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April 24, 2024

Laurie Gharis, Chief Clerk
Texas Commission on Environmental Quality
Office of the Chief Clerk, MC-105
P.O. Box 13087
Austin, Texas 78701-3087

Via TCEQ Online Comment Form

Re: Comments and Request for Contested Case Hearing regarding Applications by SL Energy Power Plan I, LLC for Proposed Air Quality Permit Nos. 177380, PSDTX1650, and GHGPSDTX244

Dear Ms. Gharis:

On behalf of Neighbors for Neighbors, Inc., d/b/a Move the Gas Plant ("MTGP"), and the Sierra Club, I submit these comments and this request for a contested case hearing regarding the above-referenced Applications by SL Energy Power Plant I, LLC ("Applicant" or "SL Energy") to construct and operate the SL Energy Power Plant I (the "Plant") in Lexington, Lee County, Texas. These are submitted as comments on behalf of the Sierra Club, but the Sierra Club is not requesting a contested case hearing at this time. The following information supplements MTGP's initial request for contested case hearing, dated September 12, 2024. MTGP may be contacted through my office at the address and telephone number indicated below.

I. Move the Gas Plant is an Affected Person

MTGP is a non-profit community membership organization based in Lexington, Texas, dedicated to protecting its community and its members' interests from the harmful effects on air quality that would be caused by the proposed Plant's construction and operations. Many MTGP members reside in close proximity to the proposed Plant site and have personal justiciable interests that are not common to the general public. For these reasons, MTGP meets the requirements for associational standing to request a contested case hearing. MTGP members, who otherwise would have standing to request a hearing in their own right, include the individuals with personal justiciable interests discussed below.

MTGP member Kourtney Jirasek and family own and reside on 23 acres of property located at 1371 CR 312, Thrall, Texas 76578, within one mile of the proposed Plant site. Ms. Jirasek is concerned that emissions from the proposed Plant would adversely affect the health of

her family. She is particularly concerned about the impact of the Plant's emissions on the health of her three-year-old son, who enjoys spending much of his time outdoors. In addition to spending time outside with their dog, Ms. Jirasek and family enjoy fishing, hunting, and engaging in other recreational activities on their property. The Plant's emissions would negatively impact air quality and the use and enjoyment of Ms. Jirasek's property. In addition, Ms. Jirasek raises livestock, which may be harmed by the Plant's emission of air contaminants.

MTGP member Trish Siler owns 10 acres of property located at 1501 County Road 312, Thrall, Texas 76578, within one mile of the proposed Plant site. Ms. Siler resides on this property, along with her daughter, son-in-law, and three young grandchildren. Emissions from the proposed Plant would adversely affect Ms. Siler's health by exacerbating her existing health conditions, which include migraines, thyroid nodules, fibromyalgia, and multiple chemical sensitivity (MCS). Ms. Siler, a disabled U.S. Army veteran, was exposed to toxic emissions from burning oil fields, among numerous other toxic emission sources, while she served in the Gulf War. In addition, Ms. Siler's son-in-law has asthma. Ms. Siler is concerned not only about the impact of emissions on her own compromised health, but also on her family's health. In addition, Ms. Siler raises cows, goats, and chickens. Her livestock may be harmed by the Plant's emission of air contaminants. Furthermore, Ms. Siler's family enjoys spending much of their time outdoors gardening, and enjoying a variety of other recreational activities, including exploring all areas of her property and watching the wildlife that frequently visit. The Plant's emissions would negatively impact air quality and the use and enjoyment of Ms. Siler's property.

MTGP member Dr. Rachel Cain Bailey, D.C. owns approximately 420 acres of ranch property located at 6059 County Road 309, Lexington, Texas 78947, within one mile of the proposed Plant site. The ranch property has been owned by Dr. Bailey's family for approximately 150 years. Dr. Bailey, her husband, and their daughter enjoy spending time at the ranch on a weekly basis to take care of their cattle and maintain the property. The family also enjoys implementing regenerative agriculture techniques to improve the soil and plants on-site and support the general ecosystem. Dr. Bailey plans to open a wellness clinic on-site with indoor and outdoor activities such as yoga. While a larger family home is being constructed, the family frequently stays overnight in a cabin on the property. Dr. Bailey and her family use the property in providing educational services, behavior therapy, physical therapy, occupational therapy, and horse care therapy for Dr. Bailey's daughter, who has autism. Dr. Bailey's daughter also has Sensory Processing Disorder, which results in an increased sensitivity to changes in air quality. For these reasons, the emission of air contaminants from the Plant would have uniquely adverse effects on her daughter's health and well-being. In addition to concerns about the impact on her daughter's health, as well as her husband's health, Dr. Bailey is concerned that the Plant's emissions will adversely affect her own health because of her sensitivity to air contaminants and past experiences of compromised respiratory health. In addition, her livestock may be harmed by the Plant's emission of air contaminants. For these reasons, the Plant's emissions would adversely affect the

health of Dr. Bailey and her family, and also adversely affect the air quality and use and enjoyment of Dr. Bailey's property.

MTGP members Julie and Kevin Drake own and reside on 10 acres of property located at 1483 CR 312, Thrall, Texas 76578, within one mile of the proposed Plant site. They raise horses, cattle, chicken, and rabbits, and also enjoy gardening and fishing on their property. Mr. and Ms. Drake are concerned that emissions of air contaminants from the Plant would adversely affect their health. They are further concerned that the emission of air contaminants would harm their livestock. The proposed Plant's emissions would negatively impact air quality and the use and enjoyment of Mr. and Ms. Drake's property.

MTGP members Tonya and Tim Leslie own and reside on 10 acres of property located at 1425 CR 312, Lexington, Texas 78947, within one mile of the proposed Plant site. Their property has a fenced-off garden area, fruit trees, and a stock pond. Mr. and Ms. Leslie also raise cattle and chickens, and have concerns about the harmful impact of the Plant's emissions on their livestock. In addition, Mr. and Ms. Leslie spend much of their time outdoors cooking, gardening, hunting, fishing, and walking their dogs. The Plant's emissions would negatively impact the air quality and use and enjoyment of Mr. and Ms. Leslie's property.

II. Comments

A. The permit improperly allows for indeterminate exemptions for periods of startup.

By the terms of the permit, a planned startup is defined as continuing until emissions compliance is achieved.[1] This definition allows for an indefinite period of exemption from applicable requirements without regard for the time period feasibly necessary for startup to be achieved. This improperly exempts emissions which should be subject to control, and subject to consideration in determining whether emissions from the facility will contribute to a violation of applicable requirements.

B. The emissions from the facility risk contributing to the Austin Area being considered in non-attainment with respect to Ozone.

The Austin-Round Rock-San Marcos metropolitan statistical area (MSA) exceeded the current NAAQS for 8-hour ozone pollution levels in 2023.[2] To the knowledge of MTGP, finalized data is not yet available regarding exceedances occurring in 2024. This history of exceedances places the area at risk of being in a status of non-attainment with regard to the 8-hour ozone pollution standard. The proposed Plant will emit significant quantities of NO_x, which are

[1] Special Conditions, 6.A.
[2] 2023 Air Quality Annual Report for the Austin-Round Rock-San Marcos Metropolitan Statistical Area, prepared by the Capital Area Council of Governments, July 31, 2024.

precursors to the formation of ozone. This will contribute to the already elevated ozone levels in the Austin-Round Rock-San Marcos MSA. The potential for the Plant to contribute to a nonattainment condition in the Austin area warrants denial of the Applications.

C. The permit limits do not accurately reflect implementation of Best Available Control Technology (BACT).

Included with these comments is the Report of Dr. Ranajit (Ron) Sahu with regard to the Applications, and the Executive Director's evaluation of the Applications. That report, including Dr. Sahu's criticisms of the Executive Director's BACT analysis, is incorporated into these comments as if fully set forth herein.[3]

A deficiency in the BACT analysis for multiple contaminants is the Executive Director's failure to account for BACT in relationship to startup events. The permit should include limitations that require the implementation of the best available technology for reducing emissions during this time period. No such emission limits are established within the permit.

With regard to VOC, the establishment of an emission limitation based on a 24-hour average fails to reflect implementation of available BACT. Proper assurance of BACT compliance requires a shorter averaging period for VOC emissions.

The BACT determination for particulate matter suffers from a similar deficiency, in that no averaging time is established by which compliance can be determined for control of particulate matter. BACT for particulate matter should be set at a level consistent with available technology, with compliance monitored by continuous emission monitoring systems.

In addition, the allowed emission rate for ammonia of 10 ppm far exceeds what is appropriately considered BACT for ammonia. The emission limit for ammonia should reflect implementation of proper operation and maintenance practices which minimize ammonia emissions.

D. The draft permit fails to incorporate the emission limits of 30 Tex. Admin. Code § 111.153.

Pursuant to 30 Tex. Admin. Code § 111.153(c), the emissions from a gas fuel-fired steam generator with a heat input greater than 2,500 million Btu per hour may not exceed 0.1 pound of total suspended particulate per million Btu averaged over a two-hour period. This limitation is not included within the draft permit.

[3] See Attachment A to these comments.

E. The draft permit fails to ensure that the facility will be protective of health and public property.

TCEQ Rules explicitly require that each application must contain information demonstrating that a facility will be protective of the health and property of the public:

> In order to be granted a permit . . . the application must include . . . (2) information which demonstrates that emissions from the facility, including any associated dockside vessel emissions, meet all of the following:
>
> (A) Protection of public health and welfare (i) The emissions from the proposed facility will comply with all rules and regulations of the commission and with the intent of the Texas Clean Air Act (TCAA), including protection of the health and property of the public.[4]

Similarly, the agency's Rules governing air quality permits provide that:

> No person shall discharge from any source whatsoever one or more air contaminants or combinations thereof, in such concentration and of such duration as are or may tend to be injurious to or adversely affect human health or welfare, animal life, vegetation, or property, or as to interfere with the normal use and enjoyment of animal life, vegetation, or property.[5]

In this case, the proposed Plant will be in close proximity to a number of residences. Yet, the necessary analysis to demonstrate that the emissions from the Plant, including fugitive emissions from all operations at the Plant, will be protective of public health and the property of those in the area of the proposed Plant. Hazardous air pollutants such as ammonia and formaldehyde have the potential for such impacts, and the analysis performed does not address the heightened potential for impacts upon health and welfare given the proximity of sensitive receptors to the proposed Plant.

