Message

From: Anne Rolfes [anne@labucketbrigade.org]
Sent: 7/26/2022 5:26:28 PM
To: Dwyer, Stacey [Dwyer.Stacey@epa.gov]
Subject: Not in the office RE: Time sensitive meeting request

Thanks for writing. I am unavailable but will be back on August 4th. If you need something, please email info@labucketbrigade.org and you will be directed to the right person.

Thank you,

Anne Rolfes

--
Anne Rolfes, Director, Louisiana Bucket Brigade, (504) 452-4909

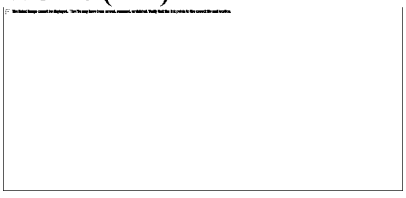
Message

From: Shreyas Vasudevan [shreyas@labucketbrigade.org]
Sent: 7/26/2022 3:25:23 PM
To: Dwyer, Stacey [Dwyer.Stacey@epa.gov]
Subject: Meeting with Dr. Nance

Hi Stacey,

Just following up on our call last week. I believe we set a meeting date for Aug 30th. I was wondering if you'd be able to send me an official invite along with a time for the meeting. You can email or call me anytime if there have been any changes since our call. Looking forward to hearing from you!

Best,
--
Shreyas Vasudevan
Campaign Researcher
Louisiana Bucket Brigade
Cell: Ex. 6 Personal Privacy (PP)
Work: (504) 484-3433



Message

From: Shreyas Vasudevan [shreyas@labucketbrigade.org]
Sent: 7/6/2022 4:19:28 PM
To: Turk, James [turk.james@epa.gov]; Davis, Suea [davis.suea@epa.gov]; Dwyer, Stacey [Dwyer.Stacey@epa.gov]
CC: Anne Rolfes [anne@labucketbrigade.org]
Subject: Re: Request for meeting with EPA Region 6 Administrator
Attachments: EPA Meeting Form.docx.pdf

Hi,

I have attached the meeting form to this email. Please reach out to me if you require any additional information and/or have any questions. Looking forward to meeting with you all soon.

Best,
Shreyas Vasudevan

On Thu, Jun 30, 2022 at 4:41 PM Shreyas Vasudevan <shreyas@labucketbrigade.org> wrote:

> Hi Stacey, Suea, and James,
>
> I wanted to inform you that it would work best for our team to meet with you virtually via Zoom, instead of in person as originally planned. I will submit the meeting form to you all tomorrow and provide an agenda for the meeting as soon as we have one ready to share! Feel free to reach out to me should you need anything in the meantime.
>
> Best,
> Shreyas Vasudevan

On Wed, Jun 29, 2022 at 10:20 AM Anne Rolfes <anne@labucketbrigade.org> wrote:

> Thank you so much,
>
> I am cc'ing my coworker Shreyas Vasudevan who is going to handle this for us.
>
> We look forward to our meeting in Dallas.
>
> Anne
> **Anne Rolfes, Director, Louisiana Bucket Brigade, (504) 452-4909**

On Mon, Jun 27, 2022 at 12:44 PM Dwyer, Stacey <Dwyer.Stacey@epa.gov> wrote:

> Anne Rolfes,

It was good talking with you today. Attached is the meeting form. Please send the completed form back to me as well as copy Ms. Sue Davis and Mr. James Turk. They are both copied on this message. If you have an agenda for the meeting, please include that document.

We will be back in touch with you soon regarding potential dates.

Thank you,

Stacey B. Dwyer, P.E.

Senior Advisor to the Regional Administrator

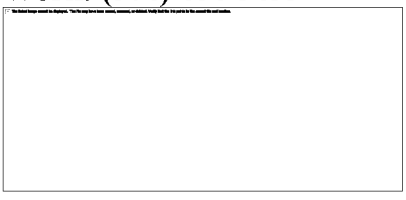
EPA Region 6

214-535-7427 EPA Cellphone

214-665-6729 EPA Landline

--

Shreyas Vasudevan
Campaign Researcher
Louisiana Bucket Brigade
Cell: Ex. 6 Personal Privacy (PP)
Work: (504) 484-3433



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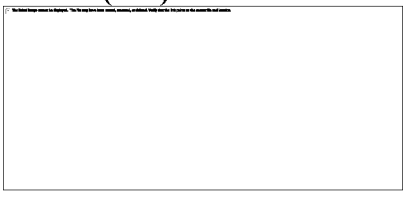
Shreyas Vasudevan
Campaign Researcher
Louisiana Bucket Brigade
Cell: Ex. 6 Personal Privacy (PP)
Work: (504) 484-3433



EPA Region 6 Meeting Information Form

This form assists in planning participation in meetings. Please be complete to minimize need for follow up. <u>This is not a confirmation or acceptance of the meeting by the Regional Administrator or Deputy Regional Administrator.</u>

Meeting Logistics

Requesting individual/organization:	*Inclusive Louisiana - Barbara Washington, Gail LeBoeuf, Myrtle Felton* *Louisiana Bucket Brigade - Anne Rolfes, Shreyas Vasudevan*
Contact information:	*Shreyas Vasudevan, shreyas@labucketbrigade.org, (412)* Ex. 6 Personal Privacy (PP)
Describe the proposed meeting topic/ agenda, provide available briefing materials	*Industrial pollution issues in St. James Parish, Louisiana. Exceedances in NAAQS for PM10 and cumulative impacts of toxic emissions in St. James Parish.*
Describe the action sought from the meeting and/or identify desired outcome(s) :	*We are requesting this meeting as a follow up to our letters to your office regarding ongoing pollution problems in Louisiana. We would like to focus on the town of Convent in St. James Parish and seek help in identifying pollution sources and taking action to end it.*
Meeting date (if date is flexible please indicate the range):	*August 2022*
Please explain any time sensitivity that impacts the date of the meeting, such as court-ordered or statutory deadline:	*The ongoing exposure to toxic pollution, particularly particulate matter.*
Proposed meeting location:	*Virtual - via Zoom*
Who is the EPA employee requested to attend? If unable to meet, is a surrogate desired? If yes, who specifically?	*Dr. Earthea Nance*

Meeting Participants

Expected meeting participants:	***Inclusive Louisiana*** *- Gail LeBoeuf (President), Myrtle Felton (Treasurer), Barbara Washington (Secretary)* ***Louisiana Bucket Brigade*** *- Anne Rolfes (Director), Shreyas Vasudevan (Campaign Researcher)*
Are any expected meeting participants federally registered lobbyists or lobbying organizations? (If yes, please identify.)	*No*
Are any expected meeting participants a partisan political candidate, a representative of a political party or a	*No*

EPA Region 6 Meeting Information Form

This form assists in planning participation in meetings. Please be complete to minimize need for follow up. <u>This is not a confirmation or acceptance of the meeting by the Regional Administrator or Deputy Regional Administrator.</u>

registered political action committee (PAC)? (If yes, please identify.)	
Do any expected meeting participants seek or currently have any business interests with the Agency such as permits, contracts, litigation, grants, etc.? (If yes, please identify.)	*No*

Background for the Meeting

Will the meeting involve legislation, broad policy options, or other general matters that involve a large and diverse range of persons and interests? (If yes, please describe.)	*Yes, we would like to discuss ongoing issues of toxic pollution in St. James Parish, LA, an Environmental Justice area, and options to address this through the use of EPA's authority.* *Concerns include the need for transparent air monitoring, failures in reporting facility accidents, cumulative impacts of pollution, lack of permit enforcement by issuing agencies, and exceedance of NAAQS for PM10.*
Will the meeting involve regulations, rules, or other matters that impact a specific industry, sector of the economy, or group of persons? (If yes, please describe.)	*Yes, regulations and rules involved include the Clean Air Act, the enforcement of permits, and air monitoring requirements.* *Industries involved are those concentrated in St. James Parish, including the oil & gas, chemical, and agricultural industries.* *People involved are residents of St. James Parish particularly those living along the fenceline with industrial facilities.*
Will the meeting involve a litigation matter, a permit, a grant, a contract, or any other matter that involves specific parties? (If yes, please identify the matter and list the specific parties.)	*No*
Any additional notes or information?	

Technology for Virtual Meetings

Preferred Virtual Meeting Platform?	*Zoom*
Do you use Microsoft Teams?	*No*

EPA Region 6 Meeting Information Form

This form assists in planning participation in meetings. Please be complete to minimize need for follow up. <u>This is not a confirmation or acceptance of the meeting by the Regional Administrator or Deputy Regional Administrator.</u>

Please return this completed form to Sue Davis at davis.suea@epa.gov
And James Turk at turk.james@epa.gov

Message

From: Anne Rolfes [anne@labucketbrigade.org]
Sent: 7/26/2022 5:50:54 PM
To: Dwyer, Stacey [Dwyer.Stacey@epa.gov]
Subject: Re: Time sensitive meeting request

Thank you so very much, Ms. Dwyer. One of the Banners is going to call you shortly.

Anne

> On Jul 26, 2022, at 12:26 PM, Dwyer, Stacey <Dwyer.Stacey@epa.gov> wrote:
>
> Ms. Joy Banner, Ms. Jo Banner, and Ms. Anne Rolfes,
> I am following up to determine if anyone from EPA has contacted you. Please give me a call on my cellphone at 214-535-7427.
>
> Thank you,
>
> Stacey B. Dwyer, P.E.
> Senior Advisor to the Regional Administrator
> US EPA Region 6
> 214-535-7427 EPA Cellphone
> 214-665-6729 EPA Landline
>
>
>
> -----Original Message-----
> From: Anne Rolfes <anne@labucketbrigade.org>
> Sent: Sunday, July 17, 2022 5:44 AM
> To: Dwyer, Stacey <Dwyer.Stacey@epa.gov>
> Cc: Jo Banner <Ex. 6 Personal Privacy (PP)>; Joy Banner <Ex. 6 Personal Privacy (PP)>
> Subject: Time sensitive meeting request
>
> Dear Ms. Dwyer,
>
> I hope you are doing well and appreciate your assistance to help communities in Louisiana. I am CCing the Founders and Directors of a group based in St. John Parish called The Descendants Project. Please meet Jo Banner and Joy Banner. I am giving a brief overview of the situation here but they can of course provide more detail and specifics to their request.
>
> Their descendant community is threatened by Greenfield Louisiana, a grain elevator proposing to build mere feet away from their homes. The air permit is due to expire and so the company has begun activity on the site under the guise of meeting the construction requirements to keep the air permit.
>
> It would be very helpful if the Banners could meet with Dr. Nance this month to make sure the region understands the threat posed by this facility and the permit requirements that are not being met. As usual in Louisiana, we are reaching out to the region because we lack confidence in our state agency.
>
> Thank you!
>
> Anne Rolfes

Message

From: Anne Rolfes [anne@labucketbrigade.org]
Sent: 6/29/2022 3:21:04 PM
To: Dwyer, Stacey [Dwyer.Stacey@epa.gov]
CC: Davis, Suea [davis.suea@epa.gov]; Turk, James [turk.james@epa.gov]; Shreyas Vasudevan [shreyas@labucketbrigade.org]
Subject: Re: Accessing the EPA Federal Building

Thank you,

I am sharing with my coworker Shreyas. We will be in touch.

Anne

Anne Rolfes, Director, Louisiana Bucket Brigade, (504) 452-4909

On Mon, Jun 27, 2022 at 12:54 PM Dwyer, Stacey <Dwyer.Stacey@epa.gov> wrote:

> Anne Rolfes,
>
> As per our conversation, here is information for visitors accessing the EPA Building.
>
> You will need to provide proof of your vaccination status, go through security screening and receive a visitor's badge. Visitors will need to present a REAL ID compliant identification (current ID with photo).
>
> The form to attest your vaccination status is attached. Each visitor must show their vaccination attestation/negative test result before entering the facility.
>
> We are located in the Renaissance Tower at 1201 Elm Street, Suite 500, Dallas, Texas, 75270. Near Renaissance Tower, there are many parking facilities and a limited number of metered street parking. There are no attendants in these parking lots, and the machines do not issue change. Several parking lots take cash as well as credit cards.
>
> Below are links providing additional information, such as the ID requirements.
>
> If you have concerns or additional questions, please give me a call.
>
> Stacey B. Dwyer, P.E.
> Senior Advisor to the Regional Administrator
> 1201 Elm Street, Suite 500
> Dallas, Texas 75270

214-535-7427 EPA Cellphone

214-665-6729 EPA Office phone

All EPA Region 6 visitors must go to the 5th floor reception and security lobby upon arrival. EPA federal facility access may be granted after successfully passing security screening, and EPA sponsorship is obtained. Weapons are not allowed in federal facilities. Visitors will need to present a REAL ID compliant identification (current ID with photo) to be sponsored by the EPA as a visitor.

All EPA sponsored visitors must be issued a visitor badge by the receptionist and must be escorted by the sponsor at all times. Once official business is completed, visitors must check out at the reception desk and the visitor's badge(s) must be returned to the receptionist.

Please note that Handicapped access Renaissance Tower is from the Elm Street side of the building. More information for visitors to EPA's Region 6 office:

A list of prohibited items

Rules and Regulations Governing Conduct on Federal Property

REAL ID Act information

Message

From: Dwyer, Stacey [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B9F207A623824720907845EAD85383CA-DWYER, STACEY]
Sent: 7/6/2022 5:04:19 PM
To: Shreyas Vasudevan [shreyas@labucketbrigade.org]; Turk, James [turk.james@epa.gov]; Davis, Suea [davis.suea@epa.gov]
CC: Anne Rolfes [anne@labucketbrigade.org]
Subject: RE: Request for meeting with EPA Region 6 Administrator

Thank you Shreyas and Anne. I will contact you soon with potential dates for a virtual meeting with Dr. Nance.

Stacey

From: Shreyas Vasudevan <shreyas@labucketbrigade.org>
Sent: Wednesday, July 6, 2022 11:19 AM
To: Turk, James <turk.james@epa.gov>; Davis, Suea <davis.suea@epa.gov>; Dwyer, Stacey <Dwyer.Stacey@epa.gov>
Cc: Anne Rolfes <anne@labucketbrigade.org>
Subject: Re: Request for meeting with EPA Region 6 Administrator

Hi,

I have attached the meeting form to this email. Please reach out to me if you require any additional information and/or have any questions. Looking forward to meeting with you all soon.

Best,
Shreyas Vasudevan

On Thu, Jun 30, 2022 at 4:41 PM Shreyas Vasudevan <shreyas@labucketbrigade.org> wrote:

> Hi Stacey, Suea, and James,
>
> I wanted to inform you that it would work best for our team to meet with you virtually via Zoom, instead of in person as originally planned. I will submit the meeting form to you all tomorrow and provide an agenda for the meeting as soon as we have one ready to share! Feel free to reach out to me should you need anything in the meantime.
>
> Best,
> Shreyas Vasudevan
>
> On Wed, Jun 29, 2022 at 10:20 AM Anne Rolfes <anne@labucketbrigade.org> wrote:
>
> > Thank you so much,
> >
> > I am cc'ing my coworker Shreyas Vasudevan who is going to handle this for us.
> >
> > We look forward to our meeting in Dallas.

Anne

Anne Rolfes, Director, Louisiana Bucket Brigade, (504) 452-4909

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> We will be back in touch with you soon regarding potential dates.
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> Thank you,
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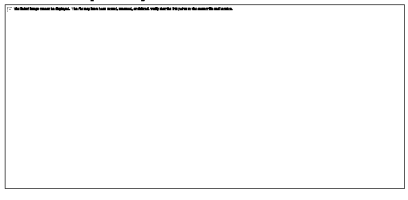
>
> Senior Advisor to the Regional Administrator
>
> EPA Region 6
>
> 214-535-7427 EPA Cellphone
>
> 214-665-6729 EPA Landline

--

Shreyas Vasudevan
Campaign Researcher
Louisiana Bucket Brigade
Cell: Ex. 6 Personal Privacy (PP)
Work: (504) 484-3433



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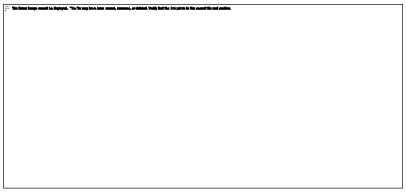
Shreyas Vasudevan
Campaign Researcher
Louisiana Bucket Brigade
Cell: Ex. 6 Personal Privacy (PP)
Work: (504) 484-3433



Message

From: Ngo, Kim [Ngo.Kim@epa.gov]
Sent: 7/21/2022 2:48:18 PM
To: anne@labucketbrigade.org
CC: Garcia, David [Garcia.David@epa.gov]; Maguire, Charles [maguire.charles@epa.gov]; Hill, Troy [Hill.Troy@epa.gov]; Nance, Earthea [Nance.Earthea@epa.gov]; Wooden-Aguilar, Helena [Wooden-Aguilar.Helena@epa.gov]; Gonzalez, Iris [Gonzalez.Iris@epa.gov]
Subject: EPA response to letter on CAA and SDWA
Attachments: LA Bucket Brigade Letter_7-13-22_signed.pdf

Good Morning Anne,

On behalf Dr. Earthea Nance, we are attaching a response to your letter dated March 31, 2022, regarding your concerns about the state of Louisiana's implementation of the CAA and SDWA.

In case this slipped through the cracks, we are just making sure you got this. Thank you for your letter.

If you have any questions please do not hesitate to contact me or my Director, David Garcia (214-665-7593).

Sincerely,

Kim

Kim Ngo
Deputy Director, Air and Radiation Division
EPA Region 6 (ARD)
1201 Elm Street, Suite 500
Dallas, TX 75270
o: 214-665-7158
c: 214-422-5219

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270

Office of the Regional Administrator

July 13, 2022

Ms. Anne Rolfes
Director
Louisiana Bucket Brigade
3416 B Canal Street
New Orleans, Louisiana 70119

Dear Ms. Rolfes:

Thank you for your letter dated March 31, 2022, to the U.S. Environmental Protection Agency regarding concerns specific to the State of Louisiana's Clean Air Act program implementation summarized below:

1. The need for reduction of ethylene oxide emissions and a halt to new permitted sources, specifically the concern that the state of Louisiana is not heeding the latest scientific guidance.

2. Assurance that the Louisiana Department of Environmental Quality implements recommendations of the Louisiana Legislative Audit published in January of 2021 Monitoring and Enforcement of Air Quality.

3. Recommendation of disapproval of LDNR's application for primacy on carbon capture and storage.

4. Multiple and specific issues at facilities of concern and multiple planned liquified natural gas terminals located along the Louisiana coastline.

The EPA announced on January 26, 2022, several key actions related to the concerns raised in your letter. EPA committed to address environmental justice concerns by conducting a Multi-Scale Monitoring Project. This project includes unannounced inspections, sampling, and air monitoring in priority areas that were toured during the Administrator's Journey to Justice visit. When the sampling and analyses are completed, we will share the analytical data and clearly communicate the risks the data indicates with the local communities. Detailed information about the announced actions can be found at this link: https://www.epa.gov/newsreleases/epa-administrator-regan-announces-bold-actions-protect-communities-following-journey.

The agency is conducting "risk and technology review" rulemakings of its existing National Emission Standards for Hazardous Air Pollutants for several chemical sector source categories. Many of the major stationary source facilities with higher ethylene oxide emissions identified in your letter are regulated by these rules with respect to controlling their hazardous air pollutant emissions. We also note that several of the sources you identified are minor stationary sources, or area sources for hazardous air pollutants emissions. The EPA is planning to conduct a technology review for the National Emission Standards for Hazardous Air Pollutants for chemical manufacturing area sources, and we intend to consider ethylene

oxide emissions from that source category as part of that review. These complex rulemakings often take several years to complete. We anticipate the potential rulemaking updates will be completed in 2024.

We understand the urgency communities face at the intersection of environmental justice concerns and the threat of climate change. Although you have requested that EPA reject all permit applications to build new petrochemical facilities or prevent the expansion of existing facilities, the Louisiana Department of Environmental Quality is the primary CAA permitting agency for Louisiana with EPA providing technical assistance and program oversight. The state permitting agencies are required to issue air quality permits consistent with all applicable federal air permitting requirements. Applicable CAA and implementing federal air permitting regulations dictate EPA's authorities to approve or disapprove the permit applications that you raise in your letter. In this instance, the state has sole primacy to review and approve or disapprove the permit applications you raise. It is only when the state issues a final permit that EPA has authority to review such permits to determine consistency with applicable federal air permitting requirements. As such, we do not have authority to reject the subject permit applications as you request at the application stage.

As part of our oversight effort, EPA Region 6 selectively reviews proposed construction and operating permits annually from the five states in Region 6. During these reviews, we provide comments to the state on the proposed permits. Regarding the Louisiana Legislative Audit, we have reviewed and incorporated, where appropriate, the report findings and recommendations into EPA Region 6's fiscal year 2021 program evaluation report for the LDEQ's title V permitting program, with the final report to be published this year. Additionally, we encourage citizens to actively participate in the state permitting agency's public participation process for facility-specific permits to help ensure that the state is fully aware of the public's concerns and considers those concerns in developing a permit that is protective of human health and the environment.

Regarding your recommendation on the Underground Injection Control Class VI program, please note that both the Louisiana Department of Environmental Quality and the Louisiana Department of Natural Resources have a role to play. Louisiana Department of Natural Resources is the implementing agency. On April 21, 2021 LDNR officially submitted their final Class VI Geo-sequestration Primacy program application for approval and codification. Class VI Geo-sequestration wells are a primary element of LDNR's effort to mitigate climate change. Staff from the Region 6 Ground Water/Injection Control Section, Office of Regional Counsel, and the Office of Water /Office of Ground Water and Drinking Water initially determined the application incomplete primarily due to questions about their public participation process and also some minor concerns with the Memorandum of Agreement and program description.

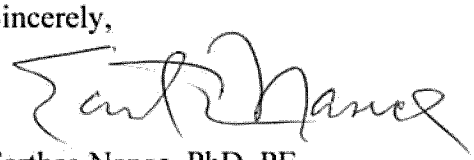
On September 17, 2021, the Louisiana Department of Environmental Quality resubmitted their primacy package to the EPA with a revised Memorandum of Agreement, revised program description, and a complete documentation of a public hearing held on July 6, 2021, in Baton Rouge, Louisiana. The EPA reviewed the revised Louisiana Department of Natural Resources Class VI primacy application and determined it complete. EPA's Office of Water will publish a Notice of Receipt of a complete application and issue the public notice and provide an opportunity to comment for a period of at least 30 days. LDNR's application for UIC Class VI primacy is currently in the application evaluation phase or our primacy process. More information on the primacy process can be found at: https://www.epa.gov/uic/primary-enforcement-authority-underground-injection-control-program#who_loop. If the EPA approves primacy for Class VI wells in Louisiana, EPA Region 6 will work with LDNR to ensure any permitted wells in the Underground Injection Control program are protective of underground sources of drinking water and human health.

There are other potential risks to health and environment posed by carbon capture and sequestration. EPA has created a work group to evaluate these risks and plan ways to create more engagement with stakeholders. This includes early dialogue with communities and community based organizations. We are at an early phase of coordinating community engagement opportunities; we hope to have more information to share soon about how you and other communities might participate in those.

Lastly, I would like to set up a meeting to discuss your concerns in more detail. I have instructed my staff to reach out to you to find a time on my calendar for us to meet.

Thank you for sharing your concerns, it is very important for me to hear from you regarding the issues that are impacting communities in Louisiana. If you have any immediate questions, please feel free to contact David F. Garcia, Director of Air and Radiation Division, at (214) 665-7593 or garcia.david@epa.gov.

Sincerely,



Earthea Nance, PhD, PE
Regional Administrator

Message

From: Russel Honore' [Ex. 6 Personal Privacy (PP)]
Sent: 4/16/2024 8:12:38 PM
To: akatn1@lsuhsc.edu; Peggy A. Honore [phono1@lsuhsc.edu]; kterrell1@tulane.edu; [Ex. 6 Personal Privacy (PP)]
CC: Anne Rolfes [anne@labucketbrigade.org]; darryl.malek-wiley@sierraclub.org; Jack Reno Sweeney [Ex. 6 Personal Privacy (PP)]; Jacques Morial [Ex. 6 Personal Privacy (PP)]; Monique Harden [moniqueh@dscej.org]
Subject: Fwd: Help Needed to Keep St. Rose/Elkinsville-Freetown/Preston Hollow Environmentally Safe
Attachments: PublicNotice_CUP_StCharlesCleanFuels.pdf; Requests for St. Rose.pdf

what can we do to help in this community this has been going on for years , I will reach out to EPA Region 6 .

