizer (EPN OL1-TEMP) in Olefins 1 Plant and 1 portable thermal oxidizer (EPN OL2-TEMP) in Olefins 2 Plant will operate simultaneously

7.0 MODELS PROPOSED AND MODELING TECHNIQUES

The purpose of the AQA is to demonstrate that the Project, as represented, will not cause or contribute to a NAAQS or PSD Increment violation; or adversely affect public health and welfare. The modeling methodology generally follows the procedures outlined in the applicable guidance documents, including the following: EPA *Guidelines on Air Quality Models* (EPA, 2017a); and, TCEQ *Air Quality Modeling Guidelines* (TCEQ, 2019a).

7.1 Dispersion Modeling Selection

Modeling was performed using the latest version of the AMS/EPA Regulatory Model (AERMOD Version 22112). AERMOD was chosen because it is classified by EPA as a *Preferred/Recommended* model and is approved by the TCEQ modeling staff. AERMOD is a steady-state plume dispersion model for assessment of pollutant concentrations from a variety of sources. AERMOD determines concentrations from multiple point, area, or volume sources based on an up-to-date characterization of the atmospheric boundary layer. The model employs hourly sequential preprocessed (AERMET) meteorological data to estimate concentrations. The AERMOD model is applicable to receptors in all types of terrain, including flat terrain, simple elevated terrain (less than height of stack), intermediate terrain (between height of stack and plume height), and complex terrain (above plume height). In addition, AERMOD provides a smooth transition of algorithms across these different terrains. Therefore, AERMOD was selected as the most appropriate model for the air quality impact analysis for the proposed facility. The Providence Engineering and Environmental Group software program, "BEEST for Windows," Version 12.09 was used to set up the model inputs and to perform the model runs.

The model parameters specified for the modeled location, such as meteorological data, rural versus urban dispersion coefficients, terrain, and receptor grid are discussed below. Except for the use of FLAT terrain, the remaining modeled parameters follow the EPA-recommended "regulatory default option," which includes the use of stack-tip downwash and calms and missing data) processing routines.

Specific modeling techniques for the area of impact (AOI), NAAQS analyses are discussed below.

7.2 PSD Modeling Analyses (NO_2, CO, $PM_{2.5}$)

7.2.1 Preliminary Impacts (SIL) Analysis

Modeling began with the preliminary impacts assessment. The modeled inventory consists of the Project emissions discussed in Section 6.1 and the contemporaneous emissions in Section 6.2. Ground-level concentrations caused by the Project were compared to the applicable SILs. See Section 5.2 for the justification for use of interim SILs.

Modeled results show maximum off-property pollutant concentrations to be less than corresponding SILs for all averaging periods for CO; as such, the Project demonstrates compliance, and no further analysis was required.

Modeled results show maximum off-property pollutant concentrations exceed the NO_2 1-hour NAAQS SIL but are less than the NO_2 annual NAAQS SIL.

Project preliminary impacts are less than established PSD SMCs for all pollutants. Thus, collection or presentation of preconstruction ambient monitoring data is not warranted. However, as described in Section 5.1, Formosa collects on-site ambient monitoring data for NO_2, $PM_{2.5}$, and ozone that meet PSD preconstruction monitoring requirements.

7.2.2 PSD Increment Analysis

Modeled results from the preliminary impacts analysis did not exceed the NO_2 annual SIL; therefore, a PSD Increment demonstration was not required. NO_2 only has an annual PSD Increment standard; therefore, no short-term NO_2 increment consumption evaluation is warranted.

7.2.3 Full NAAQS Analysis

A revised 1-hour NO_2 "full" NAAQS modeling demonstration was conducted using the following proposed procedure:

1. Performed the revised 1-hour NO_2 full NAAQS analysis using AERMOD with an inventory comprised of the maximum allowable NO_2 emission rates from Project sources discussed in Section 6.1, site-wide FPC TX sources discussed in Section 6.3, and the off-site inventory discussed in Section 6.4

2. Included receptors found to exceed the 1-hour NO_2 SIL from the preliminary impacts analysis.

3. Input monitored 1-hour NO_2 background concentrations into the AERMOD run by season and hour so cumulative 1-hour NO_2 off-property ground level concentrations can be determined (see Table 5-4).

4. Used Tier 2 screening approach to determine NO_2 concentrations (see Section 7.5). Based on limitations in AERMOD for Tier 2 processing, selected source group ALL only (i.e., no user or individual source groups are included).

5. Obtained the highest 8th-highest (H8H) maximum daily 1-hour NO_2 concentration averaged over five years modeled for source group ALL.

6. Compared the H8H to the 1-hour NO_2 NAAQS. Because it is less than the NAAQS, the demonstration is complete.

These steps sufficiently demonstrated compliance for the revised NAAQS analysis.

7.3 State NAAQS Analyses: SO_2

Project SO_2 PTE emission increases of 5.7 tpy, as shown in Table 2-1, are less than the PSD Major Source emission threshold of 40 tpy. Thus, SO_2 is subject to Minor NSR review. A State NAAQS analysis was completed for this compound for the 1-hour and 3-hour averaging periods. Results were shown to be less than the corresponding NAAQS SILs.

7.4 State Property Line Standards: SO_2

The Project SO_2 emissions are subject to concentration standards provided in TAC§112.3[1]. A demonstration is required that shows:

[1] 0.4 part per million by volume (ppmv) equates to approximately 1,021 µg/m^3, averaged over any 30-minute period for all counties other than Galveston, Harris, Jefferson, and Orange County.

- The impacts from the Project are less than 2% of the State Property Line standard, *OR*
- The total site-wide impact from all site-wide sources are less than the State Property Line standards.

The preliminary impacts analysis showed Project impacts are less than 2% of the SPL standard.

7.5 NO_2 Conversion

The emission rates in the application, as well as permitted rates, are expressed as NOx, however, the SIL and NAAQS are based on NO_2. The *Guideline on Air Quality Models* (EPA, 2017) provides a multi-tiered approach to estimating NO_2 concentrations, as follows:

- Tier 1 - assume full conversion of NO to NO_2 based on application of an appropriate refined modeling technique under Section 4.2.2 of Appendix W to estimate ambient NOx concentrations;
- Tier 2 – use an updated Ambient Ratio Method, referred to as "ARM2." ARM2 incorporates a variable ambient ratio that is a function of model predicted 1-hr NOx concentration, based on an analysis of hourly ambient NOx monitoring data from approximately 580 stations over the period 2001-2010 (API, 2013).
- Tier 3 - (non-regulatory default) detailed screening methods may be considered on a case-by-case basis, with the Ozone Limiting Method (OLM) identified as a detailed screening technique for point sources (Cole and Summerhays, 1979).

For the preliminary impacts and full impacts analyses, the "modified" Tier 2 (i.e., ARM2) conversion was used to estimate all NO_2 concentrations. Tier 3 procedures were not used for this analysis. Note that the load analysis assumed Tier 1 NO_2 conversion (see Section 6.7).

7.6 $PM_{2.5}$ Secondary Formation

The Flare Improvement Project at the FPC TX Plastics Plant in Point Comfort, Texas requires assessing impacts from both direct primary $PM_{2.5}$ as well as potential secondary formation from precursor emissions of NOx and SO_2. However, as already mentioned, the EGFs have no primary $PM_{2.5}$ emissions, only secondary formation from precursor emissions of NOx and SO_2.

The current preferred air dispersion model (i.e., AERMOD) can be used to simulate dispersion of direct $PM_{2.5}$ emissions but does not explicitly account for secondary formation of $PM_{2.5}$. As part of the revisions made to the "Guideline on Air Quality Models" (EPA, 2017), the EPA promulgated a two-tiered demonstration approach for addressing single-source impacts on secondary $PM_{2.5}$.

For this Project, a Tier 1 demonstration was conducted using guidance outlined in Appendix R – Secondary Formation of Particulate Matter ($PM_{2.5}$) of the TCEQ AQMG (TCEQ, 2019b). The development of the tool and related guidance is summarized in a memorandum from EPA (EPA, 2019). EPA has established the MERPs VIEW Qlik webpage which provides an illustrative tool to provide easy access to EPA's hypothetical single source modeled impacts of $PM_{2.5}$ to support appropriate PSD applications.

Table 7-1 presents the results of the Tier 1 analysis using Flare Improvement emission totals of NOx and SO_2. The worst-case MERP values from Appendix R Tables R-2 through R-5 will be filtered (surrogate height = L). Although the EGFs are approximately 100 feet (30 meters) tall, the "L" hypothetical stack, which represents a 3.2-foot (1.0-meter) tall stack, was used. This is the worst-case, and is presented in

Appendix R Table R-1. The worst-case MERP concentration is based on the ratio of permit-wide emission totals to the MERP values.

The MERP values were obtained directly from EPA's 2019 MERP values. TCEQ's Appendix R tables do not exactly match EPA's values. However, only slight differences are observed. These differences would not change the overall conclusions.

7.7 Ozone Analysis

The Project emission changes exceed 100 tpy of ozone precursors (i.e., VOC + NOx tpy increases > 100 tpy). As such, an ozone analysis is required to be conducted to estimate ozone concentrations from this increase. The ozone analysis previously submitted for the Project used the latest NOx and VOC emission totals from the Project. That analysis was performed using the EPA's MERPs approach, as outlined in Appendix Q of the TCEQ's AQMG (TCEQ, 2020a). Precursor emission totals (VOC and NOx) include estimates for the EGFs and elevated flares. These rates are all unchanged from the original submittal. The only change in the analysis was to update the ambient ozone background concentrations for 2020-2022, as shown in Table 5-3. Table 7-2 presents the results of the demonstration and shows that post-project ozone concentrations are predicted to be less than the NAAQS. This revision to the AQA involved no revisions to NOx and VOC emissions used in the ozone analysis already submitted for the Project.

7.8 Health Effects Review

The intent of the Health Effects Review evaluation is to show that either (1) the proposed Project has emissions or impacts so low that, by itself, or on a permit-wide basis, the impacts are less than a set of *de minimis* criteria; or (2) to show that that total predicted site-wide concentrations fall within the guidance generally accepted by TCEQ Toxicology. It is also important to note that the proposed Project includes both routine and MSS emission, which are treated separately at different stages in the MERA guidance.

The forty-six (46) compounds emitted by the Project were each evaluated based on the eight steps in the MERA flowchart. These steps are as follows:

Step 0: Applicability and Procedures
Step 1: No Net Increase
Step 2: *De Minimis* Increase
Step 3: 10% of ESL Evaluation
Step 4: Project-wide Modeling
Step 5: MSS Evaluation
Step 6: Ratio Test
Step 7: Site-wide Modeling
Step 8: Documentation

A flowchart which illustrates the Health Effects Review modeling process is provided in Figure 7-1. Important considerations for some of these steps are outlined below.

- Step 0: At this step, compounds were reviewed to determine whether they were exempt from the analysis, and/or the proper ESL to use in the evaluation. This included a review of compounds listed as simple asphyxiates; or particulate-based compounds which were evaluated against the NAAQS for particulates, and are not specifically subject to MERA review.

- With regard to the selection of ESLs for compounds with multiple ESLs: ethylene has two different ESLs: one based on vegetative sensitivity (ESL 1-hr = 1,400 µg/m^3); and the other which is health-based (ESL 1-hour = 170,000 µg/m^3). For ethylene, Dr. Jong-Song Lee of the TCEQ's Toxicology staff has indicated that the "short-term vegetation ESL is to protect all crop plants including flowering plants specifically for barley, pea, canola, peanut, sunflower, white clover, artichoke, and pine and spruce tree." The land use in the immediate area surrounding FPC TX Plant contains no "cultivated crops"; hence, the health-based ESL was used for this modeling analysis.
- Step 1: This step was skipped, as permit-wide emission increases were used in the health effects review.
- Step 2: Compound-specific, permit-wide emissions from the EGFs were evaluated against applicable *de minimis* emission levels. Permit-wide emission totals were used at this step.
- Step 3: This step used generic emission rate modeling (1 lb/hr) results for each source. Individual source groups and the primary receptor grid described in Section 11.3 were used to identify the GLC_{max} 1-hour and annual impact for each source.
- Steps 4 and 5: For these steps, permit-wide allowable emission rates were subdivided between routine and MSS sources and evaluated separately for MERA Steps 4 and 5. These were evaluated along with the generic impact from Step 3. Impact concentrations due to routine sources of emissions were compared to a threshold of 25% of the ESL for existing pollutants. MSS impact concentrations were compared to a threshold of 50% of the ESL for existing pollutants.
- Where necessary, pollutant-specific runs were conducted for Step 5 using AERMOD in order to determine the GLC_{max} and ESL exceedance frequencies for the MSS emission scenarios.
- Step 6: for this step, the following test is performed:

$$\frac{GLCmax}{ESL} \leq \frac{ERp}{ERs}$$

where:

GLC_{max}	maximum ground level concentration for the appropriate averaging time, in µg/m^3 from prior site-wide modeling (Step 4).
ESL	Effects Screening Level for the appropriate averaging time in µg/m^3.
ER_p	The Project increase, including MSS, in lb/hr or tpy.
ER_s	The proposed site-wide emissions, including MSS, in lb/hr or tpy.

- Step 7: Site-wide modeling. No specific site-wide modeling is expected to be needed/performed.
- Step 8: Documentation. The EMEW results spreadsheet provides the supporting results for each compound and is included with the electronic files of the AQA submittal. The MERA documentation is provided electronically in Appendix E.

TABLE 7-1. WORST-CASE $PM_{2.5}$ MERP VALUES FOR HYPOTHETICAL TEXAS SOURCES (SURROGATE HEIGHT=L)

DESCRIPTION	PRECURSOR	24-HOUR $PM_{2.5}$	ANNUAL $PM_{2.5}$	SURROGATE HEIGHT	JUSTIFICATION
Hypothetical/Surrogate (Tables R-2, R-3)[1]	NO_X	2,651	10,398	L	Worst-Case MERP values (Height=L). All Project Stacks = 100 ft.
Hypothetical/Surrogate (Tables R-4, R-5)[1]	SO_2	359	1,820	L	Worst-Case MERP values (Height=L). All Project Stacks = 100 ft.

[1] This table presents the worst-case NOx and SO_2 MERP values with surrogate height=L across all counties. Thus, the worst-case NOx and SO_2 MERP values are "decoupled", and may not be from the same county. This differs from TCEQ Appendix R Table R-1 (TCEQ, 2019b), which presents the worst-case metric decoupled from county *or* surrogate height.