F. The modeling provided in support of the Applications is inadequate.

The attached report of Dr. Ranajit (Ron) Sahu explains errors in the modeling presented in support of the Applications in detail. That report is included as part of these comments for all purposes.

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[4] 30 Tex. Admin. Code § 116.111(a) (See also, Tex. Health & Safety Code § 382.0518(b)(2).
[5] 30 Tex. Admin. Code § 101.4.

In addition to the issues raised in Dr. Sahu's Report, the Applicant has not demonstrated that the source is isolated, and it has not been demonstrated that the background ambient concentrations are adequate without a consideration of specific modeling of other nearby sources.

III. Conclusion

MTGP requests that the Applications be denied because of the deficiencies discussed in Section II above. In the alternative, MTGP requests a contested case hearing on the issues raised herein.

Respectfully submitted,

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ATTACHMENT A

Comments on the Proposed Permit Numbers 177380 and PSDTX1650
for the SL Energy Power Plant I, LLC

Dr. Ranajit (Ron) Sahu, Consultant[1]

I provide the following technical comments on the Applications and proposed permits by SL Energy Power Plant I, LLC. In developing these comments, I have reviewed:

1. Proposed Permit Nos. 177380 and PSDTX1650;[2]
2. the permit Application (the "Application") and air dispersion modeling protocol;[3]
3. the TCEQ's Preliminary Determination Summary (PDS);.
4. the MAER Tables;
5. the TCEQ's Air Quality Analysis Audit dated February 21, 2025; and
6. other relevant documents, including emails, etc.

As noted in the TCEQ PDS, the Applicant SL Energy Power Plant I, LLC ("Applicant" or "SL Energy") proposes to construct and operate a power generation plant (the "Plant"), consisting of two natural gas combined cycle gas turbines, located near Lexington, Texas in Lee County. The plant has a total nominal maximum power output of 1,240.2 MW under ISO conditions. The Plant will have supporting and ancillary equipment, including a lube oil system for each turbine train, one natural gas fueled auxiliary boiler, two natural gas fueled water bath heaters, one diesel fueled emergency generator, one diesel fueled emergency fire pump, two lube oil tanks, two diesel tanks, 12 high voltage circuit breakers, and fugitive piping equipment in natural gas service, ammonia service, and diesel service.

My comments focus on the turbines, the major source of air pollution emissions being authorized in this action. I note also that the permit authorizes maintenance, startup, and shutdown (MSS) activities.

The Application states that the project will include "[T]wo Siemens model SGT6-9000HL Advanced Class Gas Turbines (GT-1 and GT-2) will combust natural gas to produce electricity in each gas turbine and steam in waste heat boilers."[4]

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[1] Resume provided in Attachment A.
[2] In these comments, I do not address Permit No. GHGPSDTX244, the greenhouse gas (GHG) permit that is also proposed for issuance for the same facility.
[3] RSB Environmental, Permit Application to the TCEQ by SL Energy Power Plant I, LLC, dated August 2024. The Application also included an Air Dispersion Modeling Protocol developed by Alliance Technical Group for SL Energy Power Plant I, LLC, dated July 2024.

[4] Application, Section 4.

I. Comments

A. Emissions calculations supporting the project are unsupported or improperly supported.

1. Section 5 of the Application states that "…. [T]he air emissions for the operations represented in this application were estimated using equipment supplier emission factors along with expected production and usage rates…." However, there is no information from Siemens, the turbine manufacturer, anywhere in the Application or the permit record. Thus, the "equipment supplied emission factors" for the heart of the power plant are simply missing.

The excerpt below, taken from the Application[5], confirms that the emission of NOx, CO, VOCs, PM for normal, as well as cold startup, non-cold startup, and shutdown—along with the durations of the startup and shutdowns—are all noted as "Manufacturer guarantee." The record contains no information from the turbine manufacturer, much less anything that supports the "guarantee" from the manufacturer. I note that manufacturers' guarantees are often accompanied by stringent legal and technical limitations, including how long they apply (typically a year or less), and the conditions under which they apply. Without actually providing information from the turbine vendor, simply declaring that critical emissions data for normal, startup, and shutdown emissions are guarantees is unverifiable, unsupported, and, therefore, highly problematic.

Sandow Lakes Ranch
Site Emissions

Gas Turbines 1 and 2				
NO_x	2	ppmvd @ 15% O_2		Manufacturer guarantee
NO_x (Cold Startup)	124	lbs in 40 minutes		Manufacturer guarantee
NO_x (Non-Cold Startup)	60	lbs in 30 minutes		Manufacturer guarantee
NO_x (Shutdown)	79.3	lbs in 23 minutes		Manufacturer guarantee
CO	2	ppmvd @ 15% O_2		Manufacturer guarantee
CO (Cold Startup)	1209	lbs in 40 minutes		Manufacturer guarantee
CO (Non-Cold Startup)	414	lbs in 30 minutes		Manufacturer guarantee
CO (Shutdown)	212	lbs in 23 minutes		Manufacturer guarantee
VOC	2	ppmvd @ 15% O_2		Manufacturer guarantee
VOC (Cold Startup)	174	lbs in 40 minutes		Manufacturer guarantee
VOC (Non-Cold Startup)	104	lbs in 30 minutes		Manufacturer guarantee
VOC (Shutdown)	84.4	lbs in 23 minutes		Manufacturer guarantee
SO_2	0.0015	lb/MMBTU		Manufacturer guarantee
H_2SO_4	0.0022964	lb/MMBTU		100% lb H_2SO_4 / lb SO_2 so SO_2 EF * MW H_2SO_4 * MW SO_2
NH_3	10	ppmvd @ 15% O_2		Manufacturer guarantee
Formaldehyde	0.000222	lb/MMBTU		AP-42 Table 3.1-3
HAPs	0.000408	lb/MMBTU		AP-42 Table 3.1-3 - Toluene, Napthalene, Formaldehyde, Benzene, Acetaldehyde, Acrolein, Ethylbenzene, Propylene Oxide, Xylenes, 1,3-Butadiene, PAH
CO_2e	118.86	lb/MMBTU		40 CFR 98, Table C-2 (combined CO_2, N_2O and CH_4)
Sulfur content of natural gas	0.5	gr/100 dscf	gas quality guarantee	
	0.5	gr/100 dscf	gas quality guarantee	
PM	0.0046	lb/MMBTU		Manufacturer guarantee
NO_x MW	46.0055	lb/lbmol		
CO MW	28.01	lb/lbmol		
VOC MW	16.04	lb/lbmol	Method 25A	
SO_2 MW	64.066	lb/lbmol		
S MW	32.065	lb/lbmol		
NH_3 MW	17.031	lb/lbmol		
H_2SO_4 MW	98.08	lb/lbmol		
Air MW	29	lb/lbmol		
Fd Factor (products of combustion)	8710	dscf/MMBTU	natural gas EPA method 19 Table 19.2	
Heating Value of Natural Gas	1020	BTU/scf		
Max Heat Input	4083	MMBTU/hr		
Std Molar Volume of a Gas	379.48	dscf/lbmol		
Normal Operating Hours	8060	hrs/year		
Cold Startup Time	0.6666667	hrs	Manufacturer guarantee	
Non-Cold Startup Time	0.5	hrs	Manufacturer guarantee	
Shutdown Time	0.3833333	hrs	Manufacturer guarantee	
Number of Shutdowns per Year	8	per turbine		

2. Separate from the missing manufacturers information and guarantees noted prior, additional emissions from the turbine, such as for Hazardous Air Pollutants (HAPs), rely on EPA's AP-42 compilation of emission factors. The prior excerpt from the Application confirms that the

[5] Application, p. 63.

formaldehyde emission factor of 0.000222 lb/MMBtu, as well as the emission factors for a number of other HAPS (Toluene, Naphthalene, Formaldehyde, Benzene, Acetaldehyde, Acrolein, Ethylbenzene, Propylene Oxide, Xylenes, 1,3-Butadiene, and PAH), were taken from AP-42 Table 3.1-3.

The use of AP-42 for single source permitting is flawed, as EPA has noted in its Enforcement Alert from 2020.[6] Importantly, EPA notes in the Alert that AP-42 emission factors are averages. Therefore, such averages cannot be used to determine the Potential to Emit (PTE) for any pollutant. Just on this basis alone, the PTE for all of the HAPs as noted in the permitting record are underestimated.

EPA also notes in the Alter, relying on long-standing caveats in AP-42 itself that many of the emission factors are very poorly rated in AP-42. AP-42 uses a letter rating system with factors that are rated A are superior to those rated B, C, D, etc.

I have excerpted the Table 3.1-3,[7] the source of the formaldehyde/HAP emission factors used in this matter:

Table 3.1-3. EMISSION FACTORS FOR HAZARDOUS AIR POLLUTANTS FROM NATURAL GAS-FIRED STATIONARY GAS TURBINES[a]

Emission Factors[b] - Uncontrolled		
Pollutant	Emission Factor (lb/MMBtu)[c]	Emission Factor Rating
1,3-Butadiene[d]	< 4.3 E-07	D
Acetaldehyde	4.0 E-05	C
Acrolein	6.4 E-06	C
Benzene[e]	1.2 E-05	A
Ethylbenzene	3.2 E-05	C
Formaldehyde[f]	7.1 E-04	A
Naphthalene	1.3 E-06	C
PAH	2.2 E-06	C
Propylene Oxide[d]	< 2.9 E-05	D
Toluene	1.3 E-04	C
Xylenes	6.4 E-05	C

[a] SCC for natural gas-fired turbines include 2-01-002-01, 2-02-002-01, 2-02-002-03, 2-03-002-02, and 2-03-002-03. Hazardous Air Pollutants as defined in Section 112 (b) of the *Clean Air Act*.
[b] Factors are derived from units operating at high loads (>80 percent load) only. For information on units operating at other loads, consult the background report for this chapter (Reference 16), available at "www.epa.gov/ttn/chief".
[c] Emission factors based on an average natural gas heating value (HHV) of 1020 Btu/scf at 60°F. To convert from (lb/MMBtu) to (lb/10^6 scf), multiply by 1020. These emission factors can be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this heating value.
[d] Compound was not detected. The presented emission value is based on one-half of the detection limit.
[e] Benzene with SCONOX catalyst is 9.1 E-07, rating of D.
[f] Formaldehyde with SCONOX catalyst is 2.0 E-05, rating of D.