---------- Forwarded message ---------
From: **Kimbrelle Eugene Kyereh** <[Ex. 6 Personal Privacy (PP)]>
Date: Tue, Apr 16, 2024 at 3:00 PM
Subject: Help Needed to Keep St. Rose/Elkinsville-Freetown/Preston Hollow Environmentally Safe
To: AC (Art) Blue <[Ex. 6 Personal Privacy (PP)]>, Bishop Otis Kenner <[Ex. 6 Personal Privacy (PP)]>, Byron Teddy Bear Smith <[Ex. 6 Personal Privacy (PP)]>, Connie Bryant <[Ex. 6 Personal Privacy (PP)]>, [Ex. 6 Personal Privacy (PP)] [Ex. 6 Personal Privacy (PP)], DeGrange, Daniel <ddegrange@tulane.edu>, Desrehea A. Terrell [Ex. 6 Personal Privacy (PP)], [Ex. 6 Personal Privacy (PP)]>, Dorothy Nairne <dorothy@alovesbusa.com>, Eloise Reid [Ex. 6 Personal Privacy (PP)], Godshall, Lauren E <lgodshall@tulane.edu>, Hanson, Sidra E <shanson5@tulane.edu>, Ina Lynn Rising <[Ex. 6 Personal Privacy (PP)]>, [Ex. 6 Personal Privacy (PP)] <[Ex. 6 Personal Privacy (PP)]>, Larry Sorapuru Jr. <[Ex. 6 Personal Privacy (PP)]>, Michael Esealuka <michael@breakfreefromplastic.org>, Michael Levien <levien@jhu.edu>, [Ex. 6 Personal Privacy (PP)] <[Ex. 6 Personal Privacy (PP)]>, Pastor Adolph Smith <[Ex. 6 Personal Privacy (PP)]>, Pastor Henry LeBoyd Jr. <[Ex. 6 Personal Privacy (PP)]>, Pastor Herman Bailey <[Ex. 6 Personal Privacy (PP)]>, Pastor John White <Whiteandsonsenterprises@yahoo.com>, Pastor Johnnie Magee <[Ex. 6 Personal Privacy (PP)]>, Pastor Keith Mackey <[Ex. 6 Personal Privacy (PP)]>, Pastor Neil Bernard <[Ex. 6 Personal Privacy (PP)]>, Potter, Clara J <cpotter2@tulane.edu>, Shalon Tucker <[Ex. 6 Personal Privacy (PP)]>, Terrell, Kimberly A <kterrell1@tulane.edu>, Wilma Subra <[Ex. 6 Personal Privacy (PP)]>, Yolanda Smith <[Ex. 6 Personal Privacy (PP)]>,

[Ex. 6 Personal Privacy (PP)],

Ex. 6 Personal Privacy (PP)

Ex. 6 Personal Privacy (PP) Scott Eustis <scott@healthygulf.org>, Jade Woods <jwoods@ciel.org>, Russel Honore' <Ex. 6 Personal Privacy (PP)>, Monique Harden <moniqueh@dscej.org>, Sharon Lavigne <sharonlavigne@risestjames.org>, Bobby Taylor <Ex. 6 Personal Privacy (PP)>, Tish Taylor <Ex. 6 Personal Privacy (PP)>, Gail LeBoeuf <inclusive.louisiana@gmail.com>, Barbara Washington <Ex. 6 Personal Privacy (PP)>, Darryl Malek-Wiley <darryl.malek-wiley@sierraclub.org>, Joy Banner <joy@thedescendantsproject.com>, <jo@thedecendantsproject.com>

Dear friends, family, and fellow Louisianians,

I pray this email finds you well. **Would you please take action to support the concerned residents of St. Rose/Elkinsville-Freetown/Preston Hollow?** Many of us residents have been experiencing noxious chemical fumes entering our homes at various times of the day and night from the International Matex Tank Terminal's (IMTT) fence line industry in St. Charles Parish for many decades. Residents have reported headaches, nausea, heart palpitations, burning eyes, throats, and nasal passages, etc. Some have reported that their grandchildren's asthma is exacerbated during chemical releases into the air. Furthermore, there is no community monitoring of chemicals. Now, IMTT is partnering with St. Charles Clean Fuels (SCCF) to operate a "blue" ammonia plant with carbon capture storage adjacent to it.

You can help by **(1)** reporting the chemicals you smell from IMTT to the Louisiana Department of Environmental Quality and the St. Charles Parish Emergency Operations Center, **(2)** by writing to LDEQ to provide a professional-grade air monitoring station to monitor ALL the chemicals emitted by IMTT, and **(3)** by writing to the Louisiana Department of Energy and Natural Resources to request a public hearing on coastal usage permit that SCCF applied for.

Fence-Line Community Facts

Toxic and cancerous chemicals are emitted by IMTT. In the event of a Shelter-in-place order, residents may be in great danger. Scientists from Tulane Environmental Law Clinic and Louisiana Environmental Action Network have identified numerous chemicals emitted into the air by IMTT, such as **benzene** *(known to cause leukemia, lung cancer, lymphoma, asthma, disorders of the blood and immune system, and may cause harm to a developing fetus),* **ethanol** *(causes neurological effects),* **naphthalene** *(may cause cancer of the lungs, nose, throat, and/or colon, may cause cataracts, asthma, and may cause anemia in a developing fetus),* **formaldehyde** *(known to cause throat cancer, leukemia, nose, and sinus cancer, causes breathing problems and eye irritation, and increases the risk of spontaneous abortion),* **Chloromethane** *(can impact the nervous system, can cause liver and kidney damage, and irritate the skin and eyes, can cause dizziness, headaches, and difficulty speaking) and* **Trichlorofluoromethane** *(overexposure can cause irregular heartbeat, irritation of the lungs, shortness of breath, irritation of the skin and eyes, and causes cracking and dryness of skin).* Other chemicals include ethanol, acetone, toluene, m,p-Xylene, n-hexane, Cyclohexane, polycyclic aromatic

hydrocarbons, and **ethylbenzene** *(may cause cancer of the testicles, kidneys, lung, or liver, may cause damage to the liver, kidneys, brain, and blood, may cause birth defects or other harm to a developing fetus).*

IMTT has had numerous fires over the past few years, is rapidly expanding, and is welcoming the SCCF ammonia plant. Additionally, without informing residents, the Louisiana Department of Environmental Quality (LDEQ) has taken the St. Rose air monitor they once provided.

St. Charles Clean Fuels is urgently seeking permits to construct an ammonia plant on the swamp land adjacent to IMTT. This imminent threat could lead to unwanted community flooding and the immediate risk of further adverse health impacts due to ammonia, carbon monoxide, and carbon dioxide leaks/explosions. SCCF has to transport the carbon dioxide and inject it over a mile into the earth. Lake Maurepas will probably be the injection point, affecting St. John the Baptist Parish and Tangipahoa Parish. The potential consequences are grave, and we need your immediate support to prevent this from happening. Look at this video about the carbon capture pipeline explosion that happened in Satartia, Mississippi, in 2020.
https://youtu.be/yGIXeWktiWU?si=WqkRD1fOU8_NDOwl

Thanks to organizations like the St. Rose Community One Voice, the Green Army, and the Bucket Brigade, the St. Rose community has been on the environmental radar for many years. They have taken a stand to get chemicals from IMTT and Shell mitigated and are responsible for securing the temporary air monitor that was later removed by LDEQ. Take a look at this video of General Russel L. Honoré, retired lieutenant general and founder of the Green Army, in an interview with Al Gore, mentioning the plight of St. Rose and the belief that "we have a human right to clean air, clean water, and safe food" recorded about nine years ago.
https://youtu.be/3YZAagP0PAE?si=QgMvKGs0P82EdYvV

If you're ready to help, here's what you can do:

- Report any chemical fumes you smell to LDEQ and EOC.
- Write to the Louisiana Department of Environmental Quality (LDEQ) to request a 21st-century, permanent professional-grade air monitoring station to monitor ALL the chemicals being emitted by IMTT.
- Write to the Louisiana Department of Energy and Natural Resources (LDENR) to request a public hearing on the coastal usage permit.
- Ask your associates to help also.

Please find the following attachments and copies:

1. Public Notice of the Request for St. Charles Clean Fuels' (SCCF) Permit from LDENR.
2. Detailed Instructions on Request

Your voice matters, and your actions can help protect the valuable lives in St. Rose, Elkinsville-Freetown/Preston Hollow communities.

Gratefully,

Kimbrelle Eugene Kyereh
Founder and Executive Director
Refined Community Empowerment, Inc.
(504) 875-1237


Educate. Uplift. Empower.
For the Love of St. Rose/Elkinsville-Freetown, ❤🌹

--
Best Regards, LT General Russel Honore (Ret) www.generalhonore.com (404) 227-1527 See/Smell Something, Say Something, Do Something. Take a picture Call 911

Message

From: Anne Rolfes [anne@labucketbrigade.org]
Sent: 4/29/2024 11:49:38 PM
To: Nance, Earthea [Nance.Earthea@epa.gov]
Subject: Still flaring, no word from EPA staff
Attachments: 20240429T052140_facefront_hardware111.mov

Dear Dr. Nance,

Attached is a video from 5:30 am today. Venture Global is still flaring. I have not heard from your staff.

Thank you,

Anne Rolfes

Message

From: Anne Rolfes [anne@labucketbrigade.org]
Sent: 4/25/2024 10:41:29 PM
To: Nance, Earthea [Nance.Earthea@epa.gov]
Subject: Re: Venture Global update

Thank you,

I haven't heard from them, FYI.

A

Anne Rolfes, Director, Louisiana Bucket Brigade, (504) 452-4909

On Thu, Apr 25, 2024 at 1:10 PM Nance, Earthea <Nance.Earthea@epa.gov> wrote:

> Hi Anne, I've asked my staff to reach out to you.
>
> -E
>
> **From:** Anne Rolfes <anne@labucketbrigade.org>
> **Sent:** Thursday, April 25, 2024 7:00 AM
> **To:** Nance, Earthea <Nance.Earthea@epa.gov>
> **Subject:** Re: Venture Global update
>
>
>
> Thank you,
>
> We would definitely like to meet regarding Venture Global. The company had a 50 foot flare again yesterday. How shall I proceed for scheduling?

Anne

Anne Rolfes, Director, Louisiana Bucket Brigade, (504) 452-4909

On Wed, Apr 24, 2024 at 11:30 PM Nance, Earthea <Nance.Earthea@epa.gov> wrote:

> Dear Anne,
>
> This is in response to your recent letter. Please see attached. And please let me know if you'd like to meet.
>
> -E

Message

From: Russel Honore'
Ex. 6 Personal Privacy (PP)
Sent: 5/30/2024 1:56:36 AM
To: akatn1@lsuhsc.edu; Alex Zaroulis [alex.zaroulis@617mediagroup.com]; Allie Motz [allie.motz@617mediagroup.com]; Anne Rolfes [anne@labucketbrigade.org]; Christian Hanley [christian.hanley@617mediagroup.com]; Jack Reno Sweeney
Ex. 6 Personal Privacy (PP)
Jacques Morial
Ex. 6 Personal Privacy (PP) Peggy A. Honore [phono1@lsuhsc.edu]; kterrell1@tulane.edu
Subject: Fwd: BLACK COMMUNITIES, CLIMATES, AND THE ENVIRONMENT -- Tuesday, June 4, 2024 (GALLUP Building, 901 F Street NW, Washington, DC 20004)
Attachments: Black Communities, Climates, and the Environment A Summit on Science, Systemic Inequalities, and Solutions.pdf

Sent points or data we should include to Christen need tomorrow. Thanks Dr Honore for excellent notes , see attached

---------- Forwarded message ---------
From: **M. C. Brown** <mc.brown@tmcf.org>
Date: Wed, May 29, 2024 at 7:23 PM
Subject: BLACK COMMUNITIES, CLIMATES, AND THE ENVIRONMENT -- Tuesday, June 4, 2024 (GALLUP Building, 901 F Street NW, Washington, DC 20004)
To:

Please join the Payne Center for Social Justice, Binghamton University's Harriet Tubman Center for Freedom and Equity, and the Kaschak Institute for Social Justice for Women and Girls for

Black Communities, Climates, and the Environment: A Summit on Science, Systemic Inequalities, and Solutions

The Summit on Climate Change and Black Communities will convene leaders, policymakers, academics, and advocates from African American communities to form a new front in the movement to address the racialized impacts of climate change and highlight how Black communities are key agents of change in the fight for a sustainable future.

Tuesday, June 4, 2024
8:00 a.m.-3:00 p.m. EST
The GALLUP Building, Great Hall
901 F St. NW, 2nd Floor
Washington, D.C. 20004
This is an in-person event. Seating is limited.

Keynote Speaker

LTG Russel Honoré
Dr. Earthea Nance

Plenary Speakers

Jim Clifton, Charles Ellison, Queen Quet & Henry Obispo

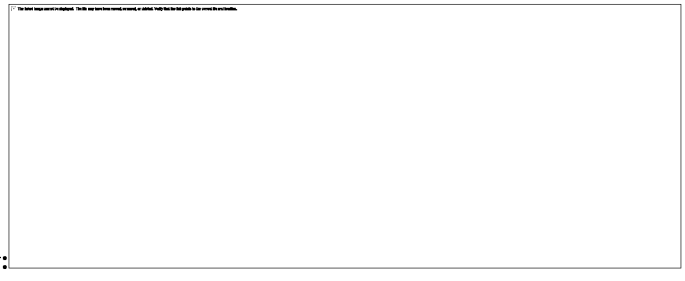
Other Speakers Include:

Jonathan C. Augustine, Benjamin Chavis, Jr, Marilyn L. Hemingway, Meldon S. Hollis Jr., Ellyn Maese, John K. Pierre, Lea Webb, and the HBCU Sustainable Communities Initiative Faculty

We look forward to your participation. Please share this invite and the flyer with those within your network.

Registration is free for attendees. Please register using this link.
Please RSVP for Breakfast and Lunch count.

In partnership with Binghamton University:



M. C. Brown II, Ph.D.
Executive Director & Research Scientist
Payne Center for Social Justice
Thurgood Marshall College Fund
202-216-2237 [|] www.paynecenter.org

--
Best Regards, LT General Russel Honore (Ret) www.generalhonore.com (404) 227-1527 See/Smell Something, Say Something, Do Something. Take a picture Call 911

PAYNE CENTER
for
SOCIAL JUSTICE
THURGOOD MARSHALL COLLEGE FUND

BLACK COMMUNITIES, CLIMATES, AND THE ENVIRONMENT:

A SUMMIT ON SCIENCE, SYSTEMIC INEQUALITIES, AND SOLUTIONS

Tuesday, June 4, 2024
GALLUP Great Hall
901 F Street NW
Washington, DC 20004
8:00 am to 3:00 pm
This is an in-person event. Seating is limited.
Please RSVP for breakfast and lunch count.

In partnership with Binghamton University's Harriet Tubman Center for Freedom and Equity and Kaschak Institute for Social Justice for Women and Girls

CONFIRMED KEYNOTE SPEAKERS

LTG Russel Honoré

Dr. Earthea Nance

Register here

Registration Link:
https://form.jotform.com/232855739696173

OTHER SPEAKERS INCLUDE

Jim Clifton
Charles Ellison
Queen Quet
Henry Obispo
Jonathan C. Augustine
Benjamin Chavis, Jr.
Marilyn L. Hemingway
Meldon S. Hollis Jr.
Ellyn Maese
John K. Pierre
Lea Webb
HBCU Sustainable Communities Initiative Faculty

Message

From: Lowell, Devin A [dlowell@tulane.edu]
Sent: 4/24/2024 8:08:50 PM
To: 'DEQ.PUBLICNOTICES@LA.GOV' [DEQ.PUBLICNOTICES@LA.GOV]; Nance, Earthea [Nance.Earthea@epa.gov]
CC: Jordan, Lisa W [lwjordan@tulane.edu]; kterrell1@tulane.edu; Garcia, David [Garcia.David@epa.gov]; Belk, Ellen [Belk.Ellen@epa.gov]; Alexander.Theresa [Alexander.Theresa@epa.gov]
Subject: Comments on 2024 Air Monitoring Network Plan, AI #168755, PER99999999
Attachments: Ex. 3 - Liu et al., 2014.pdf; Ex. 4 - Liu et al., 2015.pdf; Ex. 5 - 3-27-14 EPA response LDEQ 2013 PM Exclusion Request.pdf; Ex. 6 - Air_Monitoring_data_Interval_5_Minutes_WESTLAKE_15-Apr-24_10_14_59.csv; Ex. 1 - LDEQ Response to comments RE 2023 AMNP Response to Comments.pdf; Ex. 2 - Grover et. al, 2005.pdf; 04 24 2024 Comments RE LDEQ air monitoring plan final.pdf

Dear LDEQ Public Participation Group and Dr. Nance,

On behalf of our clients Patricia Charles, Raphael Sias, Ronald Carrier, Larry Allison, Karl Prater, McKeever Edwards, Carolyn Peters, Stafford Frank, and Peggy Anthony ("Mossville community members"), as well as Refined Community Empowerment, Inclusive Louisiana, RISE St. James, Healthy Gulf, and the Sierra Club, please find attached our comments on LDEQ's 2024 Air Monitoring Network Plan, as well as exhibits 1-6 to the same.

Kind regards,

Devin A. Lowell
Clinical Assistant Professor of Law & Supervising Attorney
Tulane Environmental Law Clinic
6329 Freret Street
New Orleans, LA 70118
Ph: (504) 862-8814
Fax: (504) 862-8721

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Technical note

Sampling and conditioning artifacts of $PM_{2.5}$ in filter-based samplers

Chun-Nan Liu [a], Sih-Fan Lin [a], Amit Awasthi [a], Chuen-Jinn Tsai [a,*], Yueh-Chuen Wu [b], Chung-Fang Chen [b]

[a] Institute of Environmental Engineering, National Chiao Tung University, Hsinchu 300, Taiwan
[b] Environmental Analysis Laboratory, Environmental Protection Administration, Jongli 320, Taiwan

ARTICLE INFO

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Teflon filter
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ABSTRACT

Field studies were conducted at Taiwan National Chiao-Tung University (NCTU) campus to evaluate the evaporation loss of fine particles ($PM_{2.5}$) collected by the multi-filter PM_{10}–$PM_{2.5}$ sampler (MFPPS), which was collocated with a dichotomous sampler (Dichot, Andersen, Model SA-241), a WINS $PM_{2.5}$ sampler (Thermo, Model 2000-FRM), and a tapered element oscillating microbalance with the filter dynamic measurement system (TEOM-FDMS, Thermo, Model 1405-DF). Porous-metal denuder samplers (PDSs) were installed in sampling channels of the MFPPS to measure the concentration of evaporated ion species. Results showed that the evaporation loss in $PM_{2.5}$ was severe during sampling, accounting for 5.8–36.0% of the corrected $PM_{2.5}$ concentration and the percentage increased with decreasing loaded particle mass and increasing filtration velocity. During 24-h sampling, the evaporated NH_4^+, NO_3^- and Cl^- concentrations accounted for 9.5 ± 6.2, 5.4 ± 3.7, and 2.0 ± 1.3% in corrected $PM_{2.5}$ concentration, respectively, or 46.4 ± 19.2, 66.9 ± 18.5, and 74.4 ± 14.0% in the concentration of each species, respectively. Due to the evaporation loss, $PM_{2.5}$ concentrations measured by the WINS, Dichot, and MFPPS were lower than those the TEOM-FDMS by 16.6 ± 9.0, 15.2 ± 10.6 and 12.5 ± 8.8%, respectively. When the MFPPS $PM_{2.5}$ concentrations were corrected for the evaporated loss determined by the PDS, good agreement with those by the TEOM-FDMS was achieved.

1. Introduction

$PM_{2.5}$ standards have been promulgated in many countries around the world, where USA-designated FRM (federal reference method) samplers are normally used for determining the compliance with the standards. However, the measurement accuracy of the FRM samplers may be influenced by sampling artifacts, since these filter-based samplers only use a single filter to collect sample for gravimetric analysis (Watson and Chow, 2011).

While there are no sampling artifacts exist for elements (Tsai et al., 1997; Chen et al., 2010a, 2010b), positive and negative artifacts occur for organic and inorganic species. Positive artifacts are due to the absorption of gaseous organic carbon (OC) or inorganic gases by the sampling media and collected particles. Several denuders have been developed to absorb these interference gases. For example, the activated charcoal diffusion denuder (Eatough et al., 2001) was used to absorb gas-phase OC; while the annular denuder (Possanzini et al., 1983), coiled denuder (Pui et al., 1990), honeycomb denuder (Koutrakis et al., 1993), and porous-metal denuder (PMD) (Tsai et al., 2001a; Tsai et al. 2001b, 2003; Huang et al., 2001) were used to absorb inorganic acid and basic gases.

Negative artifact is mainly caused by the loss of semi-volatile material (SVM) during sampling. When a denuder is placed upstream of the sampling filter to eliminate the positive artifact, more negative artifact will be induced since the removal of gaseous species disturbs the gas-particle equilibrium and enhances the evaporation of the collected SVM (Zhang and McMurry, 1991; Yu et al., 2006). Although these losses may to some degree be compensated by the water retained in the collected aerosols even the filters are conditioned for 24-h at the controlled relative humidity (RH) of 30–40% (Malm et al., 2011), yet there is lack of experimental validation. One or more backup filters are usually employed to capture the evaporated SVM from the particles collected on the front filter. For example, the carbon impregnated glass fiber filter (CIG) (Eatough et al., 2001) or the XAD impregnated quartz filter (XAD-Q) (Swartz et al., 2003) are used to capture semi-volatile organic material (SVOM); semi-volatile inorganic material (SVIM) such as HCl and HNO_3 can be captured by the nylon filter, and NH_3 can be captured by the citric acid coated glass fiber filter (Tsai and Perng, 1998; Tsai et al., 2000).

* Corresponding author. Tel.: +886 3 573 1880; fax: +886 3 572 7835.
E-mail addresses: noodle362@yahoo.com.tw, cjtsai@mail.nctu.edu.tw (C.-J. Tsai).

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http://dx.doi.org/10.1016/j.atmosenv.2013.11.075

Ex. 3

The factors influencing the extent of evaporation loss from collected particles have been evaluated in many previous studies, such as the upstream particle concentration (Cheng and Tsai, 1997), filter face velocity (V_f) (Ashbaugh and Eldred, 2004), pressure drop across the filter and the equilibrium ratio of the gas to particle concentrations of the volatile species (Zhang and McMurry, 1991), etc. Ashbaugh and Eldred (2004) evaluated the sampling results of the California Acid Deposition Monitoring Program (CADMP, V_f: 23.8 cm s^{-1}) and the Interagency Monitoring of Protected Visual Environments (IMPROVE, V_f: 100 cm s^{-1}) and concluded that the differences in the face velocity did not affect NH_4NO_3 volatilization. However, similar study conducted by Malm et al. (2011), who evaluated the sampling results of the IMPROVE sampler and the Chemical Speciation Network (CSN) samplers (V_f: 9.5–23.7 cm s^{-1}), suggested that filter face velocities had a potential effect on the extent of OC evaporation loss. Therefore, the effect of filter face velocity on the evaporation loss deserves further investigation to clarify this issue.

In addition to sampling process, SVM may also evaporate from collected particles during subsequent sample storage or conditioning processes. Witz et al. (1990) found when the high-vol PM_{10} quartz filter samples were stored at room temperature and in the laboratory air for one week, the losses of NH_4^+, NO_3^-, and Cl^- were 51, 19, and 65%, respectively. However, when the high-vol PM_{10} quartz filter samples were conditioned at 20 ± 3 °C and 40 ± 5% RH for 24-h, the percentage of the evaporated species concentration over the actual species concentration was less, which was 8, 5, and 6% for NH_4^+, NO_3^-, and Cl^-, respectively (Tsai and Perng, 1998). Since most of the existing $PM_{2.5}$ samplers use the Teflon filters to collect particles, it would be of value to evaluate the evaporation loss effect on $PM_{2.5}$ concentration using Teflon filters during the conditioning process.

Beside manual denuder samplers mentioned above, a real-time PM monitor named tapered element oscillating microbalance with filter dynamic measurement system (TEOM-FDMS) is also able to correct for the sampling artifacts for an accurate determination of PM concentrations as demonstrated in previous studies (Grover et al., 2005; Clements et al., 2012). In this study, the artifacts of $PM_{2.5}$ and ion species during sampling by manual samplers using Teflon filters and subsequent conditioning process were evaluated. The effects of both filtration velocity and loaded particle mass on the extent of the evaporation loss were also examined. Finally, the $PM_{2.5}$ concentrations measured by the filter-based samplers were compared with those of the TEOM-FDMS.

2. Experimental method

The multi-filter PM_{10}–$PM_{2.5}$ sampler (MFPPS, Liu et al., 2011) was collocated with other instruments at National Chiao-Tung University (NCTU) campus, Taiwan, from June 2012 to May 2013 for 24-h sampling to evaluate the artifacts of $PM_{2.5}$ and chemical species. These included a dichotomous sampler (Dichot, Andersen, Model SA-241), a WINS $PM_{2.5}$ sampler (WINS, Thermo, Model 2000-FRM) and a TEOM-FDMS (Thermo, Model 1405-DF). Detailed operation procedure for each instrument can be seen in the supplementary material. The sampling site in NCTU campus is far away (about 1 km) from a heavy-traffic road and inorganic species dominates at this site as found in our previous work (Liu et al., 2013).

In this study, only four MFPPS $PM_{2.5}$ channels were used, and some of the filter cassettes were replaced by the porous-metal denuder sampler (PDS, Tsai et al., 2003). As shown in Fig. 1, when aerosols enter the PDS, acid and basic interference gases are first absorbed by Na_2CO_3 and citric acid coated porous-metal discs. Then aerosols are collected by the front Teflon filter, and acid and basic

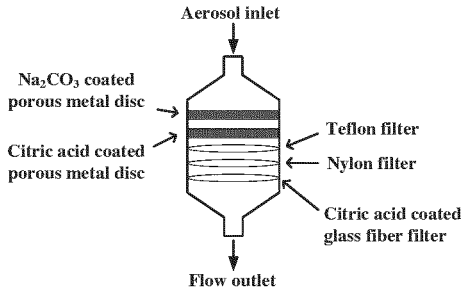

Fig. 1. Schematic of the porous-metal denuder sampler (PDS).

gases evaporated from the particles on the front Teflon filter are captured by the backup Nylon and citric acid coated glass fiber filters, respectively.

To meet different sampling purposes, two configurations for the MFPPS $PM_{2.5}$ channels were used as summarized in Table 1. In configuration A, only channel 2 was replaced by the PDS while the other channels used the original Teflon filter cassettes, and the collected samples were used to evaluate the $PM_{2.5}$ artifacts during sampling and subsequent conditioning process. To examine the effect of filtration velocity on evaporation loss, the $PM_{2.5}$ channels were arranged as configuration B, where all sampling channels were replaced by the PDSs except channel 1. These PDSs were operated at the same flow rate of 4.17 L min^{-1} but different filtration velocities (V_f). The V_f of the PDS in channel 2 was maintained at the original value of 10 cm s^{-1} (effective filter diameter: 29.8 mm). For the PDS in channel 3 (PDS_W) and channel 4 (PDS_D), the front surface of the Teflon filter was covered by a circular plastic sheet with an opening of 20.0 and 14.9 mm in diameter, respectively, to achieve the same filtration velocity as that of the WINS and Dichot, which is 22 and 36 cm s^{-1}, respectively. The analytical methods of each filter sample are also described in Table 1.

For gravimetric analysis, Teflon filters were weighed by a microbalance (Model CP2P-F, Sartorius, Germany) before and after 24-h sampling after the samples were conditioned for at least 24-h in an environment conditioning room where the RH and temperature were kept at 40 ± 2% and 21 ± 1 °C, respectively. The electrostatic charge of the Teflon filters was eliminated by an ionizing air blower (Model CSD-0911, MELSEI, Japan) before weighing. The precision of weighing was determined to be 2 μg by repeated weighing for at least five times.