PTE EMISSION TOTALS (FLARE IMPROVEMENT PROJECT): FOR MAJOR NSR MERP ANALYSIS

DESCRIPTION	PRECURSOR	24-HOUR $PM_{2.5}$	ANNUAL $PM_{2.5}$	REMARKS
EGFs_PSD-wide (tpy)	NOx	481.41	481.41	Table 2-1 PTE estimates (March 2022)
EGFs_PSD-wide (tpy)	SO2	5.70	5.70	Table 2-1 PTE estimates (March 2022)
Surrogate (tpy)	NOx	2,651.00	10,398.00	See above table.
Surrogate (tpy)	SO2	359.00	1,820.00	See above table
Ratio (Permit-wide/Surrogate)	NOx	18%	4%	
Ratio (Permit-wide/Surrogate)	SO2	2%	0.3%	
MERP Ratio (Permit/Surrogate)	**Total**	**20%**	**5%**	
MERP Conc. (ug/m3)	**Total**	**0.24**	**9.9E-03**	**MERP $PM_{2.5}$ Secondary contribution.**

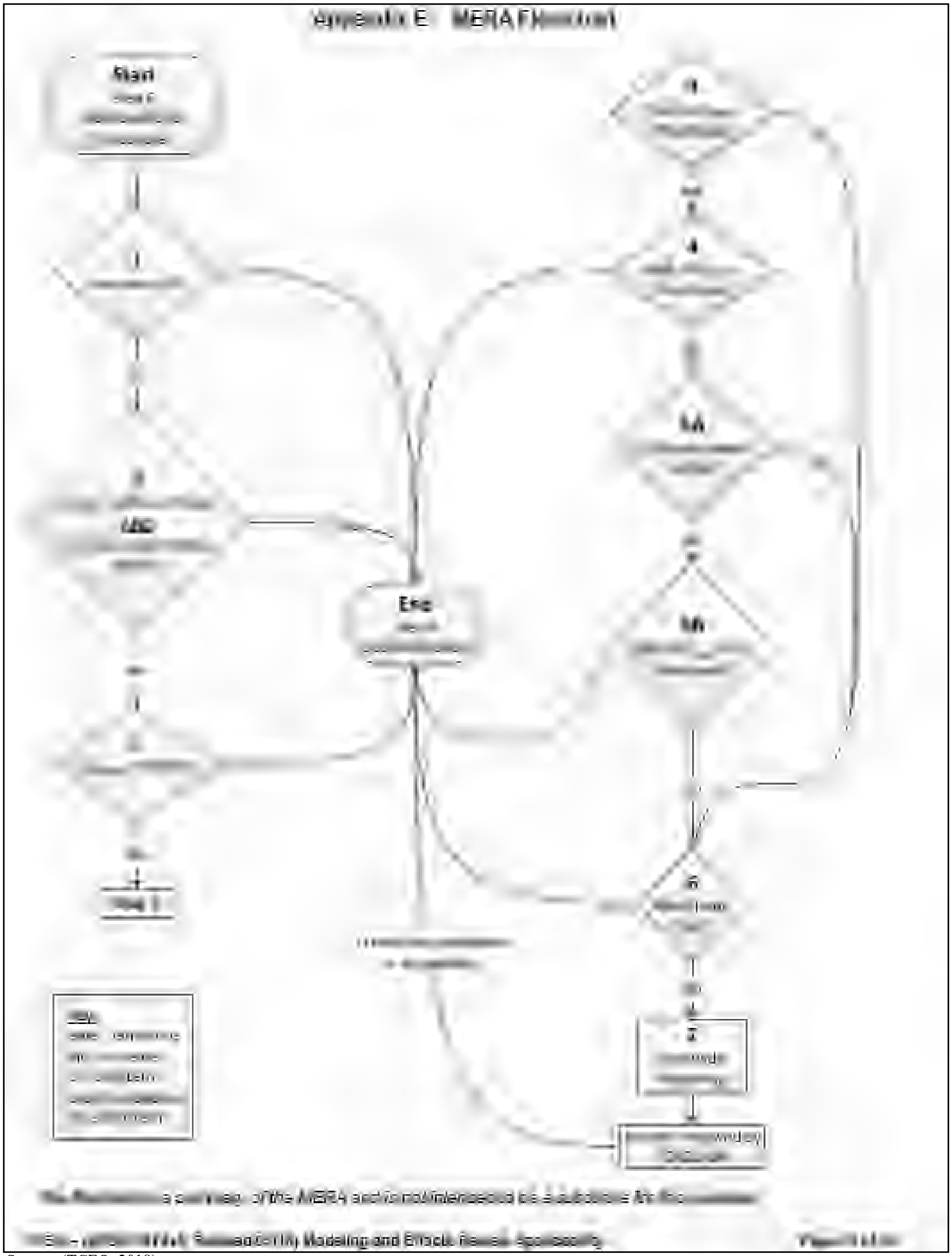
TABLE 7-2. WORST-CASE OZONE MERP VALUES FOR HYPOTHETICAL TEXAS SOURCES (SURROGATE HEIGHT=H FOR NOX, L FOR VOCS)

DESCRIPTION	PRECURSOR	8-HOUR O_3	SURROGATE HEIGHT	JUSTIFICATION
Hypothetical/Surrogate (Table Q-2)[1]	NO_X	250	L	Worst-Case MERP values (Height=L). All Project Stacks = 100 ft.
Hypothetical/Surrogate (Table Q-3)[1]	VOC	2,994	L	Worst-Case MERP values (Height=L). All Project Stacks = 100 ft.

[1] This table presents the worst-case NOx and VOC MERP values with surrogate height=L across all counties. Thus, the worst-case NOx and VOC MERP values are "decoupled", and may not be from the same county. This differs from TCEQ Appendix Q Table Q-1 (TCEQ, 2019b), which presents the worst-case metric decoupled from county *or* surrogate height.

PTE EMISSION TOTALS (FLARE IMPROVEMENT PROJECT): FOR MAJOR NSR MERP ANALYSIS

DESCRIPTION	PRECURSOR	8-HOUR O_3	REMARKS
Permit-wide (tpy)	NOx	481.41	Table 2-1 PTE estimates
Permit-wide (tpy)	VOC	263.55	Table 2-1 PTE estimates
Surrogate (tpy)	NOx	250.00	See above table.
Surrogate (tpy)	VOC	2,604.00	See above table
Ratio (Permit-wide/Surrogate)	NOx	193%	
Ratio (Permit-wide/Surrogate)	VOC	10%	
MERP Ratio (Permit-wide/Surrogate)	**Total**	**203%**	IF MERP Conc < Ozone SIL (1 ppb), done; otherwise, MERP Ozone Secondary contribution to add to ozone background.
MERP Conc. (ppb)	**Total**	**2.03**	
Ozone Background Concentration (ppb)	**Ozone**	**63.9**	2020-2022 3-year Average of H4H (FPC North Monitor)
Ozone Total Concentration (ppb)	**Ozone**	**65.9**	The cumulative concentration is less than the 8-hour NAAQS (70 ppb); therefore, the demonstration is complete.



Source: (TCEQ, 2018)

FIGURE 7-1. MERA FLOW CHART

8.0 SELECTION OF DISPERSION OPTION

Several parameters are used to describe the character of the modeled domain, including surface roughness length, albedo and Bowen ratio. These parameters are incorporated into the surface meteorological data set used by AERMOD. TCEQ has developed three separate AERMOD-ready meteorological data sets for each county in the state (see Section 12.0). The different data sets correspond to three categories of surface roughness length:

- Category 1 – LOW
  - Appropriate for flat areas with surface roughness lengths of 0.001 – 0.1 meter.
- Category 2 – MEDIUM
  - Appropriate for rural/suburban areas with surface roughness lengths of 0.1 – 0.7 meter.
- Category 3 – HIGH
  - Appropriate for urban/industrial areas with surface roughness lengths of 0.7 – 1.5 meters.

AERSURFACE Version 20060 was run to estimate which land use category best describes the area around the FPC TX complex. AERSURFACE will provide a composite surface roughness length for a circular area within a 1.0-kilometer radius centered on the main Plant site. Based on these results, the meteorological data set that utilized the appropriate category (low, medium, or high) surface roughness length values for Jackson County was used. The supporting AERSURFACE electronic modeling files are provided in the AQA.

9.0 TERRAIN

Flat terrain was modeled. The FPC TX Point Comfort Plant lies in the Texas Gulf Coast region where flat terrain prevails. This has been verified by analysis of the United States Geological Survey maps and from previous site visits. Therefore, the non-regulatory default option "FLAT" was used to characterize the terrain in lieu of collecting terrain elevations and hill heights with AERMAP.

10.0 BUILDING WAKE EFFECTS

The potential effect of building wakes (i.e., downwash) upon the stack plumes were evaluated in accordance with EPA's *Guideline for Determination of Good Engineering Practice (GEP) Stack Height* (EPA, 1985). Direction-specific building data will be evaluated for all FPC TX modeled point sources using the EPA Building Parameter Input Program PRIME (BPIPPRM dated 04274). Figure 3-1 in Section 3.0 provides a plot plan illustrating permit-wide emission points and building structures. Structure dimension and height tables are provided on this figure. Each building corner was digitized to obtain UTM coordinates. This information, along with emission point coordinates and heights, was input to the BPIPPRM model to obtain downwash inputs to the AERMOD model.

AERMOD considers direction-specific downwash using the PRIME algorithm as evaluated in the BPIPPRM program. All Project sources, as well as all other FPC TX point sources, are distant to the nearest property line; therefore, no building cavity regions extend off-property and building cavity calculations are not warranted. Electronic BPIPPRM input and output files have been provided with the electronic modeling files.

11.0 RECEPTOR GRID

This section presents the receptor grids that were used for the various modeling analyses.

11.1 Preliminary Impacts Analysis

The primary receptor grid used for the modeling analyses was created as follows:

- 25-meter spacing extending from the property line out to 100 meters for any Project sources within 300 meters of the property line;
- 100-meter spacing within 1 kilometer of Project sources for any locations not covered by the 25-meter grid;
- 500-meter spacing within 1 to 5 kilometers of Project sources;
- 1,000-meter spacing within 5 to 20 km of Project sources;

Figure 11-1 illustrates the receptor grid that was used for revised preliminary impacts modeling. Figures 11-2 and 11-3 provide additional (zoomed in) views closer to the plant.

Fencing coincides with the FPC TX property boundary, apart from the parcel immediately west of the main plant entrance to FM1593 (see Figure 11-4). Although unfenced, FPC TX security has command and control of this region, through routine motor patrol, and signage to inform those entering this area that they are "Entering FPC TX Plastics Property," and escorts anyone not on official business at the Plant out of this area. Therefore, this area is not considered ambient air and receptors were not placed there for the air quality analysis, as the public would not generally be exposed to concentrations in this region.

For this revised AQA, the following additions were made to the modeled receptor grid:

- Cox Creek: receptors were added along and within Cox Creek for the portion residing inside FPC TX property.
- Alcoa Property Along the Western Main Plant: Receptors were added to reflect a north-south parcel discovered to be owned by Alcoa along FM 1593, west of FPC TX's Main Plant.
- Extension of receptors: receptors (1km spacing) were extended from 25km to 50km to fully encapsulate/define the Project's radius of impact (ROI).

11.2 Full NAAQS Analysis

Only receptors which exceeded the NO_2 1-hour SIL were included in the "full" NAAQS modeling analysis.

11.3 PSD Increment Analysis

An annual NO_2 PSD Increment analysis was not required, as Project impacts did not exceed the NO_2 annual SIL.

11.4 Health Effects Review

The primary receptor grid shown in Figure 11-5 was used to identify the GLCmax for all steps required in the MERA. The analysis did not require further stratification of non-industrial and industrial receptors and impacts.

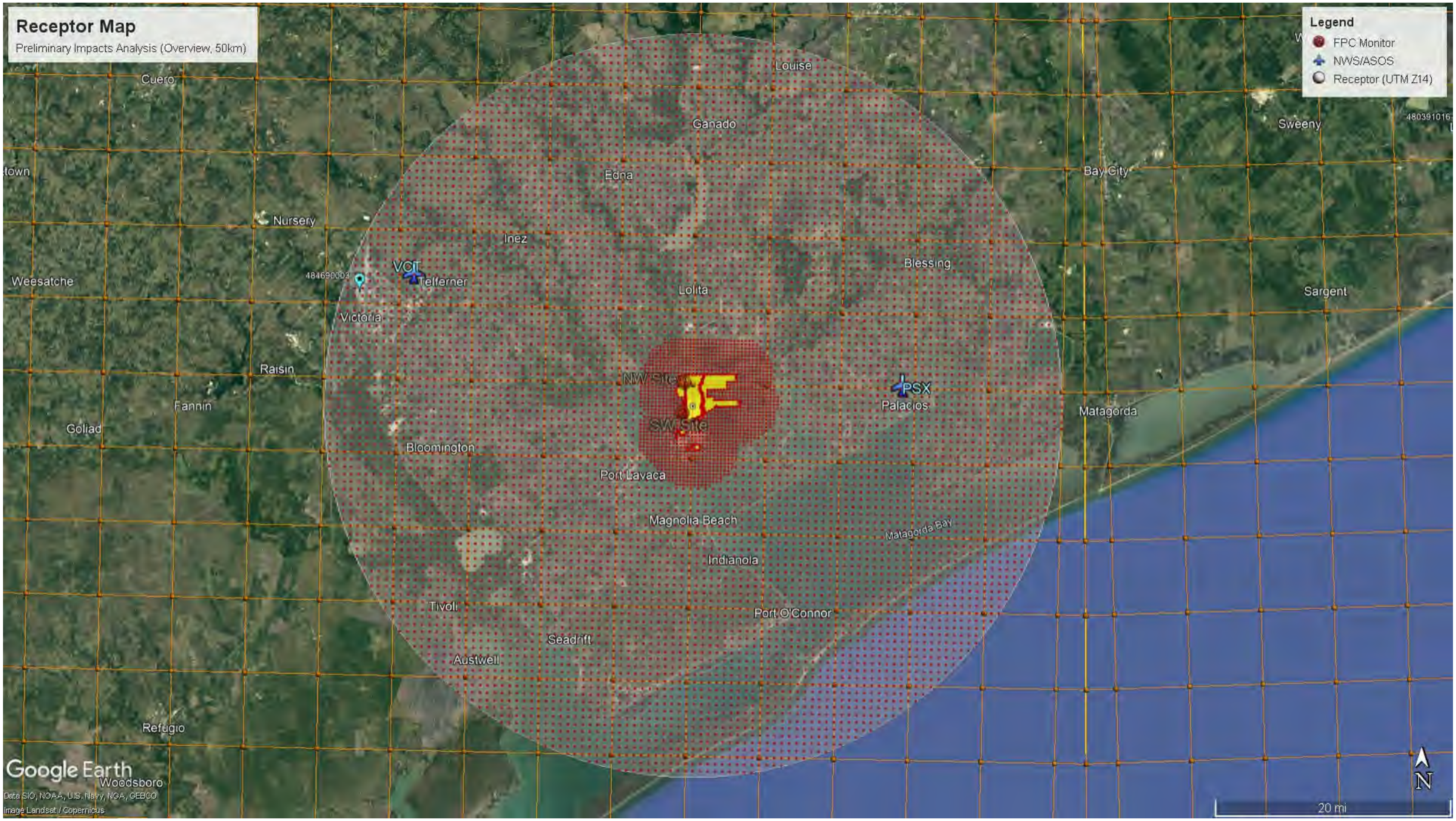


FIGURE 11-1. PRELIMINARY IMPACTS RECEPTOR GRID (VIEW 1)