[6] https://www.epa.gov/sites/default/files/2021-01/documents/ap42-enforcementalert.pdf
[7] https://www.epa.gov/sites/default/files/2020-10/documents/c03s01.pdf

It is clear that, with the exception of benzene and formaldehyde, none of the other HAP emission factors have good ratings. In fact, they are all rated either C, or even D. As such, their reliability is highly questionable.

It is also puzzling that the formaldehyde emission factor used in the Application—as cited in the prior excerpt, i.e., 0.000222 (or 2.22 E-04) lb/MMBtu—does not match the AP-42 Table 3.1-3 emission factor for this pollutant, which is shown as 7.1E-04. The AP-42 factor is over 3 times larger. Since formaldehyde, a known human carcinogen, is created in large quantities, this discrepancy is not explained. To the extent that this difference may be the result of the emissions control of this pollutant, the assumed control efficiency is not supported with any data at all.

I also note that the AP-42 HAP factors, including for benzene and formaldehyde, are all for high load (i.e., >80%) conditions. All of these HAPs and VOC emissions from turbines will be greater at lower loads. Yet, the emissions calculations do not consider this load-impact on the emission factor at all. In fact, there is no detail in the record about the load profiles for the two turbines after startup. This is a critical omission, since it will affect the emissions from the turbine.

Finally, I note that as turbine load decreases, the effectiveness of controls—such as oxidation catalysts—diminishes. This will dramatically increase emissions of VOCs, CO, and HAPs at lower loads.

3. The comments above about the proper support for emissions that are estimated from the project and the turbines, which are at the heart of the project, are not simply technicalities. As the TCEQ's own dispersion modeling and impact analyses show (in the PDS), various impacts of pollutants from the proposed project are already at or above critical thresholds. In other instances, they are sometimes barely below critical thresholds. Proper emission estimates are essential inputs for such impact analyses. I provide examples below.

Example 1 – Table 1, excerpted from the PDS, confirms that the PSD de minimis levels are exceeded for the pollutants and averaging times shown in the red box below, often by significant amounts.

Table 1. Modeling Results for PSD De Minimis Analysis in Micrograms Per Cubic Meter (μg/m³)

Pollutant	Averaging Time	GLCmax[4] (μg/m³)	De Minimis (μg/m³)
SO_2	1-hr	4.1	7.8
SO_2	3-hr	4	25
SO_2	24-hr	3	5
SO_2 (Increment)	Annual	0.3	1
PM_{10}	24-hr	9	5
PM_{10}	Annual	1.4	1
$PM_{2.5}$	24-hr	9	1.2
$PM_{2.5}$	Annual	1.35	0.13
NO_2	1-hr	113	7.5
NO_2	Annual	2	1

Pollutant	Averaging Time	GLCmax[4] (μg/m³)	De Minimis (μg/m³)
CO	1-hr	1251	2000
CO	8-hr	983	500

Example 2 – Table 4 from the PDS, excerpted below, shows in the red boxes that the $PM_{2.5}$ annual and NOx 1-hour NAAQS are at risk from the project because the calculated total, including background, concentrations are at most 80% of the NAAQS for 1-hour NOx (i.e., 150/188 = 0.79), and over 95% of the NAAQS for annual $PM_{2.5}$ (i.e., 8.6/9 = 0.955). In effect, there is little to no compliance margin at all for these pollutants. Therefore, the proper estimation of emissions for these pollutants, with data and limitations from the turbine vendor, are essential—along with the limitations of the air pollution controls, such as SCR for Nox; the load profile of the turbines; and monitoring to verify compliance.

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

Pollutant	Averaging Time	GLCmax (μg/m³)	Background (μg/m³)	Total Conc. = [Background + GLCmax] (μg/m³)	Standard (μg/m³)
PM_{10}	24-hr	7	86	93	150
$PM_{2.5}$	24-hr	5	21	26	35
$PM_{2.5}$	Annual	1.3	7.3	8.6	9
NO_2	1-hr	109	41	150	188
NO_2	Annual	2	4	6	100
CO	8-hr	969	580	1549	10000

Example 3 – Table 5 from the PDS, excerpted below, shows in the red box that the Plant's impact for 24-hour PM2.5 is at over 95% of the respective increment. Again, there is no margin. A more detailed evaluation of the PM2.5 emissions is therefore warranted.

Table 5. Results for PSD Increment Analysis

Pollutant	Averaging Time	GLCmax (µg/m^3)	Increment (µg/m^3)
PM_{10}	24-hr	8	30
PM_{10}	Annual	1	17
$PM_{2.5}$	24-hr	8	9
$PM_{2.5}$	Annual	1	4
NO_2	Annual	2	25

Example 4 – Table 7 from the PDS, excerpted below, shows that, for PAHs, which are HAPs, the estimated impact of 0.3 ug/m^3 from the project is not too far below its ESL of 0.5 ug/m^3. I have noted earlier that the AP-42 Table 3.1-3, the source of the emission factor for this pollutant, has a rating of C, which is very poor and unreliable. Since the calculated impact is already at 60% of the ESL, a more reliable analysis needs to be performed before reaching the conclusion that the ESL cannot be exceeded.

Table 7. Minor NSR Site-Wide Modeling Results for Health Effects

				Fence	
polycyclic aromatic hydrocarbons	130498-29-2	1-hr	0.3	Line that Bisects Main	0.5
				Fenced Property	

B. Background concentration values used are not from the project site and cannot be assumed to be representative.

As shown in the prior excerpt of PDS Table 4, the modeling impact analysis relating to the project requires that project impacts be summarized, along with background concentration levels, in order to determine if the NAAQS are likely to be exceeded.

A review of the record shows, however, that some of the background values were taken from locations that are nowhere near the project site in Lee County.

As noted in the PDS:

1. the CO background value was taken from EPA AIRS Monitor No. 483091037, located at 4472 Mazanec Rd., Elm Mott, McLennan County;
2. the PM2.5 background concentration was taken from EPA AIRS Monitor No. 480271045, located at 8406 Georgia Ave, Temple, Bell County; and
3. the background concentration for PM10 was taken from EPA AIRS Monitor No. 484530020, located at 12200 Lime Creek Rd, Leander, Travis County.

And, as noted in the Application[8], the background concentration for NOx (NO_2) was obtained from Monitor No. 480271047, located in Bell County.

While the PDS summarily notes that these background locations were reasonable based on the Applicant's review of land use, county population, and county emissions, along with qualitative assessments of the urban/rural nature of the monitor and project sites, this discussion is not supported in the record. In Section 7.1, the Application[9] simply shows the following table of the background locations, along with general descriptors.

Table 7-1. Proposed Ambient Monitors for Background Concentration Estimates

Compound	Monitor Number	Location	Distance (km)	Measurement Scale	Monitor Objective
CO	483091037	Waco Mazanec (C1037)	136.8	Urban Scale	Upwind Background
NO_2	480271047	Kileen Skylark Field (C1047)	87.3	Urban Scale	General / Background
PM_{10}	484530020	Austin Audubon Society	66.0	Neighborhood	Population Exposure
$PM_{2.5}$	480271045	Temple Georgia (C1045)	81.2	Urban Scale	Population Exposure
SO_2	483951076	Franklin Oak Grove (C1076)	107.00	Neighborhood	Source Oriented
O_3	480271045	Temple Georgia (C1045)	81.2	Urban Scale	Population Exposure

There is no further discussion of the appropriateness of any of the background locations. Therefore, it cannot simply be presumed that these background values are appropriate.

C. BACT and related determinations are unsupported.

The TCEQ's PDS states that "[T]he EPA accepts the TCEQ's three-tier approach to BACT as equivalent to the EPA's top-down approach to BACT for PSD review when the following are considered: recently issued/approved permits within the state of Texas, recently issued/approved permits in other states, and control technologies contained within the EPA's RBLC database for the specified source."

Having stated the above, the PDS's BACT determinations again erroneously refer to the unsupported emissions analysis presented when it states, "[T]he pollutant emission factors are

[8] Application p. 99.
[9] Application p. 145, in the modeling protocol discussion.

provided by equipment suppliers and EPA's AP-42 emission factor database. Both hourly and annual emission calculations are based on the worst-case scenario from the manufacturer's performance guarantee, which occurs when the turbine is operating at 100% load, the duct burners are operating, evaporative cooling is not used, ambient temperature is -5.0°F, relative humidity is 20.0%, and barometric pressure is 14.45 psia."

As I have noted prior, no manufacturers data, much less guarantees, are provided in the record for the turbines. In addition, as I have also noted prior, the use of AP-42 emission factors is not only technically unjustified, but goes directly against EPA's express caution.