After gravimetric analysis of the filter samples, an ion chromatograph (IC, Model DX-120, Dionex Corp, Sunnyvale, CA) was used to analyzed ionic species including F^-, Cl^-, NO_3^-, SO_4^{2-}, NH_4^+, Na^+, K^+, Mg^{2+}, and Ca^{2+} for the extraction samples. For the PDS samples, the front Teflon filters were analyzed as described above, while the second nylon filters were extracted with anion eluant to efficiently extract chloride and nitrate. The third citric coated glass fiber filters were extracted with distilled deionized water for ammonium analysis. All of these extracted samples were also analyzed by the IC.

3. Result and discussion

The comparison of $PM_{2.5}$ concentrations measured by the MFPPS ($PM_{2.5,MT1}$, $PM_{2.5}$ collected on the Teflon filter of the MFPPS and analyzed gravimetrically after 24-h conditioning) with those by the Dichot ($PM_{2.5,D}$) and WINS ($PM_{2.5,W}$) are shown in Fig. S1 of the supplementary material, which shows that $PM_{2.5,MT1}$ agrees well with $PM_{2.5,D}$ and $PM_{2.5,W}$. In addition, from the aerosol composition data (see Fig. S2 in supplementary material), it is expected that the effect of SVOM evaporation on the $PM_{2.5}$ measurement accuracy is

Table 1
Configurations of MFPPS $PM_{2.5}$ channels for different sampling needs.

Channel	Configuration	Assembly	Analytical method
1	A[a], B[b]	Teflon filter	Weighed and extracted after 24-h conditioning.
2	A, B	PDS (V_f: 10 cm s^{-1})	All filters were extracted immediately after sampling.
3	A	Teflon filter	Extracted immediately after sampling.
	B	PDS (V_f: 22 cm s^{-1})	All filters were extracted immediately after sampling.
4	A	Teflon filter	Weighed after 24, 48, 72, 96 and 120-h, and extracted after 120-h conditioning.
	B	PDS (V_f: 36 cm s^{-1})	All filters were extracted immediately after sampling.

[a] Configuration A was used to evaluate the evaporation loss of inorganic species during conditioning process.
[b] Configuration B was used to examine the effect of filtration velocity on evaporation loss of inorganic species.

not as important as that of SVIM at this sampling site. Therefore only the evaporation loss of SVIM was evaluated in this study.

3.1. Artifacts during sampling

The comparison of ion concentrations in the denuded Teflon filter ($C_{ion,MdT}$, ion concentration in the front Teflon filter of the PDS) with those in the un-denuded Teflon filter ($C_{ion,MT0}$, ion concentration in the Teflon filter of the MFPPS that is extracted immediately after sampling) and the actual ion concentrations ($C_{ion,\ actual}$) is shown in Fig. 2, in which $C_{ion,\ actual}$ is the sum of $C_{ion,MdT}$ and the concentration of ion species collected on the backup nylon and glass fiber filters of the PDS in the MFPPS ($C_{ion,Md(N+G)}$). It shows that only NO_3^- has a higher $C_{ion,MT0}$ than $C_{ion,MdT}$ by 21.0 ± 34.55% in average, while $C_{ion,MT0}$ and $C_{ion,MdT}$ of other species are very close with an average difference of less than 6.5% (open symbols in Fig. 2). This indicates that only positive NO_3^- artifact exists in the un-denuded Teflon filter due to gaseous HNO_3 absorption by collected particles, accounting averagely for 0.4 ± 0.4% and 5.0 ± 6.5% of the "corrected" $PM_{2.5}$ concentration measured by the MFPPS ($PM_{2.5,Mcorr}$) and actual NO_3^- concentration, respectively. $PM_{2.5,Mcorr}$ is $PM_{2.5,MT1}$ corrected for the evaporated ion species measured by the PDS installed in the MFPPS, or the sum of $PM_{2.5,MT1}$ and $C_{ion,Md(N+G)}$ concentrations. It can be also observed that $C_{ion,\ actual}$ is significantly higher than $C_{ion,MdT}$ for NH_4^+, NO_3^- and Cl^- species (filled symbols in Fig. 2), indicating that the evaporation loss during sampling is severe for these species. Difference in SO_4^{2-} concentrations is insignificant since it is a non-volatile species. The evaporated NH_4^+, NO_3^- and Cl^- account averagely for 9.5 ± 6.2, 5.7 ± 3.6, and 2.0 ± 1.3% of $PM_{2.5,Mcorr}$, respectively; and 46.4 ± 19.2, 68.8 ± 19.9, and

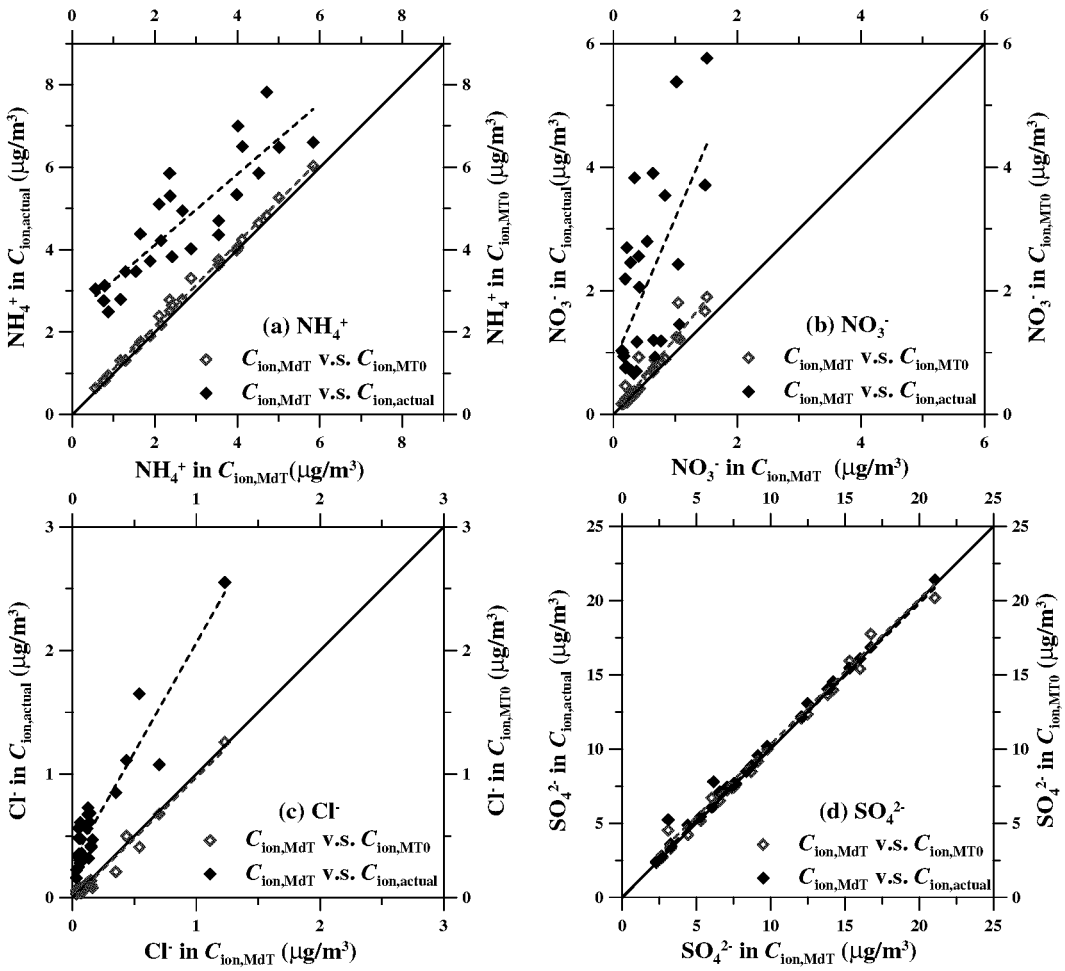

Fig. 2. Comparison of the ion concentrations in the denuded Teflon filter ($C_{ion,MdT}$) with those in the un-denuded Teflon filter ($C_{ion,MT0}$) and the actual ion concentration ($C_{ion,\ actual}$). (a) NH_4^+ (b) NO_3^- (c) Cl^- (d) SO_4^{2-} (number of samples: 26).

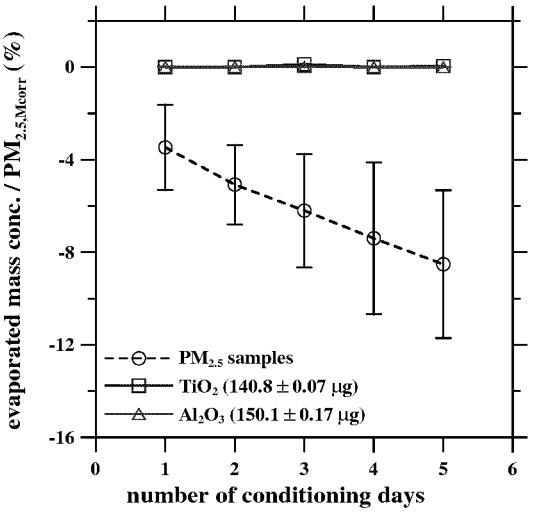

Fig. 3. Percentage of evaporated $PM_{2.5}$ in $PM_{2.5,Mcorr}$ versus the number of sample conditioning days (number of samples: 20).

74.4 ± 14.0% of $C_{ion,\ actual}$ of each species, respectively. By summing up all evaporated ion species, total ion loss during sampling is found to account for 17.0 ± 8.0% of $PM_{2.5,Mcorr}$ in average.

3.2. Evaporation loss during filter conditioning process

To evaluate the evaporation loss of $PM_{2.5}$ during filter conditioning, the samples in channel 3 of the MFPPS were analyzed gravimetrically after conditioning for 24, 48, 72, 96, and 120 h. The results are shown in Fig. 3 where the percentage of evaporated mass concentration (y-axis) is calculated based on evaporated $PM_{2.5}$ concentration divided by $PM_{2.5,Mcorr}$. The samples of non-volatile TiO_2 (AERODISP® P25, Degussa, Germany) and Al_2O_3 (QF-Al-8000, Sipernat, Japan) particles, which were generated by a small scale powder disperser (SSPD, Model 3433, TSI) and collected on Teflon filters, were also weighed and the results are plotted in the figure for comparison. It can be seen that during the sample conditioning process, the mass of non-volatile metal powder Al_2O_3 and TiO_2 samples did not change while it decreased with conditioning days in $PM_{2.5}$ samples. Since Teflon filter samples must be conditioned for at least 24-h before weighing, the evaporated $PM_{2.5}$ concentration within the first 24-h was determined by the difference in total ion concentrations obtained immediately after sampling and those after 24-h conditioning, which averages 3.3 ± 1.8% of $PM_{2.5,Mcorr}$ as will be explained in the next paragraph. For conditioning longer than 24-h, the evaporated $PM_{2.5}$ concentration was determined by the difference in $PM_{2.5}$ mass concentrations measured after 24-h conditioning and those after the conditioning hours of interest. Results show that $PM_{2.5,Mcorr}$ concentrations are further decreased by 5.1 ± 1.7, 6.2 ± 2.5, 7.4 ± 3.3 and 8.5 ± 3.2% after 48, 72, 96, and 120-h conditioning, respectively.

The loss of ion species concentrations after the filter samples were conditioned for 24 and 120-h was also evaluated and the results are shown in Fig. S3 of the supplementary material. Results show that except non-volatile SO_4^{2-} species, the evaporation loss during conditioning process can be observed for other species. The percentages of evaporated species concentration over $C_{ion,\ actual}$ account for −4.0 ± 4.3 and −7.6 ± 6.7% for NH_4^+, -8.0 ± 7.1 and −14.3 ± 11.6% for NO_3^-, and −4.0 ± 3.8 and −5.7 ± 4.7% for Cl^-, respectively, after the samples were conditioned for 24-h and 120-h. By summing up the concentrations of all evaporated species, the total evaporated ion concentration accounts for 3.3 ± 1.8 and 5.4 ± 5.3% of $PM_{2.5,Mcorr}$ in average, respectively, after 24-h and 120-h conditioning. It is also found that for the samples conditioned for 120-h, the percentage of total evaporated ion concentration in $PM_{2.5,Mcorr}$ (5.4 ± 5.3%) is slightly lower than that of total evaporated mass concentration in $PM_{2.5,Mcorr}$ (8.5 ± 3.2%). This indicates that during conditioning process, other semi-volatile species such as SVOM or the remaining water contained in the collected particles may also lead to evaporate loss. This evaporation loss was estimated as the difference between the total evaporated mass concentration and total evaporated ion concentrations, and was found to be 4.0 ± 3.1% of $PM_{2.5,Mcorr}$ in average after the samples were conditioned for 120-h.

3.3. Effects of filter face velocity and loaded particle mass on the evaporation loss

The evaporated ion concentration during sampling ($PM_{2.5,Md(N+G)}$) measured by the PDSs with different filtration velocities are shown in Fig. 4(a). It can be seen that the evaporated ion concentration increases with increasing V_f, and the evaporated ion concentrations measured by the PDS_W (V_f = 20 cm s^{-1}) and PDS_D (V_f = 36 cm s^{-1}) are higher than those the PDS (V_f = 10 cm s^{-1}) by 16.3 ± 10.5 and 33.4 ± 11.7% in average, respectively. To further

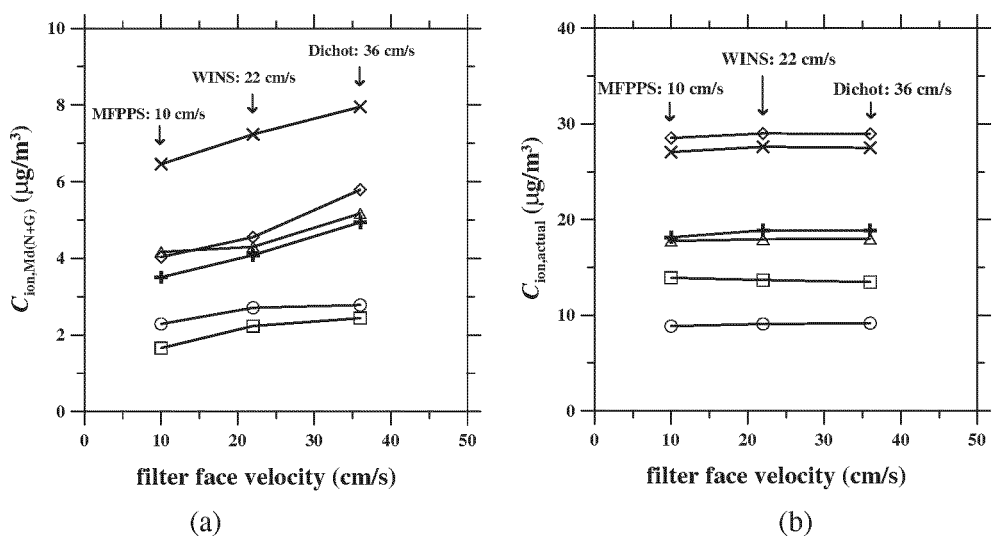

Fig. 4. Relationship between V_f and (a) evaporated ion concentration or (b) actual ion concentration (number of tests: 6).

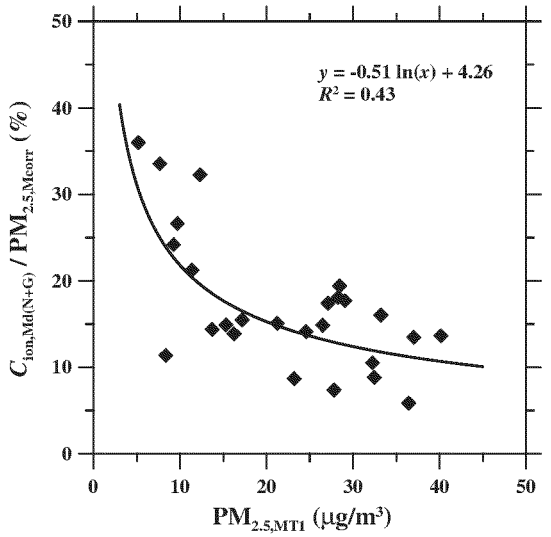

Fig. 5. Relationship between $PM_{2.5,MT1}$ and the fraction of evaporated ion species in $PM_{2.5,Mcorr}$ (number of samples: 26).

validate the measurement precision of the PDSs, the actual ion concentrations, or $C_{ion,\ actual}$, measured by the PDSs are also compared with each other as shown in Fig. 4(b). It can be seen that $C_{ion,\ actual}$ measured by the PDSs are in good agreement in all 6 test runs. The ANOVA tests also show no significant differences ($p > 0.05$) for all 6 sets of PDS samples. This gives an addition support that the difference in the ion concentrations on the backup filters of the PDSs is mainly caused by the different extent of particle evaporation loss from the particles on the front Teflon filter, rather than the measurement uncertainties.

To evaluate the effect of loaded particle mass on the extent of the evaporation loss, the fraction of $C_{ion,Md(N+G)}$ in $PM_{2.5,Mcorr}$ is plotted versus $PM_{2.5,MT1}$, as shown in Fig. 5. It shows that the evaporation percentage ranges from 5.8 to 36.0% (average: 16.9 ± 8.0%), and a clear trend of increasing percentage with decreasing $PM_{2.5,MT1}$ can be observed. This is because when $PM_{2.5}$ mass concentration is low, a thinner particle cake formed on the filter will have a larger mass transfer Sherwood number (Sh) resulting in more evaporation loss. In contrast, when $PM_{2.5}$ mass concentration is high, a thicker particle cake is formed during sampling and the evaporation will proceed at a slower rate due to a smaller Sh (Cheng and Tsai, 1997).

3.4. Comparison of $PM_{2.5}$ concentration by the TEOM-FDMS with those by manual samplers

The comparison of $PM_{2.5}$ concentrations measured by the TEOM-FDMS ($PM_{2.5,F(b-r)}$, $PM_{2.5}$ concentrations determined by the base mode corrected for those by the reference mode.) with $PM_{2.5,MT1}$ and $PM_{2.5,Mcorr}$ is shown in Fig. 6. Base and reference modes are two measurement modes in the TEOM-FDMS, in which the former is used to determine the PM mass concentration that is not corrected for sampling artifacts while the latter is used to determine the sampling artifacts for correction. More detailed operation procedure of the TEOM-FDMS can be seen in section 1 of the supplementary material. It is not surprising to see that $PM_{2.5,MT1}$ is consistently lower than $PM_{2.5,F(b-r)}$, because of the evaporation loss of SVM during sampling and filter conditioning processes in the filter-based sampler as mentioned above. Similar results were also found in Grover et al. (2005) who conducted the comparison tests by a FRM sampler and a TEOM-FDMS (Model 8500, Rupprecht & Patashnick, Co., Inc.) at Rubidoux, CA., USA. In average, $PM_{2.5,MT1}$ is lower than $PM_{2.5,F(b-r)}$ by 12.5 ± 8.8%. In comparison the $PM_{2.5}$ concentrations measured by the FRM sampler were found to be lower than those of the TEOM-FDMS by 33.7 ± 9.1% in Grover et al. (2005). Less under-measurement of $PM_{2.5}$ concentrations by the MFPPS than that in Grover et al. (2005) is possibly due to the differences in TEOM-FDMS models, filtration velocities and aerosol chemical composition. This issue deserves further investigation in the future. Similar under-measurements of $PM_{2.5}$ concentrations by the Dichot (15.2 ± 10.6%) and WINS (16.6 ± 9.0%) than those by the TEOM-FDMS also exist as can be seen in Fig. S4 of the supplementary material.

After correcting $PM_{2.5,MT1}$ for the PDS-determined evaporated ion concentration, $C_{ion,Md(N+G)}$, $PM_{2.5,Mcorr}$ is obtained and is found to be close to but slightly higher than $PM_{2.5,F(b-r)}$ by 5.4 ± 7.0% as shown in the figure. This is due to the overestimated artifacts determined by the PDS since $C_{ion,Md(N+G)}$ is the ion concentration evaporated from the particles collected on the denuded Teflon filter, and is higher than that evaporated from the un-denuded $PM_{2.5,MT1}$ Teflon filter.

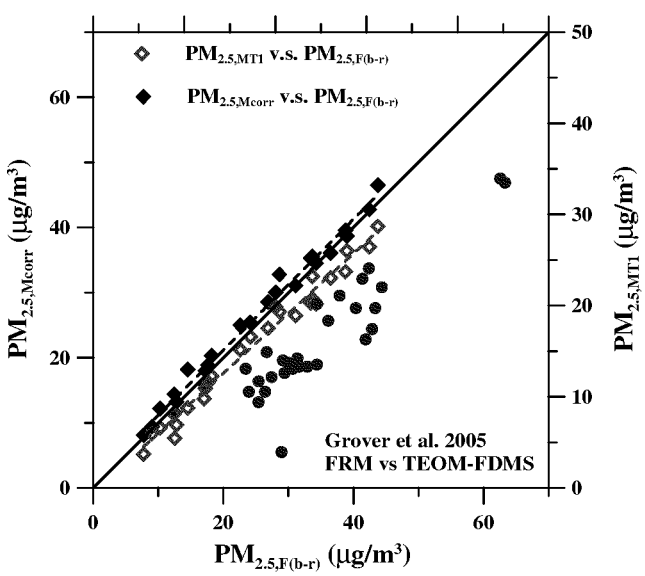

Fig. 6. Comparison of $PM_{2.5}$ concentrations measured by the TEOM-FDMS with those by the MFPPS with or without PDS correction (number of samples: 26).

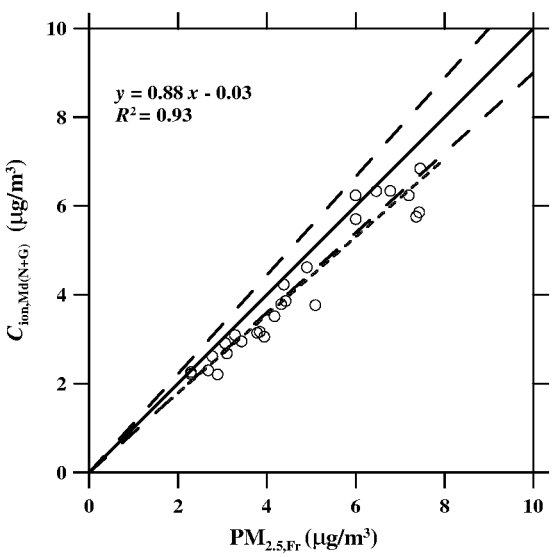

Fig. 7. Relationship between the concentration of evaporated ion species measured by the PDS ($C_{ion,Md(N+G)}$) of the MFPPS and that by the TEOM-FDMS ($PM_{2.5,Fr}$) (number of samples: 26).

Finally, to compare the SVM concentrations measured by the PDS and those by the TEOM-FDMS, $C_{ion,Md(N+G)}$ is plotted versus the reference mode concentrations of the TEOM-FDMS ($PM_{2.5,Fr}$) as shown in Fig. 7. It is observed that the former is lower than the latter by 11.0 ± 8.1% in average, which means that more SVM was evaporated from the TEMO-FDMS than that from the PDS. This is again due to the effect of V_f on the evaporation loss, since V_f of the TEOM-FDMS (37.7 cm s^{-1}) is about 3.8 times higher than that of the PDS (10 cm s^{-1}).

4. Conclusion

In this study, the MFPPS collocated with the Dichot, WINS and TEOM-FDMS was employed to evaluate the sampling artifacts of $PM_{2.5}$ mass and ionic species concentrations and to examine the effects of filtration velocity and loaded mass on the extent of evaporation loss.

Results show that during sampling, the positive artifact is not important for $PM_{2.5}$ mass concentration, and exists in NO_3^- species only, which is 5.0 ± 6.5% of actual NO_3^- concentration. Evaporation losses of NH_4^+, NO_3^- and Cl^- were evaluated to be 46.4 ± 19.2, 68.8 ± 19.9, and 74.4 ± 14.0% of the $C_{ion,\ actual}$ of each species, respectively, and the sum of them were calculated to be 17.0 ± 8.0% of corrected $PM_{2.5}$ ($PM_{2.5,Mcorr}$) in average. For the filters conditioned for 24-h, the evaporation loss calculated by the difference in total ion concentrations between $C_{ion,MT0}$ and $C_{ion,MT1}$ was found to be 3.3 ± 1.8% of $PM_{2.5,Mcorr}$. For the samples conditioned for 48, 72, 96, and 120-h, the gravimetrically-determined evaporation loss was further increased to 5.1 ± 1.7, 6.2 ± 2.5, 7.4 ± 3.3 and 8.5 ± 3.2% of $PM_{2.5,Mcorr}$, respectively.

The effects of filtration velocity and loaded particle mass on the extent of evaporation loss during sampling were also examined. Results show that the loss increases with increasing V_f, and the evaporated ion species measured by the PDS_W (20 cm s^{-1}) and PDS_D (36 cm s^{-1}) are higher than those by the PDS (10 cm s^{-1}) by 16.3 ± 10.5 and 33.4 ± 11.7% in average, respectively. For the effect of loaded particle mass, there is a trend that the evaporation fraction increases with decreasing $PM_{2.5,MT1}$ due to the effect of *Sh*.

For the comparison between the TEOM-FDMS and filter-based samplers, the present study shows that the $PM_{2.5}$ concentrations measured by the WINS, Dichot, and MFPPS are consistently lower than those the TEOM-FDMS by 16.6 ± 9.0, 15.2 ± 10.6 and 12.5 ± 8.8%, respectively, due to the loss of semi-volatile species during sampling. However, when the MFPPS data are corrected with the evaporated ion concentration measured by the PDS, good agreement with those by the TEOM-FDMS is achieved. It is also found that the concentrations of semi-volatile species measured by the PDS are somewhat lower than those by the TEOM-FDMS by 11.0 ± 8.1% in average due to the effect of lower V_f in the former on the evaporation loss.

In the future, it is worthwhile to conduct similar studies at other sites which may contain more semi-volatile organic species in aerosols such as at the urban site, heavy-traffic roadside or even tunnel environment (Chen et al., 2010b; Zhu et al., 2012) to evaluate the evaporation loss of SVOM in $PM_{2.5}$. In addition, the effects of filtration velocity, loaded particle mass, gaseous and $PM_{2.5}$ compositions on the extent of evaporation loss are also deserved to be studied theoretically since these factors normally co-exist and can't be clearly identified by experimental studies alone.

