

TCEQ DOCKET NO. 2022-0157-AIR

APPLICATION BY MAX	§	BEFORE THE
MIDSTREAM TEXAS, LLC FOR	§	TEXAS COMMISSION ON
AIR PERMIT NO. 162941 FOR	§	ENVIRONMENTAL QUALITY
THE SEAHAWK CRUDE	§	
CONDESATE TERMINAL	§	

**DIANE WILSON, SAN ANTONIO BAY ESTUARINE WATERKEEPER AND TEXAS
CAMPAIGN FOR THE ENVIRONMENT’S REPLY TO RESPONSES TO HEARING
REQUESTS**

TO THE MEMBERS OF THE COMMISSION ON ENVIRONMENTAL QUALITY:

Diane Wilson, San Antonio Bay Estuarine Waterkeeper (“Waterkeeper”), and Texas Campaign for the Environment (“TCE”) (collectively “Requesters”) file this Reply in support of their contested case hearing requests on the application by Max Midstream Texas, LLC (“Max Midstream” or “Applicant”) for New Source Review (“NSR”) permit number 16294 (“Draft Permit”).¹ This matter is germane to Waterkeeper and TCE’s organizational purposes, Waterkeeper and TCE have identified members, including Diane Wilson who will be exposed to air pollution emitted by facilities and activities at the expanded Seahawk Terminal. As explained by expert declarations by Dr. Ranajit Sahu and Dr. Loren Hopkins attached to this Reply, this direct exposure to air increased air pollution emitted by the expanded Seahawk Terminal distinguishes Requesters from the general public and will interfere with their justiciable property,

¹ In their responses to hearing requests, Max Midstream, the Executive Director of TCEQ, and OPIC all referred to Environmental Integrity Project (EIP) and Texas Rio Grande Legal Aid (TRLA) as entities seeking a contested case hearing. EIP and TRLA are law firms that represent Requesters, which have submitted comments and requests on behalf of their clients.

economic, and aesthetic interests.² Accordingly, the Commission should grant Requestors party status and refer issues raised in Requesters' comments and hearing requests to the State Office of Administrative Hearings for consideration at a contested case hearing concerning Max Midstream's application.

I. LEGAL AUTHORITY

A. Federal and State Clean Air Acts' Protected Interests

Texas has been delegated authority to issue major and minor preconstruction permits implementing New Source Review ("NSR") review requirements established by Title I of the federal Clean Air Act.³ The regulations constituting Texas's federally-approved preconstruction permitting programs were established pursuant to authority vested in the TCEQ and its predecessor agencies by the Texas Clean Air Act.⁴ While these permitting programs were established under Texas state law, their approval into the Texas's Clean Air Act State Implementation Plan gives them the effect of federal law.⁵

The interests protected by both the federal and Texas Clean Air Acts extend beyond the interests held by property owners. The federal Clean Air Act was enacted primarily to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population."⁶ The Texas Clean Air Act was created to "safeguard the state's air resources...by controlling or abating air pollution" for "the protection

² Dr. Sahu's Declaration is Exhibit 1 to this Reply ("Sahu Declaration"). Dr. Hopkins' Declaration is Exhibit 2 to this Reply ("Hopkins Declaration").

³ See 40 C.F.R. § 52.2270 (identifying regulations and other authority that are part of Texas's federally-approved State Implementation Plan, which implement federal Clean Air Act, Title I program requirements).

⁴ Tex. Health and Safety Code § 382.051 et. seq.

⁵ *Kentucky Resources Council v. EPA*, 304 F.Supp.2d 920, 923 (W.D. Ky. 2004) (citing *Gen. Motors Corp. v. United States*, 496 U.S. 530, 540 (1990))("Upon approval, a state or local SIP is printed in the Federal Register and becomes enforceable as federal law.").

⁶ 42 USC § 7401(b)(1).

of public health, general welfare, and physical property, including the esthetic enjoyment of air resources...and adequate visibility.”⁷ The Texas Clean Air Act was also designed to prevent air pollution levels that “are or may tend to be injurious to or adversely affect ... animal life, vegetation, or property; or interfere with the normal use or enjoyment of animal life, vegetation, or property.”⁸

B. Requesters with a Personally Justiciable Interest Recognized Under Article III are Affected Persons who may Participate in a Contested Case Hearing.

The federal Clean Air Act and its implementing regulations require all permitting authorities to include a process for public notice and an opportunity for the public to comment on all permit applications.⁹ Additionally, EPA has determined that the right to appeal permitting decisions to state court is necessary to ensure that public comment opportunities are effective.¹⁰

The Texas Clean Air Act and the Texas Water Code establish the framework for public participation in air permitting matters that implement federal Clean Air Act requirements and provide members of the public with a right to challenge the Commission’s permitting decisions in state court.¹¹ Various regulations established by the TCEQ and its predecessor agencies pursuant to Texas Water Code and Texas Clean Air Act regarding public notice and comment requirements for air permitting projects have been approved by EPA into the Texas State

⁷ Tex. Health and Safety Code § 382.002(a).

⁸ Tex. Health and Safety Code § 382.003(3).

⁹ 40 C.F.R. § 51.161(a)-(b).

¹⁰ See e.g. Approval and Promulgation of Air Quality Implementation Plans; Commonwealth of Virginia, 61 Fed. Reg. 1880, 1882 (Jan. 24, 1996) (The opportunity for state court judicial review “is necessary to ensure an adequate and meaningful opportunity for public review and comment on all issues within the scope of the permitting decision, including environmental justice concerns and alternatives to the proposed source.”); see also *id.* (“The EPA believes that Congress intended ... opportunity for state judicial review of PSD permit actions to be available to permit applicants and at least those members of the public who can satisfy threshold standing requirements under Article III of the Constitution.”).

¹¹ See, e.g. Tex. Health and Safety Code §§ 382.032, 382.056; Tex. Water Code §§ 5.351, 5.551 through 5.557.

Implementation Plan or “SIP”.¹² In cases where provisions in a SIP conflict with applicable State law, the SIP controls.¹³ States may not revise SIP requirements, including public participation requirements until such revisions are approved by EPA.¹⁴

In addition to traditional notice and comment procedures included in the Texas SIP, members of the public may also request a contested case hearing to litigate questions of fact (or mixed questions of fact and law) concerning certain TCEQ decisions, including major and minor NSR permitting decisions implementing federal Clean Air Act requirements, in front of an administrative law judge.¹⁵ A contested case hearing on an NSR permit cannot be granted unless TCEQ determines at least one requester is an “affected person.”¹⁶ Under Texas law, an “affected person” is “a person who has a personal justiciable interest related to a legal right, duty, privilege, power, or economic interest affected by the administrative hearing.”¹⁷ A justiciable interest is an “actual or imminent threat of injury peculiar to one’s circumstances and not suffered by the public generally.”¹⁸ The injury “may be economic, recreational, or

¹² See 40 C.F.R. § 52.2270(c) (incorporating portions of Texas’s 30 Tex. Admin. Code Chapter 39 and 55 public notice and public participation regulations into the Texas SIP).

¹³ *Kentucky Resources Council*, 304 F.Supp.2d 927 (“While the Kentucky statute [conflicting with the SIP] certainly presents a quandary because the District strove to follow state law, the correct course of action here should not have been in doubt. Federal law controls.”).

¹⁴ *Id.* (“Although it is clear that the Clean Air Act contemplates a very significant participation in air pollution control by state air control agencies, it is equally clear that final authority [to approve or deny SIPs] is vested in the EPA and the courts of the United States.”) (quotation marks omitted) (citing *U.S. v. Ford Motor Co.*, 814 F.2d 1099, 1102 (6th Cir. 1987)).

¹⁵ 30 Tex. Admin. Code § 55.201.

¹⁶ 30 Tex. Admin. Code § 55.201(b)(4).

¹⁷ *Id.* at § 55.203(a). This regulation further states that “an interest common to members of the general public does not qualify as a personal justiciable interest.”

¹⁸ *Benker v. Tex. Dept. of Ins.*, 996 S.W.2d 328, 330 (Tex. App.—Austin 1999, no pet.) (citing *Texas Rivers Protection Ass’n v. Texas Natural Resource Conservation Comm’n*, 910 S.W.2d 147, 151 (Tex. App.—Austin 1995, writ denied.)

environmental.”¹⁹ The TCEQ must consider a non-exhaustive list of factors specified by regulation to determine whether a requester is an affected person.²⁰

Unlike its traditional notice and comment procedures, Texas has chosen not to submit its contested case hearing regulations to EPA for approval into the Texas SIP. Thus, the process should not affect federally-enforceable public participation rights, including the right to judicial review of TCEQ NSR permitting decisions in state court, established by the Texas SIP. In practice, however, Texas’s State-law contested case hearing process has been treated as an administrative remedy that must be exhausted before the public may challenge a TCEQ environmental permitting decision that implements federal law requirements.²¹ Thus, the TCEQ’s affected person determinations with respect to requests for contested case hearings actually serve as a *de facto* constraint on the public’s right to challenge TCEQ decisions implementing federal law requirements in state court.

To address concerns that Texas might use State law requirements to improperly limit the public’s right to appeal TCEQ permitting decisions implementing federal law to state court, the Texas Attorney General issued an opinion stating that “[a]ny provisions of State law that limit access to judicial review do not exceed the corresponding limits on judicial review imposed by the standing requirement of Article III of the United States Constitution.”²² While this opinion was rendered in the context of EPA’s consideration and approval of Texas’s Title V program rules, the TCEQ has properly acknowledged that “the Texas Attorney General statement

¹⁹ *Id.* (citing *City of Bells v. Greater Texoma Util. Auth.*, 790 S.W.2d 6, 11 (Tex. App.—Dallas 1990, writ denied.) The injury must also be redressable by agency action, such as TCEQ’s refusal to grant a permit. *Bosque River Coalition v. Texas Com’n on Environmental Quality*, 347 S.W.3d 366, 376 (Tex. App.—Austin 2011, rev’d. on other grounds 413 S.W.3d 403 (Tex. 2013)).

²⁰ 30 TAC § 55.203(c).

²¹ *Sierra Club and Public Citizen v. TCEQ*, 2016 WL 1304928, *4 (Tex. App.—Austin 2016) (mem. op.).

²² 35 Tex. Reg. 306, 309 (January 15, 2010).

regarding equivalence of judicial review based on THSC, § 382.032 in accordance with Article III of the United States Constitution *is also applicable for every action of the commission subject to the [Texas Clean Air Act.]*²³ Accordingly, contested case hearing standing constraints must be read to provide a right to participation that is no less narrow than the corresponding standing requirement imposed by Article III of the United States Constitution. This means that justiciable interests sufficient to establish a person’s status as an affected person must include aesthetic and recreational injuries recognized under Article III of the United States Constitution,²⁴ as well as injuries resulting from being compelled to breathe air that is less pure than mandated by the law.²⁵

C. Aesthetic and Recreational Harms are Justiciable Under Texas and Federal Law.

The Texas Clean Air Act creates a legally protected interest in the “esthetic enjoyment” of Texas’s air resources.²⁶ The invasion of this interest, if specific and particularized, is sufficient to distinguish a hearing requester from the general public and satisfy Texas State law requirements for affected persons.²⁷ This not only ensures that individuals whose aesthetic interests are actually affected by proposed facilities have access to redress, it also aligns the right to administrative and judicial review of TCEQ permitting decisions under the Texas Clean Air Act to the broad right of access established by Article III.

²³ *Id.* (emphasis added).

²⁴ *Friends of the Earth, Inc. v. Laidlaw Environmental Services, Inc.*, 528 U.S. 167, 183 (2000) (quoting *Sierra Club v. Morton*, 405 U.S. 727, 735 (1972)).

²⁵ *Sierra Club v. Energy Future Holdings Corp.*, 921 F.Supp.2d 674, 679-80 (W.D. Tex. 2013) (citing *Texas United for a Safe Econ. Educ. Fund v. Crown Cent. Petroleum Corp.*, 207 F.3d 789 (5th Cir. 2000)).

²⁶ Tex. Health and Safety Code § 382.002(a).

²⁷ Compare Tex. Water Code §§ 5.556, 5.115 (collectively creating a right to a contested case hearing when a permitted activity would affect legally protected interest) with *Save Our Spring Alliance, Inc. v. City of Dripping Springs*, 304 S.W.3d 871, 880-881. (Tex. App.—Austin 2010, pet. denied) (discussing how the creation of legally protected interests in environmental statutes coupled with the creation of a private right of action results in expanded standing rights for environmental litigants).

D. Contested Questions of Fact Regarding Affected Person Status Must be Resolved in the Requester’s Favor.

The TCEQ may consider evidence to determine whether a requester is an affected person.²⁸ This includes the merits of the application, the likely impact of the regulated activity, the administrative record, the opinion of TCEQ’s executive director, and any other expert reports, affidavits, opinions, or data timely submitted.²⁹ TCEQ’s discretion to consider evidence in the affected person determination is not unlike the undertaking of a court deciding a plea to the jurisdiction.³⁰ However, this discretion is restrained when there are “disputed facts that are relevant to a hearing requester’s status as an ‘affected person’ and to the merits of the permit application.”³¹ When such disputed facts exist, TCEQ “has no discretion to resolve those fact issues at the [affected person] stage of the proceeding and must refer the hearing request to SOAH for a contested case hearing to address those issues” unless there is conclusive or undisputed evidence negating the challenged fact.³²

E. Associational Standing

Associations may request a contested case hearing. An association should be granted a requested contested case hearing when it has timely filed comments on the permit application, the request identifies by name and address at least one member who would otherwise have standing to request a hearing in their own right, the association seeks to protect an interest

²⁸ Tex. Water Code § 5.115(a-1)(1).

²⁹ *Id.*; see also 30 TAC § 55.203(e).

³⁰ *Bosque River Coalition*, 347 S.W.3d at 377 (stating that TCEQ analogized itself to a trial court deciding a plea to the jurisdiction).

³¹ *Id.* at 378.

³² *Id.*

germane to its purpose, and neither the claim nor relief requires the participation of individual members.³³

II. REQUESTERS ARE AFFECTED PERSONS AND SHOULD BE GRANTED A CONTESTED CASE HEARING.

Requesters' comments and requests for a contested case hearing establish that Diane Wilson and other Waterkeeper and TCE members have justiciable interests that are not common to the general public and provide evidence supporting a determination that they are affected persons, as defined by applicable regulations. Max Midstream and the Executive Director's assertion that Ms. Wilson and others identified by Requesters' comments and hearing requests live too far away to have stake in this case that is different from the general public is wrong.

The line between generalized grievances and particularized harm in this case is properly drawn between the generalized concerns expressed by thousands of commenters who live, work, and recreate far from the Seahawk Terminal on the one hand; and Ms. Wilson, the Mareshes, Mr. Miller, and Mr. Blanco, who have demonstrated particularized harms resulting from the expansion project. Requesters' comments establish facts demonstrating that Ms. Wilson, the Mareshes, Mr. Miller, and Mr. Blanco will be directly exposed to harmful impacts from the Seahawk Terminal expansion project where they live, work, and recreate. In addition, Dr. Sahu and Dr. Hopkins testify this harmful exposure is sufficient to distinguish the interests of these people from the general public.³⁴ This satisfies the criteria established by § 55.203, which, does not require affected persons to live any specific distance from a proposed facility, or to own residential property impacted by a proposed facility.

³³ 30 Tex. Admin. Code § 55.205(b).

³⁴ Sahu Declaration at ¶ 27; Hopkins Declaration at ¶¶ 16, 17.

A. Diane Wilson is an “Affected Person.”

Diane Wilson filed multiple timely comments and contested case hearing requests concerning the Draft Permit, both as an individual seeking party status and as a member of an organization seeking party status.³⁵ Ms. Wilson’s comments and hearing requests establish that she will be exposed to and harmed by air pollution emitted from the expanded Seahawk Terminal during her frequent visits to areas near the Terminal. Ms. Wilson’s comments and hearing requests also establish that her aesthetic and recreational interests, which are protected by the federal and Texas Clean Air Acts, will be harmed by the Terminal expansion project. Accordingly, the TCEQ should determine that Ms. Wilson is an affected person and grant her party status in this matter.

1. Health Interests

Ms. Wilson is a party to a Federal Consent Decree that she has an interest in ensuring compliance with and enforcing. That Decree requires that Formosa Plastics cease the discharge of Plastics from its Point Comfort facility in Cox Creek and Lavaca Bay.³⁶ The Decree is still in effect and will not terminate until such discharges have ceased.³⁷ The Decree gives Ms. Wilson the right to accompany remediation specialists as they survey the discharge points from the Formosa Point Comfort facility and to notify the specialists of Plastics anywhere in the Lavaca Bay or Cox Creek systems for clean-up.³⁸ She also has the right to enforce the Decree against

³⁵ Comments and Contested Case Hearing Request filed by EIP on behalf of Diane Wilson and Waterkeeper (Nov. 12, 2020) (“November 12, 2020 Comments”); Comments and Public Meeting Request filed by EIP on behalf of Diane Wilson and Waterkeeper (June 4, 2021) (“June 4, 2021 Comments”); Comments Regarding TCEQ Permit No. 162941 (Max Midstream Air Pollution) (August 12, 2021) (“August 12, 2021 Comments”); *see also* ED’s Response, 12-1; OPIC’s Response, 7-8.

³⁶ Attachment D to Max Midstream’s Response to Hearing Requests (hereinafter “Decree”), ¶ 49.

³⁷ *Id.* at ¶ 74.

³⁸ *Id.* at ¶¶ 45, 41(c).

Formosa should it discharge Plastics from its facility and not comply with the terms of the Decree for when such a discharge happens.³⁹ This is a legal interest in the land and waters near Formosa discharge points that is distinct from the interests of the general public. Ms. Wilson regularly visits the waters and shores of Lavaca Bay and Cox Creek within the radius of emissions from the facility to exercise her rights under the Decree. Her interest in these visits is different from that of the general public.

To inspect Lavaca Bay for discharged plastics, Ms. Wilson frequently visits Formosa's outfall 013 which is just several hundred feet away from the Terminal.⁴⁰ She also routinely inspects Alcoa Harbor (1.85 miles from the Terminal), the Old Causeway (2.01 miles from the Terminal), and Formosa's Outfall 003 at the Alcoa Dam (1.9 Miles from the Terminal).⁴¹ Ms. Wilson also accesses the Formosa property North of SH 35 to assist in the implementation of the Decree and to evaluate Cox Creek for the discharge of Plastics approximately four times each month.⁴² This is an exclusive right of access conferred on her by the Decree and by agreement with Formosa.⁴³ The locations of this property are between 2 and 3 miles from the proposed facility.⁴⁴ The emissions from the facility will extend to these locations.⁴⁵

Ms. Wilson is concerned that she will be exposed to harmful levels of air pollution during her visits to areas near the Terminal. This concern is supported by Dr. Hopkins' declaration, which states that emissions from the Terminal "will likely negatively impact...Diane Wilson,

³⁹ *Id.* at ¶ 73.

⁴⁰ June 4, 2020 Comments at 4; Max Midstream's Response at 28.

⁴¹ Attachment A to the June 4 2020 Comments, Images C, E, & I.

⁴² June 4, 2020 Comments at 4.

⁴³ Decree, ¶ 32(a); *see also* Liability Release, Indemnity and Hold Harmless Agreement Signed by Diane Wilson on January 18, 2020. Included as Exhibit 3 to this Reply.

⁴⁴ Attachment A to the June 4, 2020 Comments, Images F, G, & J.

⁴⁵ Sahu Declaration at ¶ 18.

who frequents waters less than a mile from the Terminal.”⁴² Dr. Hopkins also concludes that Ms. Wilson’s exposure to increased air pollution from the expanded Seahawk Terminal will result in harmful health impacts at other locations on Lavaca Bay that are within two miles of Terminal.⁴⁶ The likely impacts to Ms. Wilson’s health satisfy multiple factors the TCEQ must consider under 30 Tex. Admin. Code §55.203(c). If the Draft Permit is issued, Ms. Wilson’s health and safety during her frequent visits to areas near the Terminal will likely be impacted.⁴⁷ Ms. Wilson’s health is an “interest protected by the law under which the application will be considered”⁴⁸ and there is a “reasonable relationship between the interest claimed and the activity regulated.”⁴⁹ The TCEQ should therefore find Ms. Wilson is an affected person and grant her request for a contested case hearing.

2. Aesthetic and Recreational Interests

Ms. Wilson’s justiciable aesthetic and recreational interests are also at stake in this matter. Ms. Wilson frequently visits the beaches near the facility, and swims, kayaks, and boats in the surrounding bays.⁵⁰ The natural beauty of the area is an important aspect of her spiritual connection to the waters of this area.⁵¹ Ms. Wilson’s aesthetic and recreational interests in Matagorda and Lavaca Bays, and the surrounding beaches, have been acknowledged as sufficient to establish Article III standing by a federal court.⁵² She has stated that her enjoyment of her

⁴⁶ Hopkins Declaration at ¶ 17.

⁴⁷ 30 Tex. Admin. Code § 55.203(c)(4).

⁴⁸ 30 Tex. Admin Code § 55.203(c)(1). Health interests are protected under both the Federal and State Clean Air Acts. 42 USC § 7401(b)(1); Tex. Health and Safety Code § 382.002(a).

⁴⁹ 30 Tex. Admin. Code § 55.203(c)(3).

⁵⁰ June 4, 2020 Comments, 6-7.

⁵¹ *Id.*

⁵² *San Antonio Bay Waterkeeper, et al. v. Formosa Plastics Corp., et al.*, 2019 WL 2716544 at *9-10 (S.D. Tex., 2019) (“The undisputed evidence shows that plastic pellets and PVC powder discharged by Formosa caused or contributed to the damages suffered by the recreational, aesthetic, and economic value of Lava Bay and Cox's Creek. Evidence also establishes that the recreational and aesthetic value of Lavaca Bay, Cox Creek, and their shores have

activities and the natural beauty of the Bays will be diminished if the Draft Permit is issued and the facility is allowed operate in ways that are inconsistent with the law.⁵³ For example, Max Midstream has represented that there will be no visible particulate matter emissions from its flares. But, as Dr. Sahu’s expert report explains, this representation is unsupported and is almost certainly untrue.⁵⁴ Additionally, the Draft Permit fails to establish monitoring and flare operating requirements sufficient to ensure that the prohibition on visible emissions from the flare are practically enforceable.⁵⁵ Max Midstream’s Application and the Draft Permit also fail to account for and establish appropriate pollution control requirements on visible emissions from vessels docked at the Seahawk Terminal.⁵⁶ Visible emissions and flames from Max Midstream’s flares, vessels docked at the Seahawk Terminal, and other visible emissions emitted by facilities at the Terminal constitute a particularized harm to Ms. Wilson’s justiciable aesthetic interests protected by the federal and Texas Clean Air Acts.

The likely impacts to Ms. Wilson’s aesthetic and recreational interests satisfy multiple factors the TCEQ must consider under 30 Tex. Admin. Code §55.203(c). Her aesthetic and recreational interests are “interest[s] ... protected by the law under which the application will be considered.”⁵⁷ In addition, there is a “reasonable relationship between the interest claimed and the activity regulated”⁵⁸ as the aesthetic and recreational harms will not occur if the TCEQ does

been diminished for members of Waterkeeper, their families and the public in general for use as recreation and aesthetic pleasure. Hence, the presence of PVC powder and plastic pellets distressed the area and lessened the enjoyment of the local environment.”).

⁵³ *Id.*

⁵⁴ Sahu Declaration at § 25.

⁵⁵ Sahu Expert Report at 7.

⁵⁶ Sahu Declaration at ¶ 22.

⁵⁷ Tex. Health and Safety Code § 382.002(a); 30 Tex. Admin. Code § 55.203(c)(3).

⁵⁸ 30 Tex. Admin. Code § 55.203(c)(1).

not issue the Draft Permit.⁵⁹ The TCEQ should therefore find Ms. Wilson is an affected person and grant her request for a contested case hearing.

B. Waterkeeper and TCE Have Established a Right to Participate as Parties in a Contested Case Hearing Concerning Max Midstream’s Proposed Seahawk Terminal Expansion.

1. Waterkeeper and TCE submitted timely comments; this matter is germane to their organizational purposes; and resolution of this dispute does not require individual participation.

No party in this matter disputes that Waterkeeper and TCE submitted timely comments, that participation in this permit proceeding is germane to these organizations’ purposes, or that no claim asserted or relief requested requires the participation of individual members in this case. Accordingly, Waterkeeper and TCE have satisfied the requirements for requesting a contested case hearing established by 30 Tex. Admin. Code § 55.205(a). Additionally, as explained above with respect to Diane Wilson and as explained below with respect to other organization members, TCE and Waterkeeper’s hearing requests identified by name and address more than one member of the groups that have standing to request a contested case hearing in their own right, as required by 30 Tex. Admin. Code § 55.205(b)(2).

2. Waterkeeper and TCE Members are Affected Persons.

i. Diane Wilson (Waterkeeper)

Diane Wilson requested a contested case hearing on behalf of herself and as a member on behalf of Waterkeeper. For the reasons established in Section II. A *supra*, Ms. Wilson is an

⁵⁹ *Bosque River Coalition*, 347 S.W.3d at 375 (injuries are redressable by “the Commission’s refusal to grant the permit or imposition of additional conditions.”).

affected person in her own right. Accordingly, Waterkeeper has standing to participate as a party in a contested case hearing concerning the Draft Permit.

ii. John and Janet Maresh (Waterkeeper)

Timely filed comments establish that siblings John and Janet Maresh are Waterkeeper members who live approximately 1.79 miles from the Seahawk Terminal.⁶⁰ Based on these comments, OPIC determined that the Maresh's are affected persons.⁶¹ The Executive Director does not dispute that the Mareshes will be directly harmed by the proposed Terminal expansion. Instead, the Executive Director complains that he could not confirm the address of the Mareshes' residence.⁶² Max Midstream's Response to Hearing Requests confirmed the Mareshes' residence is located 1.79 miles from the Terminal and the address of their residence.⁶³ Given the proximity of the Mareshes' home to the Seahawk Terminal, Dr. Hopkins has opined that the Mareshes' health will be negatively impacted by air pollution from the expanded Seahawk Terminal.⁶⁴

The proximity of the Mareshes' home and the resulting harms that will result from their exposure to increased air pollution authorized by the Draft Permit satisfy multiple factors the TCEQ must consider under 30 Tex. Admin. Code §55.203(c). The Mareshes will be negatively impacted by increased pollution from the Terminal expansion where they live. All parties in this case agree that harmful air pollution impact at one's residence is sufficient to establish an

⁶⁰ June 4, 2021 Comments at 3.

⁶¹ OPIC's Response at 5.

⁶² ED's Response at 15.

⁶³ Max Midstream's Response at 17; *see also* Corrected Comments and Hearing Request at 3 dated June 4, 2021, filed on March 7, 2022, available electronically at:

https://www14.tceq.texas.gov/epic/eCID/index.cfm?fuseaction=main.download&doc_id=925565792022067

⁶⁴ Hopkins Declaration at ¶ 17.

individual's affected interest protected by the Texas Clean Air Act that is distinguishable from the general public.⁶⁵ Accordingly, the Mareshes interest in this case is "one protected by the law under which the application will be considered."⁶⁶ The Mareshes' health and safety will be impacted by the emissions authorized by the Draft Permit⁶⁷ and those emissions will negatively impact the Mareshes' use of "the impacted natural resource," which in this case is the air they breathe where they live.⁶⁸ There is also "a reasonable relationship ... between the interest claimed and the activity regulated"⁶⁹ because the likely harms to the Mareshes' health will not occur if the TCEQ does not issue the Draft Permit.⁷⁰ Therefore, the Mareshes are affected persons and the TCEQ should grant a contested case hearing to Waterkeeper.

iii. Curtis Miller (Waterkeeper and TCE)

Curtis Miller is a member of Waterkeeper and TCE.⁷¹ Mr. Miller's health and economic interests will be harmed if TCEQ issues the proposed permit. Mr. Miller is therefore an affected person and Waterkeeper and TCE should be granted a contested case hearing.

a. Health Interests

Mr. Miller recreationally fishes at Miller's Reef, which is located approximately two miles from the Seahawk Terminal, and nearby bays at least twice a month.⁷² Mr. Miller is under

⁶⁵ Max Midstream's Response to Hearing Requests at 7-8 (Arguing that TCEQ precedent requires finding a requester is an affected person only when the requester has a vested property interest.).

⁶⁶ 30 Tex. Admin. Code § 55.203(c)(1).

⁶⁷ 30 Tex. Admin. Code § 55.203(c)(4).

⁶⁸ *Id.* at § 55.203(c)(7).

⁶⁹ 30 Tex. Admin. Code § 55.203(c)(3).

⁷⁰ *Bosque River Coalition*, 347 S.W.3d at 375 (injuries are redressable by "the Commission's refusal to grant the permit or imposition of additional conditions.")

⁷¹ TCE and Waterkeeper Supplement to their Contested Case Hearing Requests, 1 (Jan. 10, 2022) ("January 10, 2022 Comments").