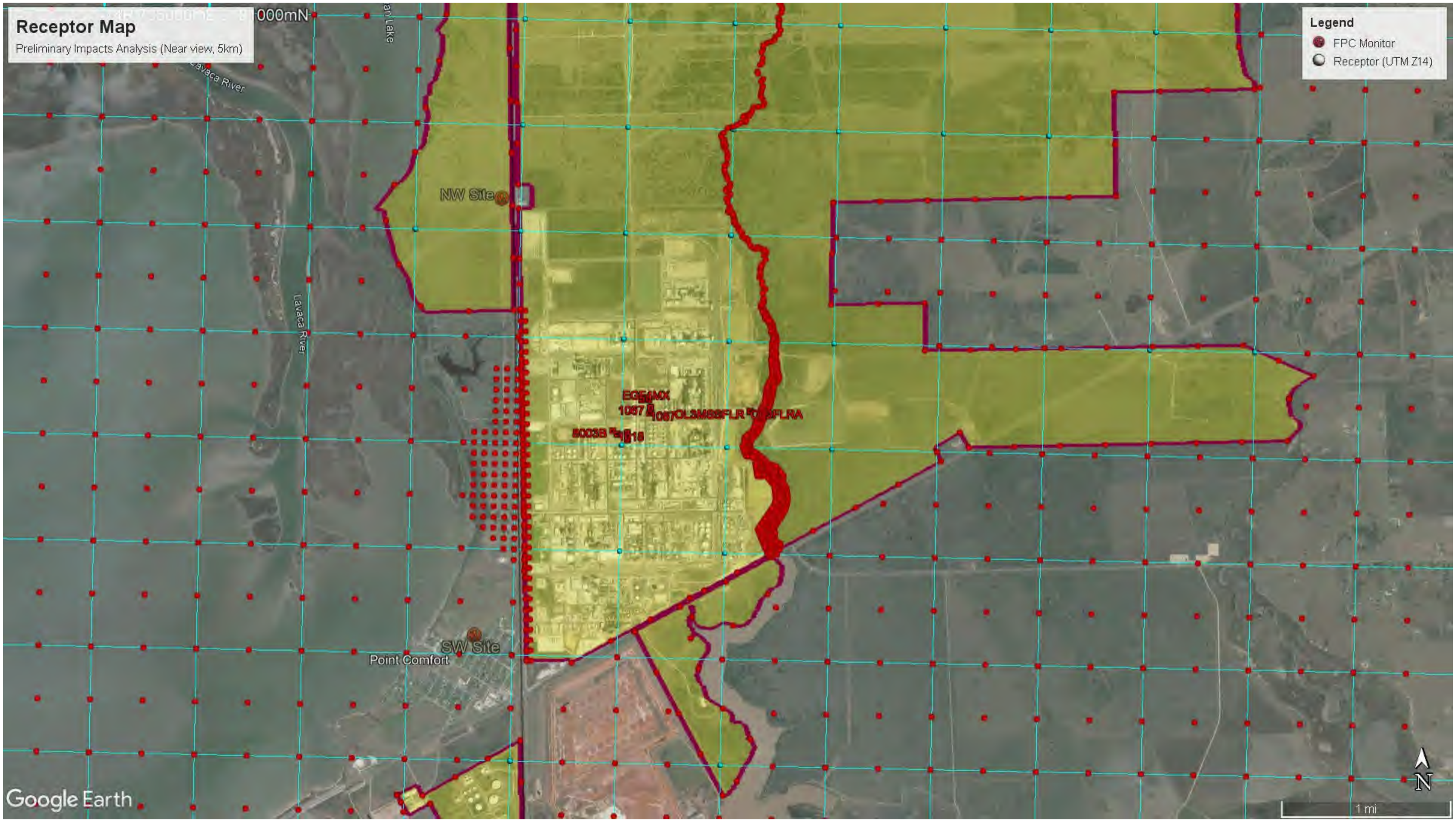


FIGURE 11-2. PRELIMINARY IMPACTS RECEPTOR GRID (VIEW 2)