Acknowledgments

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.atmosenv.2013.11.075.

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Theoretical model for the evaporation loss of $PM_{2.5}$ during filter sampling

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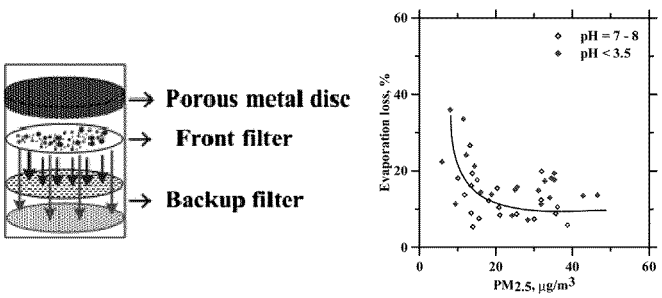
HIGHLIGHTS

- The theoretical model to calculate the evaporation loss of $PM_{2.5}$ was developed.
- The model results agree well with experimental data for pH neutral particles.
- Evaporation loss increases with decreasing $PM_{2.5}$ concentration and gas-to-particle ratio.
- For acidic aerosols, additional nitrate and chloride losses occur due to chemical interactions.

GRAPHICAL ABSTRACT



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ABSTRACT

The evaporation losses of $PM_{2.5}$ particles in eight different size ranges corresponding to the 4th–10th stages and after filter of the MOUDI were calculated theoretically and then integrated to obtain the total $PM_{2.5}$ evaporation loss. Results show that when $PM_{2.5}$ particles are nearly neutral with pH in the range of 7–8, the evaporated concentrations predicted by the present model agree well with the experimental data with an average absolute difference of 20.2 ± 11.1%. When $PM_{2.5}$ aerosols are acidic with pH less than 3.5, additional loss of nitrate and chloride can occur due to chemical interactions between collected particles and strong acids which are not considered in the present model. Under pH neutral conditions, the theoretical model was then used to examine the effect of $PM_{2.5}$ concentration, gas-to-particle ratio, ambient temperature and relative humidity on the extent of evaporation loss. Results show that evaporated $PM_{2.5}$ concentration increases with increasing temperature and decreasing relative humidity, $PM_{2.5}$ concentration and gas-to-particle ratio.

1. Introduction

Filter based samplers are commonly used for measuring ambient $PM_{2.5}$ concentrations. However, the measurement accuracy is always influenced by both positive and negative artifacts (Watson and Chow, 2011). The former is mainly caused by the adsorption of interference gases such as gaseous organic carbon (OC) and acid gases by the collected particles or sampling media (Liu et al., 2013; Zhu et al., 2012; Cheng et al., 2012; Vecchi et al., 2009; Viana et al., 2006; Tsai and Perng, 1998), while the latter is mainly due to the evaporation loss of collected semi-volatile species during sampling or subsequent sample storage processes (Liu et al., 2014; Yu et al., 2006; Wei et al., 2010; Yao et al., 2001; Witz et al., 1990). For the $PM_{2.5}$ samplers, Teflon filter is currently the most popular sampling media because it is very stable and inert to the adsorption of gases. Negative artifact has attracted more

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Ex. 4

attention by researchers in recent years. Our recent work also showed that positive artifact is less important as compared to negative artifact for both mass and inorganic species concentrations in $PM_{2.5}$ (Liu et al., 2014).

Negative artifact can be determined accurately by denuder samplers (Tsai and Perng, 1998; Eatough et al., 1999, 2001; Grover et al., 2005; Liu et al., 2014). The denuder sampler is mainly composed of a denuder element for absorbing interference gases, a front filter to collected particles, and several backup filters for capturing the gases evaporated from the front filter. Typical examples are coiled denuder (Pui et al., 1990), annular denuder (Possanzini et al., 1983; Tsai et al., 2000), porous-metal denuder sampler (PDS) (Tsai et al., 2001a; Tsai et al. 2001b, 2003; Huang et al., 2001), and the Harvard honeycomb denuder sampler (Koutrakis et al., 1993; Tsai et al., 2000).

In our previous work (Liu et al., 2014), the evaporation loss of $PM_{2.5}$ was evaluated by a multi-filter PM_{10}-$PM_{2.5}$ sampler (MFPPS, Liu et al., 2011) equipped with several PDSs. Results show that the evaporation loss of collected particles during a single filter sampling process is severe, accounting for 5.8–36.0 % loss of the actual $PM_{2.5}$ concentration, and the loss percentage was found to increase with decreasing $PM_{2.5}$ concentration and increasing filtration velocity. In addition, many other factors such as gas-to-particle ratio, ambient temperature and humidity may also influence the evaporation loss. But these factors normally co-exist and can't be clearly identified by experimental study alone. Therefore it is worthwhile to investigate $PM_{2.5}$ evaporation loss considering all of the above factors theoretically.

While there are many previous experimental studies to evaluate the evaporation loss of $PM_{2.5}$, theoretical studies are very limited. The model developed by Zhang and McMurry (1991) studied the collection efficiency of semi-volatile species for filter samplers, which was expressed as a function of the pressure drop through the sampler, the saturation ratio of vapor at the upstream of the particle bed (S_{in}), and the equilibrium concentration of vapor (ρ_e), etc. Cheng and Tsai (1997) conducted the experiment on the evaporation loss of monodisperse ammonium nitrate (NH_4NO_3) particles and showed the simple model of Zhang and McMurry (1991) overestimated the loss as compared to the experimental data. This is because in the simplified model, the saturation ratio downstream of particle bed (S_{out}) was assumed to be 1 and the variation of pressure drop through particle bed was not considered. To improve the accuracy of the theory, Cheng and Tsai (1997) proposed a new model in which more parameters including the variation of S_{out}, the pressure drop through the particle bed, the porosity of the particle bed, the particle diameter, temperature and relative humidity were all taken into account. However, this model can only be applied to predict the evaporation loss of monodisperse NH_4NO_3 particles. Since ambient $PM_{2.5}$ particles are polydisperse and contain many semi-volatile species, the model of Cheng and Tsai (1997) must be modified to allow for calculating the evaporation loss of polydisperse $PM_{2.5}$ particles.

In the modified model, the evaporation losses of $PM_{2.5}$ particles in eight different size ranges corresponding to 4th–10th stages and after filter of the MOUDI were calculated separately first. Then the losses were summed up to obtain the total evaporation loss of $PM_{2.5}$. To validate the model, the field study in Liu et al. (2014) was continued to accumulate more data for the evaporation losses of all semi-volatile species during filter sampling, and a 10-stage micro-orifice uniform deposit impactor (MOUDI, Marple et al., 1991) was used to measure the mass size distributions of $PM_{2.5}$, in which the cutoff aerodynamic diameter of the MOUDI 4th stage was modified from the original 3.2 μm–2.5 μm. Theoretical results were compared with the experimental data at first. Then the model was used to examine the effect of temperature, relative humidity, $PM_{2.5}$ concentration, and gas-to-particle ratio on the extent of evaporation loss during single filter sampling process.

2. Theoretical model for the evaporation loss of $PM_{2.5}$

In the modified model, the evaporated mass concentration of particle diameter corresponding to the ith stage of the MOUDI, $m_{e,i}$, was calculated first. Then the evaporated $PM_{2.5}$ concentration, $m_{e,2.5}$, was calculated as:

$$m_{e,2.5} = \sum_{i=4}^{11} m_{e,i} \tag{1}$$

where $i = 4$–10, and 11 corresponds to the particle aerodynamic diameter ranges of 1.8–2.5 μm (4th stage) ~ 0.056–0.1 μm (10th stage) and <0.056 μm (after filter), respectively. $m_{e,i}$ was considered as the evaporation loss of monodisperse particles with the representative particle diameter, $d_{p,i}$, calculated as the geometric mean of the upper and lower limits of the ith MOUDI stage. For example, the size range corresponding to the 8th stage is from 0.18 to 0.32 μm. Then, $d_{p,8}$ is calculated as $(0.18 \times 0.32)^{1/2} = 0.24$ μm and $m_{e,8}$ is considered as the evaporation loss of monodisperse particles with the diameter $d_{p,8}$. In each size range, $m_{e,i}$ is calculated by the following equation:

$$m_{e,i} = \sum x_r \rho_e (S_{out,i} Q_{out} - S_{in} Q_{in}) r_i \Delta t_j \tag{2}$$

where x_r is the ratio of the molecular weight of the particle species to the molecular weight of the corresponding vapor species; ρ_e is the equilibrium concentration of the vapor species; $S_{out,i}$ is the saturation ratio downstream of the particle bed for the particles with the diameter equals to $d_{p,i}$, and its calculation procedure are shown in the latter part of this section; r_i is the fraction of the mass concentration determined by the MOUDI ith stage to total $PM_{2.5}$ concentration; Q_{out} is the sampling flow rate downstream of the particle bed which is determined by $Q_{out} = Q_{in}/(1 - \delta)$; and δ is the dimensionless pressure drop through the particle bed calculated as the ratio of the pressure drop through the particle bed to the atmospheric pressure.

Results from Liu et al. (2014) showed that the evaporation loss of SVOM (semi-volatile organic matter) is not as important as that of SVIM (semi-volatile inorganic matter) at the NCTU (National Chiao Tung University) campus. The major evaporated species are NH_4^+, NO_3^-, and Cl^- ions for $PM_{2.5}$ particles. However, the evaporation loss of SVOM was not measured in Liu et al. (2014). To give a stronger support that SVOM evaporation loss is not as important as SVIM, an additional sampling study considering all semi-volatile species including SVOM and SVIM was conducted at the same sampling site. The MFPPS with a similar sampling channel configuration in Liu et al. (2014) was collocated with a semi-continuous OC/EC analyzer (Sunset Laboratory, Oregon, USA) at National Chiao-Tung University (NCTU) campus, Taiwan, from October 2013 to January 2014 for 24-h sampling and a total of 17 samples were taken. To measure the evaporation loss of SVOM, the channel 4 of the MFPPS in Liu et al. (2014) was modified with a VOC denuder followed by a filter cassette containing with a front Teflon filter and a backup CIG filter (Carbon impregnated glass fiber filter, CIG, ref. 10320163, Schleicher and Scheull, Inc.). The CIG backup filter is used to capture the SVOM evaporated from the particles collected on the Teflon filter while the VOC denuder is used to adsorb the gaseous organic carbon to avoid the measurement of CIG filter interfered by the gaseous OC. The CIG filter is analyzed by the Sunset OC/EC analyzer in the helium atmospheric environment with a maximum temperature of 200 °C which is according to Cheng et al. (2010) to avoid

the degradation of CIF filter.

Results shown in Fig. 1 indeed indicate that the evaporation loss of SVOM is negligible. It shows the concentrations of evaporated semi-volatile inorganic and organic species, non-volatile inorganic and organic species and other non-volatile species at the sampling days, in which organic species was estimated by multiplying the OC concentration by a factor of 1.6 to account for the additional mass of associated H, O, N, and S in the particle (Chen et al., 2010). Results show that the artifact-corrected $PM_{2.5}$ concentrations measured by the MFPPS agree well with those by the TEOM-FDMS with an average relative difference of 2.79 ± 1.95%. It can be seen that the evaporated fraction of semi-volatile organic species in $PM_{2.5}$ only accounts for 2.3 ± 2.2% as compared to 13.05 ± 8.37% for the semi-volatile inorganic species. According to this result, it is expected that the effect of SVOM evaporation on the $PM_{2.5}$ measurement accuracy is not as important as that of SVIM at this sampling site.

Therefore, in this study only the evaporated NH_4^+, NO_3^-, and Cl^- ions were calculated here. The corresponding x_r values are NH_4^+/NH_3 = 1.058, NO_3^-/HNO_3 = 0.984, and Cl^-/HCl = 0.973, respectively. The equilibrium concentrations of NH_3, HNO_3 and HCl vapor species were calculated by the ISORROPIA II thermodynamic model (Fountoukis and Nenes, 2007). Since the pH of collected particles was found to be an important parameter for the calculation results as will be discussed in the later part of this paper, the ISORROPIA II model was also employed to calculate the pH value of particles.

According to Cheng and Tsai (1997), S_{out} can be derived as:

$$S_{out} = \chi + \frac{4\alpha \cdot \exp(\beta) \cdot (S_{in} - \chi)}{\left[(1+\alpha)^2 \exp(\alpha \cdot \beta) - (1-\alpha)^2 \cdot \exp(-\alpha \cdot \beta)\right]} \quad (3)$$

where

$$\alpha = \sqrt{1 + \frac{4\delta}{n \cdot Pe} + \frac{24(1-\varepsilon)Sh}{Pe^2}} \quad (3a)$$

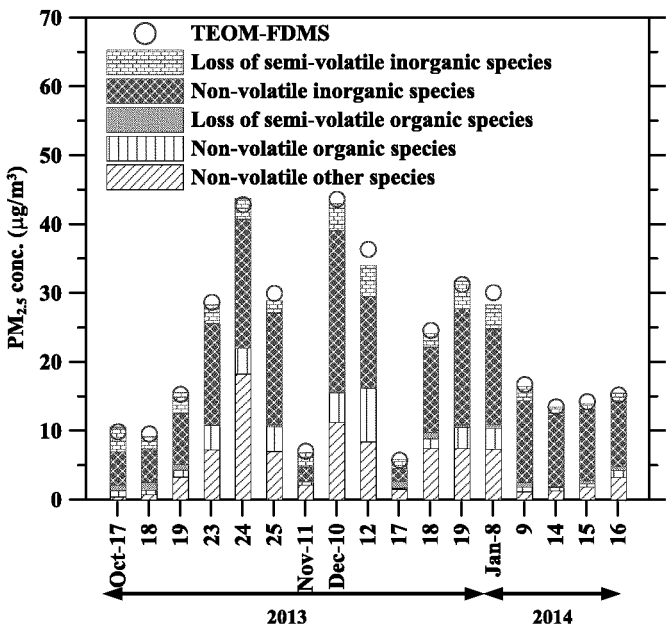

Fig. 1. Concentrations of evaporated and non-volatile semi-volatile organic and inorganic species measured at NCTU campus (number of 24-h average samples: 17).

$$\beta = \frac{n \cdot Pe}{2} \quad (3b)$$

$$\chi = \frac{1}{1 + \frac{\delta \cdot Pe}{6n(1-\varepsilon)Sh}} \quad (3c)$$

where n is the number of particle layers in the particle bed; ε is the porosity of the particle bed; Pe is Peclet number; Sh is the mass transfer Sherwood number. Detailed calculation procedure of these parameters can be seen in the Supplementary Material S1.

In the present model, the porosity of the particle bed is assumed to be 0.80 and the evaporation coefficients for NH_4^+, NO_3^- and Cl^- ion species are assumed as 0.020, 0.027 and 0.002, respectively, to yield a minimum average relative difference and a best fit between the theoretical evaporation loss values and the experimental data of each individual species (see the Supplementary Material S2). The evaporation coefficients in the literature for each species vary very much from 0.002 to 1.0. For example, the evaporation coefficient of NH_4NO_3 particles was found to be 0.02 initially and became 0.004 after filter sampling for 4-hr (Richardson and Hightower, 1987). A fixed value of 0.04 or 0.08 was used for NH_4NO_3 or NH_4Cl particles, respectively, in Harrison et al. (1990). In Cheng and Tsai (1997), the evaporation coefficient for NH_4NO_3 was set to be 0.5. For gaseous HNO_3, 0.1 was used in Jeong and Park (2008), while 1.0 was used for both gaseous HNO_3 and NH_3 in Larson and Taylor (1983). Other species such as secondary organic aerosols, the accommodation coefficient was found to range from 0.002 to 0.1 (Lee et al., 2011). The saturation ratio upstream of particle bed, S_{in}, was set to be 0 for predicting the evaporation loss in the denuded Teflon filter in the PDS where all inorganic gas species are removed by the porous-metal discs before the particles are collected by the filter.

Since the average diameter of the collected particles will decrease depending upon the extent of evaporation loss, this diameter change of collected particles is also taken into account in the present model. The time step is set to be 1 s since further reducing the time step does not lead to the changes in the calculated results.

3. Experimental

For the experiments, the MFPPS was collocated with a tapered element oscillating microbalance with a filter dynamic measurement system (TEOM-FDMS, Thermo, Model 1405-DF) and a MOUDI (MSP, Model 110) at NCTU campus, Taiwan, from June 2012 to January 2014. It is to be noted that there are a total of 39 sampling data presented in this paper in which 23 samples (June 2012 to May 2013) are from our previous work (Liu et al., 2014) while 16 additional samples (June 2013 to January 2014) were collected in the present study using the same devices and procedures as those in Liu et al. (2014). The sampling site is far away (about 1 km) from a heavy-traffic road and inorganic species dominates at this site as found in Liu et al. (2013).

The MFPPS is a PM sampler allowing the collection of four PM_{10} and four $PM_{2.5}$ samples simultaneously. In this study, only four $PM_{2.5}$ channels were used, and some of the filter cassettes were replaced by the PDS in order to measure the evaporation loss of ion species during sampling process.

For the PDS, acid and basic interference gases are first absorbed by Na_2CO_3 and citric acid coated porous-metal discs. Then aerosols are collected by the front Teflon filter, and acid and basic gases evaporated from the particles on the front Teflon filter are captured by the backup Nylon and citric acid coated glass fiber filters, respectively. Hereafter, the concentration of evaporated species captured by the back filters is denoted as $PM_{2.5,Md(N+G)}$ where the

subscripts of "M", "d", and "N + G", represent the MFPPS, denuder, and the sum of the concentrations determined by the nylon and glass fiber filers, respectively. The artifact-corrected $PM_{2.5}$ concentration ($PM_{2.5,Mcorr}$), is determined by summation of the $PM_{2.5}$ concentration measured by the Teflon filter equipped in another sampling channel of the MFPPS, which is analyzed gravimetrically after 24-h conditioning, and the PDS-determined evaporation loss, $PM_{2.5,Md(N+G)}$.

TEOM-FDMS is an automated monitor which is able to correct the sampling artifact by the base flow and reference flow that alternated every 6-min, and therefore to provide an artifact-corrected $PM_{2.5}$ measurement. Base and reference modes are two measurement modes in the TEOM-FDMS, in which the former is used to determine the PM mass concentration that is not corrected for sampling artifacts while the latter is used to determine the sampling artifacts for correction. Hereafter, the base, reference, and artifact-corrected $PM_{2.5}$ measurements are denoted as $PM_{2.5,Fb}$, $PM_{2.5,Fr}$, and $PM_{2.5,F(b-r)}$, respectively. Detailed configuration and operation procedure for the MFPPS, the PDS and the TEOM-FDMS can be seen in Liu et al. (2014).

For the MOUDI, the original 4th stage with 3.2 μm cut-size was replaced with that with 2.5 μm cut-size in order to provide the mass size distribution of $PM_{2.5}$ particles. Therefore, the cut-sizes of the MOUDI are 18, 10, 5.6, 2.5, 1.0, 0.56, 0.32, 0.18, 0.1, and 0.056 μm. Our previous work showed that the $PM_{2.5}$ concentrations measured by this modified MOUDI are comparable with those by the Dichotomous sampler (Chen et al., 2010). To avoid solid particle bounce (Pak et al., 1992; Chen et al., 2011; Tsai et al., 2012), silicone grease (KF-96-SP, Topco Technologies Corp., Taiwan) coated aluminum foils were used as the impaction substrates in 0–10th stages of the MOUDI. Teflon filter with diameter of 47-mm is employed for the after filter to collect all particles with diameters less than 0.056 μm.

Samples were collected for 24-h for the MFPPS, the PDS, and the MOUDI while the base, reference, and artifact-corrected $PM_{2.5}$ concentrations were reported every 6-min by the TEOM-FDMS. For data comparison purposes, the TEOM-FDMS data were converted to 24-h average data. The sampling filters or aluminum foils were weighed by a microbalance (Model CP2P-F, Sartorius, Germany) before and after 24-h sampling after they were conditioned for 24-h in an environment conditioning room where the RH and temperature were kept at 40 ± 2% and 21 ± 1 °C, respectively. The electrostatic charge of the Teflon filters was eliminated by an ionizing air blower (Model CSD-0911, MELSEI, Japan) before weighing. The precision of weighing was determined to be 2 μg by repeated weighing for at least five times. To determine the concentration of inorganic ion species collected by the Teflon filters, an ion chromatograph (IC, Model DX-120, Dionex Corp, Sunnyvale, CA) was used to analyze the concentrations of ionic species including F^-, Cl^-, NO_3^-, SO_4^{2-}, NH_4^+, Na^+, K^+, Mg^{2+}, and Ca^{2+} for the sample extractions.

4. Result and discussion

4.1. Experimental v.s. theoretical

Fig. 2 shows the comparison of experimental evaporated ion concentrations with theoretical prediction by the present model, in which filled symbols represent that the pH value of particles is around 7.0–8.0 while those with pH less than 3.5 are shown as open symbols. It can be seen that for neutral aerosols, most of the theoretical calculation results agree well with the experimental data, where the average absolute relative differences (RD_{abs}) of 17 samples are 26.9 ± 21.8%, 30.2 ± 15.4% and 33.0 ± 20.2% for NH_4^+, NO_3^- and Cl^- ions, respectively, and the average RD_{abs} for total evaporated $PM_{2.5}$ concentration is 20.2 ± 11.1%. Herein, RD_{abs} is calculated by:

$$RD_{abs} = \frac{|m_e^{theo} - m_e^{exp}|}{(m_e^{theo} + m_e^{exp})/2} \quad (4)$$

where m_e^{theo} and m_e^{exp} are the theoretical and the experimental evaporated concentrations, respectively, for different species. For acidic aerosols, however, it can be seen that the experimental data are greater than theoretical predictions, especially for NO_3^- and Cl^- ions. This is because in acid condition, NO_3^- and Cl^- can also be lost due to chemical interactions between collected particles and strong acids which are not easily calculated. The possible mechanisms are as follow (Kuotrakis et al., 1992; Yao et al., 2001; Pathak et al., 2004):

$$2NH_4NO_{3(s)} + H_2SO_{4(l)} \rightarrow (NH_4)_2SO_{4(s)} + 2HNO_{3(g)}\uparrow \quad (5)$$

$$NH_4NO_{3(s)} + HCl_{(g)} \rightarrow NH_4Cl_{(s)} + HNO_{3(g)}\uparrow \quad (6)$$

$$2NaCl_{(s)} + H_2SO_{4(l)} \rightarrow Na_2SO_{4(s)} + 2HCl_{(g)}\uparrow \quad (7)$$

4.2. Effect of $PM_{2.5}$ concentration

Fig. 3(a) or (b) show the relationship between the evaporated fraction in $PM_{2.5}$ and the actual $PM_{2.5}$ concentration, both of which were determined by the TEOM-FDMS or the PDS equipped in the MFPPS, respectively. From Fig. 3(a), it can be seen that for the TEOM-FDMS, the evaporated fraction decreases dramatically with increasing $PM_{2.5,F(b-r)}$ concentration when $PM_{2.5,F(b-r)}$ is <15 μg/m^3, and becomes relatively constant when $PM_{2.5,F(b-r)}$ is >15 μg/m^3. In Fig. 3(b), similar trend can also be observed for the results obtained by the PDS. The evaporation loss is more severe when collected particles are acidic (filled symbols) as compared to that of neutral particles (open symbols) due to additional evaporation loss driven by the chemical reactions (Eqs. (5)–(7)) as mentioned above.

Moreover, it is also observed that the evaporation fractions in the TEOM-FDMS are slightly higher than those in the PDS. To further address this issue, the comparison of the evaporation fraction determined by the PDS and the TEOM-FDMS is plotted and shown in the Supplementary Material S3 (Fig. S2). From this figure, it can be clearly seen the evaporation fractions in the TEOM-FDMS are higher than those in the PDS. This is because the sampling flow is dehumidified to RH < 10% first by a Nafion dryer in the TEOM-FDMS to reduce the effect of aerosol water content on the measurement accuracy while the PDS is operated under ambient RH conditions for which the daily average RH is 63.8–89.5 % in this study. For low RH conditions, evaporation loss is more severe as compared with that under ambient RH conditions. The RH effect on the extent of evaporation loss will be discussed later in section 4.3.