⁷² *Id.* at 2.

the care of a pulmonologist for serious respiratory health issues that make him particularly susceptible to harm from pollutants, like NO₂, that will be emitted from the expanded Seahawk Terminal.⁷³ As Dr. Hopkins explains, “[e]xposure to [NO₂] can ... aggravate respiratory diseases, particularly asthma, leading to increased risk of hospitalization for those who, like Curtis Miller, suffer from such conditions.”⁷⁴

Mr. Miller also works from 40 to 60 hours a week at his commercial seafood shop located approximately four miles from the facility.⁷⁵ Dr. Sahu has testified that there will likely be quantifiable air quality impacts at this distance from the facility.⁷⁶ Due to Mr. Miller’s health conditions, these impacts will be particularly harmful.⁷⁷ Mr. Miller’s interest in the protection of his health is not an interest shared by the general public because he will be directly exposed to harmful pollution increases resulting from the Terminal expansion project and because he is at a higher risk of harm from those impacts.⁷⁸

The likely impacts to Mr. Miller’s health satisfy multiple factors the TCEQ must consider under 30 Tex. Admin. Code §55.203(c). If the Draft Permit is issued, Mr. Miller’s health and safety will be impacted by the emissions authorized by the permit⁷⁹ and will negatively impact Mr. Miller’s use of “the impacted natural resource,” which, in this case, is the air he breathes

⁷³ *Id.*

⁷⁴ Hopkins Declaration at ¶ 13.

⁷⁵ January 10, 2022 Comments; while Requesters represented that Mr. Miller’s shop is located approximately five miles from the Seahawk Terminal, the Executive Director’s Response to Hearing Requests states that it is located four miles from the Terminal. ED’s Response at 15 (“Based on the address provided, the ED confirmed that the business is approximately 4 miles west form the location of the terminal.”).

⁷⁶ Sahu Declaration at ¶ 18.

⁷⁷ See Hopkins Declaration at ¶¶ 13, 17.

⁷⁸ *United Copper Industries, Inc. v. Grissom*, 17 S.W.3d 797, 804 (Tex. App.—Austin, 2000) (finding increased levels of harmful air emissions coupled with asthma is a unique health concern on shared by other members of the general public.).

⁷⁹ 30 Tex. Admin. Code § 55.203(c)(4).

when he works and recreates.⁸⁰ There is also “a reasonable relationship ... between the interest claimed and the activity regulated”⁸¹ because the likely harms to Mr. Miller’s health will not occur if the TCEQ does not issue the Draft Permit.⁸² Mr. Miller is therefore an affected person and the TCEQ should grant Waterkeeper and TCE’s requests for a contested case hearing.

b. Economic Interests

Issuance of the Draft Permit will also harm Mr. Miller’s economic interests. Mr. Miller owns and operates a commercial seafood business in Port Lavaca, approximately five miles from the Seahawk Terminal.⁸³ Mr. Miller also owns and operates a fleet of commercial shrimping and oyster boats that are staffed by local oystermen and shrimpers who oyster and shrimp in the bays near the Seahawk Terminal.⁸⁴ As such, Mr. Miller’s income is dependent on the health of the Bays. There is no dispute that the Terminal and vessels docked at the Terminal will emit carbon dioxide (“CO₂”). It is well known that at least a quarter of all emitted CO₂ is absorbed by ocean waters.⁸⁵ This leads to acidification and increased corrosiveness of coastal waters impacting oysters’ ability to grow shells and survive past the larval stage.⁸⁶ The rising acidity in Texas Bays, including bays proximate to the Seahawk Terminal is already affecting the oyster

⁸⁰ *Id.* at § 55.203(c)(7).

⁸¹ 30 Tex. Admin. Code § 55.203(c)(3).

⁸² *Bosque River Coalition*, 347 S.W.3d at 375 (injuries are redressable by “the Commission’s refusal to grant the permit or imposition of additional conditions.”).

⁸³ January 10, 2022 Comments at 1.

⁸⁴ *Id.*

⁸⁵ Colgan, David. Oysters as Catch of the Day? Perhaps no, if ocean acidity keeps rising. UCLA: Institute of the Environment & Sustainability (Jan. 29, 2020). Available at: <https://www.ioes.ucla.edu/article/oysters-as-catch-of-the-day-perhaps-not-if-ocean-acidity-keeps-rising/>; see also Ocean Acidification, Smithsonian (April 2018). Available at <https://ocean.si.edu/ocean-life/invertebrates/ocean-acidification>.

⁸⁶ *Id.*; see also Ocean Acidification’s Impact on Oysters and Other Shellfish, National Oceanic and Atmospheric Administration. Available at <https://www.pmel.noaa.gov/co2/story/Ocean+Acidification%27s+impact+on+oysters+and+other+shellfish>.

population.⁸⁷ Further increases to acidity in Coastal Bend waters resulting from the Seahawk Terminal's increased CO₂ emissions will harm Mr. Miller's economic interests in the oysters his crewed boats harvest and that he sells at his commercial seafood business.

The likely impacts to Mr. Miller's income satisfy multiple factors the TCEQ must consider under 30 Tex. Admin. Code §55.203(c). His use normal of oysters is an "interest protected by the law under which the application will be considered."⁸⁸ There is also a "reasonable relationship between the interest claimed and the activity regulated"⁸⁹ as increased CO₂ emissions from the facility will not occur if the TCEQ does not issue the Draft Permit.⁹⁰ The TCEQ should therefore find Mr. Miller is an affected person and grant Waterkeeper and TCE's requests for a contested case hearing.

iv. Mauricio Blanco (Waterkeeper and TCE)

Mauricio Blanco is a member of Waterkeeper and TCE.⁹¹ He is a commercial oysterman and shrimper.⁹² He holds several licenses issued by the State of Texas that allow him to shrimp and oyster in Matagorda and Lavaca Bay.⁹³ Mr. Blanco's health interests will be negatively affected by the proposed Seahawk Terminal expansion, because, as Dr. Sahu and Dr. Hopkins testify, he will be exposed to harmful air pollution impacts resulting from the expansion where

⁸⁷ See Mathew Tresaugue, Rising acidity of Texas Bays concerns scientists, Houston Chronicle (Mar. 17, 2015). Available at <https://www.houstonchronicle.com/news/science-environment/article/Rising-acidity-of-Texas-baysconcerns-scientists-6139904.php>. ("The falling pH is hitting Matagorda Bay harder than others ... The combination of drought, disease, parasites, upriver diversions and the rising acidity have taken a toll on its oysters, which are still being harvested but not in the same quantities as before.").

⁸⁸ Tex. Health and Safety Code § 382.003(3); 30 Tex. Admin Code § 55.203(c)(1).

⁸⁹ 30 Tex. Admin. Code § 55.203(c)(3).

⁹⁰ *Bosque River Coalition*, 347 S.W.3d at 375 (injuries are redressable by "the Commission's refusal to grant the permit or imposition of additional conditions.").

⁹¹ January 10, 2022 Comments, 3.

⁹² *Id.*

⁹³ Declaration of Mauricio Blanco, ¶¶ 3-4, included as Exhibit 4 to this Reply ("Blanco Declaration").

he works.⁹⁴ Additionally, his economic interest as a licensed shrimper and oysterman who relies on the health of marine ecosystems near the Terminal establishes that Mr. Blanco has a particularized interest in preventing potential harm to those ecosystems resulting from air pollution increases that would be authorized by the Draft Permit.⁹⁵ The TCEQ should therefore find he is an affected person and grant the contested case hearings of both Waterkeeper and TCE.

a. Health Interests

Mr. Blanco has been a commercial oysterman and shrimper for 34 years.⁹⁶ He owns 10 commercial oyster and shrimping boats that operate in the bays in the Coastal Bend.⁹⁷ He captains one boat six days each week.⁹⁸ There are several acres of oyster reefs in Cox Bay within the Lavaca Bay system.⁹⁹ During the last oyster season that Cox Bay was open for commercial oystering, Mr. Blanco spent three months, or half the commercial oystering season, harvesting oysters from Cox Bay.¹⁰⁰ Cox Bay is also an important area for shrimp harvests.¹⁰¹ Each year, Mr. Blanco spends between five and six weeks shrimping in Cox Bay.¹⁰²

⁹⁴ Sahu Declaration at ¶¶ 18, 27; Hopkins Declaration at ¶ 17 (indicating negative impacts caused by air pollution may reach up to five miles from the Terminal).

⁹⁵ See ED's Response at 20 (acknowledging that allegations that pollution from the Seahawk Terminal expansion project will "diminish the ecological integrity of the area" is a disputed question of fact ... [that is] material to the issuance of the draft permit."). While the Executive Director suggests that the TCEQ "does not have the authority to consider economic impact on the surrounding community" this contention does not nullify the express language of 30 Tex. Admin. Code § 55.203(a), which provides that "an economic interest affected by the application" is sufficient to qualify one as an affected person.

⁹⁶ Blanco Declaration at ¶ 2.

⁹⁷ *Id.*

⁹⁸ *Id.*

⁹⁹ See Montagna, Paul et al. *Evaluation for the Proposal for Widening and Deepening the Matagorda Shipping Channel*, Texas A&M University Corpus Christi, at 27 (Sept. 30, 2021). Available at <https://mbmtrust.com/media/dnid4urx/mbmt-ship-channel-dredging-evaluation-016-final-report-10-05-21.pdf>.

¹⁰⁰ Blanco Declaration at ¶ 5.

¹⁰¹ *Id.*

¹⁰² *Id.*

Mr. Blanco saves waypoints on his GPS of locations he visits on different bays.¹⁰³ He has identified four locations on Cox Bay that he has saved on this GPS.¹⁰⁴ These locations are between 1.38 miles and 2.32 miles from the proposed facility.¹⁰⁵ Mr. Blanco's many licenses grant him a special right to conduct his business in waters proximate to the Seahawk Terminal are sufficient to establish that his interest in accessing these waters is different from the general public.

Mr. Blanco is concerned that he will be exposed to harmful levels of air pollution while he works in areas near the Terminal.¹⁰⁶ This concern is warranted, because--as Dr. Hopkins testified--Mr. Blanco will be exposed to harmful impacts resulting from pollution increases at the Seahawk Terminal while he works near the Terminal.¹⁰⁷ These negative impacts satisfy multiple factors the TCEQ must consider under 30 Tex. Admin. Code §55.203(c). If the Draft Permit is issued, Mr. Blanco's health and safety will likely be negatively impacted.¹⁰⁸ Mr. Blanco's personal health is an "interest protected by the law under which the application will be considered"¹⁰⁹ and there is a "reasonable relationship between the interest claimed and the activity regulated."¹¹⁰ The TCEQ should therefore find Mr. Blanco is an affected person and grant Waterkeeper and TCE's requests for a contested case hearing.

¹⁰³ *Id.* at ¶ 6.

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ *Id.* at ¶ 9.

¹⁰⁷ Hopkins Declaration at ¶ 17.

¹⁰⁸ 30 Tex. Admin. Code § 55.203(c)(4).

¹⁰⁹ 42 USC § 7401(b)(1); Tex. Health and Safety Code § 382.002(a); 30 Tex. Admin Code § 55.203(c)(1).

¹¹⁰ 30 Tex. Admin. Code § 55.203(c)(3).

b. Economic Interests

Like Mr. Miller, Mr. Blanco will also be economically harmed by reductions in harvestable oysters resulting from the Terminal expansion project.¹¹¹ Approximately 80% of Mr. Blanco's income comes from his commercial oystering.¹¹² Accordingly, reductions in harvestable oysters caused by increased air pollution resulting from the Terminal expansion project will injure Mr. Blanco's economic interests.

Mr. Blanco is also reasonably concerned about serious impacts that could result from an oil spill at the expanded Seahawk Terminal.¹¹³ Mr. Blanco knows first-hand that such spills happen and that they have devastating consequences for those who rely on the sea to make a living. He knows this because he used to hold a commercial oystering license for Louisiana oysters, until the BP oil spill made oystering there economically infeasible.¹¹⁴ The increased shipping of crude oil from the Seahawk Terminal will increase the likelihood of an oil spill in this area.

The likely impacts to Mr. Blanco's income resulting from acidification of bays near the Terminal as a result of increased air pollution emitted by the proposed expansion, along with Mr. Blanco's reasonable concerns about the devastating effects of a potential oil spill at one of the many docks Max Midstream proposes to construct satisfy multiple factors the TCEQ must consider under 30 Tex. Admin. Code § 55.203(c). Mr. Blanco's normal use of oysters is an

¹¹¹ See Section II.B.2.iii.b *supra*.

¹¹² Declaration of Mauricio Blanco, ¶ 11.

¹¹³ *Id.* at ¶ 10.

¹¹⁴ *Id.*

“interest protected by the law under which the application will be considered.”¹¹⁵ There is also a “reasonable relationship between the interest claimed and the activity regulated”¹¹⁶ as increased CO₂ emissions from the facility and increased oil shipping traffic will not occur if the TCEQ does not issue the permit.¹¹⁷ The TCEQ should therefore find Mr. Blanco is an affected person and grant Waterkeeper and TCE’s requests for a contested case hearing.

III. MAX MIDSTREAM’S RESPONSE TO HEARING REQUESTS LACKS MERIT.

Max Midstream’s Response to Hearing requests is wrong on every important point it makes. It mis-states applicable law, it mis-represents the TCEQ’s past decisions, and it relies on expert declarations about flawed modeling that does not represent actual impacts that will occur if the Draft Permit is issued and Terminal expansion project is constructed.

All parties agree that the Commission must consider the following factors, established by 30 Tex. Admin. Code § 55.203(c) when determining whether a person requesting a contested case hearing is an “affected person” entitled to participate in a contested case hearing:

- (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;

¹¹⁵ Tex. Health and Safety Code § 382.003(3); 30 Tex. Admin Code § 55.203(c)(1).

¹¹⁶ 30 Tex. Admin. Code § 55.203(c)(3).

¹¹⁷ *Bosque River Coalition*, 347 S.W.3d at 375 (injuries are redressable by “the Commission’s refusal to grant the permit or imposition of additional conditions.”).

- (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.¹¹⁸

Ignoring the breadth of this non-exhaustive list, Max Midstream offers the following caricature of § 55.203(c) as the proper measure of affected person status:

Based on consistent Commission precedent, the quintessential test regarding whether a hearing requestor has established a personal justiciable interest in a TCEQ air permit application is whether the purported interest (which is typically a person's residence) is located within or only slightly further than one mile from the facilities which would be authorized to emit air contaminants.¹¹⁹

This reading of the applicable regulation is obviously wrong because it collapses the seven criteria listed by the regulation into a single factor, listed at 30 Tex. Admin. Code § 55.203(c)(2), *which doesn't even apply to this case*. § 55.203(c)(2) explains which kinds of distance limitations or restrictions the Commission should consider when making affected person determinations, namely: those "imposed by law on the affected interest." But *there is no limitation imposed by law on requests for contested case hearings on air permits, like the Draft Permit*. Accordingly, Max Midstream's attempt to manufacture such a restriction out of thin air must fail.

Given that Max Midstream's one-mile "test" is not actually supported by the TCEQ's rules, Max Midstream attempts to justify it as distillation of consistent precedent. But many of

¹¹⁸ 30 Tex. Admin. Code § 55.203(c).

¹¹⁹ Max Midstream's Response at 6 (emphasis in original).

the previous Commission decisions Max Midstream relies for this demonstration address multiple factors in addition to the relative distance between requesters and a proposed facility. They do not reflect a consistently applied presumption that, regardless of other factors, no person living farther than approximately one-mile from a proposed facility is not an affected person. Moreover, there have been multiple cases where persons who did not live within approximately one mile of a proposed facility were determined to be affected persons. Some notable examples include:

- **Application for Air Quality Permit No. 148420, for the construction of the Port Arthur LNG Plant.** An individual qualified as an affected person in a challenge to Port Arthur LNG's permit based on his exposure to quantifiable impacts on air quality at his home between three and four miles from the proposed facility. Even though impacts modeled by the applicant purported to demonstrate compliance with all applicable ambient air quality standards, expert testimony established credible questions as to whether this modeling accurately considered worst-case impacts and suggested that emissions increases below NAAQS thresholds could still negatively impact the individual's health.
- **Application for Air Quality Permit Nos. 19806, 22052, 46307, and 46426, for construction of and modifications to TPC Group LLC's Houston Plant.** An individual who lived approximately 1.7 miles from the Houston Plant's main flare qualified as an affected person in a challenge to TPC Group LLC's application, based on her likely exposure to air pollution from the expansion project at her home. This individual was determined to be an affected person even though she lived more than one mile from the proposed facility and did not rely on any expert testimony in support of her hearing request.
- **Application for Air Quality Permit No. 102982 for the construction of a new ethylene production unit at ExxonMobil's Baytown Olefins Plant.** An individual qualified as an affected person in a challenge to ExxonMobil's Baytown Ethylene plant permit based in part on her ownership of a motorcycle repair shop which was located between four and five miles from the ExxonMobil plant. Her home was located about three blocks from the motorcycle shop. Like the Max Midstream project, this expansion project was characterized as a minor NSR project.
- **Application for Air Quality Permit No. 85013 for construction of the Las Brisas Energy Center.** Individuals who lived more than 10 miles from the plant site were designated affected persons in this challenge to permits authorizing construction of a new petroleum coke-fired power plant.

- **Application for Air Quality Permit No. 79188 for the construction of facilities at NRG Texas Power LLC’s Limestone Electric Generating Station.** Affected party status was granted to an individual who lived approximately four miles from the site.

These decisions granting affected person status to individuals living more than one mile from a proposed facility include a case, like this one, where the contested project would be authorized by a minor NSR permit (ExxonMobil’s Baytown Olefins Plant) and multiple cases, unlike this one, where the individuals designated affected persons did not provide credible expert testimony in support of their hearing requests or on the merits of issues raised in their comments during the public comment period.

Max Midstream also relies on the air quality impacts modeling it conducted for this case, along with an affidavit by toxicologist Lucy Fraiser to defend its one-mile “test” within the context of this case. According to Dr. Fraiser, health impacts resulting from the Terminal expansion are indiscernible more than a mile from the Terminal.¹²⁰ Dr. Fraiser’s affidavit makes two basic points with respect to this project: 1) Max Midstream air impacts modeling does not show any unacceptable violations of applicable air quality standards; and 2) pollution concentrations that do not violate any applicable air quality standards will not result in discernable negative health impacts. Requesters’ expert declarations rebut both points.

Dr. Fraiser did not actually conduct any of the modeling she relies on for her testimony, nor does she analyze whether inputs to the modeling she relies on actually represents worst-case emissions from the expanded Seahawk Terminal. Instead, she takes the accuracy of the modeled impacts as a given and opines on the effects of concentrations presented in the TCEQ’s modeling

¹²⁰ Max Midstream’s Response at 11-12.

audit. But, as Dr. Sahu explains, [t]he Applicant's modeled impacts do not include or reflect worst-case emissions from sources and activities at the expanded Terminal and therefore understate air quality impacts that will result from the construction and operation of the Seahawk Terminal expansion.¹²¹ Dr. Sahu's declaration lists multiple ways that Max Midstream's modeling fails to account for pollution that will be emitted by the expanded Seahawk Terminal: 1) it underestimates VOC emissions from loading losses that affect Max Midstream's ESL demonstration and that will drive additional criteria pollutant emissions (NO_x and CO) from the vapor combustion units Max Midstream uses to control loading loss emissions; 2) it fails to include potentially significant emissions from dockside vessels at the Terminal; 3) it relies on EPA's "Intermittent" policy to reduce inputs into the model to levels far below what is authorized by the Draft Permit; and 4) Max Midstream's modeling unreasonably presumes that its flare will not emit any particulate matter.¹²² Because Max Midstream failed to model worst-case emissions, Dr. Sahu concludes that "actual impacts from pollution emitted by ... [the] expanded Seahawk Terminal will be significantly greater than the impacts predicted and demonstrated by the Applicant" and that "Requesters' probable direct exposure to pollution emitted by the Seahawk Terminal emitted by the Seahawk Terminal distinguishes them from many others living in other cities, counties, cities, states, and countries who have requested a contested case hearing in this matter."¹²³

Not only do the modeled impacts Dr. Frasier relies upon for her testimony understate actual impacts from the expanded Seahawk Terminal, Dr. Hopkins rebuts Dr. Frasier's testimony

¹²¹ Sahu Declaration at § 19.

¹²² Sahu Declaration at ¶¶ 20-25.

¹²³ *Id.* at ¶¶ 26-27.

that compliance with the NAAQS is sufficient to establish that health impacts from the expanded Seahawk Terminal will be undiscernible. Instead, Dr. Hopkins testifies that:

My research and other research that I am familiar with shows that there are measurable health benefits to reducing concentrations of NO₂ to levels well below the ... [NAAQS]. This means that NO₂ can—and does—cause harm to humans at levels well below the NAAQS. Even small increases in NO₂ levels result in increased risks to human receptors.¹²⁴

These negative health effects of NO₂ increases below the NAAQS are particularly harmful to those, like Mr. Miller, who suffer from severe respiratory health problems.¹²⁵ Based on her review of Max Midstream's application materials and Dr. Frasier's affidavit, Dr. Hopkins testifies that:

NO₂ impacts assumed by the Applicant as well as lesser impacts that will likely occur within two miles of the Terminal are harmful to those who live, work, and recreate in this area. It is my opinion that these people will be affected by air pollution from the Seahawk Terminal in a way that is distinguishable from the general public[.]

And

I conclude that emissions from the Seahawk Terminal will likely negatively impact: John and Janet Maresh, who live approximately 1.79 miles north of the Seahawk Terminal; Diane Wilson, who frequents waters less than a mile from the Terminal; Curtis Miller who owns a seafood company approximately 5 miles from the terminal and who fishes at Mitchell's Reef 2 miles from the Terminal.¹²⁶

This expert testimony rebuts Ms. Fraiser's conclusions based on the results of Max Midstream's flawed modeling demonstration and establishes that Requesters have identified individuals who are affected persons with interests distinguishable from the general public.

¹²⁴ Hopkins Declaration at ¶ 15.

¹²⁵ *Id.* at ¶ 13.

¹²⁶ *Id.* at ¶¶ 16-17.

IV. THE EXECUTIVE DIRECTOR'S RESPONSE TO HEARING REQUESTS LACKS MERIT.

The Executive Director's contention that Requesters failed to identify individuals who are affected persons in this matter lack merit. The Executive Director raises two arguments in support of this conclusion: 1) that the Executive Director could not confirm how far the Mareshes and Mr. Blanco live from the Seahawk Terminal; and 2) given the distance that Ms. Wilson and Mr. Miller live, work, or recreate "relative to the terminal, ... their health and safety would not be impacted in a manner different from the general public."¹²⁷ The Executive Director's first argument was resolved with respect to the Mareshes when Max Midstream identified the address of the Mareshes' residence and confirmed information presented in Requesters' comments representing that the Mareshes live approximately 1.79 miles from the Seahawk Terminal.¹²⁸

The Executive Director's first argument also fails with respect to Mr. Blanco, because Mr. Blanco's status as an affected person does not depend on the distance between his home and the Seahawk Terminal.¹²⁹ Indeed, the Executive Director acknowledges these interests in his response to hearing requests, but fails altogether to explain why they are insufficient to establish that Mr. Blanco is an affected person.¹³⁰ As established by Requesters' comments, this brief, and the declarations of Dr. Sahu and Dr. Hopkins, Mr. Blanco's exposure to additional harmful pollution while conducting oystering and shrimping business activities in areas near the Terminal and the negative impact that increased air pollution from the Terminal will have upon his business implicate particularized justiciable interests in this matter and support his designation as

¹²⁷ See, e.g. ED's Response at 15.

¹²⁸ Max Midstream's Response at 17.

¹²⁹ *Id.* at 14.

¹³⁰ ED's Response at 14.

an affected person under 30 Tex. Admin. Code § 55.203. The Executive Director's failure to address these core facts supporting Mr. Blanco's affected person status undermines the reasonableness of his recommendation that the Commission determine that Mr. Blanco is not an affected person.

The Executive Director's second argument that Ms. Wilson and Mr. Miller live, work, and recreate too far away from the Seahawk Terminal to establish that their safety will be impacted in a manner different from the general public is not supported by any specific facts or legal arguments. This conclusion is rebutted by specific facts presented in timely-filed comments and hearing requests as well as expert testimony that Ms. Wilson and Mr. Miller will be directly exposed to and negatively affected by air pollution from the expanded Seahawk Terminal and that this exposure is sufficient to distinguish their interests in this case from those of the general public.

V. DIANE WILSON, WATERKEEPER, AND TCE RAISED RELEVANT AND MATERIAL ISSUES OF FACT DURING THE PUBLIC COMMENT PERIOD.

No party disputes that Diane Wilson, Waterkeeper, and TCE raised relevant and material issues of fact during the public comment period that should be referred to the State Office of Administrative Hearings ("SOAH") for consideration as part of a contested case hearing on the Draft Permit if Requesters are granted party status by the Commission.¹³¹ The list of issues raised by Requesters included in the Executive Director and OPIC's responses to hearing requests, however, does not include all the issues timely raised by Requesters. The following

¹³¹ ED's Response at 18-21 (listing various disputed questions of fact raised by Requesters and others that should be referred to SOAH if the parties raising these issues are given party status for a contested case in this matter); OPIC's Response at 9 (identifying issues raised by Waterkeeper that should be referred to SOAH for consideration at a contested case hearing).

issues of disputed material fact were raised by Requesters during the public comment period and should be referred to SOAH for consideration at a contested case hearing on the Draft Permit:

Failure to Make all Required Demonstrations

- Max Midstream’s application failed to include information sufficient to demonstrate that emissions from the proposed new and modified facilities and activities meet all of the criteria established by Texas’s federally-approved preconstruction permitting rule at 30 Texas Administrative Code § 116.111(a)(2);

Failure to Ensure that Proposed Emission Limits are Enforceable

- The application fails to demonstrate that monitoring, testing, and recordkeeping requirements proposed by the applicant are sufficient to measure emissions related to the proposed project and to ensure that emission limits in the requested permit are practicably enforceable. 30 Tex. Admin. Code § 116.111(a)(2)(B);

Failure to Substantiate Representations Necessary to Evaluate the Merits of the Application

- Max Midstream relies on vendor specifications and engineering knowledge to claim that its proposed emission rates will be achieved in practice across all operating scenarios that will be authorized by the requested permit. This information, however, is not included in the public application file, which fails altogether to demonstrate that the project—if authorized—will achieve the performance specified in the application, as required by 30 Texas Administrative Code § 116.111(a)(2)(G);
- Max Midstream’s application relies on inappropriate emission factors, including AP-42 emission factors and vendor guarantees that may or may not exist, which underrepresent potential and future actual emissions of VOC, NO_x, CO, PM/PM₁₀/PM_{2.5}, SO₂, and HAPs from the Terminal. 30 Tex. Admin. Code §§ 116.111(a)(2)(A), (G), (I), 116.160(b), (c);
- Max Midstream underrepresented expected emissions from truck and marine loading and overestimated the collection efficiencies of its equipment related to these activities, and the Draft Permit fails to establish monitoring and testing conditions sufficient to make these representations practicably enforceable. 30 Tex. Admin. Code § 116.111(a)(2)(A), (B), (G), (I), (J), (K);
- Max Midstream failed to provide the basis for the crude characteristics it used to calculate proposed emission limits and to perform its air impacts demonstrations, and the Draft 6 Permit fails to require monitoring sufficient to make representations regarding crude characteristics practically enforceable. Id. at § 116.111(a)(2)(A), (B), (G), (I), (J), (K);

- Max Midstream’s representation that its emergency flare will not emit any particulate matter is unsupported and unreasonable and the Draft Permit fails to establish monitoring and testing provisions that make the prohibition on all PM emissions from the emergency flare practically enforceable. 30 Tex. Admin. Code §§ 116.111(a)(2)(A), (B), (G), (J);

Failure to Establish that the Expansion Project is a Minor Modification

- This project is subject to major New Source Review preconstruction permitting requirements, including federal Best Available Control Technology (“BACT”) requirements, for CO, NO_x, and VOC (ozone) because the project’s physical capacity to emit criteria pollutants above the applicable major source threshold is not sufficiently constrained by practicably enforceable emission limits and operating limitations. Max Midstream’s application is deficient because it does not demonstrate compliance with applicable major New Source Review requirements as mandated by 30 Texas Administrative Code §§ 116.111(a)(2)(B), (C), (G), (I), (I); 116.160(a), (c);
- Whether the Draft Permit is a sham permit taken to circumvent PSD preconstruction permitting requirements;
- Max Midstream failed to provide a reasonable basis for its representations regarding potential Hazardous Air Pollutant (“HAP”) emissions from the Terminal used to avoid major source HAP requirements and to model air quality impacts. 30 Tex. Admin. Code § 116.111(a)(2) (G), (K);

Failure to Establish that the Draft Permit is Protective of Public Health and Welfare

- Max Midstream has not demonstrated that emissions from the expanded Seahawk Terminal will not cause or contribute to violations of the NAAQS, including ozone NAAQS. 30 Tex. Admin. Code §§ 116.111(a)(2)(A), (I), (J), 116.160(c)(2);
- Whether Max Midstream’s impacts demonstration improperly excluded secondary emissions from sources and proposed sources that are interconnected with the Terminal.