Turning to BACT, my criticisms are as follows:

1. For NOx, the 2-ppm BACT limit (corrected to 15% oxygen, as is customary) relies on the use of SCR. Without support, it states that this limit should be met on a rolling 3-hour average basis. The basis for this rolling average is not clear. Further, the BACT limits for when the SCR will not be operational, such as at lower loads when the catalyst is not warm enough, is not defined. Instead, the TCEQ simply stretches the end of startup to the point at which the SCR would be expected to be operational—see Special Condition 6A. This is clearly inappropriate. The TCEQ should separately define BACT for all loads when the SCR is expected to be operation, as well as for loads between the end of startup and when the SCR becomes operational.
2. For CO, similar to Nox, the 2-ppm BACT limit is also allowed to be met on a 3-hour rolling basis, with no justification. And, analogous to the NOx comment above, no BACT limit is stated for the loads after startup and before the oxidation catalyst is effective.
3. For VOC, the 2-ppm BACT limit allows an even more expansive 24-hour average, with no justification. And, similar to the comment for CO above, no BACT for VOC is defined for when the load is greater than startup and before the oxidation catalyst is effective.
4. For $PM/PM_{10}/PM_{2.5}$ BACT, the PDS states that "[E]ach turbine is proposed to meet 0.0046 lb/MMBtu, as guaranteed by the turbine manufacturer, Siemens Energy." As noted earlier, no such data is provided from Siemen in the Application or the record. Also, the PM BACT is silent on the averaging time, meaning that the compliance would only be based on the rare 3-hour or so stack test under ideal conditions. This is inadequate. The compliance for the BACT, once supported, should be based on CEMS for the filterable PM components (i.e., PM, PM_{10}, $PM_{2.5}$) supplemented by stack testing for the condensable portion.
5. For HAPS, the PDS simply assumes that the highly flawed emissions estimates based on AP-42 Table 3.1-3 are BACT. For reasons previously stated, these emissions are highly flawed. They are, therefore, inappropriate as BACT.
6. Finally, for ammonia—which will be used as the reducing reagent for SCR—the PDS states that "[T]he ammonia slip from each turbine is limited to 10.0 ppmvd stack concentration at 15% O2 on a rolling 3-hour average…." Since ammonia slip for turbines is routinely far below 10 ppm, the TCEQ's use of 10 ppm is improper.

Minimizing ammonia emissions should be considered an essential element of any regulation of NO_x reflecting the use of SCR. Minimizing ammonia emissions requires proper operation and maintenance practices. The ability of ammonia to "slip" past the SCR depends on two main factors:

1. the uniformity of the ammonia injected via the ammonia injection grid, so that a uniform NO_x-to-ammonia ratio is achieved across the entire SCR catalyst face; and,
2. the opportunity for the flue gases (containing ammonia) to bypass the SCR catalyst bed itself, such as due to gaps in the equipment or poor maintenance. Any such bypass would contain unreacted ammonia and contribute to excessive slip.

These factors are well known in the literature. Authors at the Fossil Energy Research Corp., addressing this very issue (as well as how to maintain low NO_x levels after the SCR), noted that four reasons for high ammonia slip (the last two of which are the same as those cited above by EPRI) are:[10]

1. SCR catalyst activity, i.e., how active is the catalyst material in reducing NO_x;
2. Ability of the entire catalyst bed to reduce NO_x;
3. Poor ammonia/ NO_x distribution; and
4. Flue gas bypass around the catalyst bed.

In addition to proper operation and maintenance practices, there are also ammonia-reducing catalysts available in the market that can reduce any ammonia slip after the SCR catalyst layer, preventing it from becoming air pollution.[11]

Using a combination of the above approaches, ammonia slip should be limited to no more than 2 ppm. There are multiple instances not just of permit limits for ammonia slip at 2 ppm, but also actual demonstrated test data showing that such limits can and have been achieved in practice, such as the CPV Towantic plant in New York and the Bridgeport plant in Connecticut—without the use of ammonia reducing catalysts. In addition, there are 2-ppm ammonia slip limits in permits for natural gas-fired power plants like Renovo in Pennsylvania.

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[10] Muzio, L.J., NOx: Troubleshooting and Optimization of Combined Cycle SCR Systems, CEMTek Environmental 2016 Emissions Monitoring Seminar and Training (Sept. 28, 2016), https://cemteks.com/wp-content/uploads/2019/08/NOx_troubleshooting_and_optimization_of_combined_cycle_scr_systems.pdf.

[11] *See, e.g.,* Johnson Matthey, SCR and Advanced Ammonia Slip Catalyst (June 11, 2015),www.aqmd.gov/docs/default-source/Agendas/aqmp/control-strategy-symposium/pm2-5-miller.pdf?sfvrsn=2.

D. Other Comments

1. The PDS at Section B states correctly that "[T]he De Minimis analysis modeling results indicate that 8-hr CO exceeds the respective monitoring significance level and requires the gathering of ambient monitoring information."

While stating so, however, TCEQ has imposed no such requirement for the Applicant to gather this ambient CO data. The TCEQ should therefore include this as part of the permit requirements.

2. The Form PI-1 in the Application, excerpted below:

FIN	Unit Type	Pollutant	Minimum Monitoring Requirements	Confirm	Additional Notes for Monitoring
GT-1	Turbine: Combined Cycle, Natural Gas	NOx	CEMS. Data collected four times per hour and averaged hourly.	Yes	
		NOx (MSS)	Fill out the Additional Notes for Monitoring column to demonstrate how monitoring will be conducted to demonstrate compliance with the permit.	Yes	Same as NOx
		CO	CEMS. Data collected four times per hour and averaged hourly.	Yes	
		CO (MSS)	Fill out the Additional Notes for Monitoring column to demonstrate how monitoring will be conducted to demonstrate compliance with the permit.	Yes	Same as CO
		VOC	Continuous fuel flow monitor data used to calculate emission rate. Data collected four times per hour and averaged hourly.	Yes	
		VOC (MSS)	Fill out the Additional Notes for Monitoring column to demonstrate how monitoring will be conducted to demonstrate compliance with the permit.	Yes	Same as VOC
		SO2	Continuous fuel flow monitor data used to calculate emission rate. Data collected four times per hour and averaged hourly.	Yes	
		PM	The emission monitoring techniques for PM10 and PM2.5 will follow the technique for PM. Quarterly visible emission observations to demonstrate compliance with opacity requirements.	Yes	
		H2SO4	If this pollutant is applicable, quarterly visible emission observations to demonstrate compliance with opacity requirements.	Yes	Same as SO2
		NH3	Monthly AVO inspections of the ventilation ductwork.	Yes	
		HCHO	Fill out the Additional Notes for Monitoring column to demonstrate how monitoring will be conducted to demonstrate compliance with the permit.	Yes	Same as VOC
		HAPs	Fill out the Additional Notes for Monitoring column to demonstrate how monitoring will be conducted to demonstrate compliance with the permit.	Yes	Same as VOC
		CO2 Equivalent	Fill out the Additional Notes for Monitoring column to demonstrate how monitoring will be conducted to demonstrate compliance with the permit.	Yes	Continuous fuel flow monitor data used to calculate emission rate. Data collected four times per hour and averaged hourly.

In the last column, for monitoring, the text states that for formaldehyde (HCHO) and HAPs, the monitoring will be the same as VOCs. To the extent that this means that VOC monitoring results will be used to determine the levels of formaldehyde and HAPS (which are themselves a collection of several additional individual pollutants), the manner in which this will be done as a technical matter is not discussed. The Application presumes, but does not support, some sort of correlation between formaldehyde, HAPs, and VOCs—with no technical basis or data. Clarification is needed.

3. Section 6.2 of the Application, the modeling protocol,[12] states that the surface meteorological data will be from the College Station Easterwood Airport (Surface Station Identification CLL). However, the representativeness of this surface station to the project site is not discussed or justified. That justification should be part of the record.

[12] Application, p. 141.

4. The table below is excerpted from the Application and contains several source parameters for modeling:[13]

Texas Commission on Environmental Quality
Electronic Modeling Evaluation Workbook (EMEW)
Point Source Parameters

Date: _____
Permit #: _____
Company Name: _____

Facility:

EPN	Model ID	Modeling Scenario	Source Description	Point Source Type	Point Source Justification	Easting: X [m]	Northing: Y [m]	Base Elevation [m]	Height [m]	Exit Temperature [K]	Exit Velocity [m/s]	Diameter [m]
GT-1	GT_1R	All	Combine Cycle Gas Turbine 1 (Turbine)	POINT	vertical stack	674162.59	3366657.01	139.22	52.12	355.372	14.100	7.315
GT-1	GT_1M	All	Combine Cycle Gas Turbine 1 (Turbine) (MSS)	POINT	vertical stack	674162.59	3366657.01	139.22	52.12	355.372	14.100	7.315
GT-2	GT_2R	All	Combine Cycle Gas Turbine 2 (Turbine)	POINT	vertical stack	674254.39	3366690.72	139.88	52.12	355.372	14.100	7.315
GT-2	GT_2M	All	Combine Cycle Gas Turbine 2 (Turbine) (MSS)	POINT	vertical stack	674254.39	3366690.72	139.88	52.12	355.372	14.100	7.315
GEN-1	GEN_1	All	Emergency Generator 1	POINT	vertical stack	674196.30	3366728.60	141.15	5.49	738.150	62.405	0.253
FP-1	FP_1	All	Emergency Fire Pump 1	POINT	vertical stack	674095.15	3366649.68	139.06	5.49	760.372	20.714	0.152
AUX-1	AUX_1	All	Auxiliary Boiler 1	POINT	vertical stack	674186.85	3366658.93	139.08	24.38	455.372	19.352	0.914
FH-1	FH_1	All	Fuel Water Bath Heater 1	POINT	vertical stack	674014.75	3366819.50	139.46	7.62	505.372	6.041	0.457
FH-2	FH_2	All	Fuel Water Bath Heater 2	POINT	vertical stack	674028.00	3366824.40	139.97	7.62	505.372	6.041	0.457

This table shows the same temperature and velocity for both normal and MSS conditions. This is not technically supportable in any manner. Either such support should be provided, or these parameters should be revised.