To show the effect of $PM_{2.5}$ concentration on the extent of evaporation loss, the hourly evaporated fraction, *Sh* of the particle bed, and the number of particle layers in the particle bed at two different sampling days with different $PM_{2.5}$ concentrations of 21.03 μg/m^3 on 2013/07/01 and 10.03 μg/m^3 on 2013/07/05, respectively, were calculated and the results together with the hourly T and RH are shown in Fig. 4(a) and (b), respectively. It can be seen that on both sampling days, the evaporated fraction increases rapidly at the initial sampling period, and then approaches to a stable value after the particle bed has been formed ($n \geq 1$). This is mainly due to the fact that at the beginning of the sampling, only few particles are collected on the filter when the mass transfer

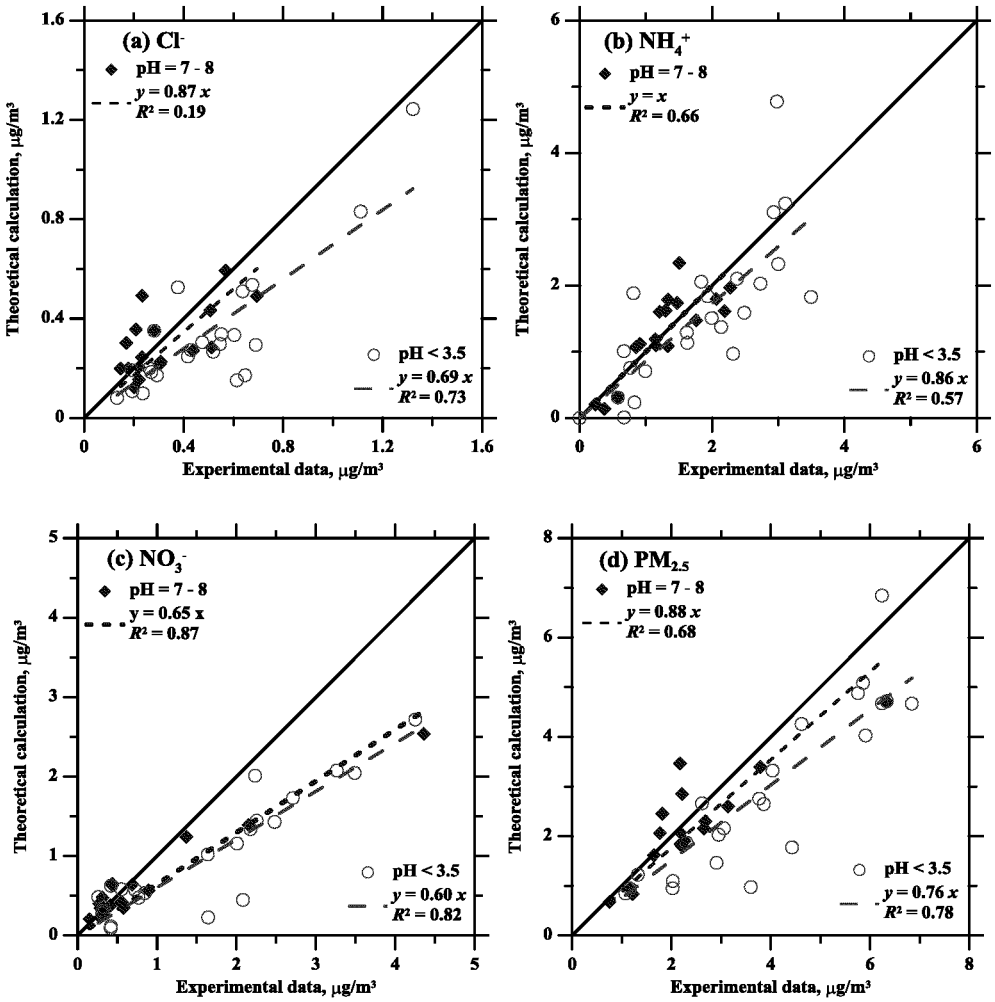

Fig. 2. Comparison of the evaporated (a) Cl^-, (b) NH_4^+, (c) NO_3^-, and (d) $PM_{2.5}$ concentrations determined experimentally with those calculated theoretically. Filled symbols: neutral particles with pH = 7.0–8.0 (number of samples: 17); Open symbols: acidic particles with pH < 3.5 (number of samples: 22).

Sherwood number is high and close to that of isolated particles. As sampling time increases, more particles are collected on the filter to form a particle bed. After that, the mass transfer Sherwood number starts to decrease as sampling time increases and finally the evaporated fraction approaches to a stable value.

Furthermore, it can be also seen that the time taken to form a particle bed at the sampling day with a higher $PM_{2.5}$ (2013/7/1) is shorter than that with a lower $PM_{2.5}$ (2013/7/5). The shorter it takes to form the particle bed the lower the evaporated fraction finally approaches to. The time taken to form a particle bed at 2013/7/1 is about 2 h and the evaporated fraction approaches to a value of about 9%, while at 2013/7/5 the time needed to form a particle bed is about 6 h and the evaporated fraction approaches to a higher value of around 22%. These results explain why the evaporation loss is more severe for the sampling day with a lower $PM_{2.5}$ concentration.

4.3. Effect of T and RH

From Fig. 4, it can be also observed that although the evaporated fraction approaches to a more or less stable value after the particle bed has been formed, some fluctuations in evaporated fraction still exist. This is mainly due to the influence of T and RH, where an increasing trend in the evaporated fraction with increasing T and decreasing RH can be observed. To further investigate these effects, the evaporated ion concentrations at 2013/7/5 (daily-averaged T = 29 °C; RH = 69%) were re-calculated assuming different T and RH values. In Fig. 5(a), the evaporated fractions were calculated assuming a fixed RH of 69% and different T ranging from 0 to 40 °C, while those calculated assuming a fixed T of 29 °C and different RH ranging from 5 to 100 % are shown in Fig. 5(b).

Results show that the daily-averaged evaporated fractions for NH_4^+, NO_3^- and Cl^- ions at 2013/7/5 are 81.0, 62.2, and 92.6%, respectively, and the fractions decrease from 93.0 to 76.4 %, 64.5–1.8 %, and 89.6–0.9 %, respectively, when T is assumed to decrease from 40 to 0 °C; or the fractions increase from 77.3 to 92.6 %, 0.3–64.5 %, and 0.3–89.7 %, respectively, when RH is assumed to vary from 100 to 5 %. The reason why both effects of T and RH on the evaporation loss are less significant for NH_4^+ than the other two species is because the equilibrium concentration of NH_4^+ calculated by the ISORROPIA II model is not very sensitive to the changes of T and RH as compared to the other two species. The relationship between calculated equilibrium concentration of each species and T or RH can be seen in the Supplementary Material S4 (Fig. S3).

The evaporated fraction of all three species combined (black solid line in Fig. 5(a) and (b)) decreases from 86.7 %–46.4 % with decreasing T from 40 to 0 °C and increases from 46.5 to 86.5 % with decreasing RH from 100 to 5 %. In Fig. 5(a), results show that even the temperature is cooled down to 0 °C, a significant evaporated fraction of 46.4% still exists which is all contributed by the

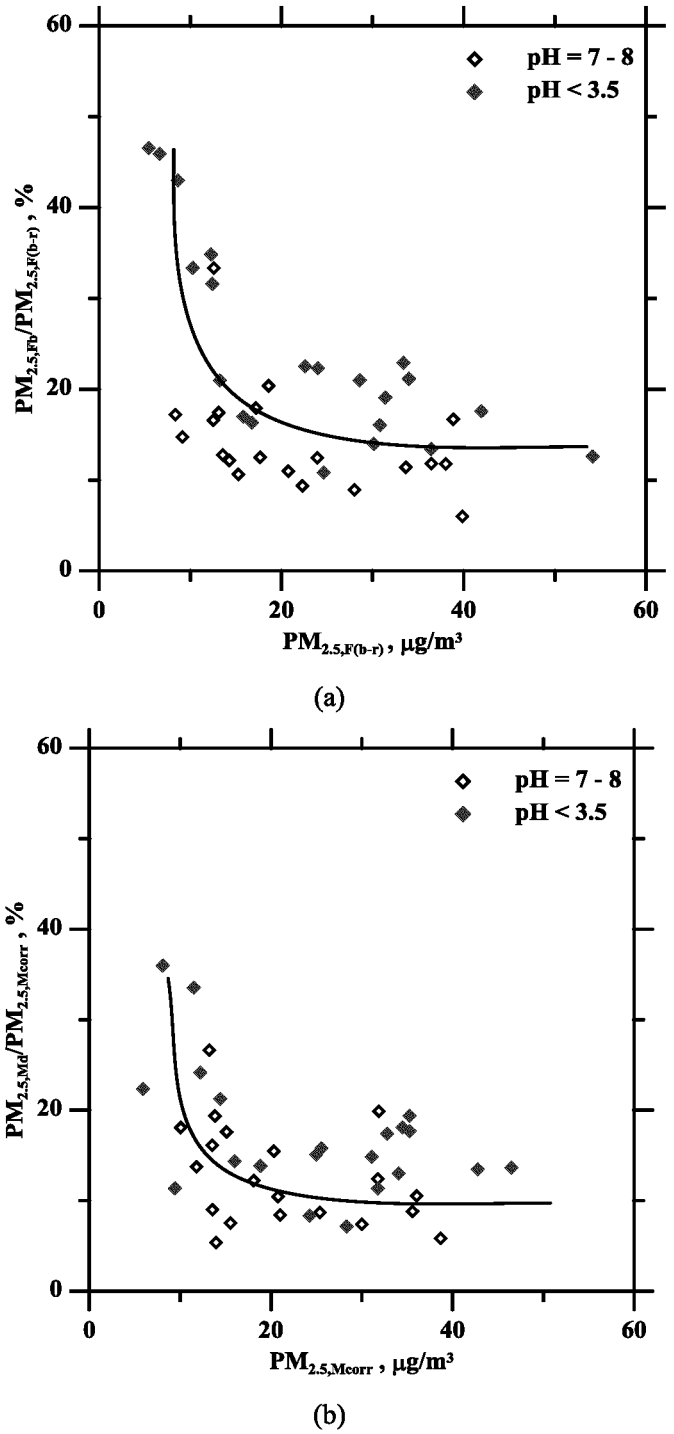

Fig. 3. Relationship between the evaporated fraction in $PM_{2.5}$ verse $PM_{2.5}$ concentration, determined by (a) the TEOM-FDMS or (b) the PDS. (Solid lines in the figures are fitted lines by eye).

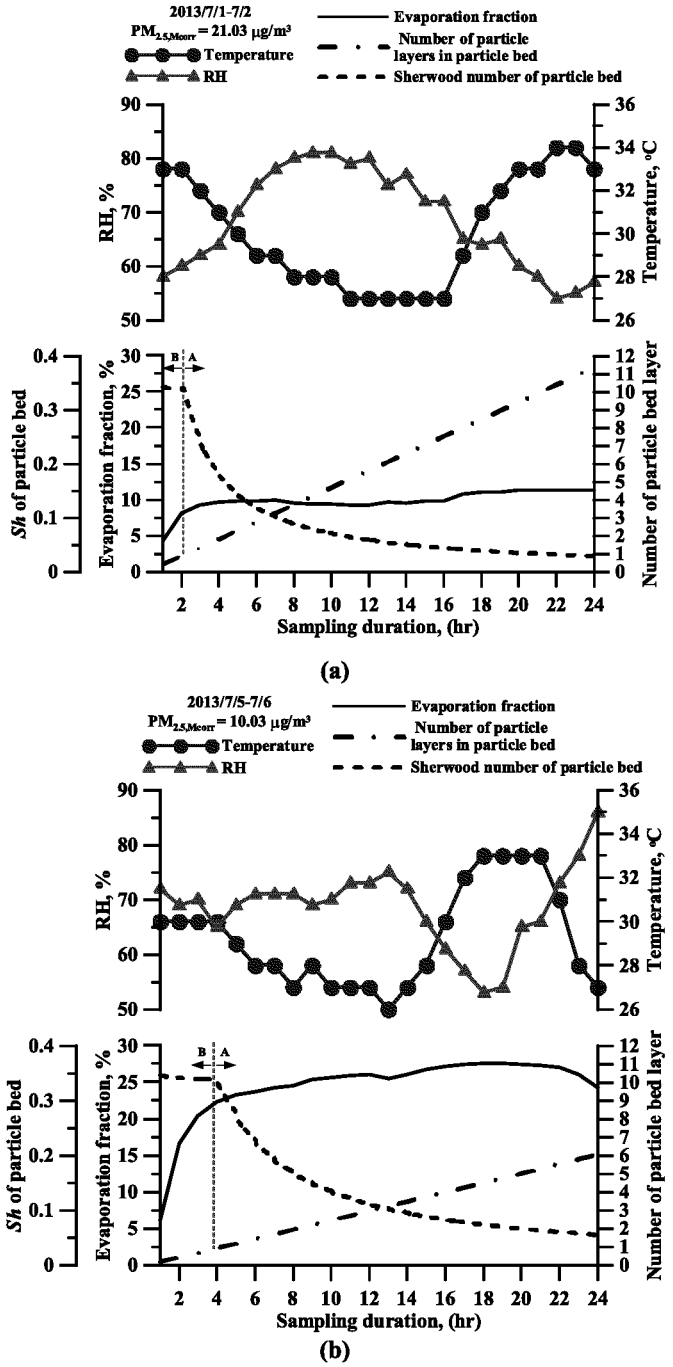

Fig. 4. Hourly variation of calculated evaporated fraction of $PM_{2.5}$, *Sh* of the particle bed, the number of particle layers in particle bed, T and RH at (a) 2013/7/1, 15:00–7/2, 15:00 and at (b) 2013/7/5, 17:00–7/6, 17:00 (region B: before the particle cake is formed, $n < 1$; region A: after the particle cake is formed, $n \geq 1$).

evaporated NH_4^+. In addition, it can be also seen that the effect of T on the evaporation loss is more significant when T ranges from 10 to 30 °C as compared to the other temperature ranges. From Fig. 5(b), it can be seen that the evaporated fraction of all three species combined increases dramatically when RH is decreased from 100 to 85%, and then increases moderately when RH is decreased from 85 to 45 %. When RH is <45%, the effect of RH on the evaporation loss disappears.

4.4. Effect of S_{in}

The above theoretical results are calculated based on $S_{in} = 0$. In order to examine the effect of S_{in} on the extent of evaporation loss, the hourly variation of evaporated fraction at 2013/7/5 was recalculated assuming different S_{in} values from 0 to 1 and the results are shown in Fig. 6. The evaporated fraction is seen to decrease with increasing S_{in}, and when S_{in} approaches to 1 there is nearly no evaporation loss. For the FRM or traditional filter-based samplers, only a single Teflon filter is employed to collect particles and the

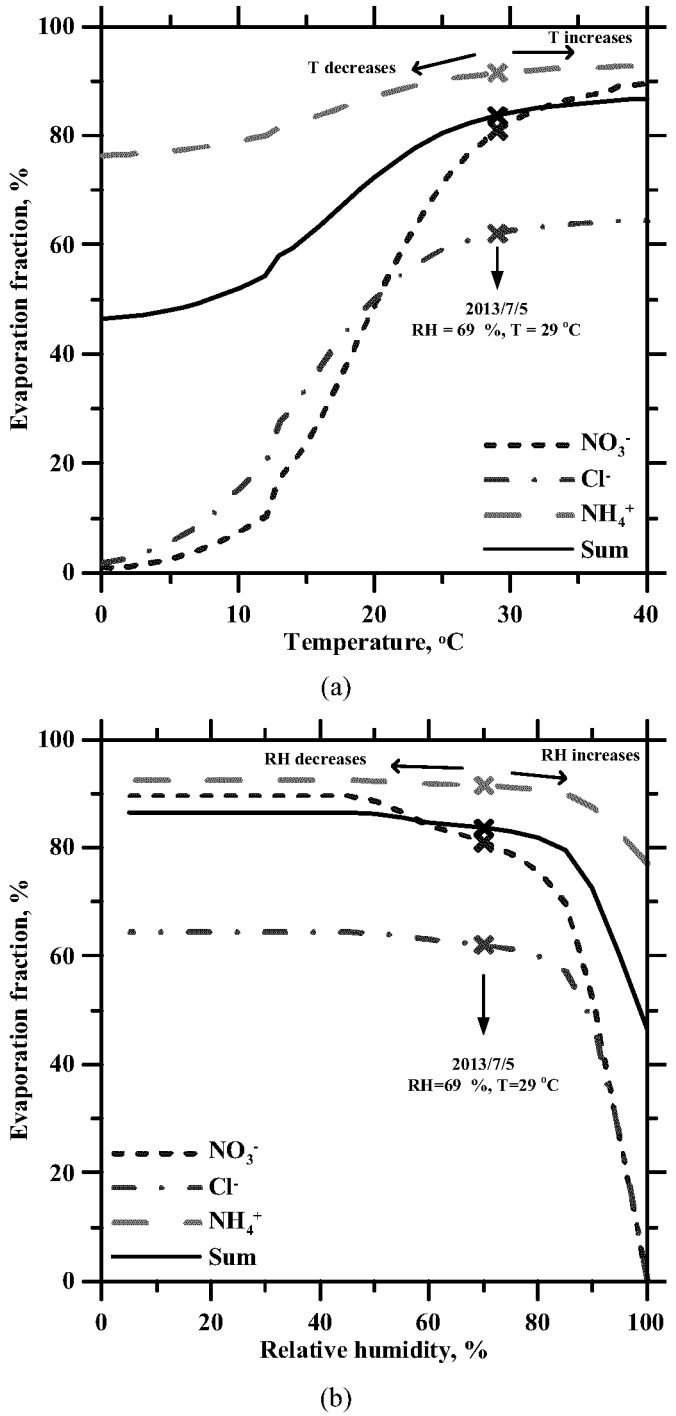

Fig. 5. Relationship between the theoretical evaporated ion concentration and (a) temperature or (b) relative humidity.

gaseous species are not removed during the sampling process. Therefore S_{in} for these samplers is normally regarded as 1. The evaporation loss in the FRM or traditional filter-based sampler predicted by the present model for pH-neutral particles as well as the model of Zhang and McMurry (1991) be nearly zero.

However, our previous study has shown that the evaporation losses of inorganic ion species from a denuded filter are very close to those from a non-denuded filter (Liu et al., 2014). That means just like the denuded sampler stated in section 4.1, other factors such as particle–particle and gas-particle interactions might play the major

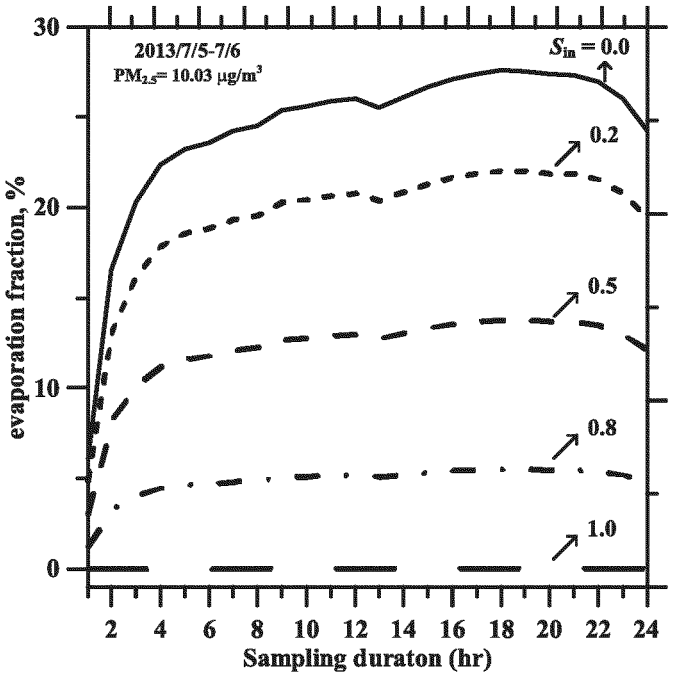

Fig. 6. Hourly variation of evaporated fraction at 2013/7/5 with different saturation ratio upstream of particle bed, S_{in}.

role in the evaporation loss for the FRM or traditional filter-based samplers, instead of the mass transfer mechanism considered in the present model and that of Zhang and McMurry (1991). Another possible minor effect is that the gas-to-particle ratio at the sampling inlet might not be in equilibrium due to the removal of acid gases by the anodized surface of sampling inlet (John et al., 1988; Hering and Cass, 1999). This may lead to a smaller S_{in} and an increase in the extent of evaporation loss.

5. Conclusion

In this study, the evaporation loss of three inorganic species including NH_4^+, NO_3^- and Cl^- ions in $PM_{2.5}$ during filter sampling was investigated theoretically. The model original developed by Cheng and Tsai (1997), which can be only used to calculate the evaporation loss of monodisperse NH_4NO_3 particles, was modified to calculate the evaporation loss of $PM_{2.5}$.

This modified model was first validated by the experimental data. Results show that the present model is able to calculate the evaporation loss occurs on a denuded Teflon filter with good accuracy when $PM_{2.5}$ particles are nearly neutral with pH in the range of 7–8. When $PM_{2.5}$ particles are acidic, the current theory underestimated the evaporated concentrations due to the additional evaporation losses driven by the chemical reactions between collected particles and strong acids which are not considered in the present model. In the future, it is worthwhile to study evaporation loss due to chemical interactions further to obtain a more accurate estimation of $PM_{2.5}$ evaporation loss when particles are acidic.

The $PM_{2.5}$ measurement data from both the TEOM-FDMS and PDS show that the evaporated fraction in $PM_{2.5}$ increases with decreasing $PM_{2.5}$ concentration, and the model was then used to investigate this effect. Results show that the evaporated fraction increases dramatically at the beginning of sampling due to the fact that only few particles are collected on the filter when the mass transfer Sherwood number is high. As sampling proceeds and particle bed has been formed, the evaporated fraction increases at a

slower rate and then finally approaches to a stable value due to the smaller Sherwood number of the particle bed. For the sampling day with a higher $PM_{2.5}$, the time needed to form a particle bed is shorter than that with a lower $PM_{2.5}$. The shorter it takes to form the particle bed the lower the evaporated fraction finally approaches to. This tells the major reason why the evaporated fraction in $PM_{2.5}$ decreases with increasing $PM_{2.5}$ concentration.

The model was also used to examine the effect of T and RH on the extent of evaporation loss. Results show that the evaporation loss increases with increasing T and decreasing RH, and both effects are less significant for NH_4^+ than other two species. Our model also demonstrates that the effect of T is significant only when T ranges from 0 to 30 °C. For the effect of RH, it is significant only when RH ranges from 85 to 100 % and disappears when RH is less than 45%.

Finally, the effect of saturation ratio at the upstream of the particle bed (S_{in}), or gas-to-particle ratio, on the extent of evaporation loss was examined. Results show that the evaporation loss decreases with increasing S_{in}, and when $S_{in} = 1$ there is nearly no evaporation loss. This result suggests that the major factors leading to the evaporation loss in the FRM or traditional filter-based samplers are gas-particle and particle–particle interactions but not just the mass transfer mechanism considered in the present model, and this issue is also worthwhile to be studied in the future.

Acknowledgments

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.atmosenv.2015.03.012.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

MAR 27 2014

Mr. Paul D. Miller, P.E.
Administrator, Office of Environmental Compliance
Assessment Division
Louisiana Department of Environmental Quality
Post Office Box 4301
Baton Rouge, LA 70821-4301

Dear Mr. Miller:

The U.S. Environmental Protection Agency (EPA) Region 6 has concluded its review of the Louisiana Department of Environmental Quality's (LDEQ) 2013 $PM_{2.5}$ Data Exclusion Request for the continuous Federal Equivalent Method (FEM) beta-attenuation monitors (BAMs) to ensure it meets the requirements of Title 40 of the Code of Federal Regulations (CFR) Part 58.11(e) and determine $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) comparability.

We are pleased to inform you that we have determined that the 2013 $PM_{2.5}$ Data Exclusion Request for all of the FEM BAMs submitted followed the required procedures of 40 CFR Part 58.11(e) to evaluate the data. We have evaluated each site individually to determine whether the data will be excluded from comparison to the $PM_{2.5}$ NAAQS and reviewed applicable requirements for the continuous $PM_{2.5}$ air monitoring network. Details of our evaluation for each site are provided in the enclosure.

We appreciate LDEQ's efforts to prepare and submit the 2013 $PM_{2.5}$ Data Exclusion Request for the BAMs. If you have any questions, please contact me at (214) 665-3102, or your staff may contact Ms. Maria Martinez, Air Quality Analysis Section Chief, of my staff at (214) 665-2230.

Sincerely yours,

Thomas H. Diggs
Associate Director for Air

Enclosure

Ex. 5

Louisiana Department of Environmental Quality (LDEQ)
$PM_{2.5}$ Data Exclusion Request Technical Comments

The Environmental Protection Agency (EPA) has reviewed your 2013 $PM_{2.5}$ Data Exclusion Request and our comments are provided below. In addition to the exclusion request, EPA's review includes additional information discussed with LDEQ. In order to reconcile all proposed network changes and as required by 40 CFR §58.14, system modifications need to be submitted to EPA in writing for approval. LDEQ will need to formally submit the requested network changes; this information can be addressed in the 2014 network plan.

Capitol site (Air Quality System, AQS #22-033-0009):

58.11(c) Exclusion Request
At the Capitol site, LDEQ operates a $PM_{2.5}$ Federal Equivalent Method (FEM) beta-attenuation monitor (BAM) designated as a state or local air monitoring stations (SLAMS) monitor and Parameter Code 88101. The Capitol site is also a National Core (NCore) multipollutant site which requires a $PM_{2.5}$ continuous monitor to meet NCore requirements. *See* 40 CFR Part 58, App. D, 3(b).

We disapprove the request to exclude the FEM BAM at the Capitol site. Based on the analysis provided by LDEQ, the data quality for the Capitol $PM_{2.5}$ BAM falls within the limits of 40 CFR Part 53 Subpart C, Table C-4 to be compared to the $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS). The 3 years of data for the continuous FEM BAM monitor correlates with the manual Federal Reference Method (FRM) monitor. We understand that there is seasonal variation, but the overall data falls within the parameters for comparison to the NAAQS. Please note if a valid 24-hour measurement is not produced from the primary monitor for a particular day (scheduled or otherwise), but a valid sample is generated by an FRM, FEM or approved regional method monitor, then that value shall be considered part of the site data record.

Network Impacts
For the Baton Rouge metropolitan statistical area (MSA), LDEQ is required to operate one continuous $PM_{2.5}$ monitor to equal at least one-half of the minimum required two sites as listed in 40 CFR Part 58, App. D, 4.7.1, Table D-5. *See* 40 CFR Part 58, App. D, 4.7.2. In addition, at least one of the continuous monitors must be operated with one of the required monitors. The Capitol site meets this requirement with the continuous $PM_{2.5}$ BAM operated in conjunction with a required manual FRM monitor.

Reporting for the Air Quality Index (AQI), an indication of the current $PM_{2.5}$ concentration, is required for all individual MSAs with a population exceeding 350,000. According to the 2012 United States Census population estimates, the Baton Rouge MSA is at 815,298 and is required to report continuous $PM_{2.5}$ for AQI.

Direction
Therefore, operation of the continuous $PM_{2.5}$ BAM at the Capitol site is required to meet the minimum $PM_{2.5}$ network requirements. Please make sure the monitor is designated as SLAMS, Parameter Code 88101 and NAAQS comparable in the 2014 network plan.

Port Allen site (AQS #22-121-0001):

58.11(e) Exclusion Request
At the Port Allen site, LDEQ operates a $PM_{2.5}$ FEM BAM designated as a SLAMS monitor and Parameter Code 88101. We approve the request to exclude the FEM BAM at the Port Allen site. Based on the analysis provided by LDEQ, the Port Allen $PM_{2.5}$ BAM met the performance criteria listed in 40 CFR Part 53 Subpart C, Table C-4 and bias to be excluded from comparison to the $PM_{2.5}$ NAAQS.