Failure to Consider Available Controls in Best Available Control Technology Demonstration

- Max Midstream’s proposed leak detection and repair (“LDAR”) program is not consistent with applicable Texas BACT requirements, because Max Midstream failed to consider more robust LDAR regimes required by recently-issued Texas air permits and because Max Midstream failed to consider whether additional monitoring using optical gas imaging (“OGI”) would provide more effective control without unreasonably increasing costs. 30 Tex. Admin. Code §§ 116.111(a)(2)(B), (C), (G), (I), 116.160(c), (a);

- Max Midstream failed to demonstrate that a NO_x emission rate of 0.1 lb/MMBtu is consistent with applicable Texas BACT requirements for units CONT-1 and CONT-2. 30 Tex. Admin. Code §§ 116.111(a)(2)(B), (C), (G), (I), 116.160(c), (a).

VI. CONCLUSION

Diane Wilson, Waterkeeper and TCE have fulfilled all requirements established by Texas law to establish their right to participate as parties in a contested case hearing concerning Max Midstream's proposed Seahawk Terminal expansion. Diane Wilson, the Mareshes, Curtis Miller, and Mauricio Blanco have amply demonstrated that construction and operation of the expanded Terminal will result in particularized harms to justiciable interests protected by the Texas and federal Clean Air Acts. These harms are sufficient to distinguish Requesters' interests from the general public's interest in ensuring that the TCEQ complies with state and federal Clean Air Act requirements. Accordingly, the TCEQ should grant hearing requests filed on behalf of Diane Wilson, Waterkeeper, and TCE and refer the disputed issues of material fact listed in Section V *supra* to SOAH for consideration at a contested case hearing. As the Executive Director recommends, "the duration of the hearing [should] be no less than six months from the preliminary hearing to the presentation of a proposal for decision to the commission."¹³²

¹³² ED's Response at 20.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of Diane Wilson, San Antonio Bay Waterkeeper and Texas Campaign for the Environment's Reply to Response to Hearing Requests has been forwarded via electronic mail or U.S. Mail to the persons on the attached service list on March 23, 2022.

By: /s/ Gabriel Clark-Leach

Gabriel Clark-Leach

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Exhibit 1
(Declaration of Ranajit Sahu, Ph.D.)

TCEQ DOCKET NO. 2022-0157-AIR

**APPLICATION BY MAX
MIDSTREAM TEXAS, LLC FOR
AIR QUALITY PERMIT NO. 162941
FOR THE SEAHAWK CRUDE
CONDENSATE TERMINAL IN
CALHOUN COUNTY, TEXAS**

§
§
§
§
§
§

**BEFORE THE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY**

DECLARATION

OF

RANAJIT SAHU, PH.D., QEP, CEM (NEVADA)

1. My name is Ranajit (Ron) Sahu. I am competent to make this declaration. This declaration is true and correct.

MY BACKGROUND AND QUALIFICATIONS

2. I am an engineer and a consultant on environmental and energy matters. I am self-employed as an independent consultant.
3. I received a Doctorate in Mechanical Engineering from the California Institute of Technology (Caltech) in Pasadena in 1988. I had previously received a Master of Science degree from Caltech in 1984. My undergraduate degree was also in Mechanical Engineering at the Indian Institute of Technology in Kharagpur, India.
4. I am a Certified Permitting Professional at the South Coast Air Quality Monitoring District, the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties.
5. I hold credentials as a Qualified Environmental Professional (QEP) from the Institute of Professional Environmental Practice (IPEP). The QEP credential has been granted full accreditation by the Council of Engineering and Scientific Specialty Boards. I am a Certified Environmental Manager in the state of Nevada. This designation is required by the Nevada Division of Environmental Protection for consultants engaged in certain environmental remediation projects specified by rule.
6. I provide project management, air quality consulting, waste remediation and management consulting, and regulatory and engineering support consulting to a variety of private sector (such as industrial companies, land development companies, law firms), public sector (such as the US Department of Justice) and public interest group clients.
7. I have more than thirty years of experience in the fields of environmental, mechanical, and chemical engineering, including: program and project management services; design and specification of pollution control equipment for a wide range of emissions sources including stationary and mobile sources; soils and groundwater remediation; combustion engineering evaluations; energy studies; multimedia environmental regulatory compliance involving statutes and regulations such as the Federal Clean Air Act, Clean Water Act, TSCA, RCRA, CERCLA, SARA, OSHA, NEPA as well as various related state statutes; transportation air quality impact analysis; multimedia compliance audits; multimedia permitting, including air quality NSR/PSD permitting, Title V permitting, NPDES permitting for industrial and stormwater discharges, RCRA permitting; multimedia/multi-pathway human health risk assessments for toxics; air dispersion modeling; and regulatory strategy development and support including negotiation of consent agreements and orders.
8. I have more than thirty years of project management experience and have successfully managed and executed numerous projects. This includes basic and applied research

projects, design projects, regulatory compliance projects, permitting projects, energy studies, risk assessment projects, and projects involving the communication of environmental data and information to the public.

9. I have provided consulting services to numerous private sector, public sector and public interest group clients. My clients have included various trade associations as well as individual companies such as steel mills, petroleum refineries, cement manufacturers, aerospace companies, power generation facilities, lawn and garden equipment manufacturers, spa manufacturers, chemical distribution facilities, and various entities in the public sector including US EPA, the US Dept. of Justice, several states, various agencies such as the California DTSC, and various municipalities. I have performed projects in all 50 states, numerous local jurisdictions, and internationally.
10. As a consulting engineer for private sector clients, I have prepared, or consulted on dozens of applications for air permits that have included engineering analyses and impacts demonstrations, including those analyses required to meet applicable technology standards, like BACT and MACT.
11. I am familiar with the design, operation and technical aspects of industrial plants including major combustion sources, power plants, petrochemical plants and refineries, and air pollution control equipment. I have completed engineering projects and reviewed numerous air quality permits relating to major and minor sources industrial emitters. I have evaluated and provided comments, expert reports, and testimony on major and minor source air permit matters.
12. I have and continue to provide expert witness services in a number of environmental areas discussed above in both state and Federal courts as well as before administrative bodies.
13. I have worked as a consultant and an expert witness on multiple Texas air permits, issued by the TCEQ, and I am familiar with the statutes, rules, and policies in Texas that are relevant to this Application.
14. In addition to consulting, I have taught numerous courses in several Southern California universities including UCLA (air pollution), UC Riverside (air pollution, process hazard analysis), and Loyola Marymount University (air pollution, risk assessment, hazardous waste management) for nineteen years. During this period, I have also taught at Caltech, my alma mater (various engineering courses), at the University of Southern California (air pollution controls) and at California State University, Fullerton (transportation and air quality).
15. My CV is attached, Attachment A.

PURPOSE OF MY TESTIMONY

16. I was asked to review the Max Midstream's Application and related materials, including Max Midstream's Response to Hearing Requests. My review of Max Midstream's Response to Hearing Requests included the affidavits of Mr. Tony Nguyen, Mr. Joe M. Kupper, and Ms. Lucy Fraiser, as well as other attachments to that filing. I was asked to render an opinion as to whether the emissions represented in the air permit Application for the Seahawk Terminal expansion project and relied upon by Mr. Kupper and Ms. Fraiser in their affidavits represent the worst-case emissions for this facility. Since the emissions used in modeling directly affect the impacts predicted by the model, I was asked to render an opinion as to whether the impacts modeled as part of the Application represent the worst-case impacts at the home of Requesters: John and Janet Maresh, the business of Curtis Miller, and areas frequented by Diane Wilson, Curtis Miller, and Mauricio Blanco.
17. I reviewed the publicly available portions of the Application, including supporting materials such as the Executive Director's Air Quality Analysis Audit, the emission calculations and emission rates used in the modeling, the Executive Director's staff memos, and other available Application materials. I also reviewed and relied on the types of technical publications and information sources that an air quality permitting specialist normally relies upon.
18. I note that neither the Kupper nor the Fraiser affidavit denies that there will be quantifiable air quality impacts at Requesters' residential and commercial property or at areas frequented by Requesters. While I have not had access to Applicant's modeling files, I believe it is likely that there will be quantifiable air quality impacts as far away as five miles from the Seahawk Terminal if the proposed expansion project is approved and constructed. This conclusion is based on the quantity of emissions authorized by the Draft Permit, my analysis of the facilities and activities authorized by the Draft Permit, and the properties of contaminants that will be emitted from the Seahawk Terminal.
19. While Ms. Fraiser relies on Applicant's modeling demonstration to opine that "[i]mpacts on public health and welfare further than 1 mile would be indiscernable," she does not claim that there would be no quantifiable air quality impacts at distances greater than one-mile from the Terminal. Instead, she accepted the impacts modeled by the Applicant as is and opined that—based on those modeled impacts—the proposed Terminal expansion would not violate any applicable air quality standards or cause exceedances of Texas air screening guidelines.
20. The Applicant's modeled impacts do not include or reflect worst-case emissions from sources and activities the expanded Terminal and therefore understate air quality impacts that will result from the construction and operation of the Seahawk Terminal expansion. For example, as I explained in my expert report attached to Requesters' August 17, 2021 comments and hearing request, the equation Max Midstream used to calculate VOC

loading losses has a built in 30 percent margin of probable error, or possibly greater. Expert Report at 3-4.

21. Because it is probable that VOC emissions from Terminal loading losses could be 30 percent higher than represented in Max Midstream's modeling demonstrations (and may be even higher than that), those demonstrations fail to predict worst-case air quality impacts resulting from the Terminal expansion. This is not only true for Max Midstream's ESL demonstration, which models impacts from certain VOC species that will be emitted by the Terminal, it is also true for Max Midstream's NAAQS demonstrations. This is so, because combustion of significant additional quantities of VOC occurring during loading operations will lead to increases in emissions of other criteria pollutants (i.e., NO_x and CO) from the many vapor combustor units Max Midstream plans to use to control VOC loading losses. *Id.* at 4.
22. Max Midstream's Application and modeling demonstration also fail to account for potentially significant dockside vessel emissions. According to the Application, the Seahawk Terminal will be authorized to load up to 96,000,000 barrels per year onto barges and 240,000,000 barrels per year onto ships. Application Table A-5 (Annual Loading Emissions). Even assuming that all loading will occur at the maximum hourly rates represented by Max Midstream, *see* Application Table A-4 (Short-Term Loading Emissions), barges will be docked during loading operations for 1,846 hours each year and ships may be docked during loading operations for 4,615 hours each year. Max Midstream's air quality impacts analysis should have accounted for emissions from dockside vessels, *see* 30 Tex. Admin. Code § 116.111(a)(2), but it does not. Since vessels, even while docked, require power and that power is derived from burning marine diesel oil or similar fuels, that combustion will result in the emissions of not only criteria pollutants such as NO_x, CO, SO₂, VOCs, PM_{2.5}, but also a range of additional toxic air contaminants such as benzene, toluene, xylenes, 1,3 butadienes and diesel particulate matter, among others.
23. Another way the Applicant avoided modeling the worst-case emissions is through the use of what is generally called the "Intermittent" policy. Invoking this policy, the Applicant lowered emission rates input into its model by averaging maximum hourly emission rates in the Draft Permit across extended periods of time. For the 1-hr SO₂ and 1-hr NO₂ National Ambient Air Quality Standard (NAAQS) analyses, Applicant's modeling was based on the annual average emission rates for the emergency engine and firewater pump engines rather than the maximum hourly emission rates used for other facilities. Air Quality Analysis Audit-Max Midstream Texas, LLC (RN106209190) at 7, dated January 26, 2021. For the 3-hr SO₂ analysis, Applicant's modeling was based on the maximum hourly emission rate for these engines divided by three. *Id.* For the 24-hr PM₁₀ and PM_{2.5} analyses, Applicant's modeling was based on the maximum hourly rate for these engines divided by 24. *Id.* If the Applicant had modeled the higher emission rates allowed by the Draft Permit, then impacts returned by the model would have been higher.

24. I am familiar with the EPA's policy on intermittent emissions. I understand the principles and context behind the policy. I disagree with the Applicant's misuse of that policy in this matter. But I wish to clarify that, for purposes of this declaration, I was not asked to critique the use of the policy in this case. (I will do so when we reach the merits). My point in raising this issue here is that, for purposes of determining offsite air quality impacts, it is a fact that the Applicant's conclusions are the result of substantially reducing the modeled emission rates, far below the levels allowed in the Draft Permit.
25. Finally, Applicant's modeling presumes that no particulate matter will be emitted from its emergency flare. As I explained in my Expert Report, completely eliminating all particulate matter from flares, especially non-steam-assisted flares like the one Max Midstream proposes to construct, is not technically supportable since such particulate matter is always emitted whenever there are any smoking conditions at the flare. Given the flare design, smoking conditions are unavoidable. Thus, potential particulate matter emissions from the Terminal represented by the Application and used to model air quality impacts almost certainly fail to account for all particulate matter that the Terminal will actually and unavoidably emit.

CONCLUSION

26. For the reasons stated above, the actual impacts from pollution emitted by Max Midstream's expanded Seahawk Terminal will be significantly greater than the impacts predicted and demonstrated by the Applicant.
27. Requesters' probable direct exposure to pollution emitted by the Seahawk Terminal distinguishes them from many others living in other cities, counties, states, and countries who have requested a contested case hearing in this matter.

My name is Ranajit Sahu, my date of birth is December 6, 1961, and my address is 311 North Story Place, Alhambra, CA, 91801, USA. I declare under penalty of perjury that the foregoing is true and correct.

Executed in Los Angeles County, State of California, on 21st of March 2022.



Declarant

ATTACHMENT A
(Ranajit Sahu, Ph.D. Curriculum Vitae)

RANAJIT (RON) SAHU, Ph.D, QEP, CEM (Nevada)

CONSULTANT, ENVIRONMENTAL AND ENERGY ISSUES

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Alhambra, CA 91801

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EXPERIENCE SUMMARY

Dr. Sahu has over thirty one years of experience in the fields of environmental, mechanical, and chemical engineering including: program and project management services; design and specification of pollution control equipment for a wide range of emissions sources including stationary and mobile sources; soils and groundwater remediation including landfills as remedy; combustion engineering evaluations; energy studies; multimedia environmental regulatory compliance (involving statutes and regulations such as the Federal CAA and its Amendments, Clean Water Act, TSCA, RCRA, CERCLA, SARA, OSHA, NEPA as well as various related state statutes); transportation air quality impact analysis; multimedia compliance audits; multimedia permitting (including air quality NSR/PSD permitting, Title V permitting, NPDES permitting for industrial and storm water discharges, RCRA permitting, etc.), multimedia/multi-pathway human health risk assessments for toxics; air dispersion modeling; and regulatory strategy development and support including negotiation of consent agreements and orders.

He has over twenty eight years of project management experience and has successfully managed and executed numerous projects in this time period. This includes basic and applied research projects, design projects, regulatory compliance projects, permitting projects, energy studies, risk assessment projects, and projects involving the communication of environmental data and information to the public.

He has provided consulting services to numerous private sector, public sector and public interest group clients. His major clients over the past twenty six years include various trade associations as well as individual companies such as steel mills, petroleum refineries, chemical plants, cement manufacturers, aerospace companies, power generation facilities, lawn and garden equipment manufacturers, spa manufacturers, chemical distribution facilities, land development companies, and various entities in the public sector including EPA, the US Dept. of Justice, several states (including Oregon, New Mexico, Pennsylvania, and others), various agencies such as the California DTSC, and various municipalities. Dr. Sahu has performed projects in all 50 states, numerous local jurisdictions and internationally.

In addition to consulting, for approximately twenty years, Dr. Sahu taught numerous courses in several Southern California universities including UCLA (air pollution), UC Riverside (air pollution, process hazard analysis), and Loyola Marymount University (air pollution, risk assessment, hazardous waste management). He also taught at Caltech, his alma mater (various engineering courses), at the University of Southern California (air pollution controls) and at California State University, Fullerton (transportation and air quality).

Dr. Sahu has and continues to provide expert witness services in a number of environmental areas discussed above in both state and Federal courts as well as before administrative bodies (please see Annex A).

EXPERIENCE RECORD

2000-present **Independent Consultant.** Providing a variety of private sector (industrial companies, land development companies, law firms, etc.), public sector (such as the US Department of Justice), and public interest group clients with project management, environmental

consulting, project management, as well as regulatory and engineering support consulting services.

- 1995-2000 Parsons ES, **Associate, Senior Project Manager and Department Manager for Air Quality/Geosciences/Hazardous Waste Groups**, Pasadena. Responsible for the management of a group of approximately 24 air quality and environmental professionals, 15 geoscience, and 10 hazardous waste professionals providing full-service consulting, project management, regulatory compliance and A/E design assistance in all areas.
- Parsons ES, **Manager for Air Source Testing Services**. Responsible for the management of 8 individuals in the area of air source testing and air regulatory permitting projects located in Bakersfield, California.
- 1992-1995 Engineering-Science, Inc. **Principal Engineer and Senior Project Manager** in the air quality department. Responsibilities included multimedia regulatory compliance and permitting (including hazardous and nuclear materials), air pollution engineering (emissions from stationary and mobile sources, control of criteria and air toxics, dispersion modeling, risk assessment, visibility analysis, odor analysis), supervisory functions and project management.
- 1990-1992 Engineering-Science, Inc. **Principal Engineer and Project Manager** in the air quality department. Responsibilities included permitting, tracking regulatory issues, technical analysis, and supervisory functions on numerous air, water, and hazardous waste projects. Responsibilities also include client and agency interfacing, project cost and schedule control, and reporting to internal and external upper management regarding project status.
- 1989-1990 Kinetics Technology International, Corp. **Development Engineer**. Involved in thermal engineering R&D and project work related to low-NOx ceramic radiant burners, fired heater NOx reduction, SCR design, and fired heater retrofitting.
- 1988-1989 Heat Transfer Research, Inc. **Research Engineer**. Involved in the design of fired heaters, heat exchangers, air coolers, and other non-fired equipment. Also did research in the area of heat exchanger tube vibrations.

EDUCATION

- 1984-1988 Ph.D., Mechanical Engineering, California Institute of Technology (Caltech), Pasadena, CA.
- 1984 M. S., Mechanical Engineering, California Institute of Technology (Caltech), Pasadena, CA.
- 1978-1983 B. Tech (Honors), Mechanical Engineering, Indian Institute of Technology (IIT) Kharagpur, India

TEACHING EXPERIENCE

Caltech

- "Thermodynamics," Teaching Assistant, California Institute of Technology, 1983, 1987.
- "Air Pollution Control," Teaching Assistant, California Institute of Technology, 1985.
- "Caltech Secondary and High School Saturday Program," - taught various mathematics (algebra through calculus) and science (physics and chemistry) courses to high school students, 1983-1989.
- "Heat Transfer," - taught this course in the Fall and Winter terms of 1994-1995 in the Division of Engineering and Applied Science.
- "Thermodynamics and Heat Transfer," Fall and Winter Terms of 1996-1997.

U.C. Riverside, Extension

- "Toxic and Hazardous Air Contaminants," University of California Extension Program, Riverside, California. Various years since 1992.
- "Prevention and Management of Accidental Air Emissions," University of California Extension Program, Riverside, California. Various years since 1992.
- "Air Pollution Control Systems and Strategies," University of California Extension Program, Riverside, California, Summer 1992-93, Summer 1993-1994.
- "Air Pollution Calculations," University of California Extension Program, Riverside, California, Fall 1993-94, Winter 1993-94, Fall 1994-95.
- "Process Safety Management," University of California Extension Program, Riverside, California. Various years since 1992-2010.
- "Process Safety Management," University of California Extension Program, Riverside, California, at SCAQMD, Spring 1993-94.
- "Advanced Hazard Analysis - A Special Course for LEPCs," University of California Extension Program, Riverside, California, taught at San Diego, California, Spring 1993-1994.
- "Advanced Hazardous Waste Management" University of California Extension Program, Riverside, California. 2005.

Loyola Marymount University

- "Fundamentals of Air Pollution - Regulations, Controls and Engineering," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1993.
- "Air Pollution Control," Loyola Marymount University, Dept. of Civil Engineering, Fall 1994.
- "Environmental Risk Assessment," Loyola Marymount University, Dept. of Civil Engineering. Various years since 1998.
- "Hazardous Waste Remediation" Loyola Marymount University, Dept. of Civil Engineering. Various years since 2006.

University of Southern California

- "Air Pollution Controls," University of Southern California, Dept. of Civil Engineering, Fall 1993, Fall 1994.
- "Air Pollution Fundamentals," University of Southern California, Dept. of Civil Engineering, Winter 1994.

University of California, Los Angeles

- "Air Pollution Fundamentals," University of California, Los Angeles, Dept. of Civil and Environmental Engineering, Spring 1994, Spring 1999, Spring 2000, Spring 2003, Spring 2006, Spring 2007, Spring 2008, Spring 2009.

International Programs

- "Environmental Planning and Management," 5 week program for visiting Chinese delegation, 1994.
- "Environmental Planning and Management," 1 day program for visiting Russian delegation, 1995.
- "Air Pollution Planning and Management," IEP, UCR, Spring 1996.
- "Environmental Issues and Air Pollution," IEP, UCR, October 1996.

PROFESSIONAL AFFILIATIONS AND HONORS

President of India Gold Medal, IIT Kharagpur, India, 1983.

Member of the Alternatives Assessment Committee of the Grand Canyon Visibility Transport Commission, established by the Clean Air Act Amendments of 1990, 1992.

American Society of Mechanical Engineers: Los Angeles Section Executive Committee, Heat Transfer Division, and Fuels and Combustion Technology Division, 1987-mid-1990s.

Air and Waste Management Association, West Coast Section, 1989-mid-2000s.

PROFESSIONAL CERTIFICATIONS

EIT, California (#XE088305), 1993.

REA I, California (#07438), 2000.

Certified Permitting Professional, South Coast AQMD (#C8320), since 1993.

QEP, Institute of Professional Environmental Practice, since 2000.

CEM, State of Nevada (#EM-1699). Expiration 10/07/2021.

PUBLICATIONS (PARTIAL LIST)

"Physical Properties and Oxidation Rates of Chars from Bituminous Coals," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **67**, 275-283 (1988).

"Char Combustion: Measurement and Analysis of Particle Temperature Histories," with R.C. Flagan, G.R. Gavalas and P.S. Northrop, *Comb. Sci. Tech.* **60**, 215-230 (1988).

"On the Combustion of Bituminous Coal Chars," PhD Thesis, California Institute of Technology (1988).

"Optical Pyrometry: A Powerful Tool for Coal Combustion Diagnostics," *J. Coal Quality*, **8**, 17-22 (1989).

"Post-Ignition Transients in the Combustion of Single Char Particles," with Y.A. Levendis, R.C. Flagan and G.R. Gavalas, *Fuel*, **68**, 849-855 (1989).

"A Model for Single Particle Combustion of Bituminous Coal Char." Proc. ASME National Heat Transfer Conference, Philadelphia, **HTD-Vol. 106**, 505-513 (1989).

"Discrete Simulation of Cenospheric Coal-Char Combustion," with R.C. Flagan and G.R. Gavalas, *Combust. Flame*, **77**, 337-346 (1989).

"Particle Measurements in Coal Combustion," with R.C. Flagan, in "**Combustion Measurements**" (ed. N. Chigier), Hemisphere Publishing Corp. (1991).

"Cross Linking in Pore Structures and Its Effect on Reactivity," with G.R. Gavalas in preparation.

"Natural Frequencies and Mode Shapes of Straight Tubes," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Optimal Tube Layouts for Kamui SL-Series Exchangers," with K. Ishihara, Proprietary Report for Kamui Company Limited, Tokyo, Japan (1990).

"HTRI Process Heater Conceptual Design," Proprietary Report for Heat Transfer Research Institute, Alhambra, CA (1990).

"Asymptotic Theory of Transonic Wind Tunnel Wall Interference," with N.D. Malmuth and others, Arnold Engineering Development Center, Air Force Systems Command, USAF (1990).

"Gas Radiation in a Fired Heater Convection Section," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1990).

"Heat Transfer and Pressure Drop in NTIW Heat Exchangers," Proprietary Report for Heat Transfer Research Institute, College Station, TX (1991).

"NO_x Control and Thermal Design," Thermal Engineering Tech Briefs, (1994).

"From Purchase of Landmark Environmental Insurance to Remediation: Case Study in Henderson, Nevada," with Robin E. Bain and Jill Quillin, presented at the AQMA Annual Meeting, Florida, 2001.

"The Jones Act Contribution to Global Warming, Acid Rain and Toxic Air Contaminants," with Charles W. Botsford, presented at the AQMA Annual Meeting, Florida, 2001.

PRESENTATIONS (PARTIAL LIST)

"Pore Structure and Combustion Kinetics - Interpretation of Single Particle Temperature-Time Histories," with P.S. Northrop, R.C. Flagan and G.R. Gavalas, presented at the AIChE Annual Meeting, New York (1987).

"Measurement of Temperature-Time Histories of Burning Single Coal Char Particles," with R.C. Flagan, presented at the American Flame Research Committee Fall International Symposium, Pittsburgh, (1988).

"Physical Characterization of a Cenospheric Coal Char Burned at High Temperatures," with R.C. Flagan and G.R. Gavalas, presented at the Fall Meeting of the Western States Section of the Combustion Institute, Laguna Beach, California (1988).

"Control of Nitrogen Oxide Emissions in Gas Fired Heaters - The Retrofit Experience," with G. P. Croce and R. Patel, presented at the International Conference on Environmental Control of Combustion Processes (Jointly sponsored by the American Flame Research Committee and the Japan Flame Research Committee), Honolulu, Hawaii (1991).

"Air Toxics - Past, Present and the Future," presented at the Joint AIChE/AAEE Breakfast Meeting at the AIChE 1991 Annual Meeting, Los Angeles, California, November 17-22 (1991).

"Air Toxics Emissions and Risk Impacts from Automobiles Using Reformulated Gasolines," presented at the Third Annual Current Issues in Air Toxics Conference, Sacramento, California, November 9-10 (1992).

"Air Toxics from Mobile Sources," presented at the Environmental Health Sciences (ESE) Seminar Series, UCLA, Los Angeles, California, November 12, (1992).

"Kilns, Ovens, and Dryers - Present and Future," presented at the Gas Company Air Quality Permit Assistance Seminar, Industry Hills Sheraton, California, November 20, (1992).

"The Design and Implementation of Vehicle Scrapping Programs," presented at the 86th Annual Meeting of the Air and Waste Management Association, Denver, Colorado, June 12, 1993.

"Air Quality Planning and Control in Beijing, China," presented at the 87th Annual Meeting of the Air and Waste Management Association, Cincinnati, Ohio, June 19-24, 1994.

Annex A

Expert Litigation Support

A. Occasions where Dr. Sahu has provided Written or Oral testimony before Congress:

1. In July 2012, provided expert written and oral testimony to the House Subcommittee on Energy and the Environment, Committee on Science, Space, and Technology at a Hearing entitled “Hitting the Ethanol Blend Wall – Examining the Science on E15.”

B. Matters for which Dr. Sahu has provided affidavits and expert reports include:

2. Affidavit for Rocky Mountain Steel Mills, Inc. located in Pueblo Colorado – dealing with the technical uncertainties associated with night-time opacity measurements in general and at this steel mini-mill.
3. Expert reports and depositions (2/28/2002 and 3/1/2002; 12/2/2003 and 12/3/2003; 5/24/2004) on behalf of the United States in connection with the Ohio Edison NSR Cases. *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).
4. Expert reports and depositions (5/23/2002 and 5/24/2002) on behalf of the United States in connection with the Illinois Power NSR Case. *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).
5. Expert reports and depositions (11/25/2002 and 11/26/2002) on behalf of the United States in connection with the Duke Power NSR Case. *United States, et al. v. Duke Energy Corp.*, 1:00-CV-1262 (Middle District of North Carolina).
6. Expert reports and depositions (10/6/2004 and 10/7/2004; 7/10/2006) on behalf of the United States in connection with the American Electric Power NSR Cases. *United States, et al. v. American Electric Power Service Corp., et al.*, C2-99-1182, C2-99-1250 (Southern District of Ohio).
7. Affidavit (March 2005) on behalf of the Minnesota Center for Environmental Advocacy and others in the matter of the Application of Heron Lake BioEnergy LLC to construct and operate an ethanol production facility – submitted to the Minnesota Pollution Control Agency.
8. Expert Report and Deposition (10/31/2005 and 11/1/2005) on behalf of the United States in connection with the East Kentucky Power Cooperative NSR Case. *United States v. East Kentucky Power Cooperative, Inc.*, 5:04-cv-00034-KSF (Eastern District of Kentucky).
9. Affidavits and deposition on behalf of Basic Management Inc. (BMI) Companies in connection with the BMI vs. USA remediation cost recovery Case.
10. Expert Report on behalf of Penn Future and others in the Cambria Coke plant permit challenge in Pennsylvania.
11. Expert Report on behalf of the Appalachian Center for the Economy and the Environment and others in the Western Greenbrier permit challenge in West Virginia.
12. Expert Report, deposition (via telephone on January 26, 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women’s Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) in the Thompson River Cogeneration LLC Permit No. 3175-04 challenge.
13. Expert Report and deposition (2/2/07) on behalf of the Texas Clean Air Cities Coalition at the Texas State Office of Administrative Hearings (SOAH) in the matter of the permit challenges to TXU Project Apollo’s eight new proposed PRB-fired PC boilers located at seven TX sites.