5. The two tables, excerpted below from the Application[14], show the preliminary modeling results for several pollutants for comparison to the 1-hour ESP (Table 5-3) and the Annual ESL (Table 5-4):

Table 5-3. Preliminary Modeling Results for Step 7 of MERA Flowchart – 1-Hour ESL

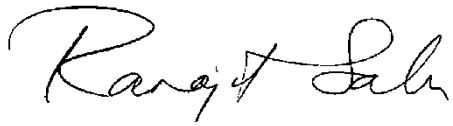
Compounds	1-Hour Concentration (µg/m³)	1-Hour ESL (µg/m³)	Additional Analysis Required?
Ammonia	22.15	180.00	NO
Formaldehyde	1.05	15.00	NO
Toluene	2.36	4,500.00	NO
Naphthalene	2.36	440.00	NO
Benzene	2.36	170.00	NO
Acetaldehyde	2.36	120.00	NO
Acrolein	2.36	3.20	NO
Ethylbenzene	2.36	26,000.00	NO
Xylene	2.36	2,200.00	NO
1,3-Butadiene	2.36	510.00	NO
PAH Compounds	0.37	0.50	NO

[13] Application, p. 86.
[14] Application, p. 140.

Table 5-4. Preliminary Modeling Results for Step 7 of MERA Flowchart – Annual ESL

Compounds	Annual Concentration (µg/m³)	Annual ESL (µg/m³)	Additional Analysis Required?
Ammonia	1.05	92.00	NO
Formaldehyde	0.02	3.30	NO
Toluene	0.04	1,200.00	NO
Naphthalene	0.04	50.00	NO
Benzene	0.04	4.50	NO
Acetaldehyde	0.04	45.00	NO
Acrolein	0.04	0.82	NO
Ethylbenzene	0.04	570.00	NO
Xylene	0.04	180.00	NO
1,3-Butadiene	0.04	9.90	NO
PAH Compounds	0.01	0.05	NO

However, it is not clear, as highlighted in the blue boxes, why the respective concentrations should be exactly the same for the various HAPs shown. As noted earlier, while of poor quality, the emission factors for these HAPS in the source AP-42 section are different. That should result in different predicted concentrations. These spurious results should be explained.



Attachment A

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

CONSULTANT, ENVIRONMENTAL AND ENERGY ISSUES

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EXPERIENCE SUMMARY

Dr. Sahu has over thirty four 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 almost thirty five years of project management experience and has successfully managed and executed hundreds of 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 three decades 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 New York, New Jersey, Connecticut, Kansas, Oregon, New Mexico, Pennsylvania, and others), various agencies such as the California DTSC, and various cities and municipalities. Dr. Sahu has executed projects in all 50 US states, numerous local jurisdictions and internationally.

In addition to consulting, for approximately two decades, Dr. Sahu taught numerous courses in several Southern California universities as adjunct faculty, 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).

Of particular relevance, Dr. Sahu is the Nevada CEM overseeing the large Basic Remediation Company (BRC) cleanup of soil and groundwater from WWII-era contamination to residential land use. He and his remediation team, working under his direction, obtained all of the soil No Further Action (NFA) determinations from the NDEP, which is allowing residential development to proceed at the Site. Over 6000 homes have already been built and are occupied. All of the technical analyses, including the many risk assessments that were conducted as part of the project including statistical sampling based confirmatory data analysis, geospatial analysis, COPC determination methods, assessment of site background conditions, DQO activities, risk pathway selection, assessment of exposure parameters (deterministic and probabilistic), and the presentation of risk calculations to regulators and the public –

were done directly under his supervision. He also led the public communication aspects as well as providing environmental clarifications, as needed, to the many builders who are associated with the site. As a matter of record, contaminants at the site included: volatile organic compounds (VOCs) including PCE, TCE, chloroform, etc.; semi-volatiles; organochlorine pesticides; asbestos; various metals including lead and arsenic; dioxins; perchlorate; PCBs; and radioactive nuclides.

Dr. Sahu has and continues to provide expert witness services in a number of environmental and engineering 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, CA.

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.

1990-1992 Engineering-Science, Inc. **Principal Engineer and Project Manager** in the air quality department.

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 beginning 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 beginning 1998.

“Hazardous Waste Remediation” Loyola Marymount University, Dept. of Civil Engineering. Various years beginning 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, 2000 - 2021.

CEM, State of Nevada (#EM-1699).

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).

"NOx 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 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.

139. Expert Report (April 2021) for *Charles Johnson Jr. (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant),* Civil Action No. 2:20-CV-01329 (Related to 12-968 BELO in MDL No. 2179). (US District Court for the Eastern District of Louisiana, New Orleans Division).

140. Affidavit (April 2021) for *Clayton Faerber et.al., (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 20-CV-00328 01329 (Related to 12-968 BELO in MDL No. 2179). (US District Court for the Southern District of Mississippi).

141. Expert Report (April 2021, June 2023) for *Floyd Ruffin (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 2:20-cv-00334-CJB-JCW (US District Court for the Eastern District of Louisiana, New Orleans Division).

142. 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).

143. Expert Report (May 2021) for *Clifford Osmer (Plaintiff) v. BP Exploration and Production Inc., et. al., (Defendants)* related to No. 18-CV-12557 (US District Court for the Eastern District of Louisiana).

144. Expert Report (May 2021) and Rebuttal Expert Report (January 2022) for *James Noel (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant),* Civil Action No. 1:19-CV-00694-JB-MU-C (US District Court for the Southern District of Alabama, Southern Division).

145. 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.)

146. 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).

147. 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.

148. Expert Report (June 2021) for *Antonia Saavedra-Vargas (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 2:18-CV-11461 (US District Court for the Eastern District of Louisiana, New Orleans Division).

149. 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, New Orleans Division).

150. Expert Report (June 2021) for *Wallace Smith (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 2:19-CV-12880 (US District Court for the Eastern District of Louisiana, New Orleans Division).

151. 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.

152. Declaration (July 2021, August 2021) on behalf of Petitioners in the matter of the Petition for a Hearing on the Merits Regarding Air Quality Permit No. 3340-RMD issued to New Mexico Terminal Services, LLC by *Mountain View Neighborhood Association et. al., (Petitioners) v. City of Albuquerque Environmental Health Department*, AQCB Petition No. 2020-1 before the Albuquerque-Bernalillo County Air Quality Control Board.

153. Expert Disclosure (September 2021), Affidavit (May 2023), and Affirmation (May 2024) on behalf of the Plaintiffs in the matter of *State of New York, Town of Hempstead, Town of Brookhaven, Incorporated Village of Garden City and Long Island Power Authority et. al., (Plaintiffs) v. Covanta Hempstead Company et. al., (Defendants)*, Index No. 7549/2013 before the Supreme Court of the State of New York, County of Nassau.

154. Expert Report (October 2021) for *John A. Battiste (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant),* Civil Action No. 1:21-CV-00118 (US District Court for the Southern District of Alabama, Mobile Division)

155. Declaration/Expert Report (October 2021) for *Charles K. Grasley et. al., (Plaintiffs) v. Chemtool Incorporated (Defendant)*, Case No. 2021-L-0000162 (State of Illinois, In the Circuit Court of the 17th Judicial Circuit, Winnebago County).

156. Declaration (October 2021) and Expert Report (November 2021) on behalf of the Plaintiffs in the matter of Toll Brothers, Inc., and Porter Ranch Development Company (Plaintiffs) v. Sempra Energy, Southern California Gas Company et. al., (Defendants), Southern California [Aliso Canyon] Gas Leak Cases, JCCP No.: 4861, Lead Case No.: BC674622, Superior Court of the State of California for the County of Los Angeles.

157. Expert Report (November 2021) and Declaration (September 2022) on behalf of Plaintiffs in Re: Deepwater Horizon BELO Cases, Case No. 3:19cv963-MCR-GRJ (US District Court for the Northern District of Florida, Pensacola Division).

158. Declaration (November 2021) for the *United States of America and the State of Kansas, Department of Health and Environment (Plaintiffs) v. Coffeyville Resources Refining & Marketing, LLC (Defendant)*, Civ. No. 6:04-cv-01064-JAR-KGG (US District Court for the District of Kansas).

159. Expert Report/Affidavit (December 2021) on behalf of the City of Detroit in the matter of Marathon Petroleum Company (Claimant) v. City of Detroit Building Safety Engineering and Environmental Department, BSEED Case No. MCR 2018-2525, DAH Appeal No. 21-SWA-01, before the State of Michigan, City of Detroit Department of Appeals and Hearings.

160. Expert Report (December 2021) for *John Pabst (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 21-CV-00290 (US District Court for the Eastern District of Louisiana).

161. Expert Report (December 2021) for *Audrey Annette Tillery-Perdue individually and as person representative of the estate of Eddie Lewis Perdue (Plaintiff) v. BP Exploration and Production Inc., et. al., (Defendant)*, Civil Action No. 5:19-cv-00052-MCR-GRJ (US District Court for the Northern District of Florida, Pensacola Division).

162. Expert Report (February 2022) for *Richard Dufour (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 19-cv-00591 (US District Court for the Southern District of Mississippi).

163. Expert Report (February 2022) and Rebuttal Expert Report (June 2022, in preparation) for *Kamuda (Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-010475 (Circuit Court of Cook County, Illinois).

164. Expert Report (February 2022) in the matter of the *Appeal Petition for Hearing on Air Quality Permit No. 8585 on behalf of Earth Care New Mexico et. al., (Petitioners) v. New Mexico Environment Department and Associated Asphalt and Materials, LLC (Applicant),* No. EIB 21-48 before the State of New Mexico Environmental Improvement Board.

165. Expert Report (March 2022), Affidavit (June 2022), Supplemental Expert Report (April 2023) in the matter of *Clean Air Council et. al., (Appellants) v. Commonwealth of Pennsylvania, Department of Environmental Protection (Appellee) and Renovo Energy Center (Permittee)* EHB Docket No. 2021-055-R before the Commonwealth of Pennsylvania Environmental Hearing Board.

166. Declaration (March 2022) in the matter of Max Midstream Texas LLC Air Quality Permit No. 162941 for the Seahawk Crude Condensate Terminal in Calhoun County Texas, TCEQ Docket No. 2022-0157-AIR, before the Texas Commission on Environmental Quality.