Network Impacts
For the Baton Rouge MSA, the Capitol site meets the minimum $PM_{2.5}$ network requirements for a $PM_{2.5}$ continuous monitor. The continued operation of the $PM_{2.5}$ BAM at the Port Allen site is not required to meet minimum network requirements. Based on LDEQ's analysis of the monitoring data, it appears that the discontinuance of the $PM_{2.5}$ BAM at the Port Allen site will not compromise the data collection needed for implementation of the $PM_{2.5}$ NAAQS and the 40 CFR Part 58, App. D ambient air monitoring requirements. Please provide LDEQ's rationale for either continued operation or decommissioning of the $PM_{2.5}$ BAM at the Port Allen site. Any request for a system modification under 40 CFR §58.14(c) should be submitted to EPA Region 6 for concurrence.

Direction
We understand that LDEQ uses the data from the continuous BAMs for reporting AQI, an indication of the current $PM_{2.5}$ concentration. Please make sure the monitor is designated as SLAMS and Parameter Code 88502 in AQS. Please note that LDEQ is required to move and load all of the $PM_{2.5}$ BAM data at the Port Allen site in EPA's national air monitoring database (AQS) from under Parameter Code 88101 to Parameter Code 88502 to ensure the data is excluded from comparison to the NAAQS. Please ensure that the monitor is correctly identified in the 2014 network plan.

Chalmette Vista site (AQS #22-087-0007):

58.11(e) Exclusion Request
At the Chalmette Vista site, LDEQ operates a $PM_{2.5}$ FEM BAM designated as a SLAMS monitor and Parameter Code 88101. We approve the request to exclude the FEM BAM at the Chalmette Vista site. Based on the analysis provided by LDEQ, the Chalmette Vista $PM_{2.5}$ BAM met the performance criteria listed in 40 CFR Part 53 Subpart C, Table C-4 and bias to be excluded from comparison to the $PM_{2.5}$ NAAQS.

Network Impacts
For the New Orleans MSA, LDEQ is required to operate two continuous $PM_{2.5}$ monitors to equal at least one-half of the minimum required three sites as listed in 40 CFR Part 58, App. D, 4.7.1, Table D-5. *See* 40 CFR Part 58, App. D, 4.7.2. In addition, at least one of the continuous monitors must be operated with one of the required monitors. LDEQ currently operates a continuous $PM_{2.5}$ tapered element oscillating microbalance (TEOM) monitor in conjunction with the FRM monitor at the Kenner site (AQS #22-051-1001) to meet this requirement.

Reporting for AQI is required for all individual MSAs with a population exceeding 350,000. According to the 2012 United States Census population estimates, the New Orleans MSA is at 1,227,096 and is required to report continuous $PM_{2.5}$ for AQI.

Direction
We understand that LDEQ uses the data from the continuous BAMs for reporting AQI, an indication of the current $PM_{2.5}$ concentration and that the $PM_{2.5}$ continuous monitor at the Chalmette Vista site provides critical information for the public. EPA supports the operation of a $PM_{2.5}$ continuous monitor at the Chalmette Vista site. Please make sure the monitor is designated as SLAMS and Parameter Code 88502 in AQS and not NAAQS comparable. Please note that LDEQ is required to move and load all of the $PM_{2.5}$ BAM data at the Chalmette Vista site in EPA's AQS database from under Parameter Code 88101 to Parameter Code 88502 to ensure the data is excluded from comparison to the NAAQS. Please ensure that the monitor is correctly identified in the 2014 network plan.

Lafayette USGS site (AQS #22-055-0007):

58.11(e) Exclusion Request
At the Lafayette USGS site, LDEQ operates a $PM_{2.5}$ FEM BAM designated as a SLAMS monitor and Parameter Code 88101. We approve the request to exclude the FEM BAM at the Lafayette USGS site. Based on the analysis provided by LDEQ, the Lafayette USGS $PM_{2.5}$ BAM met the performance criteria listed in 40 CFR Part 53 Subpart C, Table C-4 and bias to be excluded from comparison to the $PM_{2.5}$ NAAQS:

Network Impacts
Reporting for AQI is required for all individual MSAs with a population exceeding 350,000. According to the 2012 United States Census population estimates, the Lafayette MSA is at 474,415 and is required to report for AQI. The Lafayette USGS BAM is the only monitor in the Lafayette MSA currently reporting for AQI and is required.

Direction
Please make sure the monitor is designated as SLAMS and Parameter Code 88502 in AQS and not NAAQS comparable. Please note that LDEQ is required to move and load all of the $PM_{2.5}$ BAM data at the Lafayette site in EPA's AQS database from under Parameter Code 88101 to Parameter Code 88502 to ensure the data is excluded from comparison to the NAAQS. Please ensure that the monitor is correctly identified in the 2014 network plan.

Monroe site (AQS #22-073-0004):

58.11(e) Exclusion Request
At the Monroe site, LDEQ operates a $PM_{2.5}$ FEM BAM designated as a SLAMS monitor and Parameter Code 88101. We approve the request to exclude the FEM BAM at the Monroe site. Based on the analysis provided by LDEQ, the Monroe $PM_{2.5}$ BAM met the performance criteria listed in 40 CFR Part 53 Subpart C, Table C-4 and bias to be excluded from comparison to the $PM_{2.5}$ NAAQS.

Network Impacts
We understand that LDEQ uses the data from the continuous BAMs for reporting AQI, an indication of the current $PM_{2.5}$ concentration. Reporting for AQI is required for all individual MSAs with a population exceeding 350,000. According to the 2012 United States Census population estimates, the Monroe MSA is at 177,782 and is not required to report for AQI.

The Monroe site is not an NCore site and has zero required monitors; therefore, there is no continuous $PM_{2.5}$ requirement. The continued operation of the $PM_{2.5}$ BAM at the Monroe site is not required to meet minimum network requirements. Based on LDEQ's analysis of the monitoring data, it appears that the

discontinuance of the $PM_{2.5}$ BAM at the Monroe site will not compromise the data collection needed for implementation of the $PM_{2.5}$ NAAQS and the 40 CFR Part 58, App. D ambient air monitoring requirements. Please provide LDEQ's rationale for either continued operation or decommissioning of the $PM_{2.5}$ BAM at the Monroe site. Any request for a system modification under 40 CFR §58.14(c) should be submitted to EPA Region 6 for concurrence.

Direction
Please make sure the monitor is designated as SLAMS and Parameter Code 88502 in AQS. Please note that LDEQ is required to move and load all of the $PM_{2.5}$ BAM data at the Monroe site in EPA's AQS database from under Parameter Code 88101 to Parameter Code 88502 to ensure the data is excluded from comparison to the NAAQS. Please ensure that the monitor is correctly identified in the 2014 network plan.

Alexandria site (AQS #22-079-0002):

58.11(e) Exclusion Request
At the Alexandria site, LDEQ operates two $PM_{2.5}$ FEM BAMs; both are designated as SLAMS monitors and Parameter Code 88101. We approve the request to exclude the FEM BAMs at the Alexandria site. Based on the analysis provided by LDEQ, the Alexandria $PM_{2.5}$ BAMs met the performance criteria listed in 40 CFR Part 53 Subpart C, Table C-4 and bias to be excluded from comparison to the $PM_{2.5}$ NAAQS.

Network Impacts
We understand that LDEQ uses the data from the continuous BAMs for reporting AQI, an indication of the current $PM_{2.5}$ concentration. Reporting for AQI is required for all individual MSAs with a population exceeding 350,000. According to the 2012 United States Census population estimates, the Alexandria MSA is at 154,441 and is not required to report for AQI.

The Alexandria site is not an NCore site and has zero required monitors; therefore, there is no continuous $PM_{2.5}$ requirement. The continued operation of two $PM_{2.5}$ BAMs at the Alexandria site is not required to meet minimum network requirements. Based on LDEQ's analysis of the monitoring data, it appears that the discontinuance of the two $PM_{2.5}$ BAMs at the Alexandria site will not compromise the data collection needed for implementation of the $PM_{2.5}$ NAAQS and the 40 CFR Part 58, App. D ambient air monitoring requirements. Please provide LDEQ's rationale for either continued operation or decommissioning of the two $PM_{2.5}$ BAMs at the Alexandria site. Any request for a system modification under 40 CFR §58.14(c) should be submitted to EPA Region 6 for concurrence.

Direction
Please make sure the monitors are designated as SLAMS and Parameter Code 88502 in AQS. Please note that LDEQ is required to move and load all of the $PM_{2.5}$ BAM data at the Alexandria site in EPA's AQS database from under Parameter Code 88101 to Parameter Code 88502 to ensure the data is excluded from comparison to the NAAQS. Please ensure that the monitors are correctly identified in the 2014 network plan.

JOHN BEL EDWARDS
GOVERNOR

ROGER W. GINGLES
SECRETARY

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL ASSESSMENT

June 30, 2023

Mr. David F. Garcia, P.E.
Director, Air and Radiation Division
USEPA Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102

RE: Louisiana 2023 Annual Monitoring Network Plan

Dear Mr. Garcia:

Attached is the 2023 Louisiana Annual Monitoring Network Plan (AMNP) and Appendix A, submitted per 40 CFR, Part 58, Subpart B. On March 10, 2023 the Louisiana Department of Environmental Quality (LDEQ) published a public notice that the 2023 AMNP was available for review and that comments would be accepted until April 13, 2023. Appendix A contains the comments received and LDEQ responses

If you have any questions please contact me at 225-219-3408 or Peter Cazeaux at 225-219-3991.

Sincerely,

Jason Meyers, P.E.
Administrator
Air Planning and Assessment Division

Enclosures: 2023 Louisiana Annual Monitoring Network Plan
Appendix A

2023
Louisiana Annual Monitoring Network Plan

Louisiana Department of Environmental Quality
Office of Environmental Assessment
Air Planning and Assessment Division

March 3, 2023

The Louisiana Department of Environmental Quality (LDEQ) maintains its ambient air monitoring network in accordance with the quality assurance requirements of 40 CFR Part 58, Appendix A and B, utilizes the methodology provided for each monitor in accordance with Appendix C, designs its network in accordance with Appendix D, and locates its sites to meet all requirements of Appendix E. Site conditions are monitored on a weekly basis as part of required site operations. Any situation that may cause the siting criteria listed in 40 CFR Part 58 Appendix E to be in question is investigated and a solution determined at that time. The Louisiana Annual Monitoring Network Plan that follows covers the fiscal year of July 2023 through June 2024 with knowledge gained through February 2023.

LDEQ's Air Field Services section operates State and Local Ambient Monitoring Stations (SLAMS), Photochemical Assessment Monitoring Stations (PAMS), Speciation Trends Network (STN), Special Purpose Monitoring Stations (SPMS), and a National Core Network (NCore) Ambient Air Monitoring Station as a requirement of the Code of Federal Regulations (CFR), Title 40, Part 58. These stations measure ambient air concentrations of those pollutants for which standards have been established in 40 CFR Part 50. Data acquired from the stations is submitted into the EPA's Air Quality System (AQS) where it is compared to the National Ambient Air Quality Standards (NAAQS). Access to this information is available through EPA's website (www.epa.gov). Conformance of the network to 40 CFR 58 Appendix D (Network Design Criteria) and Appendix E (Probe and Path Siting Criteria) is determined using an Annual Review of the air quality surveillance system, as required for each state in 40 CFR 58.10. The review is also used to ensure that the network is continuing to meet the objectives of the air monitoring program. The three basic objectives of the air monitoring program follow:

1. Provide air pollution data to the general public in a timely manner. Data can be presented to the public in a number of different ways including through air quality maps, newspapers, internet sites, and as a part of weather forecasts and public advisories.
2. Support compliance with ambient air quality standards and emissions strategy development. Data from the monitors for NAAQS pollutants will be used for comparing an area's air pollution levels against the NAAQS. Data of various types can be used in the development of attainment and maintenance plans. Data can also be used to track trends to determine the impact of air pollution abatement control measures on improving air quality. In monitoring locations near major air pollution sources, source-oriented monitoring data can provide insight into how well industrial sources are controlling their pollutant emissions.
3. Support for air pollution research studies such as health effects assessments.

This review has several goals:

- Determine if the network requires any modifications to continue to meet its monitoring objective and data needs (through termination of existing stations, relocation of stations, or establishment of new stations); and
- Investigate ways to improve the network to ensure that it provides adequate, representative, and useful air quality data.

Monitoring Plans for July 2023-June 2024

Under EPA's NCore design guidelines, the state of Louisiana is required to operate one NCore level 2 site, which is the Capitol site (AQS# 220330009). The remaining sites in the state will all be PAMS, SLAMS, Speciation Trends Network (STN), or SPMs. Table A summarizes number and type of monitors located in each Metropolitan Statistical Area (MSA) population. Table B lists specific information about analytes monitored at each site and the MSA covered by this location. Table C lists information regarding the PAMS network. The PAMS network plan exceeds the monitoring requirements with the air monitoring stations at Capitol (AQS# 22-033-0009) and Dutchtown (AQS# 22-005-0004) as PAMS sites.

The Population Weighted Emissions Index (PWEI) is currently used to determine the number of Core Based Statistical Area (CBSA) SO_2 monitors and can be found in Table D. Per CFR 40, Part 58, Appendix D, Section 4.4.2, the PWEI is calculated by multiplying the population of each CBSA, using the most current census data or estimates, and the total amount of SO_2 in tons per year emitted within the CBSA area, using an aggregate of the most recent parish level emissions data available in the National Emissions Inventory for each parish in each CBSA. The resulting product shall be divided by one million, providing a PWEI value, the units of which are million persons-tons per year. The calculated PWEI for each CBSA can be found in Table D. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO_2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO_2 monitor is required within that CBSA.

For this network plan, the most recent (2020) parish level emissions data from the National Emissions Inventory was used and can be found at the following web address: https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data

System Modifications

- The Meraux SO_2 monitoring object classification was changed from Background to Source.
- Westlake (AQS #22-019-0008) now has a T640x monitoring $PM_{2.5}$ and PM_{10} and began polling into AQS on 4/1/2022 at 00:00 CST.
- The TEOM at Kenner (AQS #22-051-1001) has been replaced with a T640x and began polling into AQS on 6/11/2021 at 10:00 CST.
- The BAMs for $PM_{2.5}$ and PM_{10} at Chalmette Vista (AQS #22-087-0007) have been replaced by a T640x and began polling into AQS on 3/23/2022 at 10:00 CST.
- LDEQ recently received funding to upgrade most of its $PM_{2.5}$ equipment with Teledyne API's Model T640 Particulate Monitors. The $PM_{2.5}$ FRMs will operate alongside of the new T640s for comparison purposes for at least a year. The following sites will be upgraded with T640s:
    - Marrero (AQS #22-051-2001) The T640 will replace the FRM.
    - Vinton (AQS #22-019-0009) The T640 will replace the FRM.
    - Hammond (AQS #22-105-0001) The T640 will replace both FRMs. It will no longer be a collocated site.
    - New Orleans I-610 Near Road (AQS #22-071-0021) The T640 will replace the FRM.
    - Geismar (AQS #22-047-0005) The T640 will replace the FRM.

- Lafayette (AQS #22-055-0007) The T640X will replace the BAMS and the FRM.
- Monroe (AQS #22-073-0004) The T640 will replace the FRM.
- Houma (AQS #22-109-0001) The T640 will replace the FRM.
- Alexandria (AQS #22-079-0002) The T640 will replace the FRM.
- Port Allen (AQS #22-121-0001) The T640 will replace the FRM and become a collocated site.
- Shreveport Airport (AQS #22-015-0008) The T640X will replace the BAM and TEOM.
- NO City Park (AQS #22-071-0012) The T640x will replace the BAM and TEOM.
- Capital (AQS #22-033-0009) The T640x will replace the BAM, TEOM and FRM.
- Calumet (AQS #22-017-0008) The T640 will replace FRMs,

Additional Information

LDEQ plans to continue monitoring at the following sites due to situations in which the operation of these sites is above and beyond federal regulatory requirements due to the reasons discussed in each:

- Baker Lead (Pb) site (AQS #22-033-0014) will continue operation until the demolition and remediation activities at the nearby Exide recycle site are completed and LDEQ will keep EPA informed of the status. Any future request for a system modification under 40 CFR 58.14 will be submitted to the Region along with the appropriate technical analysis for any future planned discontinuation of the monitor.
- Continue to operate the Vinton (AQS #22-019-0009) $PM_{2.5}$ FRM to characterize regional transport. The FRM will be replaced with a Teledyne API T640.
- Continue to operate $PM_{2.5}$ FRM at Alexandria (AQS #22-079-0002) for regional background and will be replaced with a Teledyne API T640.
- Continue to operate the ozone monitor at the Monroe site (AQS #22-073-0004) to maintain ozone monitoring coverage for the Northeast regional area.
- Continue to operate the $PM_{2.5}$ FRM monitor at Geismar (AQS # 22-047-0009) due to the proximity of industry in the area to provide oversight of ambient air conditions in this industrial area. The FRM will be replaced with a Teledyne API T640.
- Continue to operate the $PM_{2.5}$ FRM monitors at Hammond (AQS #22-105-0001), Lafayette USGS (AQS # 22-055-0007), and Monroe (AQS # 22-073-0004) to provide oversight of ambient air conditions in these areas. The FRMs will be replaced with Teledyne API T640s.
- Continue to operate the PM_{10} monitor at Lafayette USGS (AQS # 22-055-0007) due to high population density since this area is close to the next bracket in 40 CFR 58, App D, Table D-4 and could result in a higher PM_{10} monitor regulatory minimum in the near future.
- Continue to operate the PM_{10} monitor at Shreveport Airport (AQS # 22-015-0008) due to high population density since this area is close to the next bracket in 40 CFR 58, App D, Table D-4 and could result in a higher PM_{10} monitor regulatory minimum in the near future.

Ambient air monitoring site pictures can be found in Appendix B or at https://www.deq.louisiana.gov/page/air-monitoring-sites by clicking on the desired location on the site map.

In the event of projected budget cuts for fiscal year 2023/2024, LDEQ and EPA will work closely to minimize the impact of the cuts and to ensure continued public health.

Table A: Type and Number of Monitors per Metropolitan Statistical Area (MSA)

MSA/CSA Population[1]	MSA	Number of Monitors Currently Required	Number of Existing Monitors	Proposed Network
1,000,000-4,000,000	***New Orleans*** *(population est. 1,261,726)*			
	Ozone	2	5	5
	Nitrogen Oxides	2	2	2
	Sulfur Dioxide	3	3	3
	Carbon Monoxide	1	1	1
	$PM_{2.5}$	2	4	4
	$PM_{2.5}$ Continuous	1	4	4
	PM_{10}	2-4	2	2
	Lead	2	2	2
350,000-1,000,000	***Baton Rouge*** *(population est. 871,905)*			
	Ozone	6	9	9
	Nitrogen Oxides	4	6	6
	Trace Level reactive Nitrogen Oxides; NOy	2	2	2
	Sulfur Dioxide	1	1	1
	Trace Level Sulfur Dioxide	1	1	1
	$PM_{2.5}$	1	4	4
	$PM_{2.5}$ Continuous	1	2	2
	$PM_{2.5}$ Speciation – *URG and SASS*	2	2	2
	PM_{10}	1-2	1	1
	PM Coarse	1	1	1
	Lead	1	1	1
	Trace Level Carbon Monoxide	1	1	1
	PAMS	0	2	2

[1]Metropolitan Statistical Area, 2021 Population Estimate, United States Census Bureau https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html

NOTE: The LDEQ $PM_{2.5}$ network operates continuous monitors while reporting them as non-NAAQS data while operating under a FEM method due to exclusion of the comparison of the data from $PM_{2.5}$ continuous BAM monitors to the NAAQS standards granted by EPA, Region 6 in a letter dated March 27, 2014. The BAM 1020 $PM_{2.5}$ at AQS#22-033-0009 is the only one comparable to the NAAQS.

Table A: Type and Number of Monitors per Metropolitan Statistical Area (MSA) (cont.)

MSA/CSA Population[1]	MSA	Number of Monitors Currently Required	Number of Existing Monitors	Proposed Network
350,000-1,000,000	***Shreveport*** *(population est. 389,155)*			
	Ozone	2	2	2
	Sulfur Dioxide	1	1	1
	$PM_{2.5}$	0	2	2
	$PM_{2.5}$ Continuous	1	1	1
	PM_{10}	0-1	1	1
350,000-1,000,000	***Lafayette*** *(population est. 479,212)*			
	Ozone	2	2	2
	$PM_{2.5}$	0	1	1
	$PM_{2.5}$ Continuous	0	1	1
	PM_{10}	0-1	1	1
50,000-350,000	***Lake Charles*** *(population est. 210,362)*			
	Ozone	1	2	2
	Nitrogen Oxides	1	1	1
	Sulfur Dioxide	0	1	1
	$PM_{2.5}$	0	1	1
	$PM_{2.5}$ Continuous	0	1	1
	PM_{10}	0	1	1
50,000-350,000	***Alexandria*** *(population est. 150,890)*			
	$PM_{2.5}$	0	1	1
50,000-350,000	***Monroe*** *(population est. 204,884)*			
	Ozone	0	1	1
	$PM_{2.5}$	0	1	1
50,000-350,000	***Houma / Thibodaux*** *(population est. 206,212)*			
	Ozone	1	1	1
	$PM_{2.5}$	0	1	1
	$PM_{2.5}$ continuous - *non-NAAQS*	0	1	1
50,000-350,000	***Hammond*** *(population est. 135,217)*			
	$PM_{2.5}$ FRM - *NAAQS*	0	2	2

[1]Metropolitan Statistical Area, July 1, 2019, United States Census Bureau https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html

NOTE: The LDEQ $PM_{2.5}$ network operates continuous monitors while reporting them as non-NAAQS data while operating under a FEM method due to exclusion of the comparison of the data from $PM_{2.5}$ continuous BAM monitors to the NAAQS standards granted by EPA, Region 6 in a letter dated March 27, 2014. The BAM 1020 $PM_{2.5}$ at AQS#22-033-0009 is the only one comparable to the NAAQS.

Table B: Site Specific Monitor Information

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
Alexandria 22-079-0002	8105 Tom Bowman Dr	Lat = 31.177660 Long = -92.410600	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	General Background	Regional	Yes	Alexandria
Baker LSP 22-033-0014	1400 West Irene Rd	Lat = 30.593966 Long = -91.251946	Lead	SLAMS	Gravimetric	Every 6th day	Source Oriented	Neighbor-hood	Yes	Baton Rouge
Bayou Plaquemine 22-047-0009	65180 Belleview Rd.	Lat = 30.221021 Long = -91.315297	Ozone	SLAMS	U.V. Absorption	Continuous	High Concentration	Neighbor-hood	Yes	Baton Rouge
			NOx	SLAMS	Chemilumin-escence	Continuous	High Pop. Density		Yes	
			NOy Trace-level	SLAMS	Chemilumin-escence	Continuous	High Pop. Density		No	
Capitol 22-033-0009	1061-A Leesville Ave.	Lat = 30.461981 Long = -91.179219	$PM_{2.5}$	SLAMS NCORE	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every day	High Pop. Density	Neighbor-hood	Yes	Baton Rouge
			$PM_{2.5}$	SLAMS	Sequential FRM (Collocated) R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 12th day	High Pop. Density		Yes	
			$PM_{2.5}$	SLAMS NCORE	*Continuous BAM 1020 Meth. Code: 170	Continuous	High Pop. Density		Yes	
			PM_{10}	SLAMS	*Continuous BAM 1020 Meth. Code: 122	Continuous	High Pop. Density		Yes	

*There are two BAM 1020 monitors at the Capitol Site (AQS # 22-033-0009), one that collects $PM_{2.5}$ data and the other that collects PM_{10} data. The PM Coarse pollutant listed below is calculated using these two monitors.

Table B: Site Specific Monitor Information (cont.)

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
Capitol (cont.)	1061-A Leesville Ave.	Lat = 30.461981 Long = -91.179219	$PM_{2.5}$	STN NCORE	Chemical Speciation SASS Teflon Gravimetric, Meth. Code 810 URG 3000N Meth. Code 839	24 hrs every 3rd day	High Pop. Density	Neighbor-hood	No	Baton Rouge
			SO_2 Trace-level	SLAMS NCORE	U.V. Fluorescence	Continuous	High Pop. Density		Yes	
			Ozone	SLAMS NCORE	U.V. Absorption	Continuous	High Pop. Density		Yes	
			CO Trace-level	PAMS NCORE	Nondispersive Infrared	Continuous	High Pop. Density		No	
			NOx	SLAMS NCORE	Chemilumin-escence	Continuous	High Pop. Density RA40		Yes	
			NOy Trace-level	PAMS NCORE	Chemilumin-escence	Continuous	High Pop. Density		No	
			VOC	PAMS SLAMS	Canisters; Trigger Canisters	8 3-hr samples daily during ozone season and every 6th day otherwise, also 24 hrs every 6th day; 25 min when triggered	High Pop. Density		No	
			PM Coarse	SLAMS NCORE	*Continuous BAM 1020 Meth. Code: 185	Continuous	High Pop. Density		No	
Carlyss 22-019-0002	Hwy 27 & Hwy 108	Lat= 30.140031 Long = -93.368268	Ozone	SLAMS	U.V. Absorption	Continuous	General Background	Neighbor-hood	Yes	Lake Charles
Carville 22-047-0012	5445 Point Clair Rd.	Lat= 30.203984 Long = -91.125925	Ozone	SLAMS	U.V. Absorption	Continuous	General Background	Regional	Yes	Baton Rouge

*There are two BAM 1020 monitors at the Capitol Site (AQS # 22-033-0009), one that collects $PM_{2.5}$ data and the other that collects PM_{10} data. The PM Coarse pollutant listed above is calculated using these two monitors.

Table B: Site Specific Monitor Information (cont.)

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
Chalmette Vista 22-087-0007	24 E. Chalmette Circle	Lat = 29.943164 Long = -89.976250	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 6th day	Source Oriented	Neighborhood	Yes	New Orleans
			$PM_{2.5}$	SPMS	Continuous Teledyne API T640x Meth. Code:238	Continuous	Source Oriented		Yes	
			PM_{10}	SLAMS	Continuous Teledyne API T640x Meth. Code:239	Continuous	Source Oriented		Yes	
			SO_2	SLAMS	U. V. Fluorescence	Continuous	Source Oriented		Yes	
Convent 22-093-0002	St. James Courthouse Hwy 44 @ Canatella	Lat = 29.994729 Long = -90.817308	Ozone	SLAMS	U.V. Absorption	Continuous	General Background	Neighborhood	Yes	New Orleans
Dixie 22-017-0001	Haygood Rd.	Lat = 32.683197 Long = -93.861382	Ozone	SLAMS	U.V. Absorption	Continuous	High	Urban	Yes	Shreveport
Dutchtown 22-005-0004	11153 Kling Rd.	Lat = 30.229419 Long = -90.965517	Ozone	PAMS SLAMS	U.V. Absorption	Continuous	General Background	Neighborhood	Yes	Baton Rouge
			NOx	PAMS SLAMS	Chemilumin-escence	Continuous	General Background		Yes	

.