14. Expert Testimony (July 2007) on behalf of the Izaak Walton League of America and others in connection with the acquisition of power by Xcel Energy from the proposed Gascoyne Power Plant – at the State of Minnesota, Office of Administrative Hearings for the Minnesota PUC (MPUC No. E002/CN-06-1518; OAH No. 12-2500-17857-2).
15. Affidavit (July 2007) Comments on the Big Cajun I Draft Permit on behalf of the Sierra Club – submitted to the Louisiana DEQ.
16. Expert Report and Deposition (12/13/2007) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case. *Plaintiffs v. Allegheny Energy Inc., et al.*, 2:05cv0885 (Western District of Pennsylvania).
17. Expert Reports and Pre-filed Testimony before the Utah Air Quality Board on behalf of Sierra Club in the Sevier Power Plant permit challenge.
18. Expert Report and Deposition (October 2007) on behalf of MTD Products Inc., in connection with *General Power Products, LLC v MTD Products Inc.*, 1:06 CVA 0143 (Southern District of Ohio, Western Division) .
19. Expert Report and Deposition (June 2008) on behalf of Sierra Club and others in the matter of permit challenges (Title V: 28.0801-29 and PSD: 28.0803-PSD) for the Big Stone II unit, proposed to be located near Milbank, South Dakota.
20. Expert Reports, Affidavit, and Deposition (August 15, 2008) on behalf of Earthjustice in the matter of air permit challenge (CT-4631) for the Basin Electric Dry Fork station, under construction near Gillette, Wyoming before the Environmental Quality Council of the State of Wyoming.
21. Affidavits (May 2010/June 2010 in the Office of Administrative Hearings)/Declaration and Expert Report (November 2009 in the Office of Administrative Hearings) on behalf of NRDC and the Southern Environmental Law Center in the matter of the air permit challenge for Duke Cliffside Unit 6. Office of Administrative Hearing Matters 08 EHR 0771, 0835 and 0836 and 09 HER 3102, 3174, and 3176 (consolidated).
22. Declaration (August 2008), Expert Report (January 2009), and Declaration (May 2009) on behalf of Southern Alliance for Clean Energy in the matter of the air permit challenge for Duke Cliffside Unit 6. *Southern Alliance for Clean Energy et al., v. Duke Energy Carolinas, LLC*, Case No. 1:08-cv-00318-LHT-DLH (Western District of North Carolina, Asheville Division).
23. Declaration (August 2008) on behalf of the Sierra Club in the matter of Dominion Wise County plant MACT.us
24. Expert Report (June 2008) on behalf of Sierra Club for the Green Energy Resource Recovery Project, MACT Analysis.
25. Expert Report (February 2009) on behalf of Sierra Club and the Environmental Integrity Project in the matter of the air permit challenge for NRG Limestone’s proposed Unit 3 in Texas.
26. Expert Report (June 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*
27. Expert Report (August 2009) on behalf of Sierra Club and the Southern Environmental Law Center in the matter of the air permit challenge for Santee Cooper’s proposed Pee Dee plant in South Carolina).
28. Statements (May 2008 and September 2009) on behalf of the Minnesota Center for Environmental Advocacy to the Minnesota Pollution Control Agency in the matter of the Minnesota Haze State Implementation Plans.
29. Expert Report (August 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

30. Expert Report and Rebuttal Report (September 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.
31. Expert Report (December 2009) and Rebuttal reports (May 2010 and June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).
32. Pre-filed Testimony (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
33. Pre-filed Testimony (July 2010) and Written Rebuttal Testimony (August 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions*, No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.
34. Expert Report (August 2010) and Rebuttal Expert Report (October 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Liability Phase.
35. Declaration (August 2010), Reply Declaration (November 2010), Expert Report (April 2011), Supplemental and Rebuttal Expert Report (July 2011) on behalf of the United States in the matter of DTE Energy Company and Detroit Edison Company (Monroe Unit 2). *United States of America v. DTE Energy Company and Detroit Edison Company*, Civil Action No. 2:10-cv-13101-BAF-RSW (Eastern District of Michigan).
36. Expert Report and Deposition (August 2010) as well as Affidavit (September 2010) on behalf of Kentucky Waterways Alliance, Sierra Club, and Valley Watch in the matter of challenges to the NPDES permit issued for the Trimble County power plant by the Kentucky Energy and Environment Cabinet to Louisville Gas and Electric, File No. DOW-41106-047.
37. Expert Report (August 2010), Rebuttal Expert Report (September 2010), Supplemental Expert Report (September 2011), and Declaration (November 2011) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)'s Cherokee power plant. No. 09-cv-1862 (District of Colorado).
38. Written Direct Expert Testimony (August 2010) and Affidavit (February 2012) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).
39. Deposition (August 2010) on behalf of Environmental Defense, in the matter of the remanded permit challenge to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
40. Expert Report, Supplemental/Rebuttal Expert Report, and Declarations (October 2010, November 2010, September 2012) on behalf of New Mexico Environment Department (Plaintiff-Intervenor), Grand Canyon Trust and Sierra Club (Plaintiffs) in the matter of *Plaintiffs v. Public Service Company of New Mexico* (PNM), Civil No. 1:02-CV-0552 BB/ATC (ACE) (District of New Mexico).
41. Expert Report (October 2010) and Rebuttal Expert Report (November 2010) (BART Determinations for PSCo Hayden and CSU Martin Drake units) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.
42. Expert Report (November 2010) (BART Determinations for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) to the Colorado Air Quality Commission on behalf of Coalition of Environmental Organizations.
43. Declaration (November 2010) on behalf of the Sierra Club in connection with the Martin Lake Station Units 1, 2, and 3. *Sierra Club v. Energy Future Holdings Corporation and Luminant*

- Generation Company LLC*, Case No. 5:10-cv-00156-DF-CMC (Eastern District of Texas, Texarkana Division).
44. Pre-Filed Testimony (January 2011) and Declaration (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).
 45. Declaration (February 2011) in the matter of the Draft Title V Permit for RRI Energy MidAtlantic Power Holdings LLC Shawville Generating Station (Pennsylvania), ID No. 17-00001 on behalf of the Sierra Club.
 46. Expert Report (March 2011), Rebuttal Expert Report (June 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (District of Colorado).
 47. Declaration (April 2011) and Expert Report (July 16, 2012) in the matter of the Lower Colorado River Authority (LCRA)'s Fayette (Sam Seymour) Power Plant on behalf of the Texas Campaign for the Environment. *Texas Campaign for the Environment v. Lower Colorado River Authority*, Civil Action No. 4:11-cv-00791 (Southern District of Texas, Houston Division).
 48. Declaration (June 2011) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.
 49. Expert Report (June 2011) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).
 50. Declaration (August 2011) in the matter of the Sandy Creek Energy Associates L.P. Sandy Creek Power Plant on behalf of Sierra Club and Public Citizen. *Sierra Club, Inc. and Public Citizen, Inc. v. Sandy Creek Energy Associates, L.P.*, Civil Action No. A-08-CA-648-LY (Western District of Texas, Austin Division).
 51. Expert Report (October 2011) on behalf of the Defendants in the matter of *John Quiles and Jeanette Quiles et al. v. Bradford-White Corporation, MTD Products, Inc., Kohler Co., et al.*, Case No. 3:10-cv-747 (TJM/DEP) (Northern District of New York).
 52. Declaration (October 2011) on behalf of the Plaintiffs in the matter of *American Nurses Association et al. (Plaintiffs), v. US EPA (Defendant)*, Case No. 1:08-cv-02198-RMC (US District Court for the District of Columbia).
 53. Declaration (February 2012) and Second Declaration (February 2012) in the matter of *Washington Environmental Council and Sierra Club Washington State Chapter v. Washington State Department of Ecology and Western States Petroleum Association*, Case No. 11-417-MJP (Western District of Washington).
 54. Expert Report (March 2012) and Supplemental Expert Report (November 2013) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.*, Civil Action No. 4:10-cv-4969 (Southern District of Texas, Houston Division).
 55. Declaration (March 2012) in the matter of *Center for Biological Diversity, et al. v. United States Environmental Protection Agency*, Case No. 11-1101 (consolidated with 11-1285, 11-1328 and 11-1336) (US Court of Appeals for the District of Columbia Circuit).
 56. Declaration (March 2012) in the matter of *Sierra Club v. The Kansas Department of Health and Environment*, Case No. 11-105,493-AS (Holcomb power plant) (Supreme Court of the State of Kansas).

57. Declaration (March 2012) in the matter of the Las Brisas Energy Center *Environmental Defense Fund et al., v. Texas Commission on Environmental Quality*, Cause No. D-1-GN-11-001364 (District Court of Travis County, Texas, 261st Judicial District).
58. Expert Report (April 2012), Supplemental and Rebuttal Expert Report (July 2012), and Supplemental Rebuttal Expert Report (August 2012) on behalf of the states of New Jersey and Connecticut in the matter of the Portland Power plant *State of New Jersey and State of Connecticut (Intervenor-Plaintiff) v. RRI Energy Mid-Atlantic Power Holdings et al.*, Civil Action No. 07-CV-5298 (JKG) (Eastern District of Pennsylvania).
59. Declaration (April 2012) in the matter of the EPA's EGU MATS Rule, on behalf of the Environmental Integrity Project.
60. Expert Report (August 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana) – Harm Phase.
61. Declaration (September 2012) in the Matter of the Application of *Energy Answers Incinerator, Inc.* for a Certificate of Public Convenience and Necessity to Construct a 120 MW Generating Facility in Baltimore City, Maryland, before the Public Service Commission of Maryland, Case No. 9199.
62. Expert Report (October 2012) on behalf of the Appellants (Robert Concilus and Leah Humes) in the matter of Robert Concilus and Leah Humes v. Commonwealth of Pennsylvania Department of Environmental Protection and Crawford Renewable Energy, before the Commonwealth of Pennsylvania Environmental Hearing Board, Docket No. 2011-167-R.
63. Expert Report (October 2012), Supplemental Expert Report (January 2013), and Affidavit (June 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.
64. Pre-filed Testimony (October 2012) on behalf of No-Sag in the matter of the North Springfield Sustainable Energy Project before the State of Vermont, Public Service Board.
65. Pre-filed Testimony (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.
66. Expert Report (February 2013) on behalf of Petitioners in the matter of Credence Crematory, Cause No. 12-A-J-4538 before the Indiana Office of Environmental Adjudication.
67. Expert Report (April 2013), Rebuttal report (July 2013), and Declarations (October 2013, November 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).
68. Declaration (April 2013) on behalf of Petitioners in the matter of *Sierra Club, et al., (Petitioners) v Environmental Protection Agency et al. (Respondents)*, Case No., 13-1112, (Court of Appeals, District of Columbia Circuit).
69. Expert Report (May 2013) and Rebuttal Expert Report (July 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).
70. Declaration (August 2013) on behalf of A. J. Acosta Company, Inc., in the matter of *A. J. Acosta Company, Inc., v. County of San Bernardino*, Case No. CIVSS803651.
71. Comments (October 2013) on behalf of the Washington Environmental Council and the Sierra Club in the matter of the Washington State Oil Refinery RACT (for Greenhouse Gases), submitted to the Washington State Department of Ecology, the Northwest Clean Air Agency, and the Puget Sound Clean Air Agency.

72. Statement (November 2013) on behalf of various Environmental Organizations in the matter of the Boswell Energy Center (BEC) Unit 4 Environmental Retrofit Project, to the Minnesota Public Utilities Commission, Docket No. E-015/M-12-920.
73. Expert Report (December 2013) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).
74. Expert Testimony (December 2013) on behalf of the Sierra Club in the matter of Public Service Company of New Hampshire Merrimack Station Scrubber Project and Cost Recovery, Docket No. DE 11-250, to the State of New Hampshire Public Utilities Commission.
75. Expert Report (January 2014) on behalf of Baja, Inc., in *Baja, Inc., v. Automotive Testing and Development Services, Inc. et al.*, Civil Action No. 8:13-CV-02057-GRA (District of South Carolina, Anderson/Greenwood Division).
76. Declaration (March 2014) on behalf of the Center for International Environmental Law, Chesapeake Climate Action Network, Friends of the Earth, Pacific Environment, and the Sierra Club (Plaintiffs) in the matter of *Plaintiffs v. the Export-Import Bank (Ex-Im Bank) of the United States*, Civil Action No. 13-1820 RC (District Court for the District of Columbia).
77. Declaration (April 2014) on behalf of Respondent-Intervenors in the matter of *Mexichem Specialty Resins Inc., et al., (Petitioners) v Environmental Protection Agency et al.*, Case No., 12-1260 (and Consolidated Case Nos. 12-1263, 12-1265, 12-1266, and 12-1267), (Court of Appeals, District of Columbia Circuit).
78. Direct Prefiled Testimony (June 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Implement a Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17319 (Michigan Public Service Commission).
79. Expert Report (June 2014) on behalf of ECM Biofilms in the matter of the US Federal Trade Commission (FTC) v. ECM Biofilms (FTC Docket #9358).
80. Direct Prefiled Testimony (August 2014) on behalf of the Michigan Environmental Council and the Sierra Club in the matter of the Application of Consumers Energy Company for Authority to Implement a Power Supply Cost Recovery (PSCR) Plan in its Rate Schedules for 2014 Metered Jurisdictional Sales of Electricity, Case No. U-17317 (Michigan Public Service Commission).
81. Declaration (July 2014) on behalf of Public Health Intervenors in the matter of *EME Homer City Generation v. US EPA* (Case No. 11-1302 and consolidated cases) relating to the lifting of the stay entered by the Court on December 30, 2011 (US Court of Appeals for the District of Columbia).
82. Expert Report (September 2014), Rebuttal Expert Report (December 2014) and Supplemental Expert Report (March 2015) on behalf of Plaintiffs in the matter of *Sierra Club and Montana Environmental Information Center (Plaintiffs) v. PPL Montana LLC, Avista Corporation, Puget Sound Energy, Portland General Electric Company, Northwestern Corporation, and Pacificorp (Defendants)*, Civil Action No. CV 13-32-BLG-DLC-JCL (US District Court for the District of Montana, Billings Division).
83. Expert Report (November 2014) on behalf of Niagara County, the Town of Lewiston, and the Villages of Lewiston and Youngstown in the matter of CWM Chemical Services, LLC New York State Department of Environmental Conservation (NYSDEC) Permit Application Nos.: 9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00232, and 9-2934-00022/00249 (pending).
84. *Declaration (January 2015) relating to Startup/Shutdown in the MATS Rule (EPA Docket ID No. EPA-HQ-OAR-2009-0234) on behalf of the Environmental Integrity Project.*
85. Pre-filed Direct Testimony (March 2015), Supplemental Testimony (May 2015), and Surrebuttal Testimony (December 2015) on behalf of Friends of the Columbia Gorge in the matter of the Application for a Site Certificate for the Troutdale Energy Center before the Oregon Energy Facility Siting Council.

86. Brief of Amici Curiae Experts in Air Pollution Control and Air Quality Regulation in Support of the Respondents, On Writs of Certiorari to the US Court of Appeals for the District of Columbia, No. 14-46, 47, 48. *Michigan et. al., (Petitioners) v. EPA et. al., Utility Air Regulatory Group (Petitioners) v. EPA et. al., National Mining Association et. al., (Petitioner) v. EPA et. al.*, (Supreme Court of the United States).
87. Expert Report (March 2015) and Rebuttal Expert Report (January 2016) on behalf of Plaintiffs in the matter of *Conservation Law Foundation v. Broadrock Gas Services LLC, Rhode Island LFG GENCO LLC, and Rhode Island Resource Recovery Corporation (Defendants)*, Civil Action No. 1:13-cv-00777-M-PAS (US District Court for the District of Rhode Island).
88. Declaration (April 2015) relating to various Technical Corrections for the MATS Rule (EPA Docket ID No. EPA-HQ-OAR-2009-0234) on behalf of the Environmental Integrity Project.
89. Direct Prefiled Testimony (May 2015) on behalf of the Michigan Environmental Council, the Natural Resources Defense Council, and the Sierra Club in the matter of the Application of DTE Electric Company for Authority to Increase its Rates, Amend its Rate Schedules and Rules Governing the Distribution and Supply of Electric Energy and for Miscellaneous Accounting Authority, Case No. U-17767 (Michigan Public Service Commission).
90. Expert Report (July 2015) and Rebuttal Expert Report (July 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).
91. Declaration (August 2015, Docket No. 1570376) in support of “Opposition of Respondent-Intervenors American Lung Association, et. al., to Tri-State Generation’s Emergency Motion;” Declaration (September 2015, Docket No. 1574820) in support of “Joint Motion of the State, Local Government, and Public Health Respondent-Intervenors for Remand Without Vacatur;” Declaration (October 2015) in support of “Joint Motion of the State, Local Government, and Public Health Respondent-Intervenors to State and Certain Industry Petitioners’ Motion to Govern, *White Stallion Energy Center, LLC v. US EPA*, Case No. 12-1100 (US Court of Appeals for the District of Columbia).
92. Declaration (September 2015) in support of the Draft Title V Permit for Dickerson Generating Station (Proposed Permit No 24-031-0019) on behalf of the Environmental Integrity Project.
93. Expert Report (Liability Phase) (December 2015) and Rebuttal Expert Report (February 2016) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., Environmental Law and Policy Center, and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (US District Court for the Central District of Illinois, Peoria Division).
94. Declaration (December 2015) in support of the Petition to Object to the Title V Permit for Morgantown Generating Station (Proposed Permit No 24-017-0014) on behalf of the Environmental Integrity Project.
95. Expert Report (November 2015) on behalf of Appellants in the matter of *Sierra Club, et al. v. Craig W. Butler, Director of Ohio Environmental Protection Agency et al.*, ERAC Case No. 14-256814.
96. Affidavit (January 2016) on behalf of Bridgewatch Detroit in the matter of *Bridgewatch Detroit v. Waterfront Petroleum Terminal Co., and Waterfront Terminal Holdings, LLC.*, in the Circuit Court for the County of Wayne, State of Michigan.
97. Expert Report (February 2016) and Rebuttal Expert Report (July 2016) on behalf of the challengers in the matter of the Delaware Riverkeeper Network, Clean Air Council, et. al., vs. Commonwealth of Pennsylvania Department of Environmental Protection and R. E. Gas Development LLC regarding the Geyer well site before the Pennsylvania Environmental Hearing Board.

98. Direct Testimony (May 2016) in the matter of Tesoro Savage LLC Vancouver Energy Distribution Terminal, Case No. 15-001 before the State of Washington Energy Facility Site Evaluation Council.
99. Declaration (June 2016) relating to deficiencies in air quality analysis for the proposed Millenium Bulk Terminal, Port of Longview, Washington.
100. Declaration (December 2016) relating to EPA's refusal to set limits on PM emissions from coal-fired power plants that reflect pollution reductions achievable with fabric filters on behalf of Environmental Integrity Project, Clean Air Council, Chesapeake Climate Action Network, Downwinders at Risk represented by Earthjustice in the matter of *ARIPPA v EPA, Case No. 15-1180*. (D.C. Circuit Court of Appeals).
101. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Huntley and Huntley Poseidon Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.
102. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Backus Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.
103. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Drakulic Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.
104. Expert Report (January 2017) on the Environmental Impacts Analysis associated with the Apex Energy Deutsch Well Pad on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.
105. Affidavit (February 2017) pertaining to deficiencies water discharge compliance issues at the Wood River Refinery in the matter of *People of the State of Illinois (Plaintiff) v. Phillips 66 Company, ConocoPhillips Company, WRB Refining LP (Defendants)*, Case No. 16-CH-656, (Circuit Court for the Third Judicial Circuit, Madison County, Illinois).
106. Expert Report (March 2017) on behalf of the Plaintiff pertaining to non-degradation analysis for waste water discharges from a power plant in the matter of *Sierra Club (Plaintiff) v. Pennsylvania Department of Environmental Protection (PADEP) and Lackawanna Energy Center*, Docket No. 2016-047-L (consolidated), (Pennsylvania Environmental Hearing Board).
107. Expert Report (March 2017) on behalf of the Plaintiff pertaining to air emissions from the Heritage incinerator in East Liverpool, Ohio in the matter of *Save our County (Plaintiff) v. Heritage Thermal Services, Inc. (Defendant)*, Case No. 4:16-CV-1544-BYP, (US District Court for the Northern District of Ohio, Eastern Division).
108. Rebuttal Expert Report (June 2017) on behalf of Plaintiffs in the matter of *Casey Voight and Julie Voight (Plaintiffs) v Coyote Creek Mining Company LLC (Defendant)*, Civil Action No. 1:15-CV-00109 (US District Court for the District of North Dakota, Western Division).
109. Expert Affidavit (August 2017) and Penalty/Remedy Expert Affidavit (October 2017) on behalf of Plaintiff in the matter of *Wildearth Guardians (Plaintiff) v Colorado Springs Utility Board (Defendant,)* Civil Action No. 1:15-cv-00357-CMA-CBS (US District Court for the District of Colorado).
110. Expert Report (August 2017) on behalf of Appellant in the matter of *Patricia Ann Troiano (Appellant) v. Upper Burrell Township Zoning Hearing Board (Appellee)*, Court of Common Pleas of Westmoreland County, Pennsylvania, Civil Division.
111. Expert Report (October 2017), Supplemental Expert Report (October 2017), and Rebuttal Expert Report (November 2017) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).

112. Declaration (December 2017) on behalf of the Environmental Integrity Project in the matter of permit issuance for ATI Flat Rolled Products Holdings, Breckenridge, PA to the Allegheny County Health Department.
113. Expert Report (Harm Phase) (January 2018), Rebuttal Expert Report (Harm Phase) (May 2018) and Supplemental Expert Report (Harm Phase) (April 2019) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (US District Court for the Central District of Illinois, Peoria Division).
114. Declaration (February 2018) on behalf of the Chesapeake Bay Foundation, et. al., in the matter of the Section 126 Petition filed by the state of Maryland in *State of Maryland v. Pruitt (Defendant)*, Civil Action No. JKB-17-2939 (Consolidated with No. JKB-17-2873) (US District Court for the District of Maryland).
115. Direct Pre-filed Testimony (March 2018) on behalf of the National Parks Conservation Association (NPCA) in the matter of *NPCA v State of Washington, Department of Ecology and BP West Coast Products, LLC*, PCHB No. 17-055 (Pollution Control Hearings Board for the State of Washington).
116. Expert Affidavit (April 2018) and Second Expert Affidavit (May 2018) on behalf of Petitioners in the matter of *Coosa River Basin Initiative and Sierra Club (Petitioners) v State of Georgia Environmental Protection Division, Georgia Department of Natural Resources (Respondent) and Georgia Power Company (Intervenor/Respondent)*, Docket Nos: 1825406-BNR-WW-57-Howells and 1826761-BNR-WW-57-Howells, Office of State Administrative Hearings, State of Georgia.
117. Direct Pre-filed Testimony and Affidavit (December 2018) on behalf of Sierra Club and Texas Campaign for the Environment (Appellants) in the contested case hearing before the Texas State Office of Administrative Hearings in Docket Nos. 582-18-4846, 582-18-4847 (Application of GCGV Asset Holding, LLC for Air Quality Permit Nos. 146425/PSDTX1518 and 146459/PSDTX1520 in San Patricio County, Texas).
118. Expert Report (February 2019) on behalf of Sierra Club in the State of Florida, Division of Administrative Hearings, Case No. 18-2124EPP, Tampa Electric Company Big Bend Unit 1 Modernization Project Power Plant Siting Application No. PA79-12-A2.
119. Declaration (March 2019) on behalf of Earthjustice in the matter of comments on the renewal of the Title V Federal Operating Permit for Valero Houston refinery.
120. Expert Report (March 2019) on behalf of Plaintiffs for Class Certification in the matter of *Resendez et al v Precision Castparts Corporation* in the Circuit Court for the State of Oregon, County of Multnomah, Case No. 16cv16164.
121. Expert Report (June 2019), Affidavit (July 2019) and Rebuttal Expert Report (September 2019) on behalf of Appellants relating to the NPDES permit for the Cheswick power plant in the matter of *Three Rivers Waterkeeper and Sierra Club (Appellants) v. State of Pennsylvania Department of Environmental Protection (Appellee) and NRG Power Midwest (Permittee)*, before the Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2018-088-R.
122. Affidavit/Expert Report (August 2019) relating to the appeal of air permits issued to PTTGCA on behalf of Appellants in the matter of *Sierra Club (Appellants) v. Craig Butler, Director, et. al., Ohio EPA (Appellees)* before the State of Ohio Environmental Review Appeals Commission (ERAC), Case Nos. ERAC-19-6988 through -6991.
123. Expert Report (October 2019) relating to the appeal of air permit (Plan Approval) on behalf of Appellants in the matter of *Clean Air Council and Environmental Integrity Project (Appellants) v. Commonwealth of Pennsylvania Department of Environmental Protection and Sunoco Partners Marketing and Terminals L.P.*, before the Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2018-057-L.
124. Expert Report (December 2019), Affidavit (March 2020), Supplemental Expert Report (July 2020), and Declaration (February 2021) on behalf of Earthjustice in the matter of *Objection to the*

- Issuance of PSD/NSR and Title V permits for Riverview Energy Corporation, Dale, Indiana, before the Indiana Office of Environmental Adjudication, Cause No. 19-A-J-5073.*
125. Affidavit (December 2019) on behalf of Plaintiff-Intervenor (Surfrider Foundation) in the matter of *United States and the State of Indiana (Plaintiffs), Surfrider Foundation (Plaintiff-Intervenor), and City of Chicago (Plaintiff-Intervenor) v. United States Steel Corporation (Defendant)*, Civil Action No. 2:18-cv-00127 (US District Court for the Northern District of Indiana, Hammond Division).
 126. Declarations (January 2020, February 2020, May 2020, July 2020, and August 2020) and Pre-filed Testimony (April 2021) in support of Petitioner's Motion for Stay of PSCAA NOC Order of Approval No. 11386 in the matter of the *Puyallup Tribe of Indians v. Puget Sound Clean Air Agency (PSCAA) and Puget Sound Energy (PSE)*, before the State of Washington Pollution Control Hearings Board, PCHB No. P19-088.
 127. Expert Report (April 2020) on behalf of the plaintiff in the matter of Orion Engineered Carbons, GmbH (Plaintiff) vs. Evonik Operations, GmbH (formerly Evonik Degussa GmbH) (Respondent), before the German Arbitration Institute, Case No. DIS-SV-2019-00216.
 128. Expert Independent Evaluation Report (June 2020) for *PacifiCorp's Decommissioning Costs Study Reports dated January 15, 2020 and March 13, 2020 relating to the closures of the Hunter, Huntington, Dave Johnston, Jim Bridger, Naughton, Wyodak, Hayden, and Colstrip (Units 3&4) plants*, prepared for the Oregon Public Utility Commission (Oregon PUC).
 129. Direct Pre-filed Testimony (July 2020) on behalf of the Sierra Club in the matter of *the Application of the Ohio State University for a certificate of Environmental Compatibility and Public Need to Construct a Combined Heat and Power Facility in Franklin County, Ohio*, before the Ohio Power Siting Board, Case No. 19-1641-EL-BGN.
 130. Expert Report (August 2020) and Rebuttal Expert Report (September 2020) on behalf of WildEarth Guardians (petitioners) in the matter of *the Appeals of the Air Quality Permit No. 7482-M1 Issued to 3 Bear Delaware Operating – NM LLC (EIB No. 20-21(A) and Registrations Nos. 8729, 8730, and 8733 under General Construction Permit for Oil and Gas Facilities (EIB No. 20-33 (A))*, before the State of New Mexico, Environmental Improvement Board.
 131. Expert Report (July 2020) on the *Initial Economic Impact Analysis (EIA) for A Proposal To Regulate NOx Emissions from Natural Gas Fired Rich-Burn Natural Gas Reciprocating Internal Combustion Engines (RICE) Greater Than 100 Horsepower* prepared on behalf of Earthjustice and the National Parks Conservation Association in the matter of Regulation Number 7, Alternate Rules before the Colorado Air Quality Control Commission.
 132. Expert Report (August 2020) and Supplemental Expert Report (February 2021) on the Potential Remedies to Avoid Adverse Thermal Impacts from the Merrimack Station on behalf of Plaintiffs in the matter of *Sierra Club Inc. and the Conservation Law Foundation (Plaintiffs) v. Granite Shore Power, LLC et. al., (Defendants)*, Civil Action No. 19-cv-216-JL (US District Court for the District of New Hampshire.)
 133. Expert Report (August 2020) and Supplemental Expert Report (December 2020) on behalf of Plaintiffs in the matter of *PennEnvironment Inc., and Clean Air Council (Plaintiffs) and Allegheny County Health Department (Plaintiff-Intervenor) v. United States Steel Corporation (Defendant)*, Civil Action No. 2-19-cv-00484-MJH (US District Court for the Western District of Pennsylvania.)
 134. Pre-filed Direct Testimony (October 2020) and Sur-rebuttal Testimony (November 2020) on behalf of petitioners (Ten Persons Group, including citizens, the Town of Braintree, the Town of Hingham, and the City of Quincy) in the matter of Algonquin Gas Transmission LLC, Weymouth MA, No. X266786 Air Quality Plan Approval, before the Commonwealth of Massachusetts, Department of Environmental Protection, the Office of Appeals and Dispute Resolution, OADR Docket Nos. 2019-008, 2019-009, 2019010, 2019-011, 2019-012 and 2019-013.