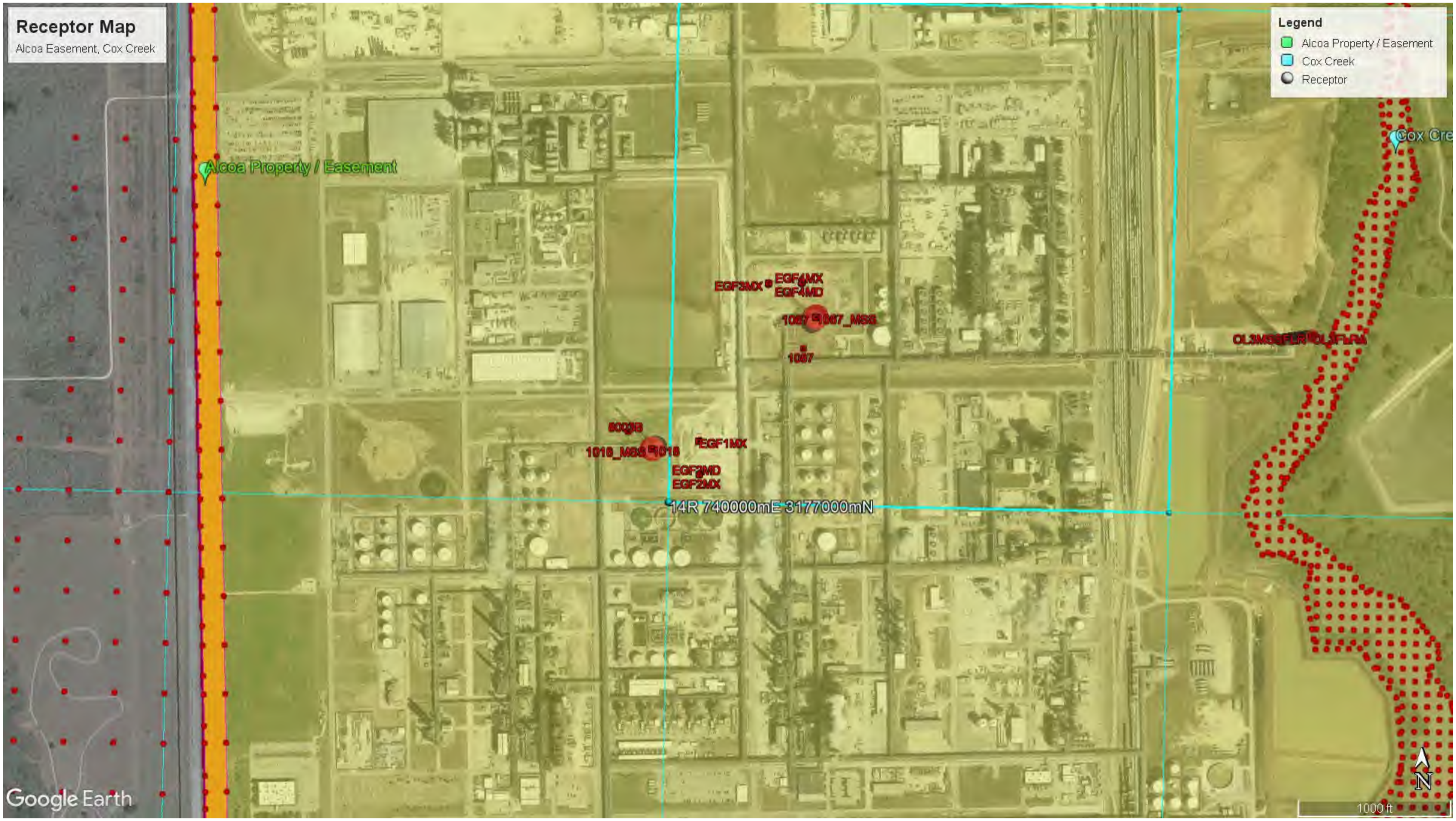


FIGURE 11-3. **PRELIMINARY IMPACTS RECEPTOR GRID (VIEW 3)**

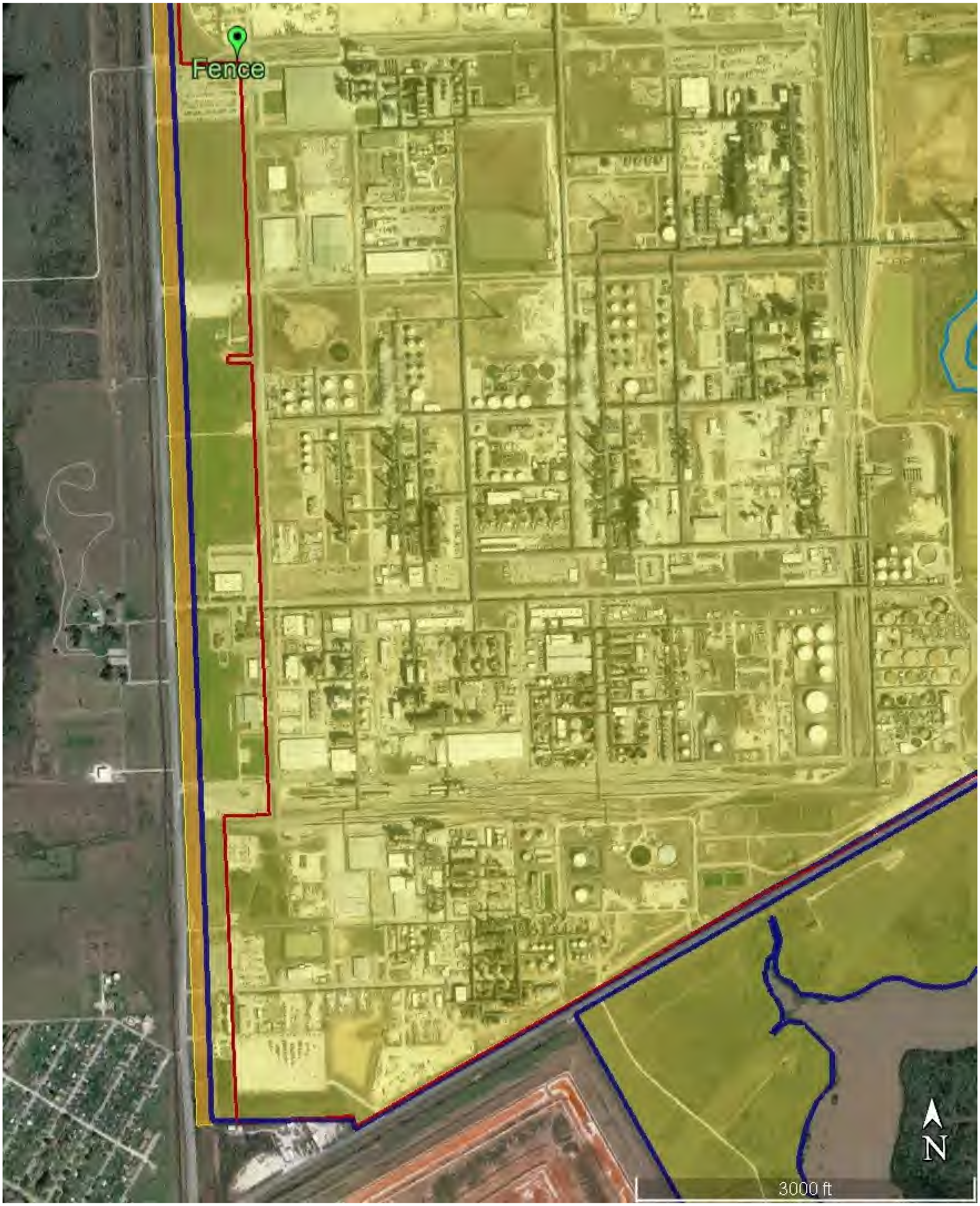


FIGURE 11-4. PROPERTY AND FENCE LINES ALONG WESTERN MAIN PLANT

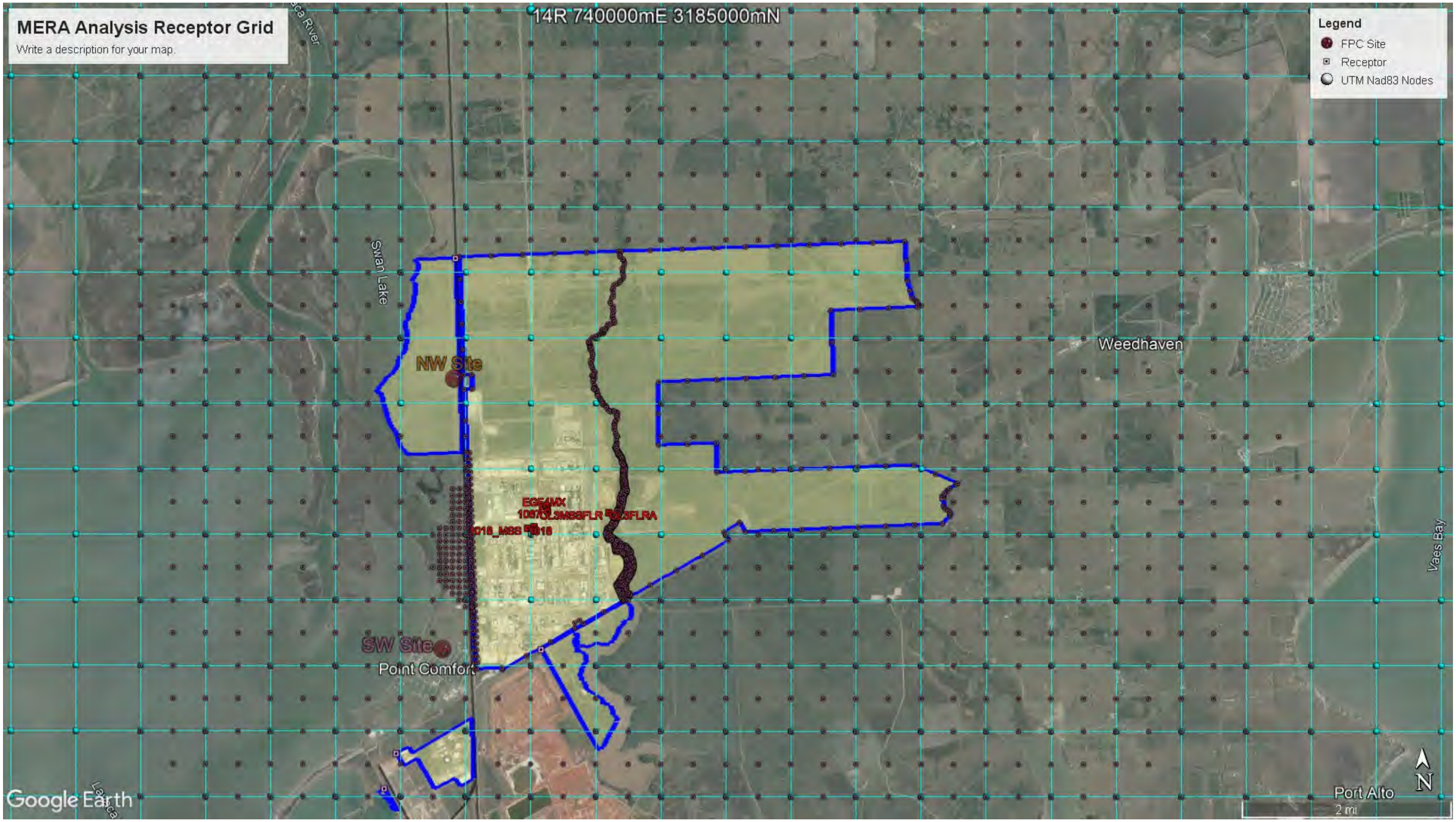


FIGURE 11-5. HEALTH EFFECTS ANALYSIS RECEPTOR GRID

12.0 METEOROLOGICAL DATA

TCEQ provides meteorological data sets deemed acceptable for refined screening-level modeling using AERMOD Version 22112 (TCEQ, 2022). TCEQ has created updated pre-processed data sets using AERMET Version 22112. TCEQ provides surface and upper air "profile" data sets to use for every county in the state (TCEQ, 2017c). Technical basis for this processing is also provided on TCEQ's website (TCEQ, 2017d). The ADMT has updated the pre-processed meteorological data for the state of Texas, which includes the ADJ_U* default option using the updated version of AERMET (Version 22112).

The FPC TX complex is located along the northern boundary of Calhoun County and southern boundary of Jackson County (see Figure 4-1). The EGFs are located along the Jackson County line. For Jackson County, TCEQ's suggested surface station is the Victoria Municipal Airport, which is 28 miles (45 kilometers) northwest and inland of FPC TX. For Calhoun County, TCEQ's selected processed surface meteorological station is the NWS ASOS site at the Aransas County Airport in Rockport, Texas (Identifier KRKP). This site is 52 miles (84 kilometers) southwest of FPC TX, down the coastline. Victoria meteorological data was chosen given the station is significantly closer to FPC TX than Rockport; matches the general land cover (flat, coastal vegetation) in the FPC TX vicinity; and has historically been proposed and used for several air quality analyses.

Table 6-2 summarizes the meteorological data sets that were used for each analysis. For pollutants subject to PSD review (CO and NO_2), a five-year dataset (2017, 2018, 2019, 2020, and 2021) were used for the analysis. A five-year composite dataset was used for the special processing necessary for pollutants having a statistical form for the NAAQS.

In accordance with TCEQ modeling guidance (TCEQ, 2019b), modeling for pollutants not subject to PSD review (i.e., State Property Line, and State Health Effects) were conducted using one year of processed meteorological data for 2020. SO_2 requires the five-year composite dataset to determine the statistical form for the NAAQS.

The TCEQ-developed "medium" surface roughness value was utilized, as supported by AERSURFACE results, which are discussed in Section 8.0.

12.1 Profile Base Elevation

A profile base elevation of 117 feet (35.7 meters) was modeled, corresponding to the elevation of surface meteorological station at the Victoria Municipal Airport.

13.0 PRESENTATION OF RESULTS

This section presents the modeling results for all applicable standards, as well as results of the additional impacts analyses.

13.1 Preliminary Impacts (SIL) Analysis

The Project preliminary impacts analysis results are summarized in Table 13-1. The analysis was completed according to the methodology outlined in Section 7.2.1. Permit-wide maximum impacts are less than the SILs for all compounds, except NO_2 1-hour.

13.2 PSD Increment Analysis

The preliminary impacts analysis showed impacts to be less than the NO_2 annual SIL, thus compliance is demonstrated with the PSD increment standard without further review.

13.3 Full NAAQS Analysis

The "full" NAAQS analysis for NO_2 1-hr average was completed according to the methodology outlined in Section 7.2.3. Modeled results are presented in Table 13-2 and demonstrate the Project will comply with the 1-hr NO_2 NAAQS.

13.4 Ozone Analysis

An ozone analysis was performed according to the methodology and results presented Section 7.7. The maximum result was 65.9 ppb, which complies with the 70 ppb ozone NAAQS. This was obtained via the following steps:

- Step 1: Obtain 8-hr ozone concentration from the Project (MERPs Analysis) = 2.03 ppb
- Step 2: Obtain 8-hr ozone ambient background from Formosa's local ambient monitoring data (2020-2022 high 4th-highest daily 8-hour average) = 63.9 ppb (see Table 5-3)
- Step 3: Add Steps 1 and 2. Total = 2.03 + 63.9 = 65.9 ppb.

13.5 Additional Impacts Analysis

The Flare Improvement Project will not result in any additional growth above what was already assessed in the original permit application and AQA. The remaining subsections of this paragraph discuss the additional impacts analysis.

13.5.1 Growth Analysis

As specified on Form PI-1 of the permit application, no permanent jobs are estimated to be created by the Flare Improvement Project. This is because the enclosed ground flares augment existing flaring activities. The municipal services currently provided by the cities of Point Comfort, Port Lavaca, and Victoria will be adequate to support this Project. Therefore, the effect on air quality due to residential growth is not significant. In addition, the Project should not result in any significant commercial or industrial growth outside the facility since its construction and operation will likely be supported by existing industrial and commercial establishments. Thus, no significant air quality degradation due to associated commercial or industrial growth is expected.

13.5.2 Soils and Vegetation Impacts

TCEQ has determined that there are no sensitive soil types within the state that would be harmed by criteria pollutant concentrations less than the NAAQS; therefore, no in-depth soil and vegetation analysis was performed.

13.5.3 Visibility Impairment Analysis

Class I Analysis

No PSD Class I area impact analysis for increment consumption and visibility impacts was performed since there are no Class I areas within 62 miles (100 kilometers) of the facility. The nearest Class I areas are Big Bend National Park, located 385 miles (620 kilometers) west of Point Comfort in Brewster County, and the Caney Creek Wilderness Area, located over 415 miles (670 kilometers) north-northeast of Point Comfort in southwestern Arkansas.

Class II Analysis

The PSD requirements provide for a system of area classifications which affords states an opportunity to identify local land-use goals. Calhoun and Jackson Counties are classified as a Class II area which allows normal well-managed industrial growth. To date, TCEQ has not identified procedures for determining visibility impacts in Class II areas. The TCEQ specifies that compliance with TCEQ Chapter 111, Control of Air Pollution from Visible Emissions and Particulate Matter, meets visibility requirements. FPC TX Port Comfort Facility will comply with this regulation.

13.6 State Property Line Analysis

A state property line significance analysis for SO_2 was conducted for this Project, as described in Section 7.4. The results are summarized in Table ES-1, as well as the Electronic Modeling Evaluation Workbook (EMEW) that is being submitted in support of this permit. Results demonstrate compliance with TCEQ state standards.

13.7 Health Effects Screening Levels Evaluation

As described in Section 7.8, each toxic compound was evaluated individually and stepped through the MERA process. All species showed compliance by Step 3 of the MERA. The Electronic Modeling Evaluation Workbook (EMEW) summarizes all evaluated pollutants and at which stage in the MERA process the modeling was completed.

TABLE 13-1. PRELIMINARY IMPACTS ANALYSIS RESULTS

CONSTITUENT	TYPE OF REVIEW	MODEL POLLUTANT ID	STANDARD AVERAGING PERIOD	MODEL AVERAGING PERIOD	MODEL AVG PERIOD RANK	SOURCE GROUP[1]	SIL	SMC	PROJECT GLCMAX	IS PROJECT GLCMAX LESS THAN SIL?	IS PROJECT GLCMAX LESS THAN SMC?
							µg/m³	µg/m³	µg/m³	YES/NO	YES/NO
Nitrogen Dioxide (NO_2)	Major NSR	NO2	1-Hour	1st-Highest Max Daily 1-Hr	1ST	ALLMD	7.5	---	34.3[1]	no	--
			Annual	Annual	1ST	ALLMD	1	14	0.12	YES	YES
Carbon Monoxide (CO)	Major NSR	CO	1-Hour	1-HR	1ST	ALLMD	2000	---	357.8	YES	---
			8-Hour	8-HR	1ST	ALLMD	500	575	143.1	YES	YES
Particulate Matter ≤ 2.5 microns ($PM_{2.5}$)	Major NSR [2]	PM25_ST	24-Hour	24-HR	1ST	*NA*	1.2	---	0.24[2]	YES	---
		PM25_LT	Annual	Annual	1ST	*NA*	0.3	---	9.9E-03[2]	YES	
Sulfur Dioxide (SO_2)	Minor NSR	SO2	1-Hour	1st-Highest Max Daily 1-Hr	1ST	ALLMD	7.8	---	0.16	YES	---
		SO2_ST	3-Hour	3-HR	1ST	ALLMD	25	---	0.14	YES	

[1] From source group "ALLMD" which designates EGFs at mid-load design exhaust parameters (50% load and emissions). This was found to be worst-case over source group "ALLMX" which designates EGFs at maximum design exhaust parameters and emission rates (220,000 lb/hr of waste gas). "ALLMD" was also used to represent annual average conditions.
[2] There are no direct/primary $PM_{2.5}$ emissions for this Project, only $PM_{2.5}$ precursors of NO_X and SO_2. (see Table 7-1 for secondary formation calculation).

TABLE 13-2. FULL NAAQS ANALYSIS SUMMARY

POLLUTANT	STANDARD AVERAGING PERIOD	MODEL AVERAGING PERIOD (FORM OF STANDARD)	"FULL" NAAQS MODELED IMPACT [A]	AMBIENT BACKGROUND [B]	FLARE IMPROVEMENT "FULL" NAAQS TOTAL IMPACT [A]+[B]	NAAQS	TOTAL IMPACT LESS THAN NAAQS?
			(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	YES/NO
NO_2	1-hour	8TH-HIGHEST MAX DAILY 1-HR	181.4 [1]	included [2]	181.4	188	YES

[1] The full NAAQS impact was determined/modeled using NO_2 Tier 2 formation for source group ALL according to the methodology presented in Section 7.2.3.
[2] Background concentrations were input directly into the model run by season and hour from data summarized in Table 5-4. The model determined the appropriate background to add for the given season and hour of the analysis.

14.0 ELECTRONIC FILES

Electronic copies of all modeling files are provided in Appendix F and will be placed on the TCEQ file server for retrieval/download.

15.0 REFERENCES

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APPENDIX A SUPPORTING INFORMATION (ELECTRONIC ONLY)

Supporting Information

EXTERNAL ELECTRONIC FILE FOLDERS

A01: 2023 Flare Improvement Project Modeling Protocol, Revised April 28, 2023

A02: Table 2F Contemporaneous Submittal

A03: EPA SILs Guidance

APPENDIX B FLARE DIAMETER CALCULATIONS (ELECTRONIC ONLY)

APPENDIX C SITE-WIDE MODELED INPUT PARAMETERS (ELECTRONIC ONLY)

APPENDIX D OFF-SITE MODELED INPUT PARAMETERS (ELECTRONIC ONLY)

APPENDIX E MERA ANALYSIS (ELECTRONIC ONLY)

APPENDIX F MODELING FILES (ELECTRONIC ONLY)

APPENDIX G AMBIENT BACKGROUND CONCENTRATIONS (ELECTRONIC ONLY)

Arnold R. Srackangast Affidavit

Exhibit AS-3

TCEQ Modeling Audit Memorandum

TCEQ Interoffice Memorandum

To: Cara Hill
Mechanical/Coatings Section

Thru: Chad Dumas, Team Leader
Air Dispersion Modeling Team (ADMT)

From: Robert Scalise
ADMT

Date: July 25, 2023

Subject: Second Air Quality Analysis Audit – Formosa Plastics Corporation, Texas (RN100218973)

1. Project Identification Information

Permit Application Numbers: 40157/PSDTX1222, 19200/PSDTX1237, 19871/PSDTX1236, 19201/PSDTX1232, 20203/PSDTX1224, 91780/PSDTX1240, 19168/PSDTX1226, 140763/PSDTX1500, and 107518/PSDTX1383
NSR Project Numbers: 336055, 336051, 336049, 336056, 336054, 336050, 336052, 336048, and 336053
ADMT Project Number: 8595
County: Calhoun
Published Map: \\tceq4avmgisdata\GISWRK\APD\MODEL PROJECTS\8595\8595.pdf

Air Quality Analysis: Submitted by Power Engineers, May 2023, on behalf of Formosa Plastics Corporation, Texas. Additional information provided June 2023. A single analysis was submitted since the project affects all permits identified above.