Table B: Site Specific Monitor Information (cont.)

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
Dutchtown (cont.)	11153 Kling Rd.	Lat = 30.229419 Long = -90.965517	VOC	PAMS SLAMS	Canisters; Trigger Canisters	4 3-hr cans every 3rd day ozone season and 8 3-hr cans every 6th day, 24 hour canister once every 6th day otherwise 25 min when triggered	Population Oriented	Neighbor-hood	Yes	Baton Rouge
French Settlement 22-063-0002	16627 Perrilloux Ln @ Hwy 16	Lat = 30.315175 Long = -90.811276	NOx	SLAMS	Chemilumin-escence	Continuous	High Concentration	Neighbor-hood	Yes	Baton Rouge
							General Background			
			Ozone	SPMS	U.V. Absorption	Continuous	High Concentration		Yes	
							General Background			
			$PM_{2.5}$	SPMS	Continuous TEOM Series1400a Meth. Code: 715	Continuous	Population Exposure		No*	
Garyville 22-095-0002	152 Anthony F. Monica St.	Lat = 30.057276 Long = -90.619185	Ozone	SLAMS	U.V. Absorption	Continuous	General Background	Regional	Yes	New Orleans
Geismar 22-047-0005	Hwy 75	Lat = 30.218867 Long = -91.062438	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	High Pop. Density	Neighbor-hood	Yes	Baton Rouge

* $PM_{2.5}$ Continuous monitor used for AQI reporting purposes only. TEOMs are operated as non-FEM/non-FRM and are therefore not NAAQS comparable.

Table B: Site Specific Monitor Information (cont.)

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
Hammond 22-105-0001	21549 Old Covington Hwy	Lat = 30.503061 Long = -90.377118	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	High Pop. Density	Neighbor-hood	Yes	Hammond
			$PM_{2.5}$	SLAMS	Sequential FRM (Collocated) R&P Partisol Plus Model 2025 Meth. Code: 145	24 hrs every 12th day	High Pop. Density		Yes	
Houma 22-109-0001	4047 West Park Ave. @ Hwy 24	Lat = 29.679051 Long = -90.779626	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	High Pop. Density	Neighbor-hood	Yes	Houma/ Thibodaux
Kenner 22-051-1001	100 West Temple Pl.	Lat = 30.040998 Long = -90.272735	NOx	SLAMS	Chemilumin-escence	Continuous	High Pop. Density Area-wide	Urban	Yes	New Orleans
			Ozone	SLAMS	U.V. Absorption	Continuous	High Concentration		Yes	
			$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	Every 6th day	High Pop. Density		Yes	
			$PM_{2.5}$	SPMS	Continuous Teledyne API T640x Meth. Code: 238	Continuous	High Pop. Density		Yes	
Lafayette USGS 22-055-0007	700 Cajundome Blvd.	Lat = 30.225877 Long = -92.042766	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	High Pop. Density	Neighbor-hood	Yes	Lafayette
			PM_{10}	SLAMS	Continuous BAM 1020 Meth. Code: 122	Continuous	High Pop. Density		Yes	
			Ozone	SLAMS	U.V. Absorption	Continuous	High Pop. Density		Yes	
			$PM_{2.5}$	SPMS	Continuous BAM 1020 Meth. Code: 170	Continuous	High Pop. Density		No*	

* $PM_{2.5}$ Continuous monitor used for AQI reporting purposes only due to exclusion of the comparison of the data from $PM_{2.5}$ continuous BAM monitors to the NAAQS standards granted by EPA, Region 6 in a letter dated March 27, 2014 (EDMS Document 12196118). The BAM 1020 PM2.5 at the Capitol Site (AQS#22-033-0009) is the only one comparable to the NAAQS.

Table B: Site Specific Monitor Information (cont.)

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
LaPlace 22-095-0003	115 Garden Grove	Lat = 30.040961 Long = -90.466783	Lead	SLAMS	Gravimetric	Every 6th day	Source Oriented	Middle	Yes	New Orleans
			Lead	SLAMS	Gravimetric (Collocated)	Every 12th day			Yes	
LSU 22-033-0003	East End Aster Lane	Lat = 30.419805 Long = -91.182016	Ozone	SLAMS	U.V. Absorption	Continuous	High Concentration	Middle	Yes	Baton Rouge
Madisonville 22-103-0002	1421 Hwy 22 West	Lat = 30.429381 Long = -90.199678	Ozone	SLAMS	U.V. Absorption	Continuous	General Background	Neighbor-hood	Yes	New Orleans
			$PM_{2.5}$	SPMS	Continuous TEOM Series1400a Meth. Code: 715	Continuous	General Background		No*	
Marrero 22-051-2001	328 Marrero Rd.	Lat= 29.900070 Long: -90.109750	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	High Pop. Density	Neighbor-hood	Yes	New Orleans
Meraux 22-087-0004	4101 Mistrot Drive	Lat = 29.939614 Long = -89.923883	Ozone	SPMS	U.V. Absorption	Continuous	General Background	Urban	Yes	New Orleans
			SO_2	SPMS	U.V. Fluorescence	Continuous	Source		Yes	
Monroe 22-073-0004	5296 Southwest Rd.	Lat = 32.509789 Long = -92.046050	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	Population Exposure	Neighbor-hood	Yes	Monroe
			Ozone	SLAMS	U.V. Absorption	Continuous	General Background		Yes	

* $PM_{2.5}$ Continuous monitor used for AQI reporting purposes only. TEOMs are operated as non-FEM/non-FRM and are therefore not NAAQS comparable.

Table B: Site Specific Monitor Information (cont.)

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
New Orleans City Park 22-071-0012	Florida & Orleans Ave.	Lat = 29.993278 Long = -90.101464	$PM_{2.5}$	SPMS	Continuous TEOM Series1400a Meth. Code: 715	Continuous	High Pop. Density	Neighbor-hood	No*	New Orleans
			PM_{10}	SLAMS	Continuous BAM 1020 Meth. Code: 122	Continuous	High Pop. Density		Yes	
New Orleans Near-Road 22-071-0021	I610 at West End Blvd.	Lat = 29.996013 Long = -90.118190	NOx	SLAMS	Chemilumin-escence	Continuous	High Concentration	Micro-scale	Yes	New Orleans
			CO	SLAMS	Gas Filter Correlation	Continuous	High Concentration			
			$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	High Concentration			
New Roads 22-077-0001	Hwy 415	Lat = 30.681718 Long = -91.366247	Ozone	SLAMS	U.V. Absorption	Continuous	General Background	Neighbor-hood	Yes	Baton Rouge
Norco 22-089-0006	Field across from 35 Goodhope Road, Norco, LA	Lat= 29.997696 Long = -90.411095	SO_2	SLAMS	U.V. Fluorescence	Continuous	Source Oriented	Neighbor-hood	Yes	New Orleans
Port Allen 22-121-0001	1005 Northwest Drive	Lat = 30.500642 Long = -91.213556	SO_2	SLAMS	U.V. Fluorescence	Continuous	High Concentration	Neighbor-hood	Yes	Baton Rouge
			$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every day	High Concentration		Yes	

* $PM_{2.5}$ Continuous monitor used for AQI reporting purposes only. TEOMs are operated as non-FEM/non-FRM and are therefore not NAAQS comparable.

Table B: Site Specific Monitor Information (cont.)

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
Port Allen (cont.)	1005 Northwest Drive	Lat = 30.500642 Long = -91.213556	Ozone	SLAMS	U.V. Absorption	Continuous	High Concentration	Neighbor-hood	Yes	Baton Rouge
			NOx	SLAMS	Chemilumin-escence	Continuous	High Concentration		Yes	
Pride 22-033-0013	11245 Port Hudson Pride Rd.	Lat = 30.700895 Long = -91.056068	NOx	SLAMS	Chemilumin-escence	Continuous	High Concentration	Neighbor-hood	Yes	Baton Rouge
			Ozone	SLAMS	U.V. Absorption	Continuous	High Concentration		Yes	
Shreveport Airport 22-015-0008	1425 Airport Dr.	Lat = 32.536273 Long = -93.748940	Ozone	SLAMS	U.V. Absorption	Continuous	High Pop. Density	Neighbor-hood	Yes	Shreveport
			$PM_{2.5}$	SPMS	Continuous TEOM Series1400a Meth. Code: 715	Continuous	Population Exposure		No*	
			PM_{10}	SLAMS	Continuous BAM 1020 Meth. Code: 122	Continuous	High Pop. Density		Yes	
			SO_2	SLAMS	U.V. Fluorescence	Continuous	High Pop. Density		Yes	
Shreveport Calumet 22-017-0008	Midway St.	Lat = 32.471494 Long = -93.795069	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	High Pop. Density	Neighbor-hood	Yes	Shreveport
			$PM_{2.5}$	SLAMS	Sequential FRM (Collocated) R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 12th day	High Pop. Density		Yes	

* $PM_{2.5}$ Continuous monitor used for AQI reporting purposes only. TEOMs are operated as non-FEM/non-FRM and are therefore not NAAQS comparable.

Table B: Site Specific Monitor Information (cont.)

Site Name AQS ID #	Address/ Location	Latitude/ Longitude Coordinates	Pollutant Measured	Station Type	Sampling Method	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	MSA Represented
St. Martinville 22-099-0001	1178 W.J. Bernard Road	Lat: 30.088872 Long = -91.869595	Ozone	SLAMS	U.V. Absorption	Continuous	General Background	Neighbor-hood	Yes	Lafayette
Thibodaux 22-057-0004	194 Thorough-bred Park Dr.	Lat = 29.764425 Long = -90.765563	Ozone	SLAMS	U.V. Absorption	Continuous	General Background	Neighbor-hood	Yes	Houma/ Thibodaux
			$PM_{2.5}$	SPMS	Continuous TEOM Series1400a Meth. Code: 715	Continuous	Population Exposure		No*	
Vinton 22-019-0009	2284 Paul Bellow Rd.	Lat = 30.227567 Long = -93.579778	$PM_{2.5}$	SLAMS	Sequential FRM R&P Partisol Plus Model 2025i Meth. Code: 145	24 hrs every 3rd day	Regional Transport	Neighbor-hood	Yes	Lake Charles
			Ozone	SPMS	U.V. Absorption	Continuous	General Background		Yes	
Westlake 22-019-0008	2646 John Stine Rd.	Lat = 30.262347 Long = -93.284906	SO_2	SLAMS	U.V. Fluorescence	Continuous	High Pop. Density	Neighbor-hood	Yes	Lake Charles
			NOx	SLAMS RA40	Chemilumin-escence	Continuous	High Pop. Density RA40		Yes	
			$PM_{2.5}$	SPMS	Continuous Teledyne API T640x Meth. Code: 238	Continuous	High Pop. Density		Yes	
			PM_{10}	SLAMS	Continuous Teledyne API T640x Meth. Code:239	Continuous	Source Oriented		Yes	

* $PM_{2.5}$ Continuous monitor used for AQI reporting purposes only. TEOMs are operated as non-FEM/non-FRM and are therefore not NAAQS comparable.

Table C: PAMS Network Plan

Site Name	Site Type	Pollutant	Sampling Frequency	Sampling Period
Capitol 22-033-0009	2	Speciated VOC	Eight 3-hr canisters (0000, 0300, 0600, 0900, 1200, 1500, 1800, 2100 LST) daily; One 24-hour canister every 6th day	May-September
			Eight 3-hr canisters (0000, 0300, 0600, 0900, 1200, 1500, 1800, 2100 LST) every 6th day; One 24-hour canister every 6th day	October – April
		TNMOC	Hourly	January-December
		NO, NO_2, NO_x	Hourly	January-December
		NOy	Hourly	January-December
		CO (ppb level)	Hourly	January-December
		Ozone	Hourly	January-December
		SO_2 (low level)	Hourly	January-December
		Wind Speed*	Hourly	January-December
		Wind Direction*	Hourly	January-December
		Temperature	Hourly	January-December
		Relative Humidity	Hourly	January-December
		UV Radiation	Hourly	January-December
		Barometric Pres.	Hourly	January-December
		Solar Radiation	Hourly	January-December
		Precipitation	Hourly	January-December
		PM_{10}	Hourly	January-December
		PMCoarse	Hourly	January-December
		$PM_{2.5}$	Hourly	January-December
		Mixing Height	Hourly	January-December
Site Name	Site Type	Pollutant	Sampling Frequency	Sampling Period
Dutchtown 22-005-0004	1/3	Speciated VOC	Four 3-hr canisters (i.e. 0300-0600, 0600-0900, 1500-1800, 1800-2100 LST) every 3rd day; One 24-hour canister every 6th day	May-September
			Eight 3-hr canisters (0000, 0300, 0600, 0900, 1200, 1500, 1800, 2100 LST) every 6th day; One 24-hour canister every 6th day	October – April
		TNMOC	Hourly	January-December
		NO, NO_2, NO_x	Hourly	January-December
		Ozone	Hourly	January-December
		Wind Speed*	Hourly	January-December
		Wind Direction*	Hourly	January-December
		Temperature	Hourly	January-December

*Wind speed and direction reported to AQS as resultant wind speed and resultant wind direction

Site pictures can be found in Appendix B or at https://www.deq.louisiana.gov/page/air-monitoring-sites by clicking on the desired location on the site map.

Table D. Population Weighted Emissions Index for Sulfur Dioxide

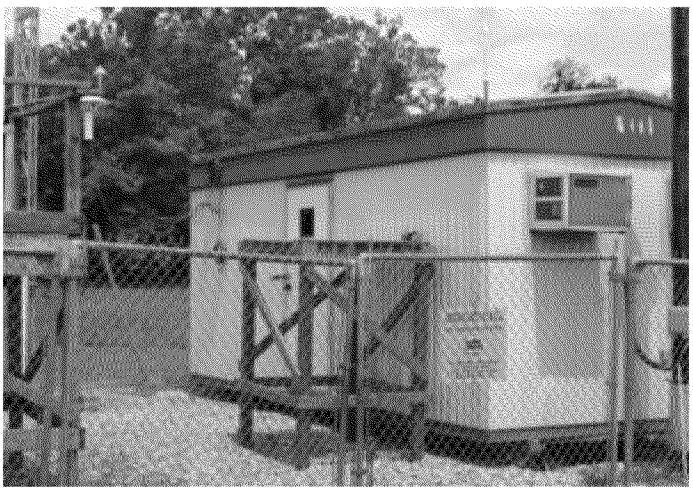
AREA (Parishes)	CBSA Code 2021 (Core Based Statistical Area)	Population Est. July 1, 2021	SO_2 Emissions 2020 (tons)*	Population Weighted Emissions Index 2022	Required SO_2 Monitors	Existing SO_2 Monitors
Alexandria (Grant, Rapides)	10780	150,890	4165.82	629	0	0
Baton Rouge (Ascension, Assumption, East Baton Rouge, East Feliciana, Iberville, Livingston, Point Coupee, St. Helena, West Baton Rouge, West Feliciana)	12940	871,905	23,478.18	20,471	1	2**
Bogalusa (Washington)	14220	45,133	773.0605	35	0	0
DeRidder (Beauregard)	19760	36,584	330.277	12	0	0
Fort Polk (Vernon)	22860	48,027	284.0448	14	0	0
Hammond (Tangipahoa)	25220	135,217	164.4525	22	0	0
Houma / Thibodaux (Lafourche, Terrebonne)	26380	206,212	878.3536	181	0	0
Lafayette (Acadia, Iberia, Lafayette, St. Martin, Vermillion)	29180	479,212	1,508.259	723	0	0
Lake Charles (Calcasieu, Cameron)	29340	210,362	18,420.74	3,875	1	1
Minden (Webster)	33380	36,184	178.2927	6	0	0
Monroe (Ouachita, Union)	33740	204,884	679.2229	139	0	0
Morgan City (St. Mary)	34020	48,232	15,900.7	767	0	0
Natchez MS-LA (Adam, Concordia)	35020	47,118	70.82156	3	0	0
Natchitoches (Natchitoches)	35060	37,026	484.6531	18	0	0
New Orleans / Metairie / Kenner (Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Tammany)	35380	1,261,726	15,028.74	18,962	1	3
Opelousas (St. Landry)	36660	82,071	173.6012	14	0	0
Ruston (Lincoln)	40820	48,152	184.6784	9	0	0
Shreveport / Bossier City (Bossier, Caddo, De Soto)	43340	389,155	5149.238	2,004	0	1

*Source: National Emissions Inventory 2020 (https://www.epa.gov/air-emissions-inventories/2021-national-emissions-inventory-nei-data)
**One of the SO_2 samplers is trace-level at our N-Core site

Appendix B: LDEQ Ambient Air Monitoring Site Pictures

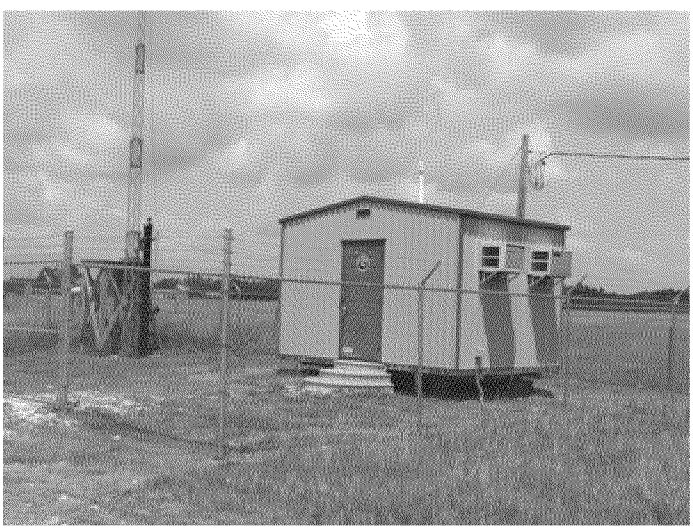
Alexandria AQS 22-079-0002

Baker AQS 22-033-0014



Bayou Plaquemine AQS 22-047-0009

Capitol AQS 22-033-0009

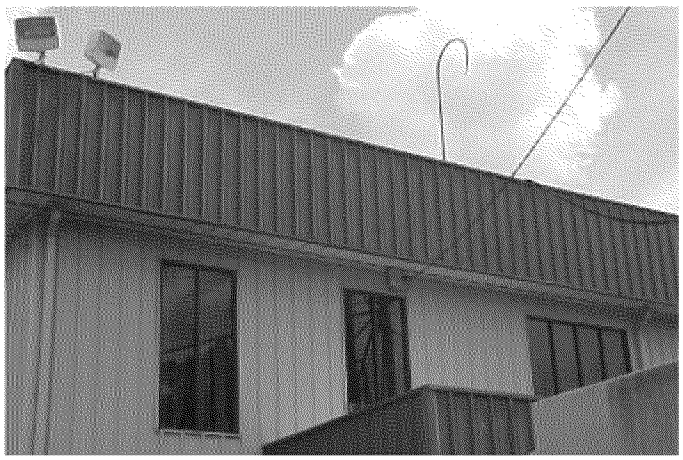


Carlyss AQS 22-019-0002

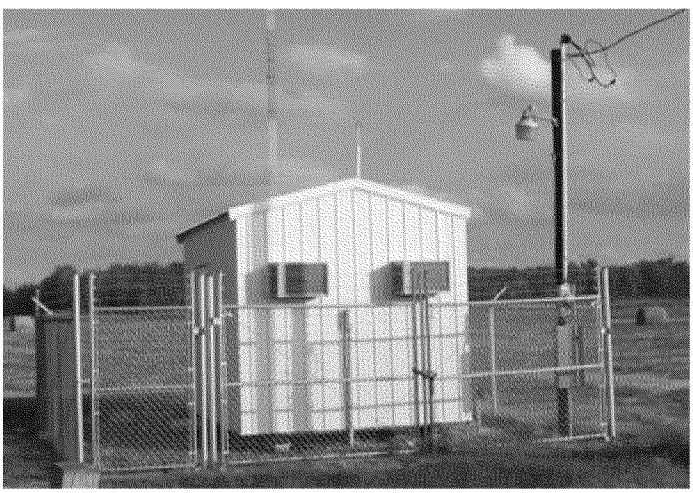
Carville AQS 22-047-0012

Appendix B: LDEQ Ambient Air Monitoring Site Pictures

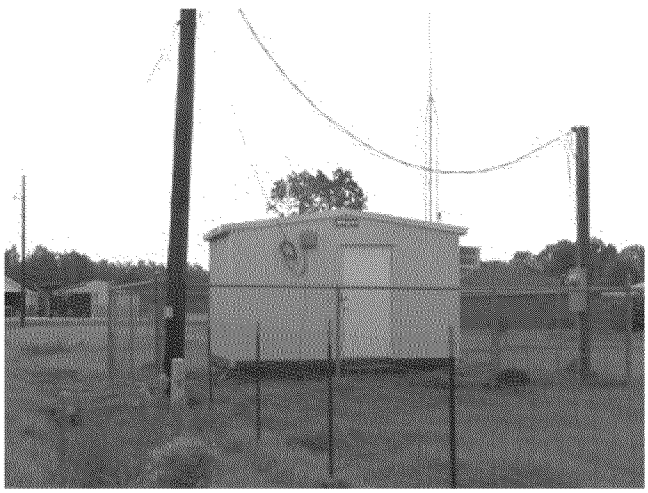
Chalmette Vista AQS 22-087-0007



Convent AQS 22-093-0002

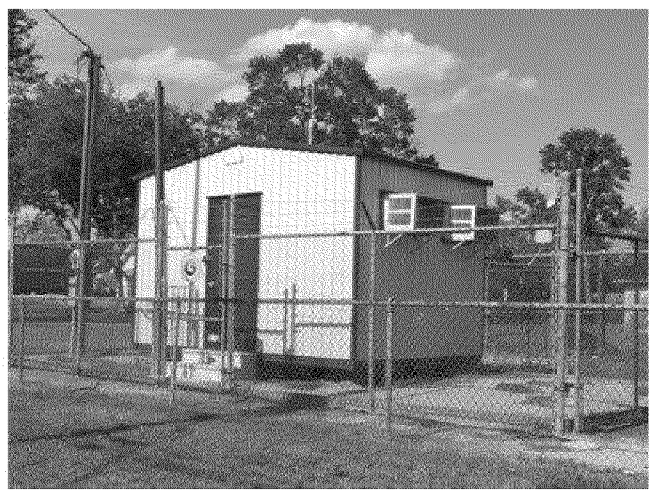


Dixie AQS 22-017-0001



Dutchtown AQS 22-005-0004

French Settlement AQS 22-063-0002



Garyville AQS 22-095-0002

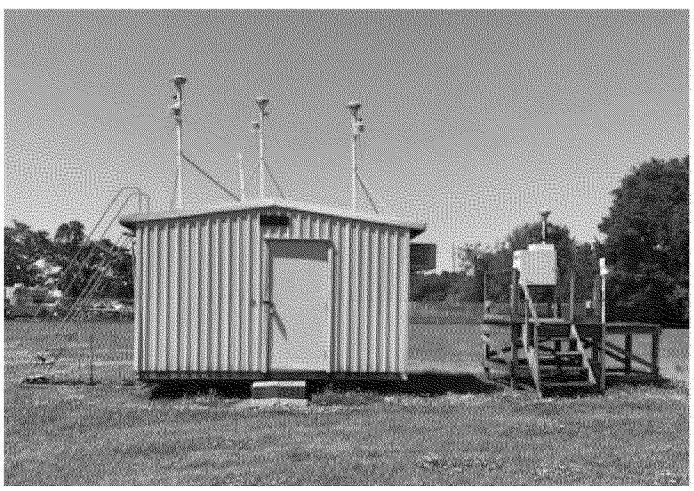
Appendix B: LDEQ Ambient Air Monitoring Site Pictures

Geismar AQS 22-047-0005

Hammond AQS 22-105-0001

Houma AQS 22-109-0001

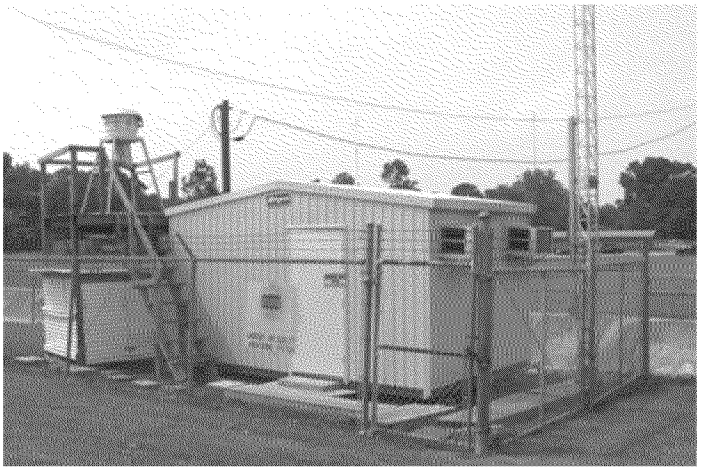
Kenner AQS 22-051-1001



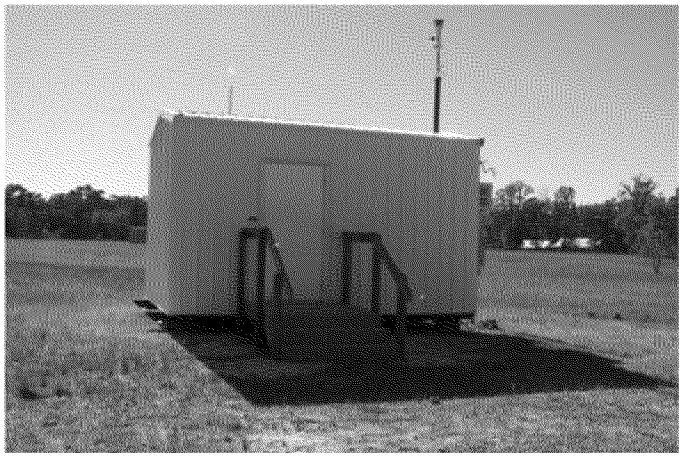
Lafayette USGS AQS 22-055-0007

LaPlace AQS 22-095-0003

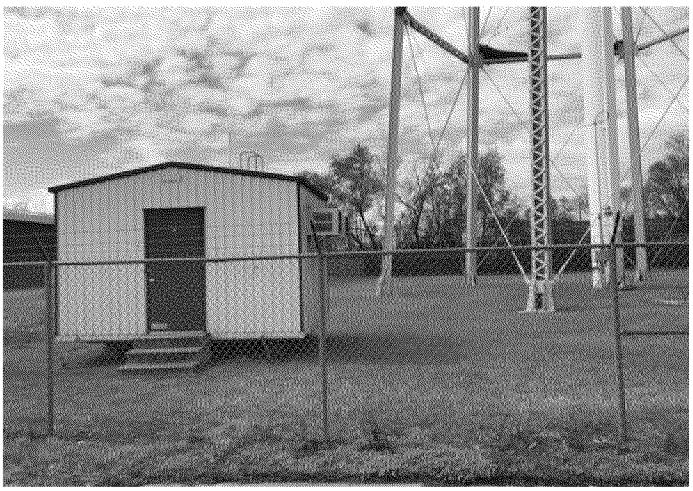
Appendix B: LDEQ Ambient Air Monitoring Site Pictures