135. Expert Report (November 2020) on behalf of Protect PT in the matter of *Protect PT v. Commonwealth of Pennsylvania Department of Environmental Protection and Apex Energy (PA) LLC*, before the Commonwealth of Pennsylvania Environmental Hearing Board, Docket No. 2018-080-R (consolidated with 2019-101-R)(the “Drakulic Appeal”).
136. Expert Report (December 2020) on behalf of Plaintiffs in the matter of *Sierra Club Inc. (Plaintiff) v. GenOn Power Midwest LP (Defendants)*, Civil Action No. 2-19-cv-01284-WSS (US District Court for the Western District of Pennsylvania.)
137. Pre-filed Testimony (January 2021) on behalf of the Plaintiffs (Shrimpers and Fishermen of the Rio Grande Valley represented by Texas RioGrande Legal Aid, Inc.) in the matter of the Appeal of Texas Commission on Environmental Quality (TCEQ) Permit Nos. 147681, PSDTX1522, GHGPSDTX172 for the Jupiter Brownsville Heavy Condensate Upgrader Facility, Cameron County, before the Texas State Office of Administrative Hearings, SOAH Docket No. 582-21-0111, TCEQ Docket No. 2020-1080-AIR.
138. Expert Report (June 2021) and Declarations (May 2021 and June 2021) on behalf of Plaintiffs in the matter of *Sierra Club (Plaintiff) v. Woodville Pellets, LLC (Defendant)*, Civil Action No. 9:20-cv-00178-MJT (US District Court for the Eastern District of Texas, Lufkin Division.)
139. Declaration (July 2021) on behalf of Plaintiffs in the matter of *Stephanie Mackey and Nick Migliore, on behalf of themselves and all others similarly situated (Plaintiffs) v. Chemtool Inc. and Lubrizol Corporation (Defendants)*, Case No. 2021-L-0000165, State of Illinois, Circuit Court of the 17th Judicial Circuit, Winnebago County.
140. Expert Report (April 2021) and Sur-Rebuttal Report (June 2021) on behalf of the Plaintiffs in the matter of *Modern Holdings, LLC, et al. (Plaintiffs) v. Corning Inc., et al. (Defendants)*, Civil Action No. 5:13-cv-00405-GFVT, (US District Court for the Eastern District of Kentucky, Central Division at Lexington).
141. Expert Witness Disclosure (June 2021) on behalf of the Plaintiffs in the matter of *Jay Burdick, et. al., (Plaintiffs) v. Tanoga Inc. (d/b/a Taconic) (Defendant)*, Index No. 253835, (State of New York Supreme Court, County of Rensselaer).
142. Expert Report (June 2021) on behalf of Appellants in the matter of *PennEnvironment and Earthworks (Appellants) v. Commonwealth of Pennsylvania Department of Environmental Protection (Appellee) and MarkWest Liberty Midstream and resource, LLC (Permittee)*, before the Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2020-002-R.
143. Expert Reports (March 2021 and May 2021) regarding the Aries Newark LLC Sludge Processing Facility, Application No. CPB 20-74, Central Planning Board, City of Newark, New Jersey.
144. Expert Report (????, 2021) for A,Almanzar de la Cruz v. BP Exploration and Production Inc., et. al., Case No. 2:19-cv-00532.
145. Affidavit (May 2021) for D. Faerber in the matter of D. Faerber v. BP (????)
146. Expert Report (April 2021) for Charles Johnson Jr., v. BP Exploration and Production Inc., et. al., Civil Action No. 20-CV-01329.
147. Expert Report (April 2021) for Floyd Ruffin, v. BP Exploration and Production Inc., et. al., Civil Action No. 20-cv-00334-CJB-JCW (US District Court for the Eastern District of Louisiana).
148. Expert Report (May 2021) for *Clifford Osmer (Plaintiff) v. BP Exploration and Production Inc., et. al., (Defendants)* related to 12-968 BELO in MDL No. 2179, Civil Action No. 18-12557 (US District Court for the Eastern District of Louisiana),
149. Expert Report (June 2021) for Antonia Saavedra-Vargas v. BP Exploration and Production Inc., et. al., Civil Action No. 18-11461 (US District Court for the Eastern District of Louisiana)
150. Affidavit (June 2021) for Lourdes Rubi in the matter of *Lourdes Rubi (Plaintiff) v. BP Exploration and Production Inc., et. al., (Defendants)*, related to 12-968 BELO in MDL No. 2179 (US District Court for the Eastern District of Louisiana).

C. Occasions where Dr. Sahu has provided oral testimony in depositions, at trial or in similar proceedings include the following:

151. Deposition on behalf of Rocky Mountain Steel Mills, Inc. located in Pueblo, Colorado – dealing with the manufacture of steel in mini-mills including methods of air pollution control and BACT in steel mini-mills and opacity issues at this steel mini-mill.
152. Trial Testimony (February 2002) on behalf of Rocky Mountain Steel Mills, Inc. in Denver District Court.
153. Trial Testimony (February 2003) on behalf of the United States in the Ohio Edison NSR Cases, *United States, et al. v. Ohio Edison Co., et al.*, C2-99-1181 (Southern District of Ohio).
154. Trial Testimony (June 2003) on behalf of the United States in the Illinois Power NSR Case, *United States v. Illinois Power Co., et al.*, 99-833-MJR (Southern District of Illinois).
155. Deposition (10/20/2005) on behalf of the United States in connection with the Cinergy NSR Case. *United States, et al. v. Cinergy Corp., et al.*, IP 99-1693-C-M/S (Southern District of Indiana).
156. Oral Testimony (August 2006) on behalf of the Appalachian Center for the Economy and the Environment re. the Western Greenbrier plant, WV before the West Virginia DEP.
157. Oral Testimony (May 2007) on behalf of various Montana petitioners (Citizens Awareness Network (CAN), Women’s Voices for the Earth (WVE) and the Clark Fork Coalition (CFC)) re. the Thompson River Cogeneration plant before the Montana Board of Environmental Review.
158. Oral Testimony (October 2007) on behalf of the Sierra Club re. the Sevier Power Plant before the Utah Air Quality Board.
159. Oral Testimony (August 2008) on behalf of the Sierra Club and Clean Water re. Big Stone Unit II before the South Dakota Board of Minerals and the Environment.
160. Oral Testimony (February 2009) on behalf of the Sierra Club and the Southern Environmental Law Center re. Santee Cooper Pee Dee units before the South Carolina Board of Health and Environmental Control.
161. Oral Testimony (February 2009) on behalf of the Sierra Club and the Environmental Integrity Project re. NRG Limestone Unit 3 before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.
162. Deposition (July 2009) on behalf of MTD Products, Inc., in the matter of *Alice Holmes and Vernon Holmes v. Home Depot USA, Inc., et al.*
163. Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Coletto Creek coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
164. Deposition (October 2009) on behalf of Environmental Defense, in the matter of permit challenges to the proposed Las Brisas coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
165. Deposition (October 2009) on behalf of the Sierra Club, in the matter of challenges to the proposed Medicine Bow Fuel and Power IGL plant in Cheyenne, Wyoming.
166. Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Tenaska coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH). (April 2010).

167. Oral Testimony (November 2009) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.
168. Deposition (December 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed White Stallion Energy Center coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).
169. Oral Testimony (February 2010) on behalf of the Environmental Defense Fund re. the White Stallion Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.
170. Deposition (June 2010) on behalf of the United States in connection with the Alabama Power Company NSR Case. *United States v. Alabama Power Company*, CV-01-HS-152-S (Northern District of Alabama, Southern Division).
171. Trial Testimony (September 2010) on behalf of Commonwealth of Pennsylvania – Dept. of Environmental Protection, State of Connecticut, State of New York, State of Maryland, and State of New Jersey (Plaintiffs) in connection with the Allegheny Energy NSR Case in US District Court in the Western District of Pennsylvania. *Plaintiffs v. Allegheny Energy Inc., et al.*, 2:05cv0885 (Western District of Pennsylvania).
172. Oral Direct and Rebuttal Testimony (September 2010) on behalf of Fall-Line Alliance for a Clean Environment and others in the matter of the PSD Air Permit for Plant Washington issued by Georgia DNR at the Office of State Administrative Hearing, State of Georgia (OSAH-BNR-AQ-1031707-98-WALKER).
173. Oral Testimony (September 2010) on behalf of the State of New Mexico Environment Department in the matter of Proposed Regulation 20.2.350 NMAC – *Greenhouse Gas Cap and Trade Provisions*, No. EIB 10-04 (R), to the State of New Mexico, Environmental Improvement Board.
174. Oral Testimony (October 2010) on behalf of the Environmental Defense Fund re. the Las Brisas Energy Center before the Texas State Office of Administrative Hearings (SOAH) Administrative Law Judges.
175. Oral Testimony (November 2010) regarding BART for PSCo Hayden, CSU Martin Drake units before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.
176. Oral Testimony (December 2010) regarding BART for TriState Craig Units, CSU Nixon Unit, and PRPA Rawhide Unit) before the Colorado Air Quality Commission on behalf of the Coalition of Environmental Organizations.
177. Deposition (December 2010) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).
178. Deposition (February 2011 and January 2012) on behalf of Wild Earth Guardians in the matter of opacity exceedances and monitor downtime at the Public Service Company of Colorado (Xcel)'s Cherokee power plant. No. 09-cv-1862 (D. Colo.).
179. Oral Testimony (February 2011) to the Georgia Office of State Administrative Hearings (OSAH) in the matter of Minor Source HAPs status for the proposed Longleaf Energy Associates power plant (OSAH-BNR-AQ-1115157-60-HOWELLS) on behalf of the Friends of the Chattahoochee and the Sierra Club).
180. Deposition (August 2011) on behalf of the United States in *United States of America v. Cemex, Inc.*, Civil Action No. 09-cv-00019-MSK-MEH (District of Colorado).
181. Deposition (July 2011) and Oral Testimony at Hearing (February 2012) on behalf of the Plaintiffs MYTAPN in the matter of Microsoft-Yes, Toxic Air Pollution-No (MYTAPN) v. State of Washington, Department of Ecology and Microsoft Corporation Columbia Data Center to the Pollution Control Hearings Board, State of Washington, Matter No. PCHB No. 10-162.

182. Oral Testimony at Hearing (March 2012) on behalf of the United States in connection with the Louisiana Generating NSR Case. *United States v. Louisiana Generating, LLC*, 09-CV100-RET-CN (Middle District of Louisiana).
183. Oral Testimony at Hearing (April 2012) on behalf of the New Hampshire Sierra Club at the State of New Hampshire Public Utilities Commission, Docket No. 10-261 – the 2010 Least Cost Integrated Resource Plan (LCIRP) submitted by the Public Service Company of New Hampshire (re. Merrimack Station Units 1 and 2).
184. Oral Testimony at Hearing (November 2012) on behalf of Clean Wisconsin in the matter of Application of Wisconsin Public Service Corporation for Authority to Construct and Place in Operation a New Multi-Pollutant Control Technology System (ReACT) for Unit 3 of the Weston Generating Station, before the Public Service Commission of Wisconsin, Docket No. 6690-CE-197.
185. Deposition (March 2013) in the matter of various Environmental Petitioners v. North Carolina DENR/DAQ and Carolinas Cement Company, before the Office of Administrative Hearings, State of North Carolina.
186. Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).
187. Deposition (August 2013) on behalf of the Sierra Club in connection with the Luminant Martin Lake Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 5:10-cv-0156-MHS-CMC (Eastern District of Texas, Texarkana Division).
188. Deposition (February 2014) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).
189. Trial Testimony (February 2014) in the matter of *Environment Texas Citizen Lobby, Inc and Sierra Club v. ExxonMobil Corporation et al.*, Civil Action No. 4:10-cv-4969 (Southern District of Texas, Houston Division).
190. Trial Testimony (February 2014) on behalf of the Sierra Club in connection with the Luminant Big Brown Case. *Sierra Club v. Energy Future Holdings Corporation and Luminant Generation Company LLC*, Civil Action No. 6:12-cv-00108-WSS (Western District of Texas, Waco Division).
191. Deposition (June 2014) and Trial (August 2014) on behalf of ECM Biofilms in the matter of the *US Federal Trade Commission (FTC) v. ECM Biofilms* (FTC Docket #9358).
192. Deposition (February 2015) on behalf of Plaintiffs in the matter of *Sierra Club and Montana Environmental Information Center (Plaintiffs) v. PPL Montana LLC, Avista Corporation, Puget Sound Energy, Portland General Electric Company, Northwestern Corporation, and Pacificorp (Defendants)*, Civil Action No. CV 13-32-BLG-DLC-JCL (US District Court for the District of Montana, Billings Division).
193. Oral Testimony at Hearing (April 2015) on behalf of Niagara County, the Town of Lewiston, and the Villages of Lewiston and Youngstown in the matter of CWM Chemical Services, LLC New York State Department of Environmental Conservation (NYSDEC) Permit Application Nos.: 9-2934-00022/00225, 9-2934-00022/00231, 9-2934-00022/00232, and 9-2934-00022/00249 (pending).
194. Deposition (August 2015) on behalf of Plaintiff in the matter of *Conservation Law Foundation (Plaintiff) v. Broadrock Gas Services LLC, Rhode Island LFG GENCO LLC, and Rhode Island Resource Recovery Corporation (Defendants)*, Civil Action No. 1:13-cv-00777-M-PAS (US District Court for the District of Rhode Island).
195. Testimony at Hearing (August 2015) on behalf of the Sierra Club in the matter of *Amendments to 35 Illinois Administrative Code Parts 214, 217, and 225* before the Illinois Pollution Control Board, R15-21.

196. Deposition (May 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., (Plaintiffs) v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).
197. Trial Testimony (October 2015) on behalf of Plaintiffs in the matter of *Northwest Environmental Defense Center et. al., (Plaintiffs) v. Cascade Kelly Holdings LLC, d/b/a Columbia Pacific Bio-Refinery, and Global Partners LP (Defendants)*, Civil Action No. 3:14-cv-01059-SI (US District Court for the District of Oregon, Portland Division).
198. Deposition (April 2016) on behalf of the Plaintiffs in *UNatural Resources Defense Council, Respiratory Health Association, and Sierra Club (Plaintiffs) v. Illinois Power Resources LLC and Illinois Power Resources Generation LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (Central District of Illinois, Peoria Division).
199. Trial Testimony at Hearing (July 2016) in the matter of Tesoro Savage LLC Vancouver Energy Distribution Terminal, Case No. 15-001 before the State of Washington Energy Facility Site Evaluation Council.
200. Trial Testimony (December 2016) on behalf of the challengers in the matter of the Delaware Riverkeeper Network, Clean Air Council, et. al., vs. Commonwealth of Pennsylvania Department of Environmental Protection and R. E. Gas Development LLC regarding the Geyer well site before the Pennsylvania Environmental Hearing Board.
201. Trial Testimony (July-August 2016) on behalf of the United States in *United States of America v. Ameren Missouri*, Civil Action No. 4:11-cv-00077-RWS (Eastern District of Missouri, Eastern Division).
202. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Huntley and Huntley Poseidon Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.
203. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Backus Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.
204. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Drakulic Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.
205. Trial Testimony (January 2017) on the Environmental Impacts Analysis associated with the Apex energy Deutsch Well Pad Hearing on behalf citizens in the matter of the special exception use Zoning Hearing Board of Penn Township, Westmoreland County, Pennsylvania.
206. Deposition Testimony (July 2017) on behalf of Plaintiffs in the matter of *Casey Voight and Julie Voight v Coyote Creek Mining Company LLC (Defendant)* Civil Action No. 1:15-CV-00109 (US District Court for the District of North Dakota, Western Division).
207. Deposition Testimony (November 2017) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).
208. Deposition Testimony (December 2017) on behalf of Plaintiff in the matter of *Wildearth Guardians (Plaintiff) v Colorado Springs Utility Board (Defendant)* Civil Action No. 1:15-cv-00357-CMA-CBS (US District Court for the District of Colorado).
209. Deposition Testimony (January 2018) in the matter of National Parks Conservation Association (NPCA) v. State of Washington Department of Ecology and British Petroleum (BP) before the Washington Pollution Control Hearing Board, Case No. 17-055.
210. Trial Testimony (January 2018) on behalf of Defendant in the matter of *Oakland Bulk and Oversized Terminal (Plaintiff) v City of Oakland (Defendant,)* Civil Action No. 3:16-cv-07014-VC (US District Court for the Northern District of California, San Francisco Division).

211. Trial Testimony (April 2018) on behalf of the National Parks Conservation Association (NPCA) in the matter of NPCA v State of Washington, Department of Ecology and BP West Coast Products, LLC, PCHB No. 17-055 (Pollution Control Hearings Board for the State of Washington).
212. Deposition (June 2018) (harm Phase) on behalf of Plaintiffs in the matter of *Natural Resources Defense Council, Inc., Sierra Club, Inc., and Respiratory Health Association v. Illinois Power Resources LLC, and Illinois Power Resources Generating LLC (Defendants)*, Civil Action No. 1:13-cv-01181 (US District Court for the Central District of Illinois, Peoria Division).
213. Trial Testimony (July 2018) on behalf of Petitioners in the matter of *Coosa River Basin Initiative and Sierra Club (Petitioners) v State of Georgia Environmental Protection Division, Georgia Department of Natural Resources (Respondent) and Georgia Power Company (Intervenor/Respondent)*, Docket Nos: 1825406-BNR-WW-57-Howells and 1826761-BNR-WW-57-Howells, Office of State Administrative Hearings, State of Georgia.
214. Deposition (January 2019) and Trial Testimony (January 2019) on behalf of Sierra Club and Texas Campaign for the Environment (Appellants) in the contested case hearing before the Texas State Office of Administrative Hearings in Docket Nos. 582-18-4846, 582-18-4847 (Application of GCGV Asset Holding, LLC for Air Quality Permit Nos. 146425/PSDTX1518 and 146459/PSDTX1520 in San Patricio County, Texas).
215. Deposition (February 2019) and Trial Testimony (March 2019) on behalf of Sierra Club in the State of Florida, Division of Administrative Hearings, Case No. 18-2124EPP, Tampa Electric Company Big Bend Unit 1 Modernization Project Power Plant Siting Application No. PA79-12-A2.
216. Deposition (June 2019) relating to the appeal of air permits issued to PTTGCA on behalf of Appellants in the matter of *Sierra Club (Appellants) v. Craig Butler, Director, et. al., Ohio EPA (Appellees)* before the State of Ohio Environmental Review Appeals Commission (ERAC), Case Nos. ERAC-19-6988 through -6991.
217. Deposition (September 2019) on behalf of Appellants relating to the NPDES permit for the Cheswick power plant in the matter of *Three Rivers Waterkeeper and Sierra Club (Appellants) v. State of Pennsylvania Department of Environmental Protection (Appellee) and NRG Power Midwest (Permittee)*, before the Commonwealth of Pennsylvania Environmental Hearing Board, EHB Docket No. 2018-088-R.
218. Deposition (December 2019) on behalf of the Plaintiffs in the matter of David Kovac, individually and on behalf of wrongful death class of Irene Kovac v. BP Corporation North America Inc., Circuit Court of Jackson County, Missouri (Independence), Case No. 1816-CV12417.
219. Deposition (February 2020, virtual) and testimony at Hearing (August 2020, virtual) on behalf of Earthjustice in the matter of *Objection to the Issuance of PSD/NSR and Title V permits for Riverview Energy Corporation, Dale, Indiana*, before the Indiana Office of Environmental Adjudication, Cause No. 19-A-J-5073.
220. Hearing (July 14-15, 2020, virtual) on behalf of the Sierra Club in the matter of *the Application of the Ohio State University for a certificate of Environmental Compatibility and Public Need to Construct a Combined Heat and Power Facility in Franklin County, Ohio*, before the Ohio Power Siting Board, Case No. 19-1641-EL-BGN.
221. Hearing (September 2020, virtual) on behalf of WildEarth Guardians (petitioners) in the matter of *the Appeals of the Air Quality Permit No. 7482-M1 Issued to 3 Bear Delaware Operating – NM LLC (EIB No. 20-21(A) and Registrations Nos. 8729, 8730, and 8733 under General Construction Permit for Oil and Gas Facilities (EIB No. 20-33 (A)*, before the State of New Mexico, Environmental Improvement Board.
222. Deposition (December 2020, March 4-5, 2021, all virtual) and Hearing (April 2021, virtual) in support of Petitioner's Motion for Stay of PSCAA NOC Order of Approval No. 11386 in the matter of the *Puyallup Tribe of Indians v. Puget Sound Clean Air Agency (PSCAA) and Puget*

- Sound Energy (PSE)*, before the State of Washington Pollution Control Hearings Board, PCHB No. P19-088.
223. Hearing (September 2020, virtual) on the *Initial Economic Impact Analysis (EIA) for A Proposal To Regulate NOx Emissions from Natural Gas Fired Rich-Burn Natural Gas Reciprocating Internal Combustion Engines (RICE) Greater Than 100 Horsepower* prepared on behalf of Earthjustice and the National Parks Conservation Association in the matter of Regulation Number 7, Alternate Rules before the Colorado Air Quality Control Commission.
 224. Deposition (December 2020, virtual and Hearing February 2021, virtual) on behalf of the Plaintiffs (Shrimpers and Fishermen of the Rio Grande Valley represented by Texas RioGrande Legal Aid, Inc.) in the matter of the Appeal of Texas Commission on Environmental Quality (TCEQ) Permit Nos. 147681, PSDTX1522, GHGPSDTX172 for the Jupiter Brownsville Heavy Condensate Upgrader Facility, Cameron County, before the Texas State Office of Administrative Hearings, SOAH Docket No. 582-21-0111, TCEQ Docket No. 2020-1080-AIR.
 225. Deposition (January 2021, virtual) on behalf of Plaintiffs in the matter of *PennEnvironment Inc., and Clean Air Council (Plaintiffs) and Allegheny County Health Department (Plaintiff-Intervenor) v. United States Steel Corporation (Defendant)*, Civil Action No. 2-19-cv-00484-MJH (US District Court for the Western District of Pennsylvania.)
 226. Deposition (February 2021, virtual) on behalf of Plaintiffs in the matter of *Sierra Club Inc. (Plaintiff) v. GenOn Power Midwest LP (Defendants)*, Civil Action No. 2-19-cv-01284-WSS (US District Court for the Western District of Pennsylvania.)
 227. Deposition (April 2021, virtual) on the Potential Remedies to Avoid Adverse Thermal Impacts from the Merrimack Station on behalf of Plaintiffs in the matter of *Sierra Club Inc. and the Conservation Law Foundation (Plaintiffs) v. Granite Shore Power, LLC et. al., (Defendants)*, Civil Action No. 19-cv-216-JL (US District Court for the District of New Hampshire.)
 228. Deposition (June 2021, virtual) on behalf of Plaintiffs in the matter of *Sierra Club (Plaintiff) v. Woodville Pellets, LLC (Defendant)*, Civil Action No. 9:20-cv-00178-MJT (US District Court for the Eastern District of Texas, Lufkin Division).
 229. Deposition (June 2021, virtual) on behalf of the Plaintiffs in the matter of *Modern Holdings, LLC, et al. (Plaintiffs) v. Corning Inc., et al. (Defendants)*, Civil Action No. 5:13-cv-00405-GFVT, (US District Court for the Eastern District of Kentucky, Central Division at Lexington).
 230. Testimony (June 2021, virtual) regarding the Aries Newark LLC Sludge Processing Facility, Application No. CPB 20-74, Central Planning Board, City of Newark, New Jersey.

Exhibit 2
(Declaration of Loren Raun, Ph.D.)

TCEQ DOCKET NO. 2022-0157-AIR

**APPLICATION BY MAX
MIDSTREAM TEXAS, LLC FOR
AIR QUALITY PERMIT NO. 162941
FOR THE SEAHAWK CRUDE
CONDENSATE TERMINAL IN
CALHOUN COUNTY, TEXAS**

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**BEFORE THE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY**

DECLARATION

OF

LOREN HOPKINS, PH.D.

1. My name is Loren Hopkins. I am competent to make this declaration. This declaration is true and correct.

MY BACKGROUND AND QUALIFICATIONS

2. I am a Professor in the Practice in the Department of Statistics at Rice University in Houston Texas. Additionally, I serve as the Chief Environmental Science Officer, Chief of Data Services, Data Science and Statistics for the City of Houston Health Department in Houston, Texas.
3. I received a Doctorate in Environmental Science and Engineering from Rice University in Houston, Texas. My thesis research focused on a statistical investigation of air pollution, human exposure assessment, and asthma. I also received Master of Science degree from Rice University, as well as a Bachelor of Science degree in Geophysics from the University of Texas in Austin, Texas.
4. Over the course of my career, I have been involved in numerous aspects of human health risk assessment, including as a practitioner in the private sector, regulatory reviewer, policy developer, and instructor.
5. As a Professor at Rice University, I teach classes on human health risk assessment from environmental exposure, and well as classes on environmental statistics. The human health risk assessment classes focus on all aspects of environmental contaminant risk assessment and include exposure and contaminant transport modeling. The environmental statistics classes focus on using statistical tools to assess current environmental contaminant data.
6. I have been conducting research into air pollution and human health effects for over two decades, with a focus in Houston, Texas. My ongoing research focuses on human health risk assessment, the association between human health and air pollution exposure, environmental statistics, and the translation of science to policy.
7. As the Chief Environmental Science Officer for the City of Houston Health Department, I review proposed state, federal, local environmental policy impacting Houston, conduct human health assessments of pollution data in the Houston Region and conduct special projects associated with air quality and water quality.
8. I served on the U.S. EPA Science Advisory Board and Risk and Technology Review Methods Panel in 2009. I served as a visiting scientist on the Centers for Disease Control and Prevention (CDC) Air Pollution and Respiratory Health Branch, Division of Environmental Hazards and Health Effects, National Center for Environmental Health in Atlanta, Georgia in 2014.
9. My CV is attached, Attachment A.

PURPOSE OF MY TESTIMONY

10. I was asked to review the Application and related material, including Max Midstream's Response to Hearing Requests. My review of Max Midstream's Response to Hearing Requests included the affidavits of Mr. Tony Nguyen, Mr. Joe M. Kupper, and Ms. Lucy Fraiser, as well as other attachments to that filing. I was asked to render an opinion as to whether the impacts modeled as part of the Application would likely negatively affect John and Janet Maresh, Curtis Miller, or Diane Wilson.
11. I reviewed the publicly available portions of the Application, including supporting materials such as the Executive Director's Air Quality Analysis Audit, the emission calculations and emission rates used in the modeling, the Executive Director's staff memos, and other available Application materials. I also reviewed the Kupper and Fraiser affidavits attached to Applicant's Response to Hearing Requests in this matter. Finally, I reviewed and relied on the types of technical publications and information sources that an air quality permitting specialist normally relies upon.
12. The Applicant modeled impacts of NO₂ that have the potential to negatively affect Respondents. The potential harm of these impacts is established based on well-known and long-standing air quality health studies. I base this conclusion on the Applicant's own modeled incremental increase in ground-level pollution levels from the Seahawk Terminal. Specifically, the Applicant modeled a maximum impact of 47 µg/m³ of NO₂ for the 1-hour National Ambient Air Quality Standard (NAAQS) as part of its De Minimis modeling for the expansion project.
13. NO₂ is a potent respiratory irritant. Exposure to NO₂ can cause respiratory symptoms including coughing, wheezing, and difficulty breathing. Exposure can also aggravate respiratory diseases, particularly asthma, leading to increased risk of hospitalization for those who, like Curtis Miller, suffer from such conditions.
14. According to the TCEQ's Air Quality Analysis Audit, Applicant's modeling for total concentrations for minor NSR NAAQS predicts a maximum increase of 42 µg/m³ of NO₂, and assumes an existing background level of 85 µg/m³ of NO₂. This amounts to an increase of nearly 50% above the existing background levels. As a statistician and a public health professional who focuses on air quality, it is my opinion that the additional 42 µg/m³ of NO₂ is not a trivial increase.
15. My research and other research that I am familiar with shows that there are measurable health benefits from reducing concentrations of NO₂ to levels well below the National Ambient Air Quality Standards (NAAQS). This means that NO₂ can—and does—cause harm to humans at levels well below the NAAQS. Even small increases in NO₂ levels result in increased risks to human receptors.

16. Based on this, my opinion is that maximum NO₂ impacts assumed by the Applicant as well as lesser impacts that will likely occur within two miles of the Terminal are harmful to those who live, work, or recreate in this area. It is my opinion that these people will be affected by air pollution from the Seahawk Terminal in a way that is distinguishable from the general public, including those who live in other counties, cities, and states.