This is the second modeling audit for these NSR project numbers, and the audit was conducted to review updated modeling performed to account for additional receptors, update meteorological data and AERMOD version, and update background concentration data. This modeling audit memorandum represents a complete summary and the modeling results in this document supersede the corresponding modeling results in the original modeling audit memorandum dated September 22, 2022 (WCC content ID 6291301).

2. Report Summary

The air quality analysis (AQA) is acceptable, as supplemented by the ADMT, for all review types and pollutants. The results are summarized below.

A. De Minimis Analysis

A De Minimis analysis was initially conducted to determine if a full impacts analysis would be required. The De Minimis analysis modeling results indicate that 1-hr NO_2 exceeds the interim de minimis concentration and requires a full impacts analysis. The De Minimis analysis modeling results for 1-hr and 8-hr CO and annual NO_2 indicate that the project is below the respective de minimis concentrations and no further analysis is required.

The justification for selecting the EPA's interim 1-hr NO_2 De Minimis level is based on the assumptions underlying EPA's development of the 1-hr NO_2 De Minimis level. As explained in EPA guidance memoranda[1], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr NO_2 NAAQS.

[1] www.tceq.texas.gov/assets/public/permitting/air/memos/guidance_1hr_no2naaqs.pdf

The ozone De Minimis levels are the EPA recommended De Minimis levels. The use of the EPA recommended De Minimis levels is sufficient to conclude that a proposed source will not cause or contribute to a violation of an ozone NAAQS based on the analyses documented in EPA guidance and policy memoranda[2].

Table 1. Modeling Results for PSD De Minimis Analysis in Micrograms Per Cubic Meter ($\mu g/m^3$)

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	De Minimis ($\mu g/m^3$)
NO_2	1-hr	34	7.5
NO_2	Annual	0.1	1
CO	1-hr	358	2000
CO	8-hr	143	500

The 1-hr NO_2 GLCmax is based on the highest five-year average of the maximum predicted concentrations determined for each receptor.

The GLCmax for all other pollutants and averaging times represent the maximum predicted concentrations over five years of meteorological data.

Table 2. Modeling Results for Ozone PSD De Minimis Analysis in Parts per Billion (ppb)

Pollutant	Averaging Time	GLCmax (ppb)	De Minimis (ppb)
O_3	8-hr	2.03	1

The applicant performed an O_3 analysis as part of the PSD AQA. The applicant evaluated project emissions of O_3 precursor emissions (NO_x and VOC). For the project NO_x and VOC emissions, the applicant provided an analysis based on a Tier 1 demonstration approach consistent with the EPA's Guideline on Air Quality Models (GAQM). Specifically, the applicant used a Tier 1 demonstration tool developed by the EPA referred to as Modeled Emission Rates for Precursors (MERPs). Using data associated with the worst-case source for NO_x and VOC, the applicant estimated an 8-hr O_3 concentration of 2.03 ppb. When the estimates of ozone concentrations from the project emissions are added together, the results are greater than the De Minimis level. Since the O_3 impact is above the De minimis level, a full impacts analysis is required.

B. Air Quality Monitoring

The De Minimis analysis modeling results indicate that NO_2 and CO are below their respective monitoring significance levels.

Table 3. Modeling Results for PSD Monitoring Significance Levels

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	Increment ($\mu g/m^3$)
NO_2	Annual	0.1	14

[2] www.tceq.texas.gov/permitting/air/modeling/epa-mod-guidance.html

CO	8-hr	143	575

The GLCmax represent the maximum predicted concentrations over five years of meteorological data.

Since the project has a net emissions increase of 100 tons per year (tpy) or more of VOC or NO_x, ambient O_3 monitoring data were evaluated.

A background concentration for O_3 was obtained from the applicant's monitoring network (FPC NW Site). The three-year average (2020-2022) of the annual fourth highest daily maximum 8-hr concentrations (63.9 ppb) was used in the analysis. The use of this monitor is reasonable as it is sited adjacent to the project site.

C. National Ambient Air Quality Standard (NAAQS) Analysis

The De Minimis analysis modeling results indicate that 1-hr NO_2 exceeds its interim de minimis concentration and requires a full impacts analysis. The full NAAQS modeling results indicate the total predicted concentrations will not result in an exceedance of the NAAQS.

Table 4. Total Concentrations for PSD NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Conc. = [Background + GLCmax] ($\mu g/m^3$)	Standard ($\mu g/m^3$)
NO_2	1-hr	181	Note background discussion below	181	188

The 1-hr NO_2 GLCmax is the highest five-year average of the 98th percentile of the annual distribution of predicted daily maximum 1-hr concentrations determined for each receptor.

Background concentrations for NO_2 were obtained from the applicant's monitoring network (FPC NW Site). The applicant conducted their evaluation by combining NO_2 background concentrations on a seasonal basis with the predicted concentrations of the project and other on- and off-property sources on a seasonal (quarterly) basis for each modeled receptor. The applicant followed EPA guidance when developing seasonal-hourly background concentrations. The seasonal background concentrations were based on the maximum three-year average (2020-2022) of the 98th percentile of the annual distribution of the daily maximum 1-hr concentrations for each hour and season. These background values were then used in the model (as background scalars) to be combined with model predictions giving a total predicted concentration. The use of this monitor is reasonable as it is sited adjacent to the project site.

Table 5. Total Ozone Concentrations for PSD NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (ppb)	Background (ppb)	Total Conc. = [Background + GLCmax] (ppb)	Standard (ppb)
O_3	8-hr	2.03	63.9	65.93	70

The applicant performed an O_3 analysis as part of the PSD AQA. The applicant evaluated project emissions of O_3 precursor emissions (NO_x and VOC). For the project NO_x and VOC emissions, the applicant provided an analysis based on a Tier 1 demonstration approach consistent with the EPA's GAQM. As noted above, the applicant used a Tier 1 demonstration tool developed by the EPA referred to as MERPs. Using data associated with the worst-case source for NO_x and VOCs, the applicant estimated an 8-hr O_3 concentration of 2.03 ppb. When the estimates of ozone concentrations from the project emissions are added to the background concentration listed in the table above, the results are less than the NAAQS.

D. Additional Impacts Analysis

The applicant performed an Additional Impacts Analysis as part of the PSD AQA. The applicant conducted a growth analysis and determined that population will not significantly increase as a result of the proposed project. The applicant conducted a soils and vegetation analysis and determined that all evaluated criteria pollutant concentrations are below their respective secondary NAAQS. The applicant meets the Class II visibility analysis requirement by complying with the opacity requirements of 30 TAC Chapter 111. The Additional Impacts Analyses are reasonable and possible adverse impacts from this project are not expected.

The ADMT evaluated predicted concentrations from the proposed project to determine if emissions could adversely affect a Class I area. The nearest Class I area, Caney Creek Wilderness, is located approximately 570 kilometers (km) from the proposed site.

The predicted concentrations of NO_2 and SO_2 for all averaging times, are all less than de minimis levels at a distance of 14 km from the proposed sources in the direction the Caney Creek Wilderness Class I area. The Caney Creek Wilderness Class I area is an additional 556 km from the location where the predicted concentrations of NO_2 and SO_2 for all averaging times are less than de minimis. Therefore, emissions from the proposed project are not expected to adversely affect the Caney Creek Wilderness Class I area.

E. Minor Source NSR and Air Toxics Analysis

Table 6. Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	0.17	20.42

Table 7. Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	0.2	7.8
SO_2	3-hr	0.1	25

The 1-hr SO_2 GLCmax is based on the highest five-year average of the maximum predicted concentrations determined for each receptor. The 3-hr SO_2 GLCmax is the maximum predicted concentration associated with one year of meteorological data.

The primary NAAQS for 24-hr and annual SO_2 have been revoked for Calhoun County and are not reported above.

The justification for selecting the EPA's interim 1-hr SO_2 De Minimis level was based on the assumptions underlying EPA's development of the 1-hr SO_2 De Minimis level. As explained in EPA guidance memoranda[3], the EPA believes it is reasonable as an interim approach to use a De Minimis level that represents 4% of the 1-hr SO_2 NAAQS.

Table 8. Generic Modeling Results

Source ID	1-hr GLCmax (µg/m³ per lb/hr)	Annual GLCmax (µg/m³ per lb/hr)
EGF1MX	0.02	0.0002
EGF2MX	0.02	0.0002
EGF3MX	0.02	0.0002
EGF4MX	0.01	0.0002
EGF1MD	0.03	0.0005
EGF2MD	0.03	0.0005
EGF3MD	0.03	0.0005
EGF4MD	0.03	0.0004
EGF1LO	0.21	0.007
EGF2LO	0.21	0.007
EGF3LO	0.18	0.006
EGF4LO	0.2	0.005
OL3FLRA	0.02	0.0005
OL3MSSFL	0.01	0.0001
1018	0.12	0.006
1067	0.07	0.003
1018_MSS	0.01	0.0001
1067_MSS	0.01	0.0001
1028WG	24.44	0.24
1068WG	10.52	0.07

3. Model Used and Modeling Techniques

[3] www.epa.gov/sites/production/files/2015-07/documents/appwso2.pdf

AERMOD (Version 22112) was used in a refined screening mode.

For the health effects analysis, a unitized emission rate of 1 lb/hr was used to predict a generic short-term and long-term impact for each source. The generic impact was multiplied by the proposed pollutant specific emission rates to calculate a maximum predicted concentration for each source. The maximum predicted concentration for each source was summed to get a total predicted concentration for each pollutant. These total predicted concentrations were used in step 3 of the MERA analysis. All pollutants met the criteria of step 3.

The applicant conducted the 1-hr and annual NO_2 NAAQS analyses using the ARM2 model option following EPA guidance.

For the CO and NO_x analyses, the applicant conducted a load analysis to determine the worst-case operating scenario. The following were evaluated:

- MAX – maximum emission rates based on a 220,000 lb/hr waste gas flow, representative of MSS activities.
- MID – emission rates based on a 110,000 lb/hr waste gas flow, representative of routine MSS and normal operations.
- LOW – emission rates based on a 11,000 lb/hr waste gas flow.

The applicant did not update the load analysis to account for the most recent AERMOD version and TCEQ pre-processed meteorological data together with the rest of the analysis. However, the ADMT conducted test modeling using the most recent version of AERMOD (22112) and meteorological data consistent with the rest of the updated analysis and determined that this discrepancy does not affect the overall conclusions of the analysis.

The MAX and MID operating scenarios were evaluated for the health effects analyses. The results associated with the worst-case operating scenarios for all affected pollutants and averaging times are reported in the tables above.

SO_2 analyses were conducted with the MID operating scenario only.

A. Land Use

Medium roughness and flat terrain were used in the modeling analysis. These selections are consistent with the AERSURFACE analysis, topographic map, and aerial photography. The selection of medium roughness is reasonable.

B. Meteorological Data

Surface Station and ID: Victoria, TX (Station #: 12912)
Upper Air Station and ID: Corpus Christi, TX (Station #: 12924)
Meteorological Dataset: 2020 for the Health Effects, State Property Line, and 3-hr SO_2 analyses
2017-2021 for all other NAAQS analyses
Profile Base Elevation: 35.7 meters

C. Receptor Grid

The grid modeled was sufficient in density and spatial coverage to capture representative maximum ground-level concentrations.

D. Building Wake Effects (Downwash)

Input data to Building Profile Input Program Prime (Version 04274) are consistent with the aerial photography, plot plan, and modeling report.

4. Modeling Emissions Inventory

The modeled emission point and area source parameters and rates were generally consistent with the modeling report. The source characterizations used to represent the sources were appropriate.

Off-property source ID A514671 was modeled at an exit velocity higher than what was reported in the AQA. However, given the relatively low emission rate(s) associated with this source, this discrepancy would not change the overall conclusions of the analysis.

Off-property source ID A514671 was modeled at a stack height inconsistent with what was reported in the AQA. However, given the relatively low emission rates associated with this source and the distance (approximately 31km) from the GLCmax, this discrepancy does not affect the overall conclusions of the analysis.

The computation of the effective stack diameters for the flares is consistent with TCEQ modeling guidance.

To account for operational limitations, the modeled emission rates for the emergency engines (Source IDs OL3GEN, PDHGEN, and LD_002) and fire water pumps (Source IDs PC_EG01, FPM_02A, FPM_02B, FPM_02C, FPM_02D, FPM_02E, UPO_F02A, UPO_F02B, UPO_F02C, 7900LJD, N7900LJD, 8FP_D20A, and 8FPD20B) were multiplied by 0 during the hours of 5 pm to 8 am.

For the 1-hr NO_2 NAAQS analysis, emissions from the temporary portable combustors (EPNs OL1-TEMP, OL2-TEMP, and LLDPE-TEMP), Diesel Emergency Engines (EPNs OL3-GEN, PDH-GEN, LD-002, EG-01, EG-02, EG-03, EG-04, PC-EG01, 7900LJD, and N7900LJD), and Fire Water Pumps (EPNs FPM-02A, FPM-02B, FPM-02C, FPM-02D, FPM-02E, UPO-F02A, UPO-F02B, UPO-F02C, 8FP-D20A, and 8FP-D20B) were modeled with an annual average emission rate, consistent with EPA guidance for evaluating intermittent emissions. Emissions from each emergency engine and fire water pump testing were represented to occur for no more than 100 hours per year. Emissions from the temporary portable combustor (EPN LLDPE-TMP) were represented to occur for no more than 26 hours per year.

Except as noted above, maximum allowable hourly emission rates were used for the short-term averaging time analyses, and annual average emission rates were used for the annual averaging time analyses.

Arnold R. Srackangast Affidavit

Exhibit AS-4

Electronic Modeling Evaluation Workbook

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Health Effect Modeling Results

Date: ________
Permit #: ________

Company Name: ________

Texas Commission on Environmental Quality
Electronic Modeling Evaluation Workbook (EMEW)
Health Effects Modeling Results Summary

Administrative Information:	
Data Type:	**Facility Information:**
Project Number:	336055
Permit Number:	19168, 107518, 19201, 4015719200
Regulated Entity ID:	100218973
Facility Name:	Enclosed Ground Flares
Company Name:	Formosa Plastics Corporation, Texa
Company Contact Name:	Tammy Lasater
Company Contact Number:	302-383-1598
County:	Calhoun

This sheet documents the health effects review for Steps 3-7 of the Modeling Effects Review Applicability (MERA) Guidance. All cells that apply must be completed for each pollutant.