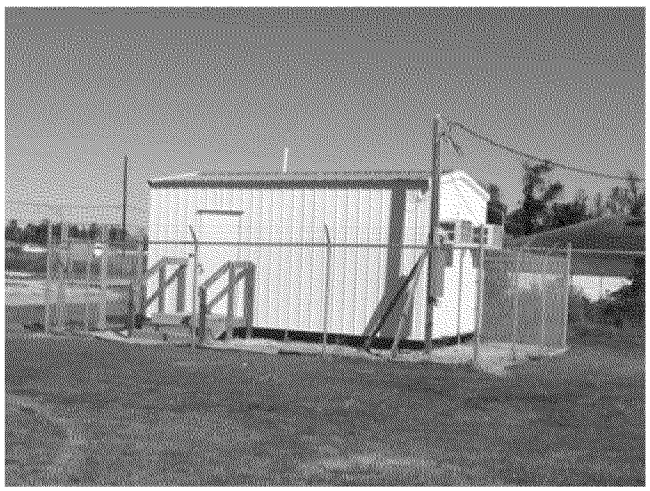
LSU AQS 22-033-0003



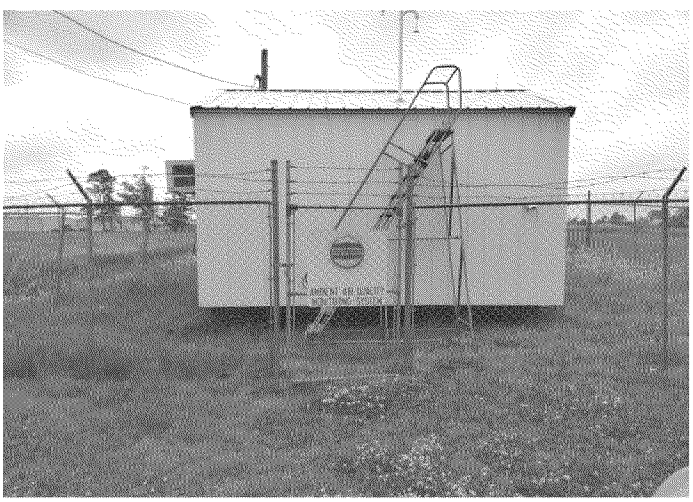
Madisonville AQS 22-103-0002



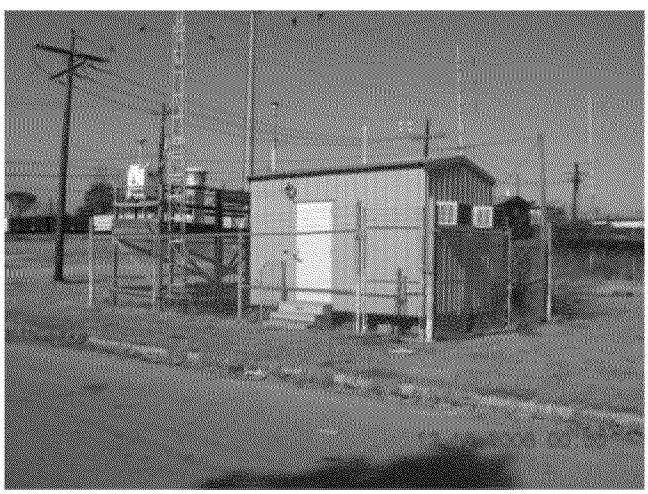
Marrero AQS 22-051-2001



Meraux AQS 22-087-0004

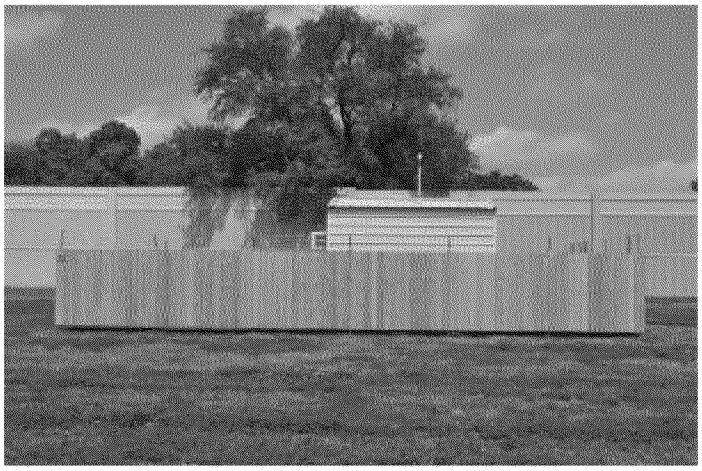


Monroe AQS 22-073-0004

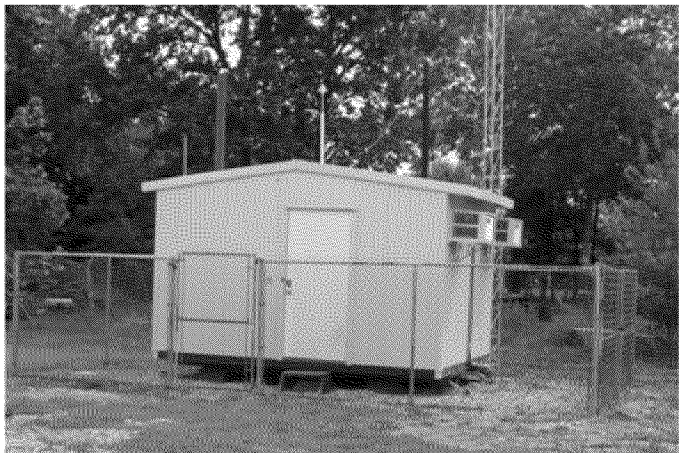


New Orleans City Park AQS 22-071-0021

Appendix B: LDEQ Ambient Air Monitoring Site Pictures

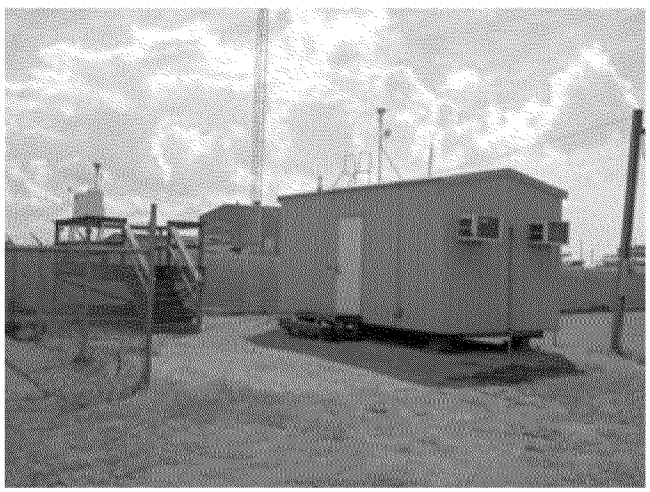


New Orleans Near-Road AQS 22-071-0021

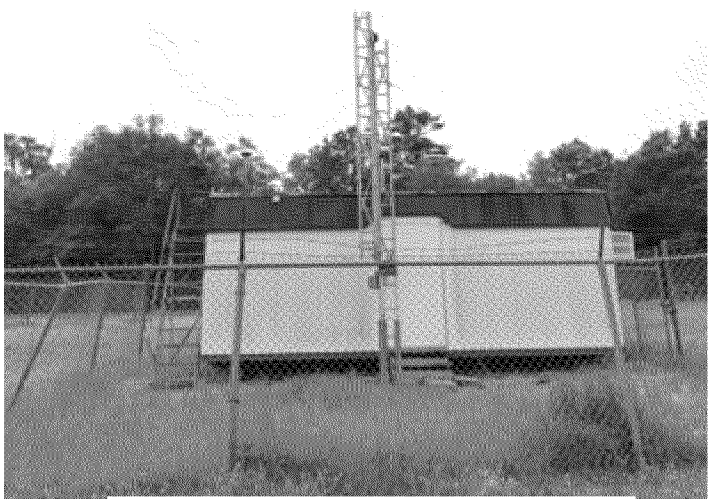


New Roads AQS 22-077-0001

Norco AQS 22-089-0006



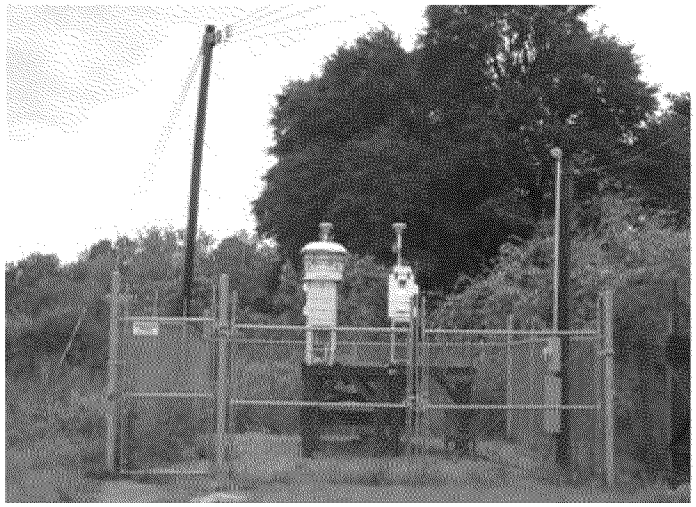
Port Allen AQS 22-121-0001



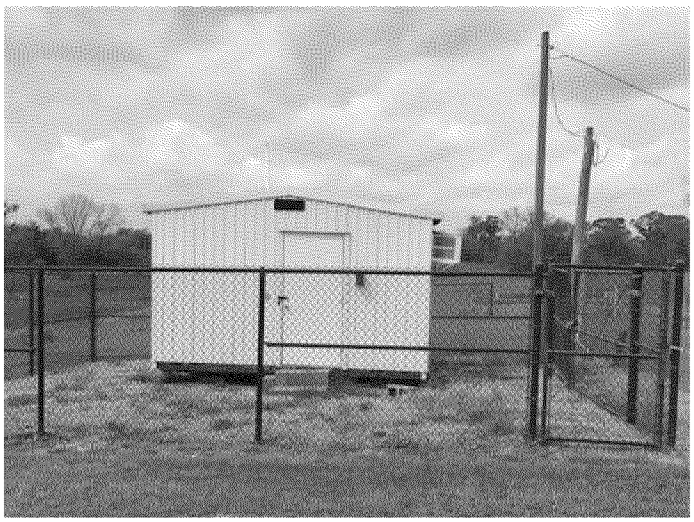
Pride AQS 22-033-0013

Shreveport Airport AQS 22-015-0008

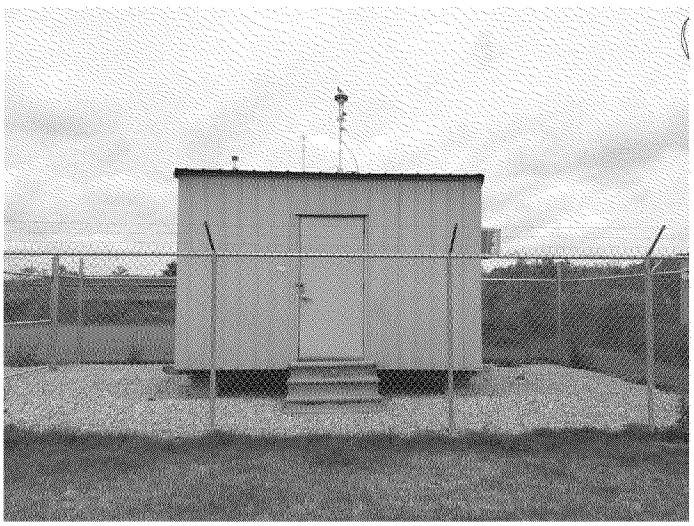
Appendix B: LDEQ Ambient Air Monitoring Site Pictures



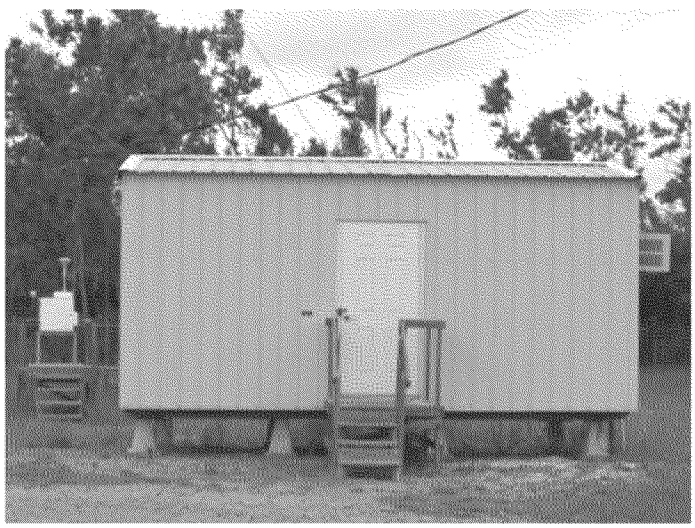
Shreveport Calumet AQS 22-017-0008



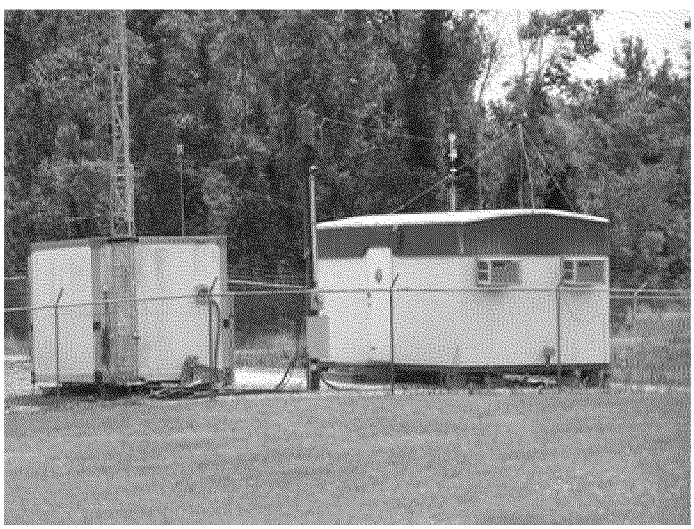
St. Martinville AQS 22-099-0001



Thibodaux AQS 22-057-0004



Vinton AQS 22-019-0009



Westlake AQS 22-0008

PUBLIC NOTICE
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY (LDEQ)
OFFICE OF ENVIRONMENTAL ASSESSMENT
AIR PLANNING AND ASSESSMENT DIVISION
2023 LOUISIANA ANNUAL MONITORING NETWORK PLAN

The LDEQ, Office of Environmental Assessment, Air Planning and Assessment Division, has completed the Annual Review of the air quality surveillance system, as required for each state in 40 CFR 58, and determined that it is complete. The review is also used to ensure that the network is continuing to meet the objectives of the air monitoring program.

Comments and requests for a public hearing or notification of the final decision can be submitted online on the public notice webpage (http://www.deq.louisiana.gov/public-notices), via personal delivery, U.S. mail, or email. **Comments and requests for public hearings must be received by 4:30 pm CST, Thursday, April 13, 2023.** Delivery may be made to the drop-box at 602 N. 5th St., Baton Rouge, LA 70802. U.S. Mail may be sent to LDEQ, Public Participation Group, P.O. Box 4313, Baton Rouge, LA 70821-4313, and emails may be submitted to DEQ.PUBLICNOTICES@LA.GOV. Persons wishing to receive notice of the final permit action must include a complete mailing address when submitting comments.

Please see additional instructions for comment submission, hand delivery and information regarding electronic submission at http://www.deq.louisiana.gov/page/the-public-participation-group or call (225) 219-3276.

The 2023 Louisiana Annual Monitoring Network Plan is available for review at the LDEQ, Public Records Center, 602 North 5th Street, Baton Rouge, LA. Viewing hours are from 8:00 a.m. to 4:30 p.m., Monday through Friday (except holidays). **The available information can also be accessed electronically on the Electronic Document Management System (EDMS) on the DEQ public website at www.deq.louisiana.gov**.

Inquiries or requests for additional information regarding this plan should be directed to Pete Cazeaux, LDEQ, Office of Environmental Assessment, P.O. Box 4314, Baton Rouge, LA 70821-4314, phone (225) 219-3991.

The 2023 Louisiana Annual Monitoring Network Plan can be viewed at the LDEQ permits public notice webpage at http://www.deq.louisiana.gov/public-notices and general information related to the public participation in permitting activities can be viewed at http://www.deq.louisiana.gov/page/the-public-participation-group.

All correspondence should specify AI Number 168755 and PER99999999.

Scheduled Publication Date: Friday, March 10, 2023 in The Advocate, Times, American Press, Advertiser, Times Picayune, New Star, Town Talk and Courier

Appendix A: Comments and Responses to the

2023 Louisiana Annual Monitoring Network Plan

Louisiana Department of Environmental Quality
Office of Environmental Assessment
Air Planning and Assessment Division

RESTORE
P.O. Box 233
Longville, LA 70652
(337)-725-3690
michaeltritico@yahoo.com

March 28, 2023

LDEQ Public Participation Group
P.O. Box 4313
Baton Rouge, LA 70821-4313

Re: AI Number 168755 and Activity Number PER99999999
2023 Louisiana Annual Monitoring Network Plan

Dear Public Participation Group:

I have read the 24 pages of the Plan at EDMS Document Number 13704719. Please accept the following comments:

The fact that there are no air monitors in the State System capable of measuring Toxic Air Pollutants is inexcusable.

The fact that there are only two places in the State where Volatile Organic Compounds are measured is inexcusable.

The fact that the PWEI system of deciding which populated areas get how many monitors shows itself to be absurd. Take the following examples:

Lake Charles, with 22.5% more sulfur dioxide per year than New Orleans, gets one sulfur dioxide monitor while New Orleans get three.

Furthermore, just one of the industrial plants in Calcasieu emits 74% of what all the sulfur dioxide sources in the New Orleans area emit combined. (That plant is Rain CII Carbon at 11,088.06 tons a year.)

Why would the Lake Charles area sulfur dioxide factor used in the Population Weighted Emission System be lower than it is in reality? Even though Rain CII Carbon and the CITGO Refinery (which processes a lot of high sulfur crude oil and

has had a history of adverse emissions and spills of sulfurous compounds) are surrounded by communities the placement of the SO_2 monitor used by LDEQ to get its baseline is NOT in the downwind direction that would register emissions from those two major sources.

I am going to attach a wind rose diagram which shows that no more than 12% of the time would emissions from Rain CII Carbon and CITGO be carried by the wind to the LDEQ SO_2 station.

Even when the wind would blow those major emissions of sulfur dioxide to the State station, the Rain CII Carbon source of SO_2 is about eight and a half miles (8.5) upwind so the plume would have already spread through Sulphur, Bayou d'Inde, Maplewood, and what is left of Mossville before it reaches the "Westlake" station.

Therefore, the logic behind the PWEI calculation process is rendered useless by having an indefensible baseline.

If there were a sulfur dioxide monitor near coordinates 30.183688 & -93.334172 the Lake Charles MSA (Metropolitan Statistical Area) would likely qualify for 3 or 4 SO_2 monitors, not just one.

Also apparent from the 2023 Monitoring Network Plan is the fact that LDEQ is still using two stations out in the country (Vinton and Carlyss), mostly upwind, getting air from the Gulf of Mexico, for regional ozone measurements. The ozone/smog that develops on many days would be detected north of the industrial/Interstate 10 corridor so the ozone monitors should be in North Calcasieu and South Beauregard Parishes.

Odd things I noticed in regions elsewhere in the state:

a. The PWEI system gives Shreveport an SO_2 monitor even though the formula would require more than doubling of the index number calculated for Shreveport to qualify for that monitor. If Shreveport can get coverage regardless of the numbers, why cannot other places?
b. Besides the inconsistencies in allotment of sulfur dioxide monitors, there is no coherent pattern in the assignment of other types of monitors around the state. For example, Baton Rouge has a monitor for every 26,000 people

whereas Lafayette has a monitor for every 96,000 people. Monroe has one for every 102,000 people, Hammond one for 68,000. I realize that air quality is not homogeneous statewide, but these assignments are based on baseline assumptions that would be obliterated if there were a meaningful network of data gathering monitors.

Such a seriously-deficient Air Monitoring Network can, in no way at all, meet any one of the three stated objectives for having such a network:

1.provide the public with air pollution data in a timely manner
2. support compliance with standards and development of an emissions strategy
3. support air pollution research studies such as health effects assessments.

Actually, having the kind of system LDEQ now has in place UNDERMINES those objectives by providing deeply-flawed data.

U.S. EPA is partly-to-blame for this unfortunate set of impediments to true improvements in our air quality. The NCore design guidelines may limit the requirement for certain tests to a single monitor in the whole state, but that limit should not be considered an excuse for failure to have testing for those substances anywhere in the state that they might occur, such as in the Calcasieu industrial complex.

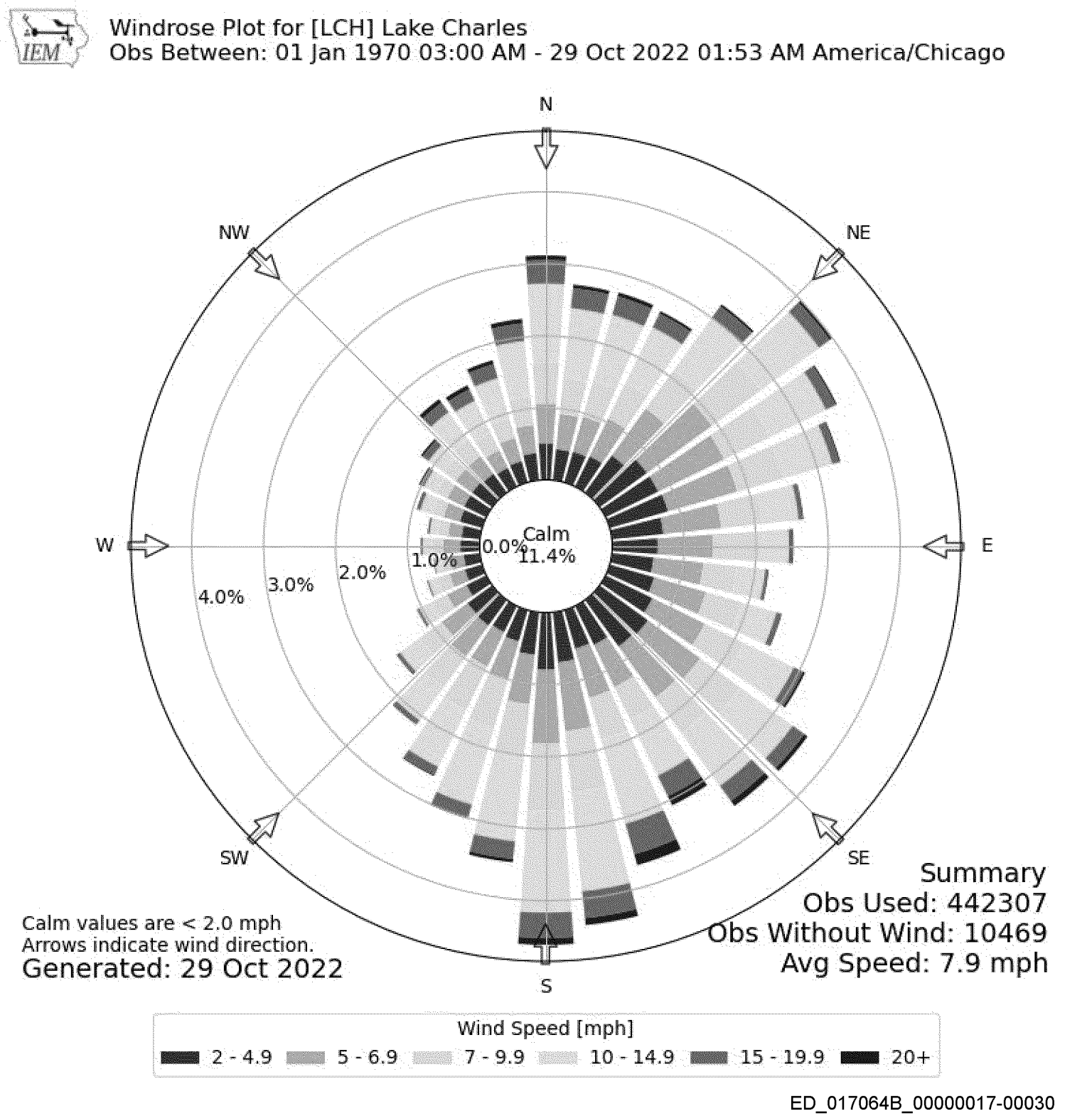
Having other NCore and PAMS type stations capable of detecting dangerous molecules is not prohibited by EPA and such should be installed in MANY places in Louisiana.

A parent who trains a child to look both ways before crossing a certain street expects the child to apply the same caution at every street that is to be crossed. Dangerous air happens more than just in Baton Rouge