CONCLUSION

17. For the reasons I have stated above, I conclude that emissions from the Seahawk Terminal will likely negatively impact: John and Jane Maresh, who live approximately 1.79 miles north of the Seahawk Terminal; Diane Wilson, who frequents waters less than a mile from the Terminal; Curtis Miller who owns a seafood company approximately 5 miles from the terminal and who fishes at Mitchell's Reef 2 miles from the Terminal.

My name is Loren Hopkins, my date of birth is November 23, 1962, and my address is 5302 Aspen, Ballaire, Texas 77401. I declare under penalty of perjury that the foregoing is true and correct.

Executed in Harris County, State of Texas, on the 20 of March, 2022.

Loren Hopkins, PhD

Declarant

ATTACHMENT A
(Loren Hopkins, Ph.D. Curriculum Vitae)

Curriculum Vitae

Loren Hopkins, Ph.D.
Formally Loren Raun

Chief Environmental Science Officer
Chief of Data Services, Data Science and Statistics
City of Houston Health Department
Houston, TX
e-mail address: Loren.hopkins@houstontx.gov

Professor in the Practice
Department of Statistics
Rice University
Houston, TX 77251-1892
Office Phone: (713) 348-3020
e-mail address: hopkins@rice.edu

Education

Ph.D., Environmental Science and Engineering, Rice University, Houston, Texas
Thesis research: Statistical Investigation of Air Pollution, Human
Exposure Assessment, and Asthma

M.S., Environmental Science and Engineering, Rice University, Houston, Texas
Thesis research: Groundwater Pollution, Stochastic Groundwater Fate
and Transport Modeling

B.S., Geophysics, University of Texas, Austin, Texas

Experience

2001-present Rice University, Statistics Department. Teach environmental statistics and human health risk assessment. These are graduate classes in a lecture/project format. The environmental statistics class focuses on using statistical tools to assess current environmental contaminant data. Topics include: sampling decision, distributional assessment, hypothesis testing (parametric and nonparametric), trend analysis and comparison tests to evaluate human health thresholds. The human health risk assessment class focuses on all aspects of environmental contaminant risk assessment and includes exposure and contaminant transport modeling. Research focuses on understanding the association between pollution and human health in Houston and identifying

effective interventions. Positions held: Professor in the Practice of Statistics (2016 to present), Faculty Fellow (2011 to 2016), and Lecturer (2006-2010).

- 2014 summer Visiting Scientist, Centers for Disease Control and Prevention, Atlanta Georgia, Air Pollution and Respiratory Health Branch, Division of Environmental Hazards and Health Effects, National Center for Environmental Health. Collaborated with exposure scientists and health economist to understand the association between air pollution and asthma in Houston, develop a warning system and evaluate the cost benefit of system.
- 2010-present City of Houston, Health Department. Review proposed state, federal, local environmental policy impacting Houston, conduct human health assessment of pollution data in the Houston Region and conduct special projects associated with the environment. Positions held: Chief Environmental Science Officer (2015 to present), Interim Chief of the Bureau of Community and Children's Environmental Health (2015 to present), Senior Environmental Analyst Health Department Bureau of Pollution Control and Prevention (2010 to 2015), Senior Environmental Analyst Mayor's Office City of Houston Office of Environmental Programming (2006-2010).
- 2002-2005 Air Pollution Researcher, University of Houston, Civil and Environmental Engineering Department, Researcher. Director of air sampling program to support dioxin congener Total Maximum Daily Load (TMDL) project in Houston Region. Sampled ambient and wet and dry deposition flux, evaluated partitioning and developed multiple regression relationships between congeners and meteorological parameters.
- 2000 Risk Assessment Reviewer, Texas Railroad Commission, Risk Assessment reviewer and co-author of risk assessment guidance for pipeline/oilfield waste including development of default screening levels, dilution attenuation factors, and method for TPH surrogate.
- 1996-1999 Risk Assessment Regulatory Reviewer, Applied Earth Sciences Consulting, Texas Natural Resource Conservation Commission-LPST Division Risk Assessment Reviewer through a state privatization contract, reviewed more than 200 risk assessments of leaking underground storage tanks including groundwater, soil and air transport.

- 1999-2005 Instructor and Course Author, Applied Environmental Statistics Course (offered through Darcy Environmental), taught all aspects of environmental statistics for risk assessment (including parametric and nonparametric hypothesis testing, trend analysis, normality testing) to professionals in a two-day continuing education course at various locations across southern United States several times a year (CEU for Texas Natural Resource Conservation Commission).
- 1995-2000 Risk Assessment Instructor, ASTM Risk-Based Corrective Action Trainer, taught all aspects of risk assessment including toxicology, data assessment, fate and transport to professionals in a three-day continuing education course at various locations across the United States.
- 1989-1995 Risk Assessor Statistician and Modeler, (OHM Corporation in Austin, Tx, Jacobs Engineering in St. Louis, Mo and Houston, Tx, Woodward-Clyde Houston, Tx and Applied Earth Sciences, Houston, Tx), risk assessor, environmental modeler and statistician employing groundwater transport (e.g., Modflow, Bioplume/MOC, Domenico), soil vapor transport (Farmer's, Thibideaux-Hwang, Sesoil) and air transport (Box, Gaussian, ISCLT).

Awards and Honors

National Leadership Academy for the Public's Health, Center for Health Leadership & Practice, 2017.

Teaching and Mentoring Award, Graduate Student Association, Rice University, 2016.

Eleanor and Mills Bennett Fellowship in Environmental Science, Rice University fellowship awarded to outstanding graduate students, 1996-1997, 1997-1998.

Blackburn Scholarship awarded to fund Environmental Research in Human Health Air Pollution Exposure and Risk Assessment, 1997.

Blackburn Award, Sixth Annual Rice Environmental Conference, for "An Improved Procedure to Estimate Human Exposure-Based Alternative Primary Ambient Ozone Standards," 1998.

National trainer for the ASTM Risk Based Corrective Action Standard, 1996-2001.

Designed, Sponsored and Implemented Community Air Pollution Reduction/Awareness Programs:

- Mayor’s Keep Houston Beautiful Award, No Mow No More Esplanade Naturalization Program, 2007.
- Governor’s Award, Texas Environmental Excellence Award, Condit Elementary School, Condit Kids for Clean Air, 2002
- Mayor’s Keep Houston Beautiful Award, Condit Elementary School, Condit Kids for Clean Air, 2002
- National Pollution Prevention Round Table, Most Valuable Pollution Prevention Program, 2002, Condit Elementary School, Condit Kids for Clean Air, 2002
- BP Environmental Excellence Award, Condit Elementary School, Condit Kids for Clean Air, 2002

Major Research Interests

Environmental statistics, human health risk assessment, association between human health and air pollution exposure and translation of science to policy.

Publications

- Hopkins, Loren, Deborah January-Bevers, Kelsey Caton, and Laura Campos. “A Simple Tree Planting Framework to Improve Climate, Air Pollution, Health, and Urban Heat in Vulnerable Locations Using Non-Traditional Partners”, *Plants, People, Planet*. Accepted, 2021.
- Miranda, Marie Lynn, Rashida Callender, Joally Canles, Elena Craft, Katherine Ensor, Max Grossman, Loren Hopkins, Joceelyn Johnston, Umair Shah, Joshua Tootoo. “The Texas flood registry: a flexible tool for environmental and public health practitioners and researchers”, *J Expo Sci Environ Epidemiol*. 2021. doi: 10.1038/s41370-021-00347-z
- Symanski, Elaine, Heyreoun An Han, Inkyu Han, Michelle McDaniel, Kristina Whitworth, Sheryl McCurdy, William Perkison, Amal Rammah, Grace Lewis, George Delclos, Elena Craft, Melissa Bondy, Cheryl Walker, Loren Hopkins, José Cede and Daisy James. “Responding to Natural and Industrial Disasters: Partnerships and Lessons Learned”, *Disaster Medicine and Public Health Preparedness*. 2021. doi.org/10.1017/dmp.2020.467.
- Symanski, Elaine, Ensor Katherine B, Piedra Pedro A, Sheth Komal, Caton Kelsey, Stephen L Williams, David Persse, Deborah Banerjee, and Loren Hopkins. “Population-Based Estimates of SARS-CoV-2 Seroprevalence in Houston, TX as of September 2020”, *The Journal of Infectious Diseases*, 2021. <https://doi.org/10.1093/infdis/jiab203>
- LaTurner, Zachary W, David M Zong, Prashant Kalvapalle, Kiara Reyes Gamas, Austen Terwilliger, Tessa Crosby, Priyanka Ali, Vasanthi Avadhula, Haroldo Hernandez Santos, Kyle Weesner, Loren Hopkins, Pedro A Piedra, Anthony W Maresso, Lauren B Stadler. “Evaluating recovery, cost, and throughput of different concentration methods for SARS-CoV-2 wastewater-based epidemiology,” *Water Research*, 2021. <https://doi.org/10.1016/j.watres.2021.117043>

- Han, Inkyu, Donald Richner, Heyreoun An Han, Loren Hopkins, Daisy James, and Elaine Symanski. "Evaluation of metal aerosols in four communities adjacent to metal recyclers in Houston, Texas, USA," *Journal of the Air & Water Management Association*, 2020, <https://doi.org/10.1080/10962247.2020.1755385>
- Symanski Elaine, Heyreoun An Han, Loren Hopkins, Mary Ann Smith, Sheryl McCurdy, Inkyu Han, Maria Jimenez, Christine Markham, Donald Richner, Daisy James, and Juan Flores. "Metal air pollution partnership solutions: building an academic-government-community-industry collaboration to improve air quality and health in environmental justice communities in Houston," *Environmental Health*, 2020, doi: 10.1186/s12940-020-00590-1.
- Raun, Loren, David Persse, Johnson Gwendolyn, Katherine Ensor, Elizabeth Stevenson, Melissa Valerio, Caton Erin, Campos Laura, and Farber Harold. "Using Complex, Multi-Sectoral Data in a Needs Assessment to Inform Future Strategies in Childhood Asthma Management," *Health Behavior Research*, 2019, <https://doi.org/10.4148/2572-1836.1037>
- Horney, Jennifer, Janelle Rios, Adelita Cantu, Steve Ramsey, Lisa Montemayor, Loren Raun, and Aubrey Miller. "Improving Hurricane Harvey Disaster Research Response Through Academic-Practice Partnerships," *American Journal of Public Health Practice*, 2019, doi: 10.2105/AJPH.2019.305166
- Raun, Loren, Katherine Ensor, John Pederson, Laura Campos and David Persse. "City Specific Air Quality Warnings for Improved Asthma Self-Management," *American Journal of Preventive Medicine*, August, 2019. <https://doi.org/10.1016/j.amepre.2019.03.022>
- Raun, Loren, John Pederson, Laura Campos, Katherine Ensor, and David Persse. "Effectiveness of the Dual Dispatch to Cardiac Arrest Policy in Houston, Texas," *Journal of Public Health Management and Practice*, 2018. doi: 10.1097/PHH.0000000000000836.
- Cicalese, Luca, Loren Raun, Ali Shirafkan, Laura Campos, Daria Zorzi, Mauro Montalbano, Colin Rhoads, Valia Gazis, Katherine Ensor, and Cristiana Rastellini. "An Ecological Study of the Association of Air Pollution and Hepatocellular Carcinoma Incidence in Texas," *Liver Cancer*, Volume 6, August, 2017.
- Raun, Loren, Laura Campos, Elizabeth Stevenson, Katherine Ensor, David Persse, and Gwen Johnson. "Analyzing Who, When and Where: Data to Better Target Resources for School-based Asthma Interventions," *Journal of School Health*, April, 2017.
- Hoyt, Daniel and Loren Raun, "Measured and Estimated Benzene and VOC Emissions at a Major US Refinery/Chemical Plant: Comparison and Prioritization," *Journal of Air and Waste Management Association*, Volume 65, August, 2015. DOI: 10.1080/10962247.2015.1058304
- Raun, Loren, Katherine Ensor, Laura Campos, and David Persse. "Factors affecting ambulance utilization for asthma attack treatment: understanding where to target interventions," *Public Health*, May, 2015.

- Raun, Loren, Katherine Ensor, and David Persse. "Using community level strategies to reduce asthma attacks triggered by outdoor air pollution: A case crossover analysis," *Environmental Health*, Volume 13, July, 2014.
- Raun, Loren, Larry Jefferson, David Persse, and Kathy Ensor. "Geospatial analysis for targeting out-of-hospital cardiac arrest intervention," *American Journal of Preventive Medicine*, Volume 45, August, 2013.
- Ensor, Kathy, Loren Raun, and David Persse. "A case-crossover analysis of out-of-hospital cardiac arrest and air pollution," *Circulation*, Volume 127, February, 2013.
<https://doi.org/10.1161/CIRCULATIONAHA.113.000027>
- Raun, Loren, Karl Pepple, Daniel Hoyt, Don Richner, Arturo Blanco and Jiao Li. "Unanticipated potential cancer risk near metal recycling facilities," *Environmental Impact Assessment Review*, Volume 41, January, 2013.
<https://doi.org/10.1016/j.eiar.2013.03.001>
- Raun, Loren, Elena Marks, and Katherine Ensor, "Detecting improvement in ambient air toxics: An application to ambient benzene measurement in Houston, Texas," *Atmospheric Environment*, Volume 43, June, 2009.
<https://doi.org/10.1016/j.atmosenv.2009.03.010>
- Correa, Oscar, Loren Raun, Hanadi Rifai, Monica Suarez, Thomas Holsen and Larry Koenig, "Depositional flux of polychlorinated dibenzofurans in an urban setting," *Chemosphere*, Volume 64, August, 2006. DOI: 10.1016/j.chemosphere.2005.11.020
- Raun, Loren, Oscar Correa, Hanadi Rifai, Monica Suarez, and Larry Koenig, "Statistical investigation of polychlorinated dibenzo-p-dioxins and dibenzofurans in the ambient air of Houston, Texas," *Chemosphere*, Volume 60, August, 2005. DOI: 10.1016/j.chemosphere.2004.12.057
- Correa, Oscar, Hanadi Rifai, Loren Raun, Monica Suarez and Larry Koenig, "Concentrations and vapor-particle partitioning of polychlorinated dibenzo-p-dioxins and dibenzofurans in ambient air of Houston, Texas," *Atmospheric Environment*, Volume 38, December, 2004. <https://doi.org/10.1016/j.atmosenv.2004.09.005>
- Hopkins, Loren. A Statistical Investigation of Ozone Exposure Assessment by Direct and Indirect Measurement, Doctoral thesis, Department of Environmental Science and Engineering, Rice University, May, 1998.
<https://scholarship.rice.edu/handle/1911/19337>
- Hopkins, Loren, Katherine Ensor, Matthew Fraser, and Hanadi Rifai, "Evaluation of the Use of Empirical Ambient Ozone Pollutant Modeling and Subject Activity Logs as an Indirect Measurement of Exposure," *Proceedings of the Air and Waste Management Association 91st Annual Meeting*, San Diego, California, June, 1998. A&WMA, Paper # 98-MA12.01
- Hopkins, Loren, Katherine Ensor and Hanadi Rifai, "Empirical Evaluation of Ambient Ozone Interpolation Procedures to Support Exposure Models," *Journal of the Air and Waste Management Association*, Volume 49, July, 1999.
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- Hopkins, Loren, Hanadi Rifai and Paul LaWare, "Using Compounding Risk as a Guide for Establishing Area-Specific RBCA Risk Limits," *Proceedings of the NGWA Petroleum*

- Hydrocarbons and Organic Chemicals in Groundwater: Prevention, Detection and Restoration, November, 1996.
- Hopkins, Loren and David Bratberg, "Nationwide Survey of Risk Assessment and Risk-Based Corrective Action Procedures," Proceedings of the NGWA Petroleum Hydrocarbons and Organic Chemicals in Groundwater: Prevention, Detection and Restoration, November, 1995.
- Bratberg, David and Loren Hopkins, "A Comparison of Risk Assessment and Risk-Based Corrective Action Procedures in the United States," Proceedings of the Hazardous Materials Control Resources Institute Superfund XV Conference, Washington, D.C., November, 1995.
- Rifai, Hanadi and Loren Hopkins, "The Natural Attenuation Toolbox: A Decision Support System for Evaluating the Appropriateness of Natural Remediation as A Remedial Alternative," Proceedings of the Third Annual Symposium on Bioreclamation, San Diego, CA, April, 1995.
- Raparathi, Viru and Loren Hopkins, "A Risk Based Evaluation of the Appropriateness of Natural Remediation as a Remedial Alternative in the Vadose Zone," Proceedings of the NGWA Outdoor Action Conference and Exposition on Aquifer Remediation, Ground Water Monitoring, Geophysical Methods, and Soil Treatment, May, 1995.
- Hopkins, Loren and Michael Marcon, "The Use of Kriging to Optimize Sampling for Risk Assessment and Remediation," Proceedings of the SPE/EPA Environmental Conference 1995.
- Hopkins, Loren and Viru Raparathi, "EPA and State Policies on Adjustment of Toxicity Factors for Dermal Absorption," for the Texas Natural Resource Conservation Commission, July, 1994.
- Durham, Lisa, Jeff Carman, and Loren Hopkins, "Delineation of Hydrostratigraphic Units in a Carbonate Aquifer," Proceedings of the Geological Society of America Meeting, October, 1992.
- Hopkins, Loren and Scott Edelen, "Optimization of Statistical Hypothesis Testing for Environmental Data Using Nonparametric vs. Parametric Methods," Proceedings of the NGWA Petroleum Hydrocarbons and Organic Chemicals in Groundwater: Prevention, Detection and Restoration, Proceedings, November, 1991.
- LaGoy, Peter, and Loren Hopkins, "Developing Site Specific Cleanup Levels: Practical Considerations," Remediation, January, 1991. <https://doi.org/10.1002/rem.3440010203>
- Newell, Charles, Loren Hopkins, and Philip Bedient. "The HGDB: A New Hydrogeologic Database and Groundwater Modeling Tool," Journal of Ground Water, October, 1990. <https://doi.org/10.1111/j.1745-6584.1990.tb01986.x>
- Hopkins, Loren, Charles Newell and Philip Bedient, "A Hydrogeologic Database for the EPACML Regulatory Model," Proceedings of the NWWA Petroleum Hydrocarbons and Organic Chemicals in Groundwater: Prevention, Detection and Restoration, November, 1989.
- Hopkins, Loren, A Hydrogeologic Database for Stochastic Groundwater Modeling with Hydrogeologic Specific Applications. Master's thesis, Rice University, Department of Environmental Science and Engineering, May, 1989.

Newell, Charles, Loren Hopkins, and Philip Bedient, "Hydrogeologic Database for Ground Water Modeling," American Petroleum Institute, Publication No. 4476, Health and Environmental Sciences Department, February, 1989.

Newell, Charles, John Haasbeek, Loren Hopkins, Sarah Alder-Schaller, Hanadi Rifai, Philip Bedient, and Anthony Gorry. "OASIS: Parameter Estimation System for Aquifer Restoration Models," User's Manual Version 2.0, EPA/600/S8-90/039, 1990.

Other Recent Scholarly Works

Houston Health Department. Health Disparity and Health Inequity Trends and Data Report, in press 2019. <https://www.houstontx.gov/health/chs/documents/Health-Disparities-Data-Report-I-2019-Root-Causes.pdf>

Raun, Loren, "Fate and Transport Modeling," in *Encyclopedia of Environmetrics*, A.-H. El-Shaarawi and W. Piegorisch (eds), John Wiley & Sons Ltd: Chichester, UK. DOI: 10.1002/9780470057339.vnn073. Published online January, 2013.

Raun, Loren, and Katherine Ensor, "Association of Out-of-Hospital Cardiac Arrest with Exposure to Fine Particulate and Ozone Ambient Air Pollution from Case-crossover Analysis Results: Are the Standards Protective?" James A. Baker III Institute for Public Policy, Rice University, October, 2012.

Raun, Loren, and Daniel Hoyt, "Measurement and Analysis of Benzene and VOC Emissions in the Houston Ship Channel Area and Selected Surrounding Major Stationary Sources Using DIAL (Differential Absorption Light Detection and Ranging) Technology to Support Ambient HAP Concentrations Reductions in the Community (DIAL Project)," City of Houston Bureau Pollution Control and Prevention, Final Report, June, 2011.

Raun, Loren, "Severity and Trend Analysis of Benzene and 1,3 Butadiene Concentrations in the ambient Air in the Houston Region: 2000 to 2009," City of Houston Bureau of Air Quality Control.

Raun, Loren, "Trend Analysis of Ozone Concentrations in the City of Houston and Vicinity (2005-2009)," City of Houston Bureau of Air Quality Control.

Raun, Loren, "Statistical Assessment of Benzene and 1,3 Butadiene in Ambient Air in the Houston Region: 1997 to 2007," City of Houston Mayor's Office of Environmental Programming. <http://www.greenhoustontx.gov/reports/benzeneandbutadiene.pdf>

Comments of the City of Houston: TCEQ 1,3 butadiene proposed ESL changes. http://www.tceq.state.tx.us/assets/public/permitting/air/Guidance/NewSourceReview/mra_summary3_08.pdf

City of Houston Benzene Action Plan, An Interim Report—May 27, 2008

<http://www.greenhoustontx.gov/reports/benzeneactionplan-2008may.pdf>

Comments of the City of Houston: "National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries," EPA proposed rule, December 20, 2007.

"Houston Regional Benzene Air Pollution Reduction: A Voluntary Plan for Major Sources," City of Houston Mayor's Office of Environmental Programming, Department of Health and Human Services, Bureau of Air Quality Control, major author. 2006. Using results from the TRI, in conjunction with EPA's RSIE and NATA models, the major potential

air toxic emitters posing the highest risk to Houstonians were identified. The ambient air toxic data from monitors up and downwind of these facilities were assessed. Statistically significant differences between air contaminant distributions were noted and established as baseline conditions. Facility and process specific emission reduction mechanism recommendations were made. Facilities entering the voluntary agreement would implement emission reduction mechanisms beyond those currently required by regulation. Subsequent reductions in air concentrations from the baseline condition would be tracked. <http://www.greenhoustontx.gov/reports/benzenereductionplan.pdf>
City of Houston Code of Ordinances, Draft Nuisance Ordinance; Drafted amendment to the nuisance ordinance to specifically address ambient air concentrations of certain hazardous air pollutants.

Current or Recent Board/Committee Participation

Regional Air Quality Planning Advisory Committee, Executive Board, Chair (2018 to 2020), Vice Chair (2017), Houston Galveston Area Council (2015 to present)
Houston Wilderness Executive Board, Chair (2018 to 2020), Vice Chair (2014 to 2017)
Environmental Protection Agency Air Quality Monitoring Fellow, Department of State, U.S. Embassy Jakarta (2017-2018)
Environmental Analysis Professional Masters Faculty Advisor, Rice University (2013 to present)
Kinder Institute for Urban Research Fellow (2016 to present)
EPA Science Advisory Board, Risk and Technology Review Methods Panel (2009)
Houston Region Air Quality Task Force (2007)
Houston Exposure to Air Toxics Study Advisory Committee (2007 to 2009)

Key Multiple Reviews or Significant Edits

State of Health, Houston/Harris County, Texas, 2008-2015. Houston Department of Health and Human Services.
Counting on Quality of Life: An Environment Indicator Report, December 2007, Center for Houston's Future.
Comparative Assessment of Air Pollution-Related Health Risks in Houston, Ken Sexton, Stephen H. Linder, Dritano Marko, Heidi Bethel and Philip J. Lupo, doi: 10.1289/ehp.10043, July 5, 2007, online.
The Control of Air Toxics: Toxicology Motivation and Houston Implications, A. Clements, V. Flatt, M. Fraser, W. Hamilton, P. Ledvina, S. Mathur, A. Tamhane, and J. Ward, Rice University, 2007
A Closer Look at Air Pollution in Houston: Identifying Priority Health Risks, Report of the Mayor's Task Force on the Health Effects of Air Pollution, convened by the Institute for Health Policy, The University of Texas School of Public Health under the auspices of The University of Texas Health Science Center at Houston and the City of Houston, Institute for Health Policy Report ES-001-006.

Key Presentations

- Callender RC, Tootoo JL, Leong MC, Johnston J, Caton K, Domakonda K, Hopkins L, and Miranda ML. "Validating the Lead Exposure Risk Index for the City of Houston," Oral Presentation, CDC Annual Childhood Lead Poisoning Prevention Program Grantee Meeting, December 2019
- Leong MC, Tootoo JL, Johnston J, Callender RC, Caton K, Domakonda K, Hopkins L, and Miranda ML. "Symbolizing Childhood Lead Exposure Risk: The CEHI Lead Exposure Risk Model." Poster Presentation, Rice University & The City of Houston Health Department, CDC Annual Childhood Lead Poisoning Prevention Program Grantee Meeting, December 2019
- Wang, D, Raun L, Kathy K, and Nurmagametov T, "Estimated Reduction in EMS-treated Asthma Attacks and Cost Savings from City-Specific Multi-Pollutant Ambient Air Asthma Warnings," CDC Summit on Environmental Hazards and Health Effects, January 28, 2016
- Raun, L, Richner, D, "Study of the Accuracy of Emission Factors and Emission Estimating Methods Using the DIAL System. What does DIAL tell us about benzene and VOC emissions from refineries?" EPA webinar presented. October 2012
- Raun, L, "What is actually emitted from Area Sources: Results of a Special Study of Metals Recyclers," EPA National Air Quality Conference - Ambient Monitoring 2012, Assessment and Special Studies, Denver, CO, May, 16, 2012
- Raun, L, "Differential Absorption Light Detection and Ranging Measured Emissions at a Houston Ship Channel Area Petroleum Refinery and Chemical Plant: Methods, Results, Comparison to Emission Factors," Southeast Texas Photochemical Modeling Technical Committee, Texas Commission of Environmental Quality, October 19, 2011
- Raun, L, Ensor K, and Persse D, "Out of hospital cardiac arrest based on the levels of ozone and fine particulates: tracking and predicting at a temporal scale of one hour and a continuous spatial scale," Center for Disease Control, Tracking in Action, 2011 National Conference, Atlanta, Georgia, September 14, 2011
- Raun, L, Ensor K, and Persse D, "Out of hospital cardiac arrest based on the levels of ozone and fine particulates: tracking and predicting at a temporal scale of one hour and a continuous spatial scale," University of Texas School of Public Health, Houston, Biostatistics Department, Texas September 20, 2011
- Raun, L, Rice Environmental Conference, Houston Air Policy: Compliance, Impact, Limitations, October, 2008
- Raun, L, Rice Air Exchange Meeting, the State of Houston Air and the Voluntary Plan, November, 2007
- Raun, L, Rice Environmental Conference, Houston's Proposed Regional Benzene Air Pollution Reduction: A Voluntary Plan for Major Sources, October 16, 2007
- Raun, L, and Blanco A, Statistical Techniques to Gain More Information from the Same Set of Air Monitoring Data: A Better Understanding of the Air Pollution Human Health

- Risk in Houston, U. S. EPA Region 6 16th Annual Quality Assurance Conference, October 20-24, Dallas, Texas 2006
- Raun, L, Correa O, Rifai H, Suarez M, and Koenig L, Dioxin in Air, U. S. EPA Region 6 13th Annual Quality Assurance Conference, October 20-24, Dallas, Texas 2003
- Peple, Karl, Yeoman B, Raun L, Byun D, “Evaluation of Campus Commitments to Sustainability Indicators in DOE Humid Zones,” poster presented November 2008.
- Raun, L, and Ward J, “Clearing the Air in Houston: Using Science to Address Policy,” Public Health, Washington D.C. November, 2007
- Raun, L, “Houston’s Proposed Regional Benzene Air Pollution Reduction: A Voluntary Plan for Major Sources,” presented multiple times, City of Houston Environmental Committee, City of Houston Public Hearing, February 12, 2007, Council of Local Mayors, March, 14 2007; Houston Bar Association, Environmental Law Section, Greater Houston Partnership, Informational Public Meeting, Rice University, February 22, 2007
- Raun, L, “Methodology for Tracking the Health of an Airshed: Ambient Benzene and 1,3 Butadiene in Houston Air 1997 to 2007,” presented multiple times, City of Houston Bureau of Air Quality Control, Mayor’s Office of Environmental Programming.
- Raun, L, “Houston Air Monitor Location Sampling Optimization: Benzene, 1, 3 Butadiene and Ozone,” 2007 City of Houston Bureau of Air Quality Control
- Raun, L, Hoyt D, and Blanco A, “A Quantitative decision-based voluntary benzene reduction plan for ambient air in the Houston region,” EPA Conference, Las Vegas, October 2006.
- Raun, L, “Houston Human Health Risk from Air Pathway: Contribution from Shell Oil,” City of Houston Bureau of Air Quality Control, April 24, 2006.
- Rifai, H, and Hopkins L, The Natural Attenuation Toolbox: A Decision Support System for Evaluating Natural Attenuation, NGWA/AP Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Detection, Prevention and Restoration, Houston, TX. November 29-December 1, 1995 (Poster Presentation).
- Rifai, H, and Hopkins L, An Exposure/Risk Based Screening Approach for Selecting the Natural Attenuation Alternative at Sites, In Situ and On-Site Bioreclamation, The Third International Symposium, San Diego, CA, Apr 24-27, 1995 (Poster Presentation).