Instructions:
For modeling analyses which require modeling for health effects, fill in the information below. Note: Only steps of the MERA that require modeling are reported in the table below. For steps not requiring modeling, provide this separately for your assigned permit reviewer to review.
1. Select the chemical species from the drop down. The list only includes those chemical species identified on the Speciated Emissions sheet.
2. Next, select the averaging time being evaluated from the drop down.
3. Based on these selections, the CAS number and ESL will auto populate.
4. Following the MERA guidance, start at Step 3 and continue through the row for each applicable Step of the MERA. If a step is skipped, put N/A and continue to the next step.
5. If the demonstration is complete ("fall out of the MERA") before reaching the end of the row, you do not need to continue filling it out.

Notes:
1. Step 3 in this sheet assumes that a Unit Impact Modeling demonstration was conducted. To demonstrate compliance with Step 3 using the look up tables, provide this in a separate attachment for your assigned permit reviewer.
2. Step 6 of the MERA is listed in the table below. While it is listed below, the results of this step should be provided separately to the assigned permit reviewer if the health effects analysis falls out at this step.
3. The Chemical Species available in the drop down are based on the inputs from the "Speciated Emissions" sheet.
4. Do not insert, cut, or delete rows.

Tips:
1. As a reminder, the Toxicology Division will conduct a case-by-case review of the health and welfare effects for any chemical species requiring a Tier III review. Additional information should be provided to help the toxicologist develop a final determination on the likelihood that emissions will increase the risk of adverse health or welfare effects. The additional information could include predicted GLCmax impacts and frequency of exceedances (routine only and routine+MSS), a description of the land use and zoning at the locations of the GLCmax (routine only and routine+MSS), description of area of max impacts, a map of concentration plots, time of predicted exceedances (e.g., do exceedances all occur at night), and potential for public exposure.
Applicants are encouraged to contact The Toxicology Division to discuss the details of specific projects early in the application process to ensure that all information necessary to evaluate a project is provided, as well as to prevent the unnecessary expenditure of time and resources on the applicant's part.
2. For questions on what each step of the MERA requires, please see the following:

https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/mera.pdf

Example:

Modeled Health Effect Results (MERA Guidance):				Step 3	Step 4: Production		Step 4: MSS	
Chemical Species	CAS Number	Averaging Time	ESL [µg/m^3]	10% ESL Step 3 Modeled GLCmax [µg/m^3]	25 % ESL Step 4 Production GLCmax since most recent site wide modeling [µg/m^3]	10% ESL Step 4 Production Project Only GLCmax [µg/m^3]	50% ESL Step 4 MSS GLCmax since most recent site wide modeling [µg/m^3]	25% ESL Step 4 MSS Project Only GLCmax [µg/m^3]
2-sec-butyl-6-ethylaniline	71758-10-6	1-hr	100	122.00	26.00	13.50	52.00	27.00
2-sec-butyl-6-ethylaniline	71758-10-6	Annual	10	0.90				

Facility:

Modeled Health Effect Results (MERA Guidance):				Step 3	Step 4: Production		Step 4: MSS	
Chemical Species	CAS Number	Averaging Time	ESL [µg/m^3]	10% ESL Step 3 Modeled GLCmax [µg/m^3]	25 % ESL Step 4 Production GLCmax since most recent site wide modeling [µg/m^3]	10% ESL Step 4 Production Project Only GLCmax [µg/m^3]	50% ESL Step 4 MSS GLCmax since most recent site wide modeling [µg/m^3]	25% ESL Step 4 MSS Project Only GLCmax [µg/m^3]
1,3-butadiene	106-99-0	1-hr	510	1.819				
1-pentene	109-67-1	1-hr	290	0.004				
acetylene	74-86-2	1-hr	26600	0.169				
benzene	71-43-2	1-hr	170	2.045				
n-butane	106-97-8	1-hr	66000	1.704				
1-butene	106-98-9	1-hr	19000	11.935				
butyl benzene	104-51-8	1-hr	2740	0.685				

Texas Commission on Environmental Quality

Date: ________
Permit #: ________

Company Name: ________

Electronic Modeling Evaluation Workbook (EMEW)

Health Effect Modeling Results

Modeled Health Effect Results (MERA Guidance):				Step 3	Step 4: Production		Step 4: MSS	
Chemical Species	CAS Number	Averaging Time	ESL [µg/m³]	10% ESL Step 3 Modeled GLCmax [µg/m³]	25 % ESL Step 4 Production GLCmax since most recent site wide modeling [µg/m³]	10% ESL Step 4 Production Project Only GLCmax [µg/m³]	50% ESL Step 4 MSS GLCmax since most recent site wide modeling [µg/m³]	25% ESL Step 4 MSS Project Only GLCmax [µg/m³]
carbon disulfide	75-15-0	1-hr	7500	1.3E-22				
carbonyl sulfide	463-58-1	1-hr	130	0.025				
cyclopentadiene	542-92-7	1-hr	2000	Step 2				
5,6-dihydrodicyclopentadiene	4488-57-7	1-hr	270	0.589				
Di-isopropyl-dimethoxysilane	18230-61-0	1-hr	Provide Documentation	0.004				
dimethylethyl benzene	98-06-6	1-hr	2450	0.262				
ethyl mercaptan	75-08-1	1-hr	1	1.3E-22				
ethyltoluene	25550-14-5	1-hr	1250	2.210				
ethylbenzene	100-41-4	1-hr	26000	0.574				
ethylene	74-85-1	1-hr	1400	80.795				
1-hexene	592-41-6	1-hr	1700	4.999				
2-hexene	592-43-8	1-hr	1700	0.054				
indane	496-11-7	1-hr	480	0.969				
isobutane	75-28-5	1-hr	23000	10.354				
isopentane	78-78-4	1-hr	59000	0.007				
isoprene	78-79-5	1-hr	130	Step 2				
propyne	74-99-7	1-hr	16400	0.011				
methyl mercaptan	74-93-1	1-hr	1.9	0.010				
alpha-methylstyrene	98-83-9	1-hr	250	3.165				
n-decane	124-18-5	1-hr	1700	0.279				
n-heptane	142-82-5	1-hr	10000	0.403				
n-hexane	110-54-3	1-hr	5600	11.200				
n-nonane	111-84-2	1-hr	4800	5.0E-5				
n-octane	111-65-9	1-hr	5600	1.344				
n-pentane	109-66-0	1-hr	59000	3.633				
1,2-propadiene	463-49-0	1-hr	1100	0.049				
propane	74-98-6	1-hr	Simple Asphyxiant	Step 0				
n-propylbenzene	103-65-1	1-hr	2500	0.535				
propylene	115-07-1	1-hr	Simple Asphyxiant	Step 0				
tetrahydrodicyclopentadiene	2825-82-3	1-hr	270	0.246				
toluene	108-88-3	1-hr	4500	1.067				
triethyl aluminum	97-93-8	1-hr	20	Step 2				
trimethylbenzene	25551-13-7	1-hr	4400	2.039				
xylene	1330-20-7	1-hr	2200	0.496				
styrene	100-42-5	1-hr	110	Step 2				

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Health Effect Modeling Results

Date: ________
Permit #: ________

Company Name: ________

Modeled Health Effect Results (MERA Guidance):				Step 3	Step 4: Production		Step 4: MSS	
Chemical Species	CAS Number	Averaging Time	ESL [µg/m^3]	10% ESL Step 3 Modeled GLCmax [µg/m^3]	25 % ESL Step 4 Production GLCmax since most recent site wide modeling [µg/m^3]	10% ESL Step 4 Production Project Only GLCmax [µg/m^3]	50% ESL Step 4 MSS GLCmax since most recent site wide modeling [µg/m^3]	25% ESL Step 4 MSS Project Only GLCmax [µg/m^3]
methanol	67-56-1	1-hr	3900	Step 2				
pyrolysis gasoline (< 70% benzene)	68921-67-5	1-hr	240	--				
ethane	74-84-0	1-hr	Simple Asphyxiant	Step 0				
distillates (petroleum), light catalytic cracked	64741-59-9	1-hr	3500	Step 2				
1,3-butadiene	106-99-0	Annual	9.9	0.001				
benzene	71-43-2	Annual	4.5	0.002				
1-butene	106-98-9	Annual	1600	0.003				
carbon disulfide	75-15-0	Annual	32	1.0E-25				
carbonyl sulfide	463-58-1	Annual	2.6	2.0E-5				
ethylbenzene	100-41-4	Annual	570	4.5E-4				
ethylene	74-85-1	Annual	34	0.253				
n-hexane	110-54-3	Annual	200	0.003				
n-nonane	111-84-2	Annual	450	4.2E-7				
n-octane	111-65-9	Annual	540	0.001				
1,2-propadiene	463-49-0	Annual	9.9	8.0E-5				
trimethylbenzene	25551-13-7	Annual	54	0.002				
xylene	1330-20-7	Annual	180	3.9E-4				
pyrolysis gasoline (< 70% benzene)	68921-67-5	Annual	6.4	1.3E-5				

ATTACHMENT D

Affidavit of Lucy Fraiser, Ph.D., DABT

TCEQ DOCKET NO. 2025-1160-AIR
AFFIDAVIT OF LUCY FRAISER, PH.D., DABT
FRAISER TOXICOLOGY CONSULTING, LLC

STATE OF ARKANSAS §
COUNTY OF WASHINGTON §

BEFORE ME, the undersigned authority, on this day personally appeared Lucy Fraiser, Ph.D., DABT, who after being duly sworn upon her oath stated as follows:

1. My name is Lucy Fraiser. I am over 21 years of age, am of sound mind, and am fully competent to make this affidavit. Each and every statement contained in this affidavit is based upon my personal knowledge and is true and correct.

EXPERIENCE

2. I am a toxicologist with over 35 years of experience in the areas of exposure and risk assessment, health effects and toxicology evaluations, development of quantitative toxicity criteria, development of risk-based air and water quality guidelines, and soil cleanup criteria, and litigation support. My education includes a B.A. in Psychology and a Ph.D. in Toxicology from the University of Texas in Austin. I am a Diplomate of the American Board of Toxicology ("***DABT***"). The DABT certification is a globally recognized credential in toxicology awarded by the American Board of Toxicology ("***ABT***"), which is the largest professional toxicology credentialing organization in the world. The DABT certification represents competency and commitment to human health and environmental sciences. Becoming certified by the ABT requires a combination of higher education and experience, with rigorous certification (testing) and recertification processes. I am also a member of the American College of Toxicology. I worked for the Toxicology Division of the Texas Natural Resource Conservation Commission (***"TNRCC"***) early in my career. I have extensive experience performing public Health and Welfare Effects Evaluations related to air quality permit applications submitted to the Texas Commission on Environmental Quality ("***TCEQ***") and its predecessor agency, the TNRCC. I have worked for a number of consulting firms and formed Lucy Fraiser Toxicology Consulting LLC, a toxicology consulting firm, in 2017. A copy of my curriculum vitae is included in this affidavit as **Exhibit LF-1**.

BACKGROUND

3. I have been retained by Formosa Plastics Corporation, Texas ("***FPC***") to conduct a public Health and Welfare Effects Evaluation to evaluate the potential for health and/or welfare effects from maximum allowable emissions proposed in FPC's applications to amend TCEQ Air Quality Permit Nos. 140763, 19871, 91780, 19200, 19168, 107518, 20203, 40157, 19201, PSDTX1500M1, PSDTX1236M1, PSDTX1240M1, PSDTX1237M1 PSDTX1226M1, PSDTX1383M2 PSDTX1224M1, PSDTX1222M1 PSDTX1232M1,

GHGPSDTX46M1 GHGPSDTX221, GHGPSDTX223 GHGPSDTX218, GHGPSDTX224 GHGPSDTX48M1, GHGPSDTX222 GHGPSDTX225, and GHGPSDTX219 (collectively, the "***Application***") associated with FPC's Flare Improvement Project to comply with recent EPA Residual Risk and Technology Review rulemakings (the "***Project***") at the company's chemical plant complex in Point Comfort, Calhoun and Jackson Counties, Texas (the "***Complex***").

4. I reviewed the following documents and data in relation to the Application from POWER Engineers, Incorporated who prepared the Application and the required air dispersion modeling for the Application. These documents are the same type of documents that any toxicologist would be expected to review and rely upon when conducting a public Health and Welfare Effects Evaluation for an air quality permit. I have also reviewed *Formosa Plastics Corporation, Texas's Response to Hearing Requests* and attached affidavits of Tammy Lasater Wacker, FPC Corporate Environmental Director, Eric J. Quiat, P.E., POWER Engineers ("***Quiat Affidavit***"), and Arnold Srackangast, Contract Senior Scientist, POWER Engineers ("***Srackangast Affidavit***") filed in this Docket.

Date	**Description**
May 16, 2023	Air Quality Analysis Report that POWER prepared for the Application ("***AQA***")
July 7, 2022	TCEQ Air Quality Analysis Audit ("***First Modeling Audit***")
July 25, 2023	TCEQ Air Quality Analysis Audit ("***Second Modeling Audit***")
November 18, 2022	Letter requesting public meeting and contested case hearing on the Application filed in this Docket on behalf of San Antonio Bay Estuarine Waterkeeper ("***Waterkeeper***")
February 2, 2023	Public comments on the Application filed in this Docket on behalf of Waterkeeper
September 28, 2023	Public comments on the Application filed in this Docket by the U.S. Environmental Protection Agency
May 1, 2025	TCEQ Executive Director's Response to Public Comment
May 30, 2025	Letter requesting contested case hearing on the Application filed in this Docket on behalf of Waterkeeper
June 2024	TCEQ *Air Quality Modeling Guidelines*, APDG 6232
March 2018	TCEQ *Modeling and Effects Review Applicability,* APDG 5874 ("***MERA***")
April 2018	EPA *Technical Basis for the EPA's Development of the Significant Impact Thresholds for* $PM_{2.5}$ *and Ozone*, EPA-454/R-18-001
September 2015	TCEQ *Guidelines to Develop Toxicity Factors*, RG-442

2009	Bissett, Smith, Adams, Field, Moyer, Phillips & Thompson, *Geostatistical analysis of biomarkers of genotoxicity in cattle, Bos taurus and Bos taurus X Bos indicus, sentinels near industrial facilities. Ecotoxicology*, 18:87–93.

5. In its Application, FPC seeks authorization of emissions from new and modified facilities in the Project (collectively, the "***Project Facilities***"). Calhoun and Jackson Counties are designated as attainment/unclassifiable with respect to the National Ambient Air Quality Standards ("***NAAQS***") for all criteria pollutants. Individual stationary sources are subject to different requirements depending on air contaminants and proposed emission rates. As demonstrated in **Table 2-1** of the AQA, emission increases associated with the Flare Improvement Project require Prevention of Significant Deterioration ("***PSD***") review (i.e., Major NSR)[1] for Nitrogen Oxides ("***NOx***"), Carbon Monoxide ("***CO***"), Volatile Organic Compounds ("***VOC***"), secondary Particulate Matter with a diameter less than 2.5 micrometers ("$PM_{2.5}$") and Ozone ("O_3") precursors (VOC and Nitrogen Dioxide ("NO_2")). Sulfur Dioxide ("SO_2") emissions did not trigger PSD review.

TOXICOLOGY EVALUATION

6. Applicants for TCEQ new source review ("***NSR***") air permit applications use site-specific air dispersion modeling to predict and evaluate concentrations of air contaminants from proposed new or modified facilities at off-property "receptors," which TCEQ modeling guidance defines as locations "where the public could be exposed to an air contaminant in the ambient air." Air dispersion models predict movement of contaminants in the atmosphere and provide conservative estimates (i.e., overestimates) of air contaminant concentrations at different distances and directions from an emissions source. Therefore, conservatively estimated air concentrations from air dispersion modeling are routinely used to evaluate potential exposures by providing conservatively estimated air concentrations at different locations. The concentration of an air contaminant to which a member of the public is potentially exposed is critical to determining whether adverse health or welfare effects will occur. In reality, exposure only occurs if local populations come into contact with air contaminants emitted from a facility.

The objectives of an air quality dispersion modeling analysis are to: 1) establish maximum off-property ground-level concentrations ("GLC_{max}") of contaminants resulting from proposed and/or existing emissions in an air quality permit application; and 2) evaluate the GLC_{max} of proposed contaminants for their potential to cause adverse health or welfare effects, regardless of whether any person is actually exposed at that location.

7. The criteria pollutants CO, NO_2, and O_3, in the Application were evaluated in a PSD (Major NSR) NAAQS Analysis. Since the Application has no direct $PM_{2.5}$ emission increases, it

1 The PSD program applies when a major source located in an area that is designated as attainment or unclassifiable for any criteria pollutant, is constructed and/or undergoes a major modification. Calhoun and Jackson Counties are currently designated as attainment/unclassified for all criteria pollutants.

was not subject to PSD review. But secondary $PM_{2.5}$ emissions from Project Facilities were evaluated due to precursor (NOx) emissions exceeding the significant emissions rate (40 tons per year ("***tpy***"). When pollutants from a proposed project do not require a Major NSR/PSD review, a Minor NSR (otherwise known as a State NAAQS) Analysis is performed. In addition to the Major (PSD) and Minor (State) NAAQS Analyses, a State Property Line Standard Analysis was conducted for sulfur compounds (i.e., SO_2) proposed in the Application. Finally, speciated compounds from Project Facilities were subjected to a TCEQ Health and Welfare Effects Evaluation. Hence, the three areas of TCEQ's review of the AQA for the Application include: 1) NAAQS Analysis; 2) State Property Line Standard Analysis; and 3) Health and Welfare Effects Evaluation.

8. **NAAQS Analyses**. First, TCEQ reviews constituents known as "criteria pollutants" (those for which the U.S. Environmental Protection Agency has established a NAAQS under the federal Clean Air Act). EPA is required to establish each primary NAAQS at a level that is protective of public health with an adequate Margin of Safety ("***MOS***"). Secondary NAAQS are set to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The results of NAAQS Analyses for the Project are provided in **Table 1** and discussed in the paragraphs that follow. Except for O_3, concentrations in **Table 1** are in units of micrograms per cubic meter ("***$\mu g/m^3$***").

Table 1.
NAAQS Analysis

Pollutant	Averaging Time	Concentration			NAAQS *De Minimis* Levels (SILs)		Primary NAAQS	Secondary NAAQS
		GLC_{max}	Background	Total (Background + GLC_{max})				
		($\mu g/m^3$)			($\mu g/m^3$)	% of NAAQS	($\mu g/m^3$)	
NO_2	1-hr	34[a]		181	7.5[c]	4%	188[d]	--
	Annual	0.1[e]		--	1[d]	1%	100[d]	100[d]
CO	1-hr	Included in Total[b]		--	2,000 [d]	5%	40,000[d]	--
	8-hr	--	--	--	500 [d]	5%	10,000[d]	--
O_3	8-hr	--	64 ppb[g]	66 ppb	1 ppb[d]	1%	70 ppb[d]	70 ppb[d]
Secondary $PM_{2.5}$	24-hr	0.24[h]	--	--	1.2[i]	3.5%	9[d]	15[d]
	Annual	0.01[h]	--	--	0.3[i]	3%	35[d]	35[d]
SO_2	1-hr	0.2[j]	--	--	7.8[c]	4%	196[d]	--
	3-hr	0.1[k]	--	--	25[d]	2%	--	1,300[d]

a. The 1-hour NO_2 GLC_{max} is based on the highest five-year average of the maximum predicted concentrations determined for each receptor.
b. Monitored 1-hour NO_2 background concentrations obtained from FPC's NW Site were input into the AERMOD and run by season to predict Total cumulative NO_2 off-property GLC_{max} (summarized in Table 5-4 of the AQA).
c. Interim SIL. Justification for this value is provided in Section 5.2 of the AQA.
d. Table B-1 of TCEQ Air Quality Modeling Guidelines, APDG 6232) (TCEQ, 2024)
e. The GLC_{max} represents the maximum predicted concentrations over five years of meteorological data.
f. The O_3 analysis was performed using the EPA's MERPs approach, as outlined in Appendix Q of the TCEQ's AQMG (TCEQ, 2020). See Table 7-2 of the AQA for *worst-case* O_3 MERP values (based on *worst-case* Project source emissions for NOx and VOCs) for hypothetical Texas sources.
g. See Table 5-3 of the AQA for a summary of ambient background concentrations.
h. Secondary $PM_{2.5}$ formation was modeled using guidance outlined in Appendix R – Secondary Formation of Particulate Matter ($PM_{2.5}$) of the TCEQ AQMG (TCEQ, 2019). See Table 7-1 of AQA for worst-case $PM_{2.5}$ MERP values for hypothetical Texas sources.
i. EPA recommended value of 1.2 $\mu g/m^3$ for the 24-hour average. Annual value of 0.3 $\mu g/m^3$ from 40 CFR § 51.165(b)(2). Justification for these values is presented in Section 5.2 of the AQA.
j. The 1-hour SO_2 GLC_{max} was based on the highest five-year average of the maximum predicted concentrations determined for each receptor.
k. The 3-hour SO_2 GLC_{max} is the maximum predicted concentration associated with one year of meteorological data.
-- Not Applicable.

9. The *PSD NAAQS Analysis* consisted of modeling proposed emissions of criteria pollutants from the Project Facilities to estimate GLC_{max} with the objective of determining whether Project Facilities have the potential to cause or contribute to an exceedance of the NAAQS. This was done by comparing modeled GLC_{max} concentrations to NAAQS *de minimis* levels, otherwise known as Significant Impact Levels ("***SILs***") in a *Preliminary Impact Analysis*. A SIL is a very conservative screening level set by EPA for each criteria pollutant. If a *Preliminary Impact Analysis* indicates that an air contaminant subject to the NAAQS is above the SIL at any off-site locations, then additional review is required for the off-site locations where the model shows that the SIL will be exceeded. The NAAQS *de minimis* levels or SILs for each criteria pollutant have been set by EPA at a small fraction of the NAAQS, as shown in **Table 1** above and described in **Section 5.2** of the AQA. The NAAQS *de minimis* levels or SILs used in the *Preliminary Impact Analysis* represent changes in air quality concentrations below which EPA deems air quality degradation to be "insignificant." As shown in **Table 1**:

a. The GLC_{max} for CO (1-hour and 8-hour) and NO_2 (Annual) are each less than the corresponding NAAQS *de minimis* levels or SILs. Since the NAAQS *de minimis* levels or SILs are set at a small fraction of the health and welfare-protective NAAQS, CO (1-hour and 8-hour) and long-term (Annual) NO_2 emissions from the Project are not expected to pose a health or welfare threat. The 1-hour NO_2 and 8-hour O_3 GLC_{max} were greater than the respective SILs and were, therefore, subject to further evaluation, as described in detail below.

b. The 1-hour GLC_{max} for NO_2 at one or more receptors in the modeling grid was greater than its NAAQS *de minimis* level or SIL, thereby requiring a *Full NAAQS Analysis* for short-term (1-hour) NO_2 emissions. The *Full NAAQS Analysis* requires emissions from Project Facilities to be evaluated in combination with off-property emissions sources, otherwise known as background, and other existing permitted FPC sources (sources not related to the Flare Improvement Project). This is done by comparing the Total Concentration, consisting of background concentrations plus the combined GLC_{max} for Project Facilities, other FPC sources (i.e., non-Flare Improvement Project sources), and off-property sources to the Full NAAQS (as opposed to NAAQS *de minimis* levels or SILs).

i. To account for natural background and the impact of sources whose emissions are not explicitly modeled in the AQA, NO_2 background concentrations were combined with the predicted GLC_{max} from Project Facilities, other site-wide FPC sources, and off-property sources (all permitted stationary sources within 50 km of the Project Facilities) on a quarterly basis for each modeled receptor. **Section 6.3** and **6.4** of the AQA describe the site-wide FPC sources and off-property sources included.

ii. Background concentrations for NO_2 were obtained from FPC's monitoring network (the FPC NW Site monitor). Using site-specific monitoring data yielded a highly conservative 1-hour NO_2 background concentration since the FPC NW Site monitor is only 2 km downwind of Project Facilities and NO_2

concentrations from the FPC NW Site monitor already include any impacts from emissions of existing FPC sources. In this way, the background *double counts* existing FPC source NO_2 impacts. Moreover, the nearest off-property sources of 1-hour NO_2 emissions are over 6 km away from the Project Facilities, making the inclusion of any off-site sources highly conservative (impacts from sources 6 km away are not likely to overlap NO_2 impacts from Project Facilities).

iii. The *Full NAAQS Analysis* for 1-hour NO_2 indicates that the total 1-hour NO_2 off-property concentration is less than the NAAQS. Since NAAQS are protective of health and welfare, with a MOS, 1-hour NO_2 emissions from the Project are not expected to pose a health threat.

c. An *O_3 NAAQS Analysis* was also performed as part of the *PSD NAAQS Analysis* because the Project has the potential to emit 100 tpy or more of NOx and VOC emissions. FPC evaluated emissions of O_3 precursor emissions (NOx and VOC) from the Project Facilities using a Tier 1 demonstration tool developed by the EPA referred to as Modeled Emission Rates for Precursors ("***MERPs***"). MERPs link precursor emissions (NOx and VOCs) to secondary pollutants (O_3). *Worst-case* Project emissions for NOx and VOC were used to estimate an 8-hour GLC_{max} for O_3. As shown in **Table 1**, above:

i. The resulting modeled 8-hour GLC_{max} for O_3 is 2.03 ppb, which exceeded the NAAQS *de minimis* level or SIL for O_3, thereby requiring a *Full NAAQS Analysis* for 8-hour O_3. Therefore, background concentrations for O_3 were obtained from the FPC NW Site monitor for inclusion in the *Full NAAQS Analysis*.

ii. When *worst-case* estimates of off-property O_3 concentrations from the Project are added to the background concentration, results were less than the NAAQS. Since NAAQS are protective of health with a MOS and welfare, modeled 8-hour O_3 levels potentially resulting from the Project are not expected to pose a health or welfare threat.

10. A *Minor NAAQS Analysis*, also referred to as a *State NAAQS Analysis*, was performed for SO_2 since emissions from the Project did not require Major NSR[2] (PSD) review. The Minor *NAAQS Analysis* was conducted to demonstrate that proposed emissions of SO_2 for the 1-hour and 3-hour averaging periods will not cause or contribute to a NAAQS exceedance. As shown in **Table 1** above, both the 1-hour and 3-hour GLC_{max} concentrations for SO_2 are below their respective NAAQS *de minimis* levels or SILs. Since the NAAQS *de minimis* levels or SILs are set at a small fraction of the health and welfare-protective NAAQS, SO_2 emissions from Project Facilities (1-hour and 3-hour) are not expected to pose a health or welfare threat.

2 The Total Potential to Emit SO_2 emission increase for the Flare Improvement Project (5.7 tpy) is well below the PSD Major Modification threshold (40 tpy).

11. A *Minor NAAQS PM $_{2.5}$ Secondary Formation Analysis* was also performed. A Tier 1 demonstration was conducted to estimate *worst-case* Project secondary $PM_{2.5}$ formation, as described in **Section 7.6** of the AQA using *worst-case* MERPs. As shown in **Table 1** above:

   i. *Worst-case* secondary $PM_{2.5}$ formation from Project Facilities resulted in GLC_{max} (24-hour and Annual) that were less than the corresponding NAAQS *de minimis* levels or SILs.
   ii. Since the NAAQS *de minimis* levels or SILs are set at a small fraction of the health and welfare-protective NAAQS, secondary formation of $PM_{2.5}$ (24-hour and Annual) from the Project is not expected to pose a health or welfare threat.

12. **State Property Line Standard Analysis**. Second, in addition to the NAAQS Analyses, a TCEQ State Property Line Standard ("***SPLS***") Analysis is conducted for sulfur compounds as part of the review of Texas air quality permits to demonstrate compliance of the Project with the SPLS. As shown in **Table 2** below, the SO_2 GLC_{max} modeled from Project Facilities was less than 2% of the SPLS in Title 30 Texas Administrative Code Chapter 112. Therefore, no further analysis is required.