167. Expert Pre-filed Testimony (April 2022) in the matter of Application of TPC Group LLC for New State and PSD Air Quality Permits (various), TCEQ Docket No. 2021-1422-AIR, SOAH Docket No. 582-22-0799, Before the Texas State Office of Administrative Hearings.

168. Expert Report (April 2022) and Rebuttal Report (August 2022) for *Teresa Fornek (Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-010744 (Circuit Court of Cook County, Illinois.)

169. Rule 26 Disclosure (May 2022) in the matter of the *Water Works and Sewer Board of the City of Gadsden (*Plaintiff*) v. 3M Company, et. al., (Defendants)*, Civil Action No.: 31 CV-2016-900676.00 (Circuit County of Etowah County, Alabama)

170. Expert Report (June 2022) for *Heather Schumacher (Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-011939 (Circuit Court of Cook County, Illinois.)

171. Expert Report (June 2022), Rebuttal Reports (August 2022, September 2022) for Plaintiffs in *Phylliss Grayson et. al. (Plaintiffs), v Lockheed Martin Corporation (Defendant),* Case No. 6:20-cv-01770. (US District Court for the Middle District of Florida – Orlando Division.)

172. Expert Affidavit (July 2022) for Center for Environmental Rights in connection with the 2019 South Africa Integrated Resource Plan in *African Climate Alliance et. al. v. The Minister of Mineral Resources and Energy et. al.*, in the High Court of South Africa, Gauteng Division, Pretoria.

173. Expert Affidavit (July 2022) for Center for Environmental Rights in connection with the Limpopo Mine (Lephalale Coal Mines Ltd.) in *Earthlife Africa v. The Minister of Forestry, Fisheries and Environment et. al.*, in the High Court of South Africa, Gauteng Division, Pretoria, Case No. 9149/2022.

174. Pre-filed Testimony (July 2022) and Rebuttal Testimony (September 2020) on behalf of the Puyallup Tribe of Indians in the matter of *Washington Utilities and Transportation Commission (Complainant) v. Puget Sound Energy (Respondent)* before the Washington Utilities and Transportation Commission, Docket UE-220066 and UG-220067 (Consolidated).

175. Expert Report (September 2022) *Clean Air Council, Citizens for Pennsylvania's Future, Mountain Watershed Association (Appellants) v. Allegheny County Health Department (Appellee) and Allegheny Energy Center (*Intervenor*, Permittee),* Case No. 21-043 before the Hearing Officer of the Allegheny County Health Department.

176. Expert Affidavit (October 2022) for *Concerned Citizens of Cook County GA (Petitioner) v. Georgia Department of Natural Resources (Respondent) and Spectrum Energy Georgia, LLC (Respondent Intervenor)* before the Office of State Administrative Hearings, State of Georgia, Docket No: 2303405-OSAH-BNR-AQ-37-Barnes.

177. Expert Rebuttal Report (January 2023), Supplemental Rebuttal Expert Report (March 2023, May 2023, November 2023) for *Ann Jordan et. al., and Blake Darnell (Plaintiffs) v. Terumo BCT et. al., (Defendants)* before District Court, Jefferson County, Colorado Case Numbers: 2020CV031457, 2021CV030474 (consolidated with 2020CV031457) and 2020CV03148.

178. Expert Report (January 2023) and Rebuttal Expert Report (April 2023) for *Potomac Riverkeeper and Sierra Club (Plaintiffs) v. Virginia Electric and Power Company (Defendant)*, Civil Action No. 2:21-CV-23 (Kleeh) (US District Court for the Northern District of West Virginia, Elkins Division).

179. Affidavit (January 2023) for *Richard Dufour (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 1:19-cv-00591-HSO-BWR (Related to 12-968 BELO in MDL No. 2179). (US District Court for the Southern District of Mississippi).

180. Expert Report (January 2023) and Supplemental Expert Report (July 2023) on behalf of Plaintiffs in the matter of *Stephanie* Mackey *et. al., (Plaintiffs) v. Chemtool Inc. et. al., (Defendants) and Holian Insulation Company Inc. (Third-party Defendant)*, Case No.: 3:21-cv-50283, U.S. District Court, Northern District of Ilinois, Western Division.

181. Expert Report (February 2023) for *Vervicia Henderson, et al. (Plaintiff) v. Lockheed Martin Corporation (Defendant)*, Case No. 6:21-cv-01363, U.S. District Court, Middle District of Florida, Orlando Division.

182. Expert Report (February 2023) for *Carol Davis (Plaintiff) v. Lockheed Martin Corporation (*Defendant*)*, Case No. 6:22-cv-81-RBD-EJK, U.S. District Court, Middle District of Florida, Orlando Division.

183. Expert Report (February 2023) for Mark Letart (Plaintiff), et al. v. Union Carbide Corporation, et al. (Defendants), Case No. 2:19-cv-877, U.S. District Court, Southern District of West Virginia, Charleston Division.

184. Affidavit (March 2023) on behalf of plaintiffs in the matter of the *State of New Mexico, ex rel. Raul Torrez, Attorney General (Plaintiffs) v. Sterigenics US LLC, Sotera Health Holdings, LLC, Sotera Health LLC and Sotera Health Company (Defendants)*, Case No.: D-307-CV-2020-02629, State of New Mexico, Third Judicial District Court, County of Dona Ana

185. Pre-filed Direct Testimony (March 2023) in the matter of *Algonquin Gas Transmission LLC., on behalf of Community Residents (*Petitioners*)*, Commonwealth of Massachusetts Department of Environmental Protection, Office of Appeals and Dispute Resolution, OADR Docket Nos. 2017-011 and 012, Waterways Application License No. W16-4600, Weymouth Mass.

186. Declaration (April 2023) in the matter of Sierra Club (Plaintiff) v. Tennessee Valley Authority in the matter of the Johnsonville Aeroderivative Combustion Turbines Project, Case No.: 3:22-cv-1054, U.S>, District Court, Middle District of Tennessee, Nashville Division.

187. Expert Report (May 2023/June 2023), Affidavit (April 2023) and Declaration (July 2023) for *Ezequiel Caraballo-Pache (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 8:20-cv-00263-SCB-JSS (US District Court for the Middle District of Florida, Tampa Division).

188. Affidavit (May 2023) for *Lawrence Tucei (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 1:22-cv-00078-HSO-BWR (US District Court for the Southern District of Mississippi).

189. Expert Report (May 2023/June 2023) for *Vincent Culliver (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 3:21-cv-4942-MCR/HTC (US District Court for the Northern District of Florida).

190. Expert Report (June 2023) for *Matthew Williams (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 1:22-cv-00278-LG-BWR (US District Court for the Southern District of Mississippi).

191. Declaration (June 2023) in support of public commenters relating to the Michigan Department of Environment Great Lakes and Energy (EGLE)'s Annual Network Monitoring Plan 2024.

192. Expert Report (July 2023) and Rebuttal Expert Report (September 2023) relating to Greenhouse Gas and Energy Management (GEMM2) for Manufacturing in Colorado (September 2023) on behalf of Environmental Defense Fund.

193. Pre-filed Direct Testimony (July 2023) on behalf of Citizens for Environmental Justice in the matter of the permit Application of Valero Refining-Texas, LP for Modification to State and Prevention of Significant Deterioration Air Quality Permits No. 38754 and PSDTX324M15 before the Texas State Office of Administrative Hearings, SOAH Docket No. 582-23-14975, TCEQ Docket No. 2023-0203-AIR.

194. Declaration (August 2023) in support of comments by Environmental Defense Fund in connection with the "Good Neighbor Plan" for the 2015 Ozone National Ambient Air Quality Standards, published at 88 Fed. Reg. 36,654 (June 5, 2023) ("Final Rule"), Docket ID No. EPA-HQ-OAR-2021-0668.

195. Expert Report (August 2023) on behalf of Appellants in the matter of *PennEnvironment and Sierra Club (Appellants) v. Commonwealth of Pennsylvania, Department of Environmental Protection, (Appellee), and PPG Industries, Inc. (Permittee)*, EHB Docket No. 2022-032-B. Environmental Hearing Board, Department of Environmental Protection, State of Pennsylvania.

196. Pre-filed Testimony (September 2023) and Cross Answering Testimony (October 2023) on behalf of the Puyallup Tribe of Indians in the matter of *Washington Utilities and Transportation Commission (Complainant) v. Puget Sound Energy (Respondent)*, Docket: UG-230393. Before the Washington Utilities and Transportation Commission.

197. Expert Report (December 2023) on behalf of plaintiffs in the matter of *PennEnvironment and Sierra Club (Plaintiffs) v. PPG Industries, Inc. (Defendant).* Case No.: Civil Action Nos. 2:12-cv-00342, 2:12-cv-00527, 2:13-cv-01395, 1:13-cv-01396, 2:14cv-00229 (consolidated). U.S. District Court Western District of Pennsylvania.

198. Expert Report (December 2023) and Rebuttal Expert Report (June 2024) on behalf of the plaintiff in the matter of *Jennifer Perrotti (Plaintiff) v. Lockheed Martin Corporation (Defendant).* Case No. 6:22-cv-01338 in the U.S. District Court Middle District of Florida – Orlando Division.

199. Expert Report (Tranche 1 - January 2024, Tranche 2 – May 2024, Tranche 3 – June 2024) and Rebuttal Report (Tranche 1 – June 2024) on behalf of the plaintiffs in the matter of *Emily Glass et. al., (Plaintiff) v. B. Braun Medical Inc., et. al., (Defendants).* Case No. 00315 (May Term 2021) and Consolidated Cases in the First Judicial District of Pennsylvania Court of Common Pleas of Philadelphia County.

200. Expert Report (February 2024) and Supplemental Expert Report (March 2024) on behalf of the plaintiff in the matter of *Kathleen Koch (Plaintiff) v. Medline Industries, Inc. et. al. and Vantage Specialty Chemicals, Inc. (Defendants)*. Case No. 2320 L 000686 in the Circuit Court of Cook County, IL.

201. Expert Report (April 2024 and August 2024) on behalf of the plaintiff in the matter of *Paula Johnson et. al., (Plaintiff) v. Prairie Farms Dairy, Inc. et. al., (Defendants).* Case No. 2017 L 001562 in the Circuit Court, Third Judicial Circuit Madison County, Illinois.