Recent Undergraduate Research Advising

Data Evaluation to Prevent Foodborne Illness at Houston Area Restaurants, D2k Learning Lab Project, Students: Wendy Feng, Carolina Hatanpaa, Charlseal Lamb, Alvin Sheng, and Ouyan Zhu, Sponsor mentor: Loren Raun, Faculty Mentor: Katherine Ensor; Spring, 2019.

Methodologies for Evaluating Inhalation Human Health Risk from Metal Recycling Facilities in Houston Fenceline Communities; Building Scholars Summer Undergraduate Research Program, Student: Sara J Mahmoud; Advisor: Loren Raun, August, 2017.

Renaturalizing White Oak Bayou: A Water Quality Investigation, Houston Action Research Team: Kevin Czachura, Will Deadrick, Qiu Wong, Avery Zaleski; Advisors: Avantika Gori, Loren Raun, Alan Steinberg, and Elizabeth Vann; May, 2017.

Understanding Child Blood Lead Poisoning Exposure Sources in Houston and Identifying High Risk Areas; Building Scholars Summer Undergraduate Research Program, Student: Miguel Fraga; Advisor: Loren Raun, August 2016. *Winning Poster* in Undergraduate Summer Research Symposium.

Bridge to Clean Air, Houston Action Research Team: Will Deadrick, Vera Liu, Ryan Saathoff, Jackie Yang; Advisors: Loren Raun, Alan Steinberg, and Elizabeth Vann; May, 2016.

Memberships

Houston Wilderness
Society of Public Health Educators
Regional Air Quality Planning Advisory Committee

Exhibit 3

(Diane Wilson, Liability Release, Indemnity and Hold Harmless Agreement)

LIABILITY RELEASE, INDEMNITY AND HOLD HARMLESS AGREEMENT

Printed Name: Diane Wilson

Date: ~~Feb~~ Jan 18, 2020
DW

In consideration of my entry upon the real property of Formosa Plastics Corporation, Texas ("FPC-TX"), generally located along Cox Creek in the area of FPC-TX's facility in Point Comfort, Calhoun County, Texas ("Property"), I, the undersigned, for myself and my agents, principals, representatives, insurance carriers, successors, heirs or assigns, organization, client, company, employer hereby knowingly, voluntarily, and irrevocably:

- Warrant and represent that no representation, promise or agreement, which is not herein expressed, has been made to me by FPC-TX and that I am relying entirely on my own judgment and advice of legal counsel, if I choose to seek legal counsel and I acknowledge that I recognize that I am free to do so in executing this agreement;
- Acknowledge and understand that FPC-TX, its partners, members, managers, principals, past or present officers, directors, shareholders, employees, attorneys, agents, representatives, subsidiaries, parents, assigns, investors, insurance carriers, successors, and any affiliated or associated entities of whatever kind, make no representations or warranties of any kind, either expressed or implied, as to the condition and/or safety of the Property or any improvements located thereon;
- Acknowledge and understand that the Property may include dangerous conditions, risks and hazards, both obvious and latent, both natural and man-made, which could cause serious bodily injury or death and/or damage or destruction to personal property, including, but not limited to: exposure to harsh or extreme elements; unstable surfaces, holes, eroded areas, steep inclines and declines, sharp and jagged rocks; unmaintained and rough roadways and trails; water with perils above and beneath the surface; trees and tree limbs, both dead and alive, that may fall unexpectedly without warning; unstable or dilapidated structures; wells of various types, plants and animals, which could be poisonous, diseased or otherwise dangerous and unpredictable; as well as numerous other dangerous conditions of any kind, known or unknown;
- **ASSUME ANY AND ALL RISK** of harm associated in any way with entry or presence upon the Property;
- **ACQUIT, RELEASE, AND DISCHARGE** FPC-TX, its partners, members, managers, principals, past or present officers, directors, shareholders, employees, attorneys, agents, representatives, subsidiaries, parents, assigns, investors, insurance carriers, successors, and affiliated or associated entities of whatever kind from any and all liability, damages, claims, demands, rights and causes of action, of whatever kind or nature, including but not limited to

those based upon bodily injuries, death or property damage, in any way arising from, relating to or resulting from my entry or presence on the Property whether or not caused by the sole, concurrent or contributory negligence of FPC-TX;

- Agree to INDEMNIFY AND HOLD HARMLESS FPC-TX against all actions, causes of action, claims, damages, judgments, executions, debts, costs of litigation and attorneys' fees, including but not limited to those based upon bodily injuries, death or property damage in any way arising from, relating to or resulting from my entry or presence on the Property whether or not caused by the sole, concurrent or contributory negligence of FPC-TX;

SIGNATURE Sylvia Diane Wilson

STATE OF TEXAS

COUNTY OF Calhoun

Before me, on this day personally appeared Sylvia Diane Wilson, known to me (or proved to me on the oath of Sylvia Diane or through TX DL to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

Given under my hand and seal of office this 18th day of Jan, (year) 2020

Mary Day

Notary Public's Signature

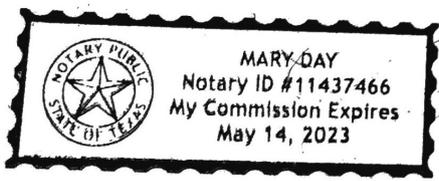


Exhibit 4
(Declaration of Mauricio Blanco)

TCEQ DOCKET NO. 2022-0157-AIR

**APPLICATION BY MAX
MIDSTREAM TEXAS, LLC
SEAHAWK CRUDE CONDESATE
TERMINAL, AIR PERMIT 162941**

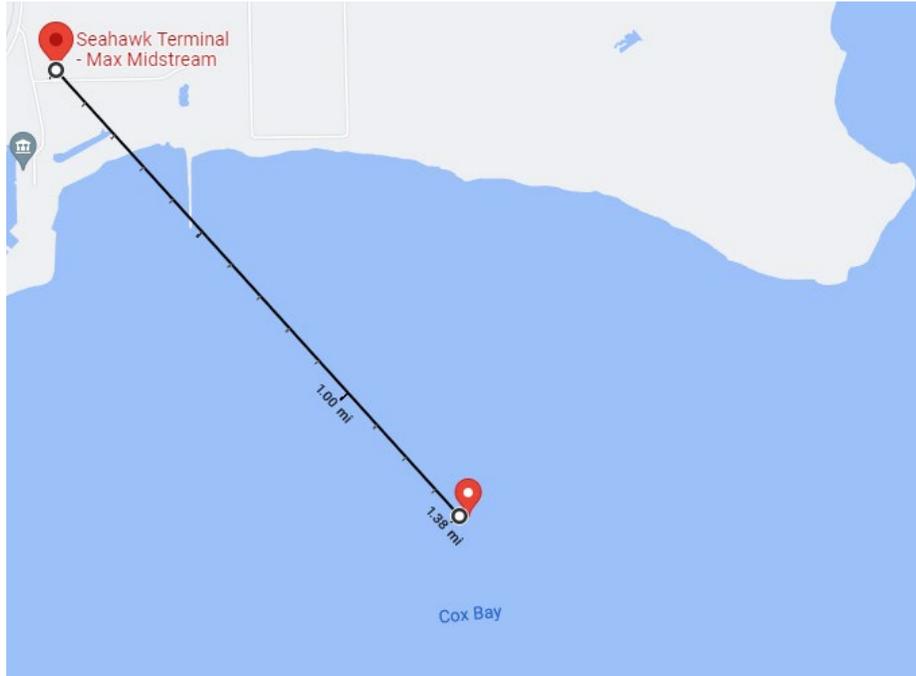
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**BEFORE THE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY**

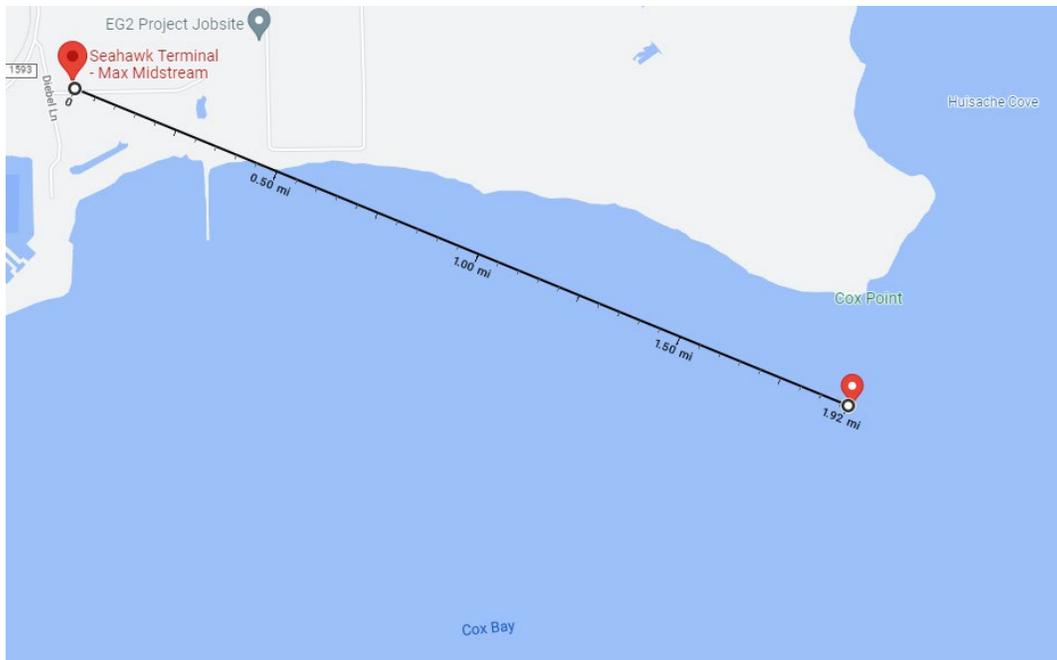
UNSWORN DECLARATION OF MAURICIO BLANCO

1. “My name is Mauricio Blanco. I am over 18 years of age, of sound mind, and fully competent to make this declaration. I have personal knowledge of the facts herein and they are all true and correct.
2. I have been a commercial oysterman and shrimper in the Calhoun County area for 34 years. I own 10 boats that oyster and shrimp in the bays in the Texas Coastal Bend. This includes the Matagorda and Lavaca Bay complexes. I captain one of the commercial boats 6 days a week. The remaining boats are staffed with local oystermen and shrimpers.
3. I have 10 commercial oystering licenses issued by the State of Texas. There is one license for each of my boats. I also hold 9 shrimping licenses issued by the State of Texas. Oyster season in Texas is from November 1st to April 30th each year.
4. I also hold 9 shrimping licenses issued by the State of Texas. Four of my boats have 2 shrimping licenses each and one of my boats has a single shrimping license. My boats with shrimp licenses can shrimp all year round.
5. One of the minor bays I frequently work in is Cox Bay in the Lavaca Bay complex. It is directly south of the Seahawk terminal. Cox Bay has many oyster reefs and is also a good bay for shrimping. During the last oyster season that Cox Bay was open for commercial oystering, I worked in it for 3 months of the season. That means I spent half the entire commercial oyster season in Cox Bay. I also shrimp in Cox Bay for five or six weeks each year.
6. I save waypoints that we visit on our boat on my GPS. I reviewed these waypoints and we have worked at the following coordinates in Cox Bay:
 - a. N 28°37.984, W 96°31.935
 - b. N 28°38.231, W 96°31.103
 - c. N 28°37.034, W 96°31.952
 - d. N28°38.120, W 96°30.174
7. Maps 1-4 below are an accurate reflection of the location of these coordinates in Cox Bay.

Map 1 – Distance from the Proposed Project to N 28°37.984, W 96°31.935



Map 2 – Distance from the Proposed Project to N 28°38.231, W 96°31.103



Map 3 – Distance from the Proposed Project to N 28°37.034, W 96°31.952



Map 4 – Distance from the Proposed Project to N 28°38.120, W 96°30.174



8. Maps 1-4 are just a sample of waypoints I have saved for Cox Bay. I have oystered and shrimped at other locations in Cox Bay.
9. I am concerned that if the proposed project is granted a permit by TCEQ that I will breathe in harmful air pollution from the facility while oystering and shrimping in Cox Bay. I am also concerned that I will breathe in harmful air pollution while oystering and shrimping in other locations in the Lavaca and Matagorda bay complexes which are the bays closest to the Seahawk terminal.
10. I love my job. I feel free when I am out on the water. I am concerned about the impacts an oil spill from increased oil shipments from the proposed project could have on my ability to work in these bays. I have seen first-hand what happens to oysters after an oil spill. I used to have licenses to oyster in both Texas and Louisiana. After the BP oil spill, the oysters in the Louisiana part of the Gulf would not grow very big before dying. Because of that, I don't oyster in Louisiana anymore. If something like that happened here, I would not be able to oyster in these bays anymore.
11. Approximately 80% of my yearly income comes from oystering. Oysters that are too small cannot be sold on the market under Texas law. Anything that causes oysters not to grow or makes it so that less oysters can survive in the bays harms my ability to make a living in these bays.

My name is Mauricio Blanco, my date of birth is January 16, 1972, and my address is 714 South San Antonio Street, Port Lavaca, Texas 77979 and I declare under penalty of perjury that the foregoing is true and correct.”

Executed in Calhoun County, State of Texas, on 3/21/2022.

DocuSigned by:

4DD376131EF4423...
Mauricio Blanco



June 4, 2021

Ms. Laurie Gharis
Chief Clerk, MC-105
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Via Electronic Filing

Re: Corrected Comments and Public Meeting Request Concerning Draft Air Quality Permit No. 162941, Authorizing an Expansion of the Seahawk Terminal, Located in Calhoun County, Texas

Dear Ms. Gharis:

If finalized, Draft Air Quality Permit No. 162941 (“Draft Permit”) will authorize Max Midstream Texas LLC (“Max Midstream”) to construct a significant expansion of its existing Seahawk Terminal (“Terminal”), located in Point Comfort, Texas. On November 12, 2020, S. Diane Wilson, San Antonio Bay Estuarine Waterkeeper (“Waterkeeper”), Texas Rio Grande Legal Aid, and Environmental Integrity Project (“Commenters”) filed comments and requested a contested case hearing on Max Midstream’s application for authorization to construct the Terminal expansion project. Comments and Contested Case Hearing Request Concerning Max Midstream Texas LLC’s Application for Permit No. 162941 (November 12, 2020) (“Initial Comments”). Today, Commenters appreciate the opportunity to file supplementary comments on the Draft Permit and to **request a public meeting** on Max Midstream’s application and Draft Permit. These supplementary comments add to, rather than replace, issues of fact and law identified in the Initial Comments.

I. Introduction

As the many requests for a contested case hearing and a public meeting concerning this project indicate, Max Midstream’s proposed Terminal expansion project is a matter of great concern to those who live, work, and recreate near the Terminal. This concern is warranted, not only in light of the significant deficiencies in Max Midstream’s air permit application, but also because the project threatens to substantially transform the profile of the Point Comfort area in a way that will diminish the ecological integrity of the area, interfere with residents’ use and enjoyment of their private property, and increase residents’ exposure to various dangerous contaminants that will be emitted into the air and discharged into Matagorda Bay. For example, the Matagorda Ship Channel will be deepened and widened to accommodate ship traffic to the Seahawk Terminal. This endeavor and subsequent activities at the Terminal threaten to smother up to 700 acres of oyster reefs, increase the salinity of the bay, and unearth methyl mercury pollution from the adjacent Alcoa Superfund site, potentially devastating local fisheries and

harming the already overburdened communities in Calhoun County, Texas. All of this is in addition to the harmful air quality impacts from construction and operation of the expanded Seahawk Terminal.

Additionally, many people are concerned that Max Midstream has been less than forthcoming and transparent about its intentions and about the likely impacts of the Terminal expansion project. For example, Max Midstream's decision to improperly mark all the detailed emission calculations submitted with its initial application "confidential," significantly limited the public's ability to identify critical deficiencies in the application and may have discouraged many from requesting a contested case hearing during the initial comment period on Max Midstream's application.¹ Had Commenters not made their hearing request as best they could, given the limited available public information, and challenged Max Midstream's claim of confidentiality in comments filed with the Texas Attorney General, the public would have lost its opportunity to demand a contested case hearing and crucial information necessary for a full review of the application as well as for enforcement of the Draft Permit's terms—if issued—would still be inaccessible to the public.

Given these serious and well-founded concerns, the TCEQ must take its review of Max Midstream's air permit application seriously and ensure that any authorization issued to Max Midstream includes all applicable federal and state-law requirements, as well as monitoring, testing, and recordkeeping conditions sufficient to make those requirements enforceable. As Commenters explained in their Initial Comments and explain further below, the Draft Permit falls far short of this mark.

II. Request for a Public Meeting

The proposed expansion project at the Seahawk Terminal is a matter of significant public concern. It will require a massive reshaping of Lavaca Bay that threatens to release mercury contamination from the nearby Alcoa Superfund site. *See, e.g.,* Matagorda Bay Foundation, Supplemental Environmental Impact Statement Letter, dated April 15, 2021.² It will lead to increased ship traffic in the Bay and increased road traffic through Point Comfort and potential congestion near the Terminal. Air emissions from the expanded Terminal, along with pollution

¹ Max Midstream's designation of these materials as "confidential" directly conflicts with applicable federal requirements that make enforceable application representations and emission calculations public as a matter of law. 40 C.F.R. § 2.31(f) (providing that "[e]missions data [and] standards or limitations ... shall be available to the public notwithstanding any other provision of this part."). When Commenters requested information Max Midstream improperly designated "confidential," and explained that emission calculations and enforceable application representations may not be withheld, Max Midstream did not revise its claim of confidentiality to allow prompt review of its materials. Instead, the company allowed Commenters' request to be forwarded to the Texas Attorney General without comment. Presumably, Max Midstream opted not comment on this referral because the company understood that its claim of confidentiality was unsupported. Consequently, Commenters were able to obtain the requested information, but only after the public comment period on the application had closed.

² Available electronically at: <https://www.sabaypartnership.org/manager/wp-content/uploads/2021-04-28-Matagorda-Bay-Corps-Supplemental-EIS-Letter.pdf>

from the ships and trucks using the Terminal, as well as emissions from recently constructed or expanded sources threaten to significantly diminish air quality in the area. While Max Midstream claims that its expansion project is “minor,” it has failed to show that it will be able to comply with synthetic limits claimed to avoid more stringent pollution control and impacts evaluation requirements that apply to “major” projects and the Draft Permit fails to establish monitoring requirements that are capable of reliably detecting non-compliance with the synthetic minor limits. Members of the public should have an opportunity to voice their concerns about this project and to put questions to Max Midstream and TCEQ representatives directly. For these reasons, Commenters request that the Executive Director or the Office of the Chief Clerk hold a public meeting on Max Midstream’s application and Draft Permit, as allowed by 30 Tex. Admin. Code § 55.154(c).

III. Evidence Regarding Affected Persons

A. Newly-Identified affected persons (Waterkeeper)

Siblings John Maresh and Janet Maresh are members of Waterkeeper who reside in Point Comfort, approximately 1.79 miles north of the Seahawk Terminal. Their home is located at 67 Milam Street, Point Comfort, Texas 77978. Both were born in Calhoun County and grew up in Point Comfort. Each has an ownership interest in their family home in Point Comfort, which is their primary residence. Both are concerned that the proposed Seahawk Terminal expansion project will contribute to existing air pollution problems and that cumulative impacts from the Terminal and other new and expanding sources of air pollution, like Formosa’s plastics plant and frequent traffic congestion, will push the area into non-attainment for National Ambient Air Quality Standards (“NAAQS”).

When conditions are right, thick acrid smog settles over Point Comfort. The Maresh family is concerned that this problem will only become worse if TCEQ authorizes the Seahawk Terminal expansion project. They are also concerned that this massive industrial undertaking will reshape and degrade the local landscape, destroy native wildlife habitat, and threaten sensitive ecosystems. For these reasons, and because increased air pollution and industrial activity related to the Seahawk Terminal will diminish the Maresh’s use and enjoyment of their property, interfere with their recreational activities in the area, and may cause them deleterious health impacts, the Mareshes oppose issuance of the Draft Permit. Mr. Maresh and Ms. Maresh are affected persons, as defined by Texas law.

B. Additional evidence demonstrating that S. Diane Wilson is an affected person

Commenters identified S. Diane Wilson as an affected person in their Initial Comments and now provide additional evidence that she is an affected person entitled to participate in a contested case hearing challenging the sufficiency of Max Midstream’s application and the Draft Permit.

As part of her work with Waterkeeper, Ms. Wilson routinely visits the water bodies near the Seahawk Terminal in Cameron County to observe whether plastic pellets, powder, or flakes are or have been discharged from the Formosa Plastics facility in Point Comfort (“Formosa”). Ms. Wilson visits the area at least once a week and as frequently as three times a week. During each of these trips, Ms. Wilson is outdoors in a kayak, a motorboat, or on foot between four and six hours. Ms. Wilson began visiting many of these sites as early as 2016 and will continue to visit them to monitor Formosa’s compliance with the Consent Decree entered in *San Antonio Bay Estuarine Waterkeeper, et. al., v. Formosa Plastics, Texas et. al.*, No. 6:17-cv-00047 (S. D. Texas, Dec. 9, 2019). This consent decree provides remedies to injuries suffered by Ms. Wilson and Waterkeeper from Formosa’s illegal discharge of plastics as found by Judge Kenneth Hoyt of the Southern District of Texas. These remedies establish a legally protected interest for Waterkeeper and Ms. Wilson that is not shared by the general public. Ms. Wilson’s reasonable concerns that her exposure to air pollution resulting from Max Midstream’s proposed expansion of the Seahawk Terminal interfere with these interests further establish that she is an affected person with a right to participate in a contested case hearing concerning Max Midstream’s air permit application and Draft Permit. Moreover, the District Court ruled in favor of Ms. Wilson and Waterkeeper on the question of Formosa’s liability in this lawsuit affirming that Ms. Wilson’s frequent use of the waters close or adjacent to the Formosa facility were sufficiently particularized to establish her standing to sue Formosa for violations of its wastewater discharge permit. Memorandum and Order, *San Antonio Bay Estuarine Waterkeeper, et al, v. Formosa Plastics Corp.*, Civil Action No. 6:17-CV-0047 (U.S. District Court, Southern District of Texas, Victoria Division June 27, 2019). The Court’s holding regarding standing remains in effect and supports Commenters’ demonstration that Ms. Wilson is an affected person in this case, because Max Midstream’s proposed expansion project will interfere with her use and enjoyment of these same areas.

Ms. Wilson regularly visits locations in Lavaca and Cox Bay to evaluate the presence and source of plastics in those water bodies. Three times in the last four months, Ms. Wilson visited the site of Formosa’s outfall number 013 located about 3,100 feet of the Seahawk terminal. Attachment A, Image A. Twice in the last year, Ms. Wilson visited Formosa’s outfall number 011 located near the Calhoun Port Authority and roughly 1,300 feet from the Seahawk terminal. *Id.* at Image B. Several times in the last year, Ms. Wilson visited the Northern portion of the harbor near the Alcoa facility, approximately 1.85 miles from the Seahawk terminal. *Id.* at Image C. Ms. Wilson also visits Formosa’s outfall 001 in Lavaca Bay once every two months, and the old causeway near Point Comfort once a week. Each are approximately two miles from the Seahawk Terminal. *Id.* at Images D & E.

Ms. Wilson visits Formosa’s outfalls 006, 002, 004, 005 and the Tres Bahias property on the East side of Cox Creek once a week. These are three miles or less from the Seahawk Terminal. *Id.* at Images F, G, & H. Multiple times a year, Ms. Wilson also visits other portions of Cox Creek including Formosa’s outfall 003 and the Alcoa Dam, Formosa’s fence line along highway 35, and a boom intended to catch plastics discharged from outfalls 002, 004, and 005. Each of these are 2.5 miles or less from the Seahawk terminal. *Id.* at Images I, J, & K. Ms. Wilson also visits locations on the southwest peninsula of Lavaca Bay once a week. These locations are all five miles or less of the Seahawk terminal. *Id.* at Images L, M, & N.

IV. Additional Disputed Issues of Fact and Law

Commenters preserve the following issues of material fact and law for consideration at a contested case hearing concerning Max Midstream's application and Draft Permit. Additional details about some, but not all, of these contested issues is provided below in Section V of these supplemental comments.

- The Terminal is a major source of CO, NO_x, and VOC (ozone), because the Terminal has the physical capacity to emit these pollutants at rates that exceed the Prevention of Significant Deterioration ("PSD") significance threshold of 100 tons per year ("TPY") and the synthetic minor limits Max Midstream has taken to avoid PSD preconstruction permitting requirements are not practicably enforceable. 30 Tex. Admin. Code § 116.111(a)(2)(B), (G), (I);
- Max Midstream has not attempted to demonstrate compliance with applicable PSD preconstruction requirements triggered by the expansion project. *Id.* at §§ 116.111(a)(2)(I), 116.160(b), (c);
- Max Midstream's application relies on inappropriate emission factors, including AP-42 emission factors and vendor guarantees that may or may not exist, which underrepresent potential and future actual emissions of VOC, NO_x, CO, PM/PM₁₀/PM_{2.5}, SO₂, and HAPs from the Terminal. *Id.* at §§ 116.111(a)(2)(A), (G), (I), 116.160(b), (c);
- Max Midstream failed to provide a reasonable basis for its representations regarding potential Hazardous Air Pollutant ("HAP") emissions from the Terminal used to avoid major source HAP requirements and to model air quality impacts. *Id.* at § 116.111(a)(2)(G), (K);
- Max Midstream's representation that its emergency flare will not emit *any* particulate matter is unsupported and unreasonable and the Draft Permit fails to establish monitoring and testing provisions that make the prohibition on all PM emissions from the emergency flare practically enforceable. *Id.* at §§ 116.111(a)(2)(A), (B), (G), (J);
- Max Midstream underrepresented expected emissions from truck and marine loading and overestimated the collection efficiencies of its equipment related to these activities, and the Draft Permit fails to establish monitoring and testing conditions sufficient to make these representations practicably enforceable. *Id.* at § 116.111(a)(2)(A), (B), (G), (I), (J), (K);
- Max Midstream failed to provide the basis for the crude characteristics it used to calculate proposed emission limits and to perform its air impacts demonstrations, and the Draft

Permit fails to require monitoring sufficient to make representations regarding crude characteristics practically enforceable. *Id.* at § 116.111(a)(2)(A), (B), (G), (I), (J), (K);

- Max Midstream’s application fails to demonstrate that the Draft Permit’s emission limits and pollution control requirements are consistent with applicable Texas Best Available Control (“BACT”) requirements, because it fails to include *any* information about pollution control requirements in recently issued permits for similar sources. *Id.* at §§ 116.111(a)(2)(B), (C), (G), (I), 116.160(c), (a);
- Max Midstream’s proposed leak detection and repair (“LDAR”) program is not consistent with applicable Texas BACT requirements, because Max Midstream failed to consider more robust LDAR regimes required by recently-issued Texas air permits and because Max Midstream failed to consider whether additional monitoring using optical gas imaging (“OGI”) would provide more effective control without unreasonably increasing costs. *Id.* at §§ 116.111(a)(2)(B), (C), (G), (I), 116.160(c), (a);
- Max Midstream failed to demonstrate that a NO_x emission rate of 0.1 lb/MMBtu is consistent with applicable Texas BACT requirements for units CONT-1 and CONT-2. *Id.* at §§ 116.111(a)(2)(B), (C), (G), (I), 116.160(c), (a);
- Max Midstream has not attempted to demonstrate that emissions from the Terminal will not cause or contribute to violation of National Ambient Air Quality Standards (“NAAQS”) for ozone. *Id.* at §§ 116.111(a)(2)(A), (I), (J), 116.160(c)(2);
- Max Midstream’s air quality impacts demonstration is deficient, because it (1) relies upon unrealistic and practicably unenforceable assumptions about emission rates for new and existing equipment; (2) fails to model impacts from the Terminal using the 10 ppmv at 3% O₂ VOC emission rate included in the Draft Permit; (3) uses unrepresentative meteorological data; (3) improperly and arbitrarily excludes or averages emissions from certain emission points; (4) uses unrepresentative information about source parameters and location; (5) fails to properly identify point sources and area sources for purposes of modeling, and (6) fails to account for cumulative impacts from other new and recently permitted sources. *Id.* at §§ 116.111(a)(2)(A), (I), (J), 116.160(c)(2).

V. Detailed Comments on Select Disputed Issues of Fact and Law

A. Max Midstream’s representations about the Terminal’s potential to emit are unsupported and unreasonable.

According to Max Midstream’s updated application, the expanded Seahawk Terminal will emit pollutants at the following rates:

Table 1: Represented Potential to Emit

Pollutant	Tons Per Year	Major Modification Threshold (TPY)
CO	97.35	100
NO _x	97.03	100
PM/PM ₁₀ /PM _{2.5}	11.12	100
SO ₂	21.93	100
Ozone (as VOC)	84.15	100
Ozone (as NO _x)	97.03	100

Max Midstream, PI-1 General Application Table dated November 2020.