Table 2.
State Property Line Analysis

Pollutant	Averaging Time	GLC_{max}	State Property Line Standard
		$\mu g/m^3$	
SO_2	1-hr	0.17	1021

13. **Health and Welfare Effects Evaluation**. Third, a TCEQ Health and Welfare Effects Evaluation is conducted for constituents lacking a NAAQS or TCEQ SPLS. The purpose of the Health and Welfare Effects Evaluation is to evaluate whether emissions of constituents that do not have a NAAQS or SPLS from the Project will be protective of the public's health and welfare. In a Health and Welfare Effects Evaluation, modeled GLC_{max} are compared to TCEQ-derived Effects Screening Levels ("***ESLs***"), which are health and/or welfare-based screening levels (not promulgated standards, such as the NAAQS and SPLS) used in the TCEQ permitting process. ESLs are guidelines or screening levels that TCEQ sets at concentrations that correspond to a "no significant risk level." Because they are designed to be protective in nature, ESLs are set at levels: 1) below the threshold for health effects (i.e., sub-clinical levels corresponding to an insignificant risk); or 2) where odor nuisance or vegetative effects (welfare effects) are unlikely. Setting ESLs at these conservative levels ensures that public health and welfare are protected by incorporating a MOS. Therefore, if a predicted GLC_{max} exceeds the relevant ESL, adverse health or welfare effects are not necessarily expected to occur. Instead, a more in-depth review is triggered.

14. The TCEQ Air Permits Division has developed and requires permit applicants to use the MERA guidance document in properly conducting a Health and Welfare Effects Evaluation. The steps outlined in the MERA represent TCEQ screening procedures by which TCEQ expects a permit applicant to demonstrate that emissions of compounds from a project will be protective of the public's health and welfare. In accordance with the MERA, short-term (1-hour) and long-term (annual) GLC_{max} were modeled for each compound emitted by Project Facilities lacking a NAAQS or SPLS that was not eliminated because it was a simple asphyxiant.[3] This resulted in modeling for a total of 46 compounds. Six of the 46 compounds were eliminated based on TCEQ-established *de minimis* levels[4] identified in the MERA. As shown in **Exhibit AS-4** of the Srackangast Affidavit, modeled GLC_{max} for the remaining 40 compounds evaluated in the Health and Welfare Effects Evaluation were all well below their respective ESLs. Although there are additional steps outlined in the MERA guidance, because the GLC_{max} for each of the 40 compounds for which the Health and Welfare Effects Evaluation applies is less than 10 percent of its respective ESL (corresponding to Step 3 of the MERA), the MERA guidance required no further evaluation. Since ESLs are set below the threshold for health effects or where odor nuisance or vegetative effects (welfare effects) are unlikely, the compounds proposed to be emitted from Project Facilities and evaluated in the Health and Welfare Effects Evaluation following the MERA process are not expected to pose a health or welfare threat.

15. **Conservatism of Evaluations.** The NAAQS Analyses, SPLS Analyses, and the public Health and Welfare Effects Evaluation, are each highly conservative.

16. The first layer of conservatism in determining potential health and welfare effects is in the emissions estimates and a second layer of conservatism occurs in the air dispersion modeling. As a result, the modeled air concentrations used in the evaluations are highly conservative for several reasons, including but not limited to the following:

    a. Modeled emission rates for all criteria pollutants were based on the *worst-case* maximum allowable emission rates for Project Facilities, which is conservative because these *worst-case* emissions will not occur continuously.

    b. VOC emissions estimates for the flares in the Application conservatively assume 99% destruction removal efficiency ("***DRE***") for C1-C3 VOCs, and 98% DRE for C3+ VOCs.

    c. Estimated 1-hour NO_2 emissions assumed planned short-term maintenance, startup, and shutdown ("***MSS***") activities would occur 8,760 hours per year, even though MSS are by nature intermittent and thus occur less or far less than 8,760 hours per year.

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[3] Ethane, propane, and propylene.

[4] Cyclopentadiene, distillates (petroleum, light catalytic cracked), isoprene, methanol, styrene, and triethyl aluminum.

d. *Worst-case* MERP values (i.e., lowest) were used to estimate GLC_{max} for O_3 and secondary $PM_{2.5}$.

e. The overall 1-hour NO_2 GLC_{max} was estimated as the summation (without regard to time and space) of *worst-case* maximum allowable emissions from the Project, plus other existing permitted FPC sources, and permitted stationary sources within 50 km of the Project.

f. Background concentrations from the FPC NW Site monitor were incorporated into the Full NAAQS Analysis, resulting in a double counting effect for NO_2 because the FPC NW Site monitor is influenced by emissions from existing FPC sources (only 2 km upwind) whose maximum allowable emission rates were also included in estimating the overall 1-hour NO_2 GLC_{max}, as described above; and

g. Including any off-property sources of NO_2 was conservative because the nearest off-property sources of NO_2 emissions are over 6 km away from the Project Facilities and, therefore, NO_2 impacts from the Project Facilities and off-property sources are unlikely to occur at the same location (i.e., they are unlikely to overlap).

17. By design, NAAQS are set at levels to protect public health and welfare and are conservative. In setting primary health-based NAAQS, EPA is obligated not only to consider relevant science, but also the requirement for a MOS, which is intended to address uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and to protect against hazards that research has not yet identified. In selecting a primary NAAQS that provides an adequate MOS, EPA not only seeks to prevent air concentrations that have been demonstrated to be harmful, but also to prevent lower-level concentrations that may pose an unacceptable risk of harm, even if the nature or degree of risk is not precisely known. Some common features of the primary NAAQS-setting process that ensure conservatism include:

a. Frequent reliance on epidemiological studies, which almost always involve exposure to more than just the constituent being studied and do not identify specific exposure levels that cause reported health effects;

b. Use of animal studies in which laboratory animals are exposed to pollutant levels many times higher than those found in ambient air;

c. Use of human exposure studies that expose sensitive individuals (e.g., asthmatics) to high levels of pollutants (much higher than those found in the atmosphere) under conditions that amplify exposure (e.g., while exercising, which increases ventilation rates and allows pollutants to reach deeper regions of the lungs, or via mouth exposure, which bypasses the protective capabilities of the nose); and

d. Reliance on results from studies in which responses to exposure were not statistically significant (i.e., the observed responses may have been due to chance alone).

Secondary welfare-based NAAQS are set at levels that reduce risk sufficiently to protect the public welfare from known or anticipated adverse welfare effects.

18. TCEQ's ESLs are highly conservative for many reasons, including:

a. TCEQ identifies the level at which adverse health effects first occur in sensitive animals or humans as the lowest concentration observed in toxicology or epidemiology studies and then extrapolates to even lower exposure levels to ensure health protection or divides occupational limits (the level below which no worker harm is expected) by conservative safety factors (100 for short-term ESL and 1,000 for long-term ESL) in setting ESLs;

b. TCEQ considers the possibility that exposure may occur to multiple airborne chemicals at the same time (cumulative exposure);

c. TCEQ considers the possibility that short-term exposure may occur to a single airborne chemical multiple times or from different sources (short-term ESLs are designed to be protective of multiple 1-hour exposures);

d. Health-based ESLs are set at levels that are either below the health effects threshold or that correspond to "no significant risk" of developing cancer;

e. Welfare-based ESLs are set at conservative vegetative damage levels or odor detection/recognition thresholds; and

f. The ESL used in permit reviews is the lowest of the health and welfare-based ESLs (i.e., the lowest ESL for all potential endpoints is used), making all ESLs protective of both health and welfare effects.

19. Without exception the maximum modeled concentrations of pollutants (i.e., GLC_{max}) proposed in the Application are less than relevant state and federal standards and ESLs. Based on these results and the conservatism of the air dispersion modeling coupled with the inherent conservatism in the NAAQS and ESLs to which maximum modeled concentrations are compared, it can easily be concluded that emissions from the Flare Improvement Project do not pose adverse health or welfare threats. Because all criteria pollutants were less than their respective NAAQS and all non-criteria pollutants were eliminated in early MERA process steps (by Step 3) that only required comparing modeled GLC_{max} to conservative screening levels (i.e., ESLs), there was no need for a detailed review by the TCEQ Toxicology Division.

20. **Hearing Requestor Analysis.** Waterkeeper requested a contested case hearing based on affected party status it seeks through member Diane Wilson. Ms. Wilson lives more than 20 miles from the Project Facilities, as shown in the Hearing Requestor Location Map (**Exhibit EQ-3** of the Quiat Affidavit). Waterkeeper's hearing requests state that Ms. Wilson frequently recreates in and around waterways near the Complex and participates in voluntary citizen enforcement monitoring of FPC stormwater and wastewater outfalls.

a. Waterkeeper asserts that Ms. Wilson "frequently" recreates in Lavaca Bay, Matagorda Bay, and San Antonio Bay and at Magnolia and Indianola Beaches but the hearing requests do not specify the frequency of such activities. In addition, Waterkeeper states that Ms. Wilson is concerned about reduced enjoyment of Lavaca Bay's and Cox Creek's natural aesthetic beauty from emissions of CO, NOx, and VOC. And Waterkeeper's hearing requests refer to Ms. Wilson's voluntary monitoring of wastewater and stormwater outfalls along Lavaca Bay and Cox Creek near the FPC Complex for "several" hours by kayak, motorboat, or on foot every few weeks.

b. As shown in the Area Map (**Exhibit EQ-2** of the Quiat Affidavit), although Lavaca Bay and Cox Creek are near the Complex, portions of both, as well as all of Cox Bay, are more than two and a half miles from the Project Facilities, while Matagorda Bay and San Antonio Bay are more than eight miles from the Project Facilities. The FPC Complex Map (**Exhibit EQ-4** of the Quiat Affidavit) shows FPC's outfall locations, and none are on or near Lavaca Bay.

c. Air concentrations over Lavaca Bay and Cox Creek were modeled in the AQA, including areas where Ms. Wilson recreates, enjoys natural beauty, and monitors outfalls. Importantly, the health and welfare-protective annual NAAQS and ESLs, to which long-term maximum-modeled impacts (GLC_{max}) are compared during the permit review process, assume continuous exposure (24 hours/day, 7 days/week) over a lifetime (i.e., 100% of the potentially exposed person's time is assumed to be spent at the GLC_{max}) and short-term NAAQS and ESLs assume near worst-case (i.e., maximum, 4^{th} high, 98^{th} percentile) exposures. Not only do Ms. Wilson's potential exposures not occur at the GLC_{max} 100% of the time (and perhaps none of the time she is near the Complex), her exposures are also discontinuous (*i.e.*, intermittent and periodic), making it unlikely that she would be present at the specific time for which worst-case concentrations were modeled.

d. Therefore, Ms. Wilson's potential exposures are expected to be far lower than exposures assumed during the permit application review. Given that all pollutant concentrations were less than their respective NAAQS and ESLs at maximum-modeled impact locations (i.e., GLC_{max}) combined with the fact that the primary NAAQS and health-based ESLs are set at concentrations below which negative health impacts in any member of the public are expected to occur (including the most sensitive members of the public [e.g., children, elderly, and the infirm]), maximum allowable emissions from the Project are not expected to negatively affect the health of Ms. Wilson or any other member of the public.

e. Secondary NAAQS are set to protect public welfare, including protection against decreased visibility, damage to animals, crops, ecosystems, vegetation, and buildings. Welfare-based ESLs are based on odor detection and vegetation effect threshold concentrations. However, protection of pets, livestock and wildlife is also indirectly ensured by health-based ESLs because they are typically based on "No Effect Levels" in the most sensitive animal species and are then ratcheted down to lower levels to ensure protection for humans. Since the GLC_{max} for all pollutants were below the respective secondary NAAQS and welfare-based ESLs, decreased visibility or damage to animals (including livestock and wildlife), vegetation, and the ecosystem is not anticipated from any pollutant.

f. Waterkeeper's May 30, 2025 hearing request referenced a 2009 study purportedly about genetic damage to cattle as far as six miles away from the FPC Complex and stated Ms. Wilson's concern that proposed emissions would similarly affect local wildlife.[5] However, the 2009 study shows no clear pattern of increased DNA damage in cattle.[6] The 2009 study only evaluated locations downwind (north) of FPC and another industrial plant. Since no upwind or crosswind locations were evaluated, the study's conclusion that predicted increases in DNA damage in cattle is associated with being downwind from industry is highly questionable.[7] Moreover, the study is not relevant to whether Ms. Wilson is an affected person because Ms. Wilson does not claim to own the cattle reportedly evaluated and, therefore, she would not be affected by damage (if any) to cattle any differently than any other member of the general population.

21. For the reasons stated above, potential impacts of the air emissions from the Project are expected to be indiscernible for members of the general public, including Ms. Wilson. This is because primary NAAQS incorporate a MOS as a built-in buffer to protect public health, even for vulnerable populations (children, the elderly, and people with preexisting health conditions) and secondary NAAQS protect against damage to visibility, animals, crops, vegetation, the ecosystem, and buildings. Likewise, health-based ESLs are set at levels below which adverse effects are observed in sensitive populations (e.g., asthmatics, the most sensitive animal species, etc.), indirectly protect wildlife, and are designed to be protective of cumulative and aggregate exposures (i.e., simultaneous exposures to multiple chemicals and exposure to the same chemical from more than one source), while welfare-based ESLs protect against vegetative damage and nuisance odors. The application of these conservative procedures in setting NAAQS and ESLs ensures that the likelihood of adverse health and welfare effects below these levels is exceedingly small. In other words, no person who owns property, resides, or who regularly visits areas near the Complex will be

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5 Waterkeeper did not include a reference to the study in its May 30, 2025 request but I located it based on the claims described in the request. *See* Texas A&M University (Bisset *et al.*, 2009).

6 The largest cluster of increased predicted DNA damage was located downwind but at a greater distance from industry.

7 Cattle in different ordinal directions were not evaluated and, therefore, being downwind from industry cannot be concluded to be the causative factor.

impacted any differently than the general public. Moreover, impacts at locations farther from the FPC Complex fenceline (e.g., at Ms. Wilson's residence, more than 20 miles away), or that occur on a more intermittent basis (e.g., during Ms. Wilson's recreational and volunteer activities), would be even less discernible.

22. Based on the Modeling and on my evaluation as described above, Ms. Wilson would not experience impacts from periodically visiting the locations described in the Waterkeeper's requests any differently than anyone else.

Further affiant sayeth not."

L. Fraser

Lucy Fraiser
Fraiser Toxicology Consulting, LLC

This instrument was acknowledged before me, the undersigned authority, this 12 th day of September 2025, by Lucy Fraiser, Fraiser Toxicology Consulting, LLC.

Notary Public in and for the State of Arkansas

INEZ Y. HERNANDEZ
Notary Public - Arkansas
Washington County
Commission # 12393665
My Commission Expires May 29, 2033