202. Expert Report (April 2024) on behalf of the plaintiffs in the matter of *Tom Mutz et al., (Plaintiffs) v. Sterigenics US, LLC (Defendants).* Civil Action File No. 20-A-3448 in the State Court of Cobb County, State of Georgia.

203. Expert Report (April 2024), Declaration (August 2024) and Rebuttal Expert Report (November 2024) on behalf of the plaintiff in the matter of *United States of America (plaintiff) v. EES Coke*

Battery, LLC (Defendant). Civil Action No. 22-11191 in the US District Court for the Eastern District of Michigan.

204. Affidavit on behalf of the petitioner (April 2024) in the matter of Dr. Darren Masier (Petitioner) v. North Carolina State University (Expected Adverse Party). File No. 24CV013058-910 in the General Court of Justice, Superior Court Division, Wake County, North Carolina.

205. Affirmation (June 2024) on behalf of the petitioners in the matter of Gwendolyn Harris et. al. (Petitioners) v. Marie Therese Dominguez (Commissioner of the New York State Department of Transportation) et. al., (Respondents) in the Supreme Court of the State of New York, County of Erie relating to the Kensington Expressway.

206. Expert Report (July 2024) on behalf of the Plaintiff in the matter of *Mourad Abdelaziz et. al., (Plaintiff) v. B. Braun Medical Inc., (Defendant).* Case No. 2020-C-1984 in the Pennsylvania Court of Common Pleas, Lehigh County.

207. Prefiled Direct Testimony (August 2024) on behalf of *Sierra Club and Portland Citizens United in the matter of the permit Application by Corpus Christie Liquefaction LLC* for Air Quality Permit Nos. 105710 and PSDTX1306M1 before the Texas State Office of Administrative Hearings, SOAH Docket No. 582-24-14373, TCEQ Docket No. 2023-1474-AIR.

208. Expert Report (August 2024) on behalf of the Plaintiff in the matter of *Pamela Knobbe (Plaintiff) v. Isomedix Operations, Inc., and Cosmed Group, Inc. (Defendants)*. Case No. 2022 L 008574 in re. Medline EtO Release, Consolidated with 2023 L 00686 in the Circuit Court of Cook County, Illinois.

209. Expert Rebuttal Report (September 2024) for *Eve Isaacks et. al., (Plaintiffs) v. Terumo BCT et. al., (Defendants)* before District Court, Jefferson County, Colorado Case Numbers: 2022CV031124 (consolidated with *Douglass et. al.* 2023CV30085).

210. Prefiled Direct Testimony (October 2024) and Rebuttal Testimony (December 2024) on behalf of the *Sierra Club in the matter of the Application of Duke Energy Kentucky, Inc. for a Certificate of Public Convenience and Necessity* to Convert its Wet FGD etc. Case No. 2024-00152 before the Public Service Commission, Commonwealth of Kentucky.

211. Expert Report (December 2024) on behalf of the plaintiffs in the matter of *Mary Beth Tamm et. al., (Plaintiff), Cibelli (Case No. 2023-L-011216) and Wagner (Case No. 2024-L-009290) v. Sterigenics U.S., LLC, et. al., (Defendants),* Case No. 2023-L-5701 in the Circuit Court of Cook County, Illinois.

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

212. 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.

213. Trial Testimony (February 2002) on behalf of Rocky Mountain Steel Mills, Inc. in Denver District Court.

214. 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).

215. 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).

216. 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).

217. 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.

218. 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.

219. Oral Testimony (October 2007) on behalf of the Sierra Club re. the Sevier Power Plant before the Utah Air Quality Board.

220. 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.

221. 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.

222. 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.

223. 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*.

224. Deposition (October 2009) on behalf of Environmental Defense and others, in the matter of challenges to the proposed Coleto Creek coal fired power plant project at the Texas State Office of Administrative Hearings (SOAH).

225. 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).

226. 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.

227. 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).

228. 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.

229. 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).

230. 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.

231. 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).

232. 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).

233. 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).

234. 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.

235. 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.

236. 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.

237. 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.

238. 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).

239. 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.).

240. 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).

241. 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).

242. 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.

243. 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).

244. 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).

245. 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.

246. 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.

247. 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).

248. 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).

249. 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).

250. 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).

251. 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).

252. 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).

253. 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).

254. Oral Testimony at Hearing (April 2015) and Testimony via Zoom (April 2024) 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).

255. 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).

256. 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.

257. 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).

258. 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).

259. Deposition (April 2016) on behalf of the Plaintiffs in *Natural 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).

260. 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.

261. 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.

262. 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).

263. 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.

264. 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.

265. 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.

266. 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.

267. 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).

268. 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).

269. 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).

270. 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.

271. 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).

272. 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.

273. 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).

274. 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.

275. 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).

276. 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.

277. 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.

278. 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.

279. 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.

280. 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.

281. 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.

282. 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.

283. 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.

284. 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.

285. 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.

286. 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.)

287. 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.)

288. 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.)

289. 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).

290. 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).

291. 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).

292. Testimony at Hearing (October 2021) on behalf of Evraz Rocky Mountain Steel in the matter of Colorado's Proposed Revisions to Regulation 22, the Greenhouse Gas Emissions and Energy Management for the Manufacturing Sector in Colorado (GEMM Rule), before the Colorado Air Quality Control Commission.

293. Deposition (November 2021) for *Charles Johnson Jr. (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant),* Civil Action No. 2:20-CV-01329 (Related to 12-968 BELO in MDL No. 2179). (US District Court for the Eastern District of Louisiana).

294. Testimony at Hearing (November 2021) on behalf of *National Parks Conservation Association, et. al*., in the matter of the Proposed Revisions to Colorado's Regional Haze State Implementation Plan (SIP) and Colorado Regulation 23, before the Colorado Air Quality Control Commission.

295. Deposition (December 2021) on behalf of Plaintiffs in Re: Deepwater Horizon BELO Cases, Case No. 3:19cv963-MCR-GRJ (US District Court for the Northern District of Florida, Pensacola Division).

296. Deposition (December 2021) for *James Noel (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant),* Civil Action No. 1:19-CV-00694-JB-MU-C (US District Court for the Southern District of Alabama, Southern Division).

297. Testimony at Hearing (February 2022, virtual) in the matter of the *Appeal Petition for Hearing on Air Quality Permit No. 8585 on behalf of Earth Care New Mexico et. al., (Petitioners) v. New Mexico Environment Department and Associated Asphalt and Materials, LLC (Applicant),* No. EIB 21-48 before the State of New Mexico Environmental Improvement Board.

298. Deposition (March 2022) and Rebuttal Deposition (July 2022) for *Kamuda (Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-010475 (Circuit Court of Cook County, Illinois.)

299. Deposition (April 2022, virtual) in the matter of Application of TPC Group LLC for New State and PSD Air Quality Permits (various), TCEQ Docket No. 2021-1422-AIR, SOAH Docket No. 582-22-0799, Before the Texas State Office of Administrative Hearings.

300. Deposition (May 2022, virtual) in the matter of the *Water Works and Sewer Board of the City of Gadsden (Plaintiff) v. 3M Company, et. al., (*Defendants*)*, Civil Action No.: 31 CV-2016-900676.00 (Circuit County of Etowah County, Alabama)

301. Deposition (June 2022 and September 2022, both virtual) for *Teresa* Fornek *(Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-010744 (Circuit Court of Cook County, Illinois.)

302. Deposition (June 2022, virtual) on behalf of the Plaintiffs in the matter of Toll Brothers, Inc., and Porter Ranch Development Company (Plaintiffs) v. Sempra Energy, Southern California Gas Company et. al., (Defendants), Southern California [Aliso Canyon] Gas Leak Cases, JCCP No.: 4861, Lead Case No.: BC674622, Superior Court of the State of California for the County of Los Angeles.

303. Deposition (July 2022) for *Richard Dufour (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 19-cv-00591 (US District Court for the Southern District of Mississippi).

304. Trial (August 2022) on behalf of the Plaintiffs in the matter of Modern *Holdings, LLC, et al. (Plaintiffs) v. Phillips (Defendants)*, Civil Action No. 5:13-cv-00405-GFVT, (US District Court for the Eastern District of Kentucky, Central Division at Lexington).

305. Trial (August 2022, in person) for *Susan Kamuda (Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-010475 (Circuit Court of Cook County, Illinois).

306. Deposition (September 2022, virtual) for *Heather Schumacher (Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-010744 (Circuit Court of Cook County, Illinois.)

307. Deposition (September 2022) on behalf of Plaintiffs in *Phylliss Grayson et. al. (Plaintiffs), v Lockheed Martin Corporation (Defendant),* Case No. 6:20-cv-01770. (US District Court for the Middle District of Florida – Orlando Division.)

308. Deposition (September 2022) for *Teresa Fornek (Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-010475 (Circuit Court of Cook County, Illinois).

309. Hearing (October 2022) on behalf of the Puyallup Tribe of Indians in the matter of *Washington Utilities and Transportation Commission (Complainant) v. Puget Sound Energy (Respondent)* before the Washington Utilities and Transportation Commission, Docket UE-220066 and UG-220067 (Consolidated).

310. Trial (October 2022, in person) for *Teresa Fornek (Plaintiff) v. Sterigenics U.S., LLC, et. al., (Defendant)*, Case No. 2018-L-010475 (Circuit Court of Cook County, Illinois).

311. Depositions (March 2023, June 2023) for *Ann Jordan et. al., and Blake Darnell (Plaintiffs) v. Terumo BCT et. al., (Defendants)* before District Court, Jefferson County, Colorado Case Numbers: 2020CV031457, 2021CV030474 (consolidated with 2020CV031457) and 2020CV03148.

312. Depositions (March 2023, April 2023, May 2023) for Quinn Buczek (Plaintiff) v. Sterigenics US, LLC, Sotera Health, LLC, Prologis First US Properties, LP, et. al., (Defendants) before State Court of Gwinnett County, State of Georgia, Case No. Civil Action File No. 20-C-05918-S1.