As Commenters demonstrated in their Initial Comments, the expanded Terminal will have the physical capacity to emit pollution far above the significance threshold of 100 tons per year that triggers PSD preconstruction permitting requirements. Initial Comments at 2-3. Thus, the expansion project triggers PSD preconstruction permitting requirements, *see* 30 Tex. Admin. Code § 116.160(c) (describing additional requirements that apply to PSD major modifications), unless the permit authorizing the project establishes practicably enforceable “synthetic” limitations for criteria pollutants, like NO_x, PM, and VOC (an ozone precursor), ensuring that emissions of these pollutants will remain below the 100 ton per year PSD significance threshold. *See In the Matter of Yuhuang Chemical Inc. Methanol Plant*, Order on Petition No. VI-2015-03 (August 31, 2016) at 14 (“Importantly, only limits that meet certain enforceability criteria may be used to restrict a facility’s PTE, and the permit must include sufficient terms and conditions such that the source cannot lawfully exceed the limit.”) (citing *In the Matter of Cash Creek Generation*, Order on Petition No. IV-2010-4 (June 22, 2012) (explaining that an “emission limit can be relied upon to restrict a source’s PTE only if it is legally and practicably enforceable.”)); *see also* EPA, *New Source Review Workshop Manual*, at A.5 (Draft October 1990) (“For any limit or condition to be a legitimate restriction on potential to emit, that limit or condition must be federally-enforceable, which in turn requires practical enforceability.”).

In this case, Max Midstream has identified constraints on throughput, loading rates, operating time, and material composition that are intended to establish enforceable constraints on the Terminal’s potential to emit. However, these constraints alone are not sufficient to show that actual emissions from the Terminal will remain below the applicable PSD significance threshold. Max Midstream also relies on “emission factors,” which are predictions about how much pollution units and activities at the Terminal will emit per the unit of activity that the Draft Permit will limit, to calculate its potential to emit given the artificial constraints on utilization of equipment at the Terminal. For example, where Max Midstream has proposed a cap on the combustion capacity or utilization of combustion sources in terms of MMBtu/hour or year, it relies on emission factors that predict how much pollution per MMBtu equipment at the Terminal will emit to calculate the Terminal’s PTE. These emission factors are taken from various sources, including TCEQ guidance, EPA’s AP-42 emission factors document, vendor guarantees that may or may not exist, and other undisclosed sources. If the Draft Permit is approved, these emission factors become conditions of the air permit. *See* 30 Tex. Admin. Code § 116.116(a) (making application representations regarding construction and operation of a source enforceable conditions of an air permit).

Unfortunately, Max Midstream failed to show that these emission factors reliably predict maximum potential emissions from the Terminal, given the proposed utilization constraints, and the Draft Permit fails to establish monitoring requirements that make the emission factors practicably enforceable. Accordingly, the synthetic minor limits Max Midstream has proposed are not practicably enforceable and do not effectively limit the Terminal’s potential to emit. Because these emission factors are unreliable and unenforceable, and because the gap between the synthetic minor limits proposed by Max Midstream and the applicable significance threshold is much smaller than the probable margin of error for the calculation methods Max Midstream has used, Max Midstream has failed to establish that this project is minor.

These practically unenforceable, unjustified, and unreliable emission factors also undermine the Company’s air quality impacts demonstration. Accordingly, Max Midstream has failed to demonstrate that a *minor* source permit is the appropriate vehicle for authorizing construction of the expansion project, *Id.* at § 116.111(a)(2)(B), (G), (I), that the project complies with applicable PSD preconstruction permitting requirements, *id.*, and that air quality impacts from the expanded Terminal will not endanger public health, welfare, and the environment. *Id.* at § 116.11(a)(2)(A), (J).

Table 2: Bases for Max Midstream Application Emission Calculations

Unit Type	Activity/Pollutant	Basis	Application Page
Storage Tanks	Routine working and breathing emissions	AP-42, Section 7.1 (March 2020)	5-1
	Short-term emission rates	AP-42, Section 7 equations with max. Temp. And vapor pressure per TCEQ	

		Guidance Document APDG 6419v2 (February 2020)	
Marine Vessel Loading	Uncontrolled loading losses	AP-42, Section 5.2, Equation 1	5-2
	VCU VOC emissions 99.9% DRE	Vendor guarantee	
	Uncollected fugitive based on efficiency of 99.89% for inerted ship and ocean-going barge loading, 100% for vacuum loading activities	TCEQ Air Permit Technical Guidance for Chemical Sources: Flares and Oxidizers, October 2002	
	VCU NO _x and CO emissions	Vendor guaranteed emission factors and a vapor heat content of 20,000 Btu/lb	
	VCU PM/PM ₁₀ /PM _{2.5} , SO ₂ from assist gas	AP-42, Section 1.4	
Emergency Flare	VOC DRE 99% for straight-chained organic compounds 3 carbons or less, 98% other compounds	TCEQ Guidance	5-3
	NO _x and CO	Calculated based on heat input of the material being combusted and TCEQ emission factors	
	VOC and SO ₂ from pilot gas	AP-42, Section 1.4 emission factors for natural gas combustion.	
Equipment Fugitives		Estimated using methods outlined in TCEQ's guidance web page for Equipment Leak Fugitives. Number of components times emission factor.	5-3
Storage Tank Floating Roof		Subsection 7.1.3.3 Floating Roof	5-4

Landing Losses (MSS)		Landing Losses, Section 7.1 AP-42 (March 2020)	
Storage Tank Refilling Losses (MSS)		Subsection 7.1.3.3.1, Section 7.1 AP-42	5-5
Storage Tank cleaning, refilling, and degassing (MSS)	VOC concentrations higher than 10,000 ppmv routed to control	TCEQ's Air Permit Guidance for Chemical Sources: Flares and Oxidizers (October 2002)	5-5
Equipment Venting (MSS)	VOC, NO _x , SO ₂ , PM/PM ₁₀ /PM _{2.5} and CO	Estimated from vapor combustion	5-6
Vacuum Truck and Frac Tank Loading (MSS)		AP-42, Section 5.2	5-6
Pipeline Pigging Emissions (MSS)		Carbon canister emissions are estimated based on vapor flow rates and a carbon breakthrough concentration of 100ppmv	5-7

1. Max Midstream failed to justify its reliance on AP-42 emission factors and equations.

Max Midstream's application and the TCEQ's review of that application rely heavily upon AP-42 emission factors to calculate the Terminal's potential to emit, which, in turn, provides the basis for Max Midstream's impacts and BACT demonstrations. AP-42 is a compilation of air pollutant emission factors developed by EPA, which has been published since 1972.³ These emission factors were developed to provide approximations of average emissions from certain *kinds* of activities and equipment. They were not intended to be used as the primary point of reference for source-specific permitting and enforcement. According to EPA, an AP-42 emission factor is:

a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These

³ Available electronically at: <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors>

factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e.g., kilograms of particulate emitted per megagram of coal burned). Such factors facilitate estimation of emissions from various sources of air pollution. *In most cases, these factors are simply averages of all available data of acceptable quality*, and are generally assumed to be representative of *long-term averages* for all facilities in the source category (i.e., a population average).

AP-42 (1995), Introduction at 1 (underlining in original, italics added).⁴

EPA has long warned that AP-42 that AP-42 emission “factors are not likely to be accurate predictors of emissions from any one specific source, except in very limited scenarios.” EPA Reminder About Inappropriate Use of AP-42 Emission Factors, Publication No. EPA 325-N-20-001 (November, 2020) (“Enforcement Alert”).⁵ Specifically, EPA has explained that “[u]se of these factors as source-specific permit limits ... is not recommended by EPA.” AP-42 (1995), Introduction at 1. This is so:

Because emission factors essentially represent an average of a range of emission rates, approximately half of the subject sources will have emission rates greater than the emission factor and the other half will have emission rates less than the factor. As such, a permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance.

Id. (emphasis added).

In an enforcement alert released just last year, EPA emphasized an additional reason that AP-42 emission factors should not be used to establish or determine compliance with source-specific emission limits:

With the advent of 1-hour and short-term National Ambient Air Quality Standards (NAAQS), permit limits must be able to account for short term fluctuations. AP-42 emission factors also do not account for short term variation in emissions as the emission factors are intended for use in developing area-wide annual or triannual inventories. In developing emission factors, test data are typically taken from normal operating conditions and generally avoid conditions that can cause short-term fluctuations in emissions. These short-term fluctuations in emissions can stem from variations in process conditions, control device conditions, raw materials, ambient conditions, or other similar factors. This means that if facilities use AP-42 emission factors as permit limits, facilities increase their chances of violating their short-term permit limits. It also increases the likelihood of a geographic area’s non-compliance with the NAAQS.

⁴ Available electronically at: <https://www.epa.gov/sites/production/files/2020-09/documents/c00s00.pdf>

⁵ Available electronically at: <https://www.epa.gov/sites/production/files/2021-01/documents/ap42-enforcementalert.pdf>

Enforcement Alert at 1-2.

Thus, Max Midstream should not be allowed to use AP-42 emission factors and equations to demonstrate that the Terminal expansion does not trigger PSD preconstruction permitting requirements or that impacts from the expansion project are acceptable without providing a justification that this case is one of the “very limited scenarios” where reliance on AP-42 to predict emissions from a specific source over both long and short-term averaging periods is appropriate.

These warnings, from the government agency responsible for publishing, developing, and collecting the very emission factors Max Midstream relies upon in this case must be taken seriously. EPA’s warnings about the practical limitations of AP-42 emission factors generally is bolstered by EPA’s characterization of the specific AP-42 equation Max Midstream used to calculate maximum loading losses for the Terminal. This calculation is key to Max Midstream’s claim that the expansion project is minor for purposes of PSD, because the amount of pollution lost during loading activities determines the utilization of the propose vapor combustion units (“VCUs”), which account for almost all of the NO_x and CO the Terminal will emit. A NO_x or CO increase of less than 4% from these VCUs would be sufficient to trigger PSD preconstruction requirements.

Table 3: Terminal Expansion NO_x and CO Emissions Increases

Pollutant	Represented Source-Wide Emissions (TPY)	Major Source Threshold (TPY)	Difference (TPY)	4% of Marine Control Emissions Cap (TPY)
NO _x	97.03	100	2.97	3.5
CO	97.35	100	2.65	3.5

This razor thin margin is a huge problem for Max Midstream, because the equation the company relies upon to determine how much pollution will be combusted in the proposed VCUs has “*a probable error of +/- 30 percent.*” AP-42, Section 5.2 at 5.2-4 (emphasis added).⁶ Max Midstream should not be allowed to rely on such an imprecise equation to determine the maximum potential annual loading losses from the Terminal because an increase of even 4%—much less than the margin of probable error built into the loading loss equation—would likely result in an increase in NO_x emissions sufficient to trigger PSD requirements. And while it may not be a certainty that an increase in loading losses will drive a one-to-one increase in NO_x and/or CO emissions from Max Midstream’s VCUs, given that the composition of the loading displacement gas changes, which affects the heat content, and that, in turn affects NO_x and CO emissions from the VCUs, the relationship will be very close to one-to-one on an annual basis. Accordingly, it is unreasonable for Max Midstream to rely on an equation that builds in a probable error rate of 30% to calculate loading losses from the Terminal to demonstrate that the project is minor, when a mere increase of 4% would likely trigger major NSR requirements.

⁶ Available electronically at: https://www.epa.gov/sites/production/files/2020-09/documents/5.2_transportation_and_marketing_of_petroleum_liquids.pdf

If the TCEQ wishes to allow Max Midstream to rely on AP-42 emission factors and the AP-42 loading loss equation to limit the Terminal's potential to emit, the agency must establish monitoring methods that are sufficient to determine whether emissions from the Terminal are consistent with the generic emission factors used to establish the Draft Permit's synthetic minor limits. Otherwise, the only enforceable constraints on Max Midstream's potential to emit are the throughput and operational limits represented in the application, which do not ensure that emissions from the Terminal will remain below the applicable significance threshold unless emissions from the Terminal are consistent with the practicably unenforceable emission factors. To make the Draft Permit's synthetic minor limits enforceable, the TCEQ must require Max Midstream to operate NO_x, CO, and VOC CEMS on its VCUs and to use optical gas imaging to monitor for fugitive leaks. Without such direct monitoring, the synthetic limits Max Midstream has agreed to are not practicably enforceable and may not be used to avoid PSD preconstruction permitting requirements. If Max Midstream thinks the cost of enforceable synthetic limits is too high, the proper solution is not approving unenforceable synthetic minor limits; it is requiring Max Midstream to obtain a PSD permit.

Max Midstream also claims—without support—that its proposed emergency flare will not emit *any* particulate matter (“PM”). Completely eliminating all PM from flares is very difficult, especially with flares—like the one Max Midstream proposes to construct—that are not steam assisted. AP-42 indicates that PM from flares most often falls within a range of 0-274 lb/10⁻⁶ BTU. AP-42, Section 13.5, 13.5-4 (Table 13.5-1).⁷ It is very unlikely that Max Midstream will be able to *completely* eliminate PM emissions from its flare on a continuous basis without additional monitoring and control technology that is not required by the Draft Permit. Thus, potential PM emissions from the Terminal represented Max Midstream's application and used to model air quality from the Terminal almost certainly fail to account for all PM that the Terminal will actually emit.

Before the TCEQ may finalize the Draft Permit, it must establish monitoring, testing, and recordkeeping requirements sufficient to assure continuous compliance with the zero PM emissions representation or require Max Midstream to use a more realistic particulate matter emission rate to model air quality impacts from its emergency flare. Monitoring sufficient to ensure continuous compliance is critical, because “[w]ith the advent of ... short-term National Ambient Air Quality Standards [, including 24-hour standards for PM_{2.5} and PM₁₀,] permit limits must be able to account for short term fluctuations.” Enforcement Alert at 1.

2. The Draft Permit fails to assure compliance with Max Midstream's representations regarding the destruction and removal efficiency of its proposed vapor combustion units.

According to Max Midstream's initial application, represented NO_x and CO emission rates from the proposed VCUs as well as the represented VCU VOC destruction and removal efficiency (“DRE”) of at least 99.9% were “based on vendor guaranteed emission factors and a vapor heat content of 20,000 Btu/lb.” Application at 5-2, 5-5. However, when the TCEQ asked Max

⁷ Available electronically at: <https://www3.epa.gov/ttnchie1/ap42/ch13/final/c13s05.pdf>

Midstream to provide this vendor data, so that Max Midstream's emissions calculations could be verified, Max Midstream replied that it has not actually obtained a vendor guarantee:

The vendor selection process is currently underway and a final decision on vendors has yet to be made. However, the attached updated Table A-6 VCU NO_x and CO emission factors are representative of vapor control devices installed at similar terminals and achieve controls which exceed recent BACT determinations.

Response to TCEQ, Dated November 20, 2020 at Response 6.

Max Midstream's application represents a very high VOC DRE of 99.9% at a relatively low minimum combustion temperature of 1,400° F. This DRE is so high, in fact, that Max Midstream contends that it cannot be confirmed by stack testing. Email from Neal Nygaard to Ariel Ramirez, dated February 1, 2021 ("Modern VCUs are capable of achieving control at levels which result in stack exit concentrations that may be below the applicable monitoring detection limits."). To address this possibility, the Draft Permit allows Max Midstream to demonstrate compliance with the 99.9% DRE representation by maintaining VOC emissions from the VCUs at or below 10 ppm at 3% oxygen during the initial stack test. Draft Permit at Special Condition No. 14.

There are several problems with Max Midstream's DRE representations. First, Max Midstream attempts to downplay its initial misrepresentation that the represented VCU DRE is supported by a vendor guarantee by explaining that the represented DRE is also consistent with "vapor control devices installed at similar terminals and achieve controls which exceed recent BACT determinations." But Max Midstream failed to identify any of these similar sources and did not provide information showing that these other VCUs would be able to continuously achieve a 99.9% DRE under conditions comparable to those at the Terminal. It is not enough for Max Midstream to show that controls at other unspecified sources have achieved the "beyond BACT" level of control the company has represented to avoid triggering PSD requirements (and Max Midstream has not even done this). Max Midstream must also demonstrate that its source will achieve that level of control. 30 Tex. Admin. Code § 116.111(a)(2)(G).

Max Midstream also failed to demonstrate that the proposed alternative measure of compliance for its VCUs' VOC DRE, 10 ppmv at 3% O₂, is equivalent to the represented 99.9 % DRE. If Max Midstream must use this alternative to demonstrate compliance with its permit, the company should also be required to use the alternative emission rate to model crude-related air quality impacts. Additionally, Max Midstream's proposal to demonstrate compliance with DRE representations by conducting a single stack test is unacceptable. There are various factors that affect a VCU's performance, including changes in the composition of the materials being combusted. Max Midstream contends that it would not be practical to establish throughput limits for the various materials it will handle at the Terminal, "due to the varying nature of crude oils and crude oil condensates and customer markets at the terminal." Application at 5-1.⁸ Given this

⁸ Max Midstream's suggestion that it is not bound by represented throughput limits represented in its application is mistaken. These throughput limits will be conditions of the Draft Permit, if it is issued. 30 Tex. Admin. Code § 116.116(a).

variability, the very high level of control represented and the proximity of Max Midstream's represented VOC emissions to the PSD significance threshold, Max Midstream must be required to conduct more frequent monitoring of its VCUs' emissions. Specifically, Max Midstream should be required to use VOC CEMS to monitor emissions from its VCUs and to assure compliance with its synthetic minor permit limits across all the different operating conditions authorized by the Draft Permit. Otherwise, Max Midstream should be required to obtain a PSD permit before constructing the Terminal expansion, because the synthetic VOC limits it took to avoid PSD are not practicably enforceable and do not effectively limit the Terminal's potential to emit.

Finally, Commenters are also concerned that Max Midstream failed to show that it will be able to maintain the represented DRE from its VCUs while also complying with represented emission rates for VCU NO_x and CO. According to Max Midstream's application, the VCUs will achieve a VOC DRE of 99.9%, so long as the combustion zone temperature is maintained above 1,400° F. Draft Permit at Special Condition No. 17(A). This is a relatively low combustion zone temperature, and it is unclear that it will be sufficient to maintain the represented DRE across all operating scenarios. For example, Max Midstream indicates that its emergency flare will maintain a temperature of 1,832° F to achieve a much lower DRE between 98 and 99%. Additionally, Max Midstream's February 2021 update to its emission calculations indicates that the operating temperature for its VCUs will be 1,600° F and not 1,400° F required by the Draft Permit. *See* Annual Crude/Crude Condensate Inputs Table, dated February 2021. Given these inconsistencies in Max Midstream's application representations, and given the fact that increasing the VCU combustion zone temperature will result in higher NO_x emissions, the TCEQ should require Max Midstream to install VOC, NO_x, and CO CEMs on its VCUs to determine the proper combustion zone temperature necessary to comply with the represented DRE and to clarify whether this temperature can be maintained without exceeding represented NO_x and CO emission rates taken to avoid triggering PSD preconstruction requirements. If this measure is unacceptable to Max Midstream, the TCEQ should require the company to apply for a PSD permit, because the synthetic limits taken to avoid triggering these requirements are not otherwise practicably enforceable.

B. Max Midstream failed to demonstrate compliance with applicable Texas BACT requirements.

In Texas, projects that are not subject to federal major NSR requirements must comply with Best Available Control Technology, or "BACT," requirements established by the Texas Clean Air Act and the TCEQ's regulations implementing the Texas Clean Air Act. 30 Tex. Admin. Code §§ 116.10(1), 116.111(a)(2)(C). According to this standard, proposed pollution controls must be at least as good as those accepted as BACT in recent permit reviews for the same process and/or industry, unless the applicant demonstrates that such controls would not be as effective at the proposed source, the controls cannot be used at the proposed source due to technical constraints, or that using those controls would be economically unreasonable. *See*, TCEQ Air Permit Reviewer Reference Guide, APDG 6110, Air Pollution Control ("BACT Guidance"), dated January 2011 at 12-13. As the TCEQ's BACT Guidance explains, "BACT for any particular industry is not static," and "before accepting a BACT proposal "[t]he permit reviewer must ensure that the administrative record provided by the applicant ... is sound, comprehensive, and

adequately supports the conclusions of the BACT review.” *Id.* at 11. The BACT Guidance also explains that the “applicant must fully document the basis for air pollution control determinations as it is the applicant’s responsibility to adequately demonstrate that the permit should be issued.” *Id.* at 1. *See also* 30 Tex. Admin. Code § 116.111(a)(2)(C).

Max Midstream’s BACT demonstration is deficient because it fails to include *any* specific information about control technologies applied and control efficiencies achieved at recently authorized similar sources. What’s more, Max Midstream failed to identify any such sources that informed its analysis. Accordingly, Max Midstream has failed to make the demonstration required by § 116.111 and the TCEQ’s BACT Guidance. Below, Commenters flag some additional problems with specific representations related to BACT in Max Midstream’s application materials. These problems are illustrative rather than exhaustive and Commenters reserve the right to present evidence regarding other deficiencies in Max Midstream’s BACT demonstration at a contested case hearing.

1. The proposed NO_x emission rates for VCU units CONT-1 and CONT-2 are too high and the lower limits for the other VCUs are unsupported.

The Draft Permit establishes two different sets of NO_x and CO pollution requirements for VCUs at the Terminal. According to the Draft Permit, units CONT-1 and CONT-2 must comply with a performance standard of 0.10 lb/MMBtu for NO_x and CO. Draft Permit at Special Condition No. 18(D). Units CONT-3 through CONT-11 and CONT-15 through CONT-23 must comply with the significantly more stringent performance standard of 0.02 lb/MMBtu for NO_x and CO. *Id.* If a standard of 0.02 lb/MMBtu for NO_x and CO is BACT for these units, it should also be required as BACT for units CONT-1 and CONT-2, unless Max Midstream demonstrates that there are technical reasons CONT-1 and CONT-2 will be unable to comply with the more stringent standards or that uniform compliance with the more stringent standards is not economically reasonable. Max Midstream has not attempted this demonstration. Accordingly, its application is incomplete.

On the other hand, Max Midstream has also failed to demonstrate that its VCUs will be able to achieve ongoing compliance with the more stringent 0.02 lb/MMBtu NO_x and CO performance standards established by the Draft Permit. This is important because these performance standards are necessary to demonstrate that the expansion project does not trigger PSD preconstruction requirements. Less stringent NO_x and CO requirements established by two recently-issued permits authorizing VCUs at sources subject to more stringent *federal* BACT requirements cast doubt on the achievability of the lower limits requested by Max Midstream. In 2018, the TCEQ issued a PSD permit authorizing construction of a VCU at Oxy Midstream’s Ingleside Energy Center subject to a NO_x limit of 0.0600 lb/MMBtu. *See* RBLC ID TX-0844.⁹ Then, in 2020, the TCEQ issued a permit authorizing construction of a VCU at Motiva’s Port Arthur Refinery with a NO_x limit of 0.1380 lb/MMBtu. *See* RBLC ID TX-0879.¹⁰ Emissions

⁹ Available electronically at:

https://cfpub.epa.gov/rblc/index.cfm?action=PermitDetail.ProcessInfo&facility_id=28571&PROCESS_ID=112357

¹⁰ Available electronically at:

https://cfpub.epa.gov/rblc/index.cfm?action=PermitDetail.ProcessInfo&facility_id=28715&PROCESS_ID=113111

from the VCU's at the Seahawk Terminal that only comply with these less stringent limits would result in NO_x emissions increases triggering PSD preconstruction permitting requirements. And while Max Midstream initially represented that its proposed 0.02 lb/MMBtu CO and NO_x emission limits were supported by a vendor guarantee, Max Midstream has since backtracked from that statement. Accordingly, Max Midstream should be required to provide evidence that its proposed emission rates for CO and NO_x are achievable and the TCEQ should revise the Draft Permit to include continuous direct monitoring to assure compliance with the represented NO_x and CO emission rates. If Max Midstream is unwilling to accept such monitoring requirements, the TCEQ should require it to obtain a PSD permit before constructing the Terminal expansion.

2. The Leak Detection and Repair program mandated by the Draft Permit is not consistent with applicable Texas BACT requirements.

The Draft Permit identifies the TCEQ's 28VHP LDAR program as BACT for fugitive emissions. Draft Permit at Special Condition No. 19. This determination and Max Midstream's application supporting the determination are deficient for several reasons. First, BACT should include a set of technologies that eliminate fugitive VOC emissions to the greatest extent practicable. Such measures include using sealless pumps and compressors as well as leakless valves in every instance, unless Max Midstream demonstrates that there are process constraints or other reasons why that cannot be done cost-effectively. These technologies have been available for decades, and yet there was no consideration of such preventative technologies in Max Midstream's BACT analysis.

Second, using any type of LDAR as BACT for fugitive emissions is unreliable and technically obsolete. Common deficiencies with LDAR programs, including the TCEQ's 28VHP program, are: not identifying all components; using wrong leak definitions; not following Method 21 properly; failing to monitor the maximum leak location; not monitoring long enough to identify existing leaks; holding the Method 21 probe too far away from components; using incorrect or expired calibration gas; not repairing leaking components within the time period specified by the relevant permit; and not keeping detailed and accurate records. LDAR programs, like the one mandated by the Draft Permit, rely on human beings to properly implement a monotonous, repetitive, and tedious set of measurements at hundreds or thousands of individual components in a single day. Given these conditions, it is unsurprising and perhaps inevitable that LDAR programs are often far-less effective at identifying and controlling fugitive emissions than billed.

Third, even if LDAR is a necessary component of BACT for fugitives in this case, Max Midstream failed to demonstrate that 28VHP is the most effective economically reasonable LDAR program available.¹¹ The TCEQ has required compliance with stricter LDAR programs in several recently-issued permits. For example, the TCEQ's 28MID program is in use at the NuStar Corpus Christi Terminal and the Motiva Port Arthur Refinery. Thus, according to the TCEQ's three-tiered BACT methodology, Max Midstream should be required to match these stricter control requirements unless it provides specific evidence demonstrating that the requirements are

¹¹ Information about the TCEQ's various LDAR programs is available electronically at: https://www.tceq.texas.gov/permitting/air/guidance/newsourcereview/fugitives/nsr_fac_eqfug.html

workable for the Seahawk Terminal or that they are economically unreasonable. Max Midstream’s application does not attempt such a demonstration, and, accordingly, it fails to establish that 28VHP is BACT for fugitives in this case.

Finally, even if a LDAR program is selected as BACT in this case, it should be supplemented using surveillance tools, like optical gas imaging. LDAR supplemented by OGI is superior to LDAR alone because it allows sources to rapidly identify sources of large leaks, allowing such leaks to be repaired quickly, which, in turn, significantly reduces fugitive emissions. These advantages are so significant that EPA has included OGI in its New Source Performance Standards (“NSPS”) for oil and natural gas facilities since 2016. Industry has also long recognized the weaknesses of LDAR programs and that supplementing LDAR programs with OGI offers a significant improvement over LDAR programs alone. The improved leak detection and repair time possible with the use of OGI benefits both the environment and the operator. ExxonMobil provided the following graphical illustration on the benefits of using OGI:¹²

Method 21 vs. OGI for LDAR



Method 21	OGI Technology
	
<ul style="list-style-type: none">• Finding a leak is like looking for a needle in a haystack – and you need to inspect every “straw”!• Inspecting hundreds of components to find one leak (or no leaks)	<ul style="list-style-type: none">• OGI allows for rapid screening of components – focusing on the “needle” rather than every “straw”• Much more efficient method for finding significant leaks• Potential to reduce the cost of LDAR compliance

Because OGI is a proven technology that is required by the Oil and Gas NESHP and that has been successfully implemented at existing sources to reduce fugitive emissions, the TCEQ

¹² New Optical Gas Imaging Technology for Quantifying Fugitive Emission Rates, Powerpoint Presentation by Providence Photonics and ExxonMobil, available electronically at: <http://content.4cmarketplace.com/presentations/NewOpticalGasImagingTechnologyforQuantifyingFugitiveEmissionRates4C2015.pdf>

should require it as part of the BACT regime for reducing fugitive emissions at the Seahwak Terminal.

VI. Conclusion

Commenters have demonstrated that Max Midstream has failed to make demonstrations required by 30 Tex. Admin. Code § 116.111, that S. Diane Wilson and Waterkeeper are entitled to a contested case hearing on Max Midstream's application and the Draft Permit, and that the Executive Director or Office of the Chief Clerk should convene a public meeting concerning this project. Accordingly, the TCEQ may not issue the requested permit authorizing Max Midstream's proposed expansion project before correcting the deficiencies Commenters have identified and convening a contested case hearing to consider contested issues of fact and law preserved by the Initial Comments and supplemented by this filing.

Sincerely,

/s/ Gabriel Clark-Leach

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Subject: Public comment on Permit Number 162941
Date: Monday, March 7, 2022 6:11:50 PM
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REGULATED ENTY NAME SEAHAWK CRUDE CONDENSATE TERMINAL

RN NUMBER: RN106209190

PERMIT NUMBER: 162941

DOCKET NUMBER: 2022-0157-AIR

COUNTY: CALHOUN

PRINCIPAL NAME: MAX MIDSTREAM TEXAS LLC

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COMMENTS: Please find attached a corrected copy of San Antonio Bay Estuarine Waterkeeper's June 4, 2021 contested case hearing request. The filing has been corrected to include the physical address for two Waterkeeper members.