313. Deposition (May 2023) for *Potomac Riverkeeper and Sierra Club (Plaintiffs) v. Virginia Electric and Power Company (Defendant)*, Civil Action No. 2:21-CV-23 (Kleeh) (US District Court for the Northern District of West Virginia, Elkins Division).

314. Deposition (May 2023) for Mark Letart (Plaintiff), et al. v. Union Carbide Corporation, et al. (Defendants), Case No. 2:19-cv-877, U.S. District Court, Southern District of West Virginia, Charleston Division.

315. Testimony at Hearing on behalf of Evraz North America In the Matter of Colorado Air Quality Regulation Proposed Revisions to Regulation Number 3 to establish enhanced Modeling, monitoring and permitting requirements for Stationary sources in disproportionately impacted communities 5 CCR 1001-5, before the Air Quality Control Commission, State of Colorado.

316. Deposition (2023) and Daubert Hearing (August 2024) for *Vervicia Henderson, et al. (Plaintiff) v. Lockheed Martin Corporation (Defendant)*, Case No. 6:21-cv-01363, U.S. District Court, Middle District of Florida, Orlando Division.

317. Testimony at Hearing (July 2023) *Clean Air Council, Citizens for Pennsylvania's Future, Mountain* Watershed *Association (Appellants) v. Allegheny County Health Department (Appellee) and Allegheny Energy Center (*Intervenor*, Permittee),* Case No. 21-043 before the Hearing Officer of the Allegheny County Health Department.

318. Deposition (July 2023) for *Ezequiel Caraballo-Pache (Plaintiff) v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 8:20-cv-00263-SCB-JSS (US District Court for the Middle District of Florida, Tampa Division).

319. Deposition (August 2023) for *Floyd Ruffin (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 2:20-cv-00334-CJB-JCW (US District Court for the Eastern District of Louisiana, New Orleans Division).

320. Deposition (August 2023) on behalf of petitioners in *Doreen Carey et; al., (Petitioners) v. Fulcrum Centerpoint LLC. (Permittee/Respondent) and Indiana Department of Environmental Management (Respondent)*, Permit Number 089-44042-00660, before the Indiana Office of Environmental Adjudication.

321. Deposition (August 2023) on behalf of the Plaintiff in the *Water Works and Sewer Board of the Town of Centre, Alabama v. 3M Company, et. al.*, Civil Action No.: CV-2017-900049. Circuit Court of Cherokee County, State of Georgia.

322. Deposition (August 2023) for *Matthew Williams (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 1:22-cv-00278-LG-BWR (US District Court for the Southern District of Mississippi).

323. Deposition (September 2023) for *Vincent Culliver (Plaintiff), v. BP Exploration and Production Inc., et. al. (Defendant)*, Civil Action No. 3:21-cv-4942-MCR/HTC (US District Court for the Northern District of Florida).

324. Testimony at Hearing for Greenhouse Gas and Energy Management (GEMM2) for Manufacturing in Colorado (September 2023) on behalf of Environmental Defense Fund.

325. Testimony at Hearing (October 2023) in the matter of *Algonquin Gas Transmission LLC., on behalf of Community Residents (*Petitioners*)*, Commonwealth of Massachusetts Department of Environmental Protection, Office of Appeals and Dispute Resolution, OADR Docket Nos. 2017-011 and 012, Waterways Application License No. W16-4600, Weymouth Mass.

326. Testimony at Hearing (August 2023) on behalf of Citizens for Environmental Justice in the matter of the permit Application of Valero Refining-Texas, LP for Modification to State and Prevention of Significant Deterioration Air Quality Permits No. 38754 and PSDTX324M15 before the Texas State Office of Administrative Hearings, SOAH Docket No. 582-23-14975, TCEQ Docket No. 2023-0203-AIR.

327. Testimony at Hearing (September 2023) on behalf of Appellants in the matter of *PennEnvironment and Sierra Club (Appellants) v. Commonwealth of Pennsylvania, Department of Environmental Protection, (Appellee), and PPG Industries, Inc. (Permittee)*, EHB Docket No. 2022-032-B. Environmental Hearing Board, Department of Environmental Protection, State of Pennsylvania.

328. Testimony at Hearing (November 2023) on behalf of the Puyallup Tribe of Indians in the matter of *Washington Utilities and Transportation Commission (Complainant) v. Puget Sound Energy (Respondent)*, Docket: UG-230393. Before the Washington Utilities and Transportation Commission.

329. Deposition (February 6, 2024, July 2024) in the matter of *Gena M. McLendon (Plaintiff) v. Becton, Dickinson and Company, et. al. (Defendants)*, on behalf of the Plaintiff in Civil Action File No. 20-C-07123-S1 in the State Court of Gwinnett County, State of Georgia.

330. Testimony at Hearing (February 7, 2024) in the matter of *Jefferson County Foundation, et. al., (Appellants) v. Laura M. Crowder, Director, Division of Air Quality, Department of Environmental Protection (Appellee)*, No. 23-02.AQB on behalf of the Appellant, before the West Virginia Air Quality Hearing Board, Charleston, WV. Also, testimony in related matter No. 23-01-AQB (Roxul USA Inc., d/b/a Rockwool v. same Appellee at No. 23-02-AQB).

331. Deposition (February 2024) and Trial testimony (June 2024) on behalf of the Plaintiffs in the matter of *Penn Environment and Sierra Club (Plaintiffs) v. PPG Industries, Inc. (Defendants).* Case No. 2:12-CV-00342 in the US District Court for the Western District of Pennsylvania.

332. Deposition (March 2024 and April 2024) on behalf of the Plaintiff in the matter of Kathleen *Koch (Plaintiff) v. Medline Industries, Inc. et. al. and Vantage Specialty Chemicals, Inc. (Defendants)*. Case No. 2320 L 000686 in the Circuit Court of Cook County, IL.

333. Deposition (May 2024 and September 2024) on behalf of the plaintiff in the matter of *Paula Johnson et. al., (Plaintiff) v. Prairie Farms Dairy, Inc. et. al., (Defendants).* Case No. 2017 L 001562 in the Circuit Court, Third Judicial Circuit Madison County, Illinois.

334. Deposition (August 2024) on behalf of the plaintiffs in the matter of *Tom Mutz et al., (Plaintiffs) v. Sterigenics US, LLC (Defendants).* Civil Action File No. 20-A-3448 in the State Court of Cobb County, State of Georgia.

335. Deposition (October 2024 and November 2024) in the matter of *Gary B. Walker (Plaintiff) v. Becton, Dickinson and Company, et. al. (Defendants)*, on behalf of the Plaintiff in Civil Action File No. 21-C-08201-S1 in the State Court of Gwinnett County, State of Georgia.

336. Trial (November 2024) on behalf of the plaintiffs in the matter of *Emily Glass et. al., (Plaintiff) v. B. Braun* Medical *Inc., et. al., (Defendants).* Case No. 00315 (May Term 2021) and Consolidated Cases in the First Judicial District of Pennsylvania Court of Common Pleas of Philadelphia County.

337. Deposition (August 2024) on behalf of the plaintiff in the matter of *Jennifer Perrotti (Plaintiff) v. Lockheed Martin Corporation (Defendant).* Case No. 6:22-cv-01338 in the U.S. District Court Middle District of Florida – Orlando Division.

338. Deposition (August 2024) and Hearing (September 2024) on behalf of *Sierra Club and Portland Citizens United in the matter of the* permit *Application by Corpus Christie Liquefaction LLC* for Air Quality Permit Nos. 105710 and PSDTX1306M1 before the Texas State Office of Administrative Hearings, SOAH Docket No. 582-24-14373, TCEQ Docket No. 2023-1474-AIR.

339. Deposition (September 2024) and Trial (December 2024) on behalf of the Plaintiff in the matter of *Pamela Knobbe (Plaintiff) v. Isomedix Operations, Inc., and Cosmed Group, Inc. (Defendants).* Case No. 2022 L 008574 in re. Medline EtO Release, Consolidated with 2023 L 00686 in the Circuit Court of Cook County, Illinois.

340. Deposition (December 2024) for *Eve Isaacks et. al., (Plaintiffs) v. Terumo BCT et. al., (Defendants)* before District Court, Jefferson County, Colorado Case Numbers: 2022CV031124 (consolidated with *Douglass et. al.* 2023CV30085).

2025 Matters

- January 8 (3rd Supp/Rebuttal for BBraun)
- January 14 (Deposition: Willowbrook Cibelli/Wagner). In-person, Monterey Park Courtyard-by-Marriott
- January 31 (Prefiled Testimony and Deposition) Cheniere Stage 3/Trains 8 and 9 Texas SOAH Challenge. SOAH Docket No. 582-25-02533, TCEQ Docket No. 2024-1197-AIR, Application by Corpus Christie Liquefaction, LLC for Amendment of Air Quality Permit Nos. 139479 AND PSDTX1496M1
- February 6, 7, 10, 11 (Testified at Trial, Terumo. Case Number: 2022CV031124. Consolidated with Douglass, et al. [2023CV30085] District Court, Jefferson County, Colorado, Plaintiffs: EVE ISAACKS on behalf of decedent DORETA ELAINE ISAACKS, et al., v. Defendants: TERUMO BCT STERILIZATION SERVICES, INC., et. al.
- February 27. Deposition on behalf of Appellants Friends of Grays Harbor, et. al., v ORCAA, the City of Hoquiam, and Pacific Northwest Renewable Energy LLC (PNWRE) before the State of Washington Pollution Control Hearings Board, PCHB No. 24-037.
- March 6 (Testimony at Hearing) Cheniere Stage 3/Trains 8 and 9 Texas SOAH Challenge. SOAH Docket No. 582-25-02533, TCEQ Docket No. 2024-1197-AIR, Application by Corpus Christie Liquefaction, LLC for Amendment of Air Quality Permit Nos. 139479 AND PSDTX1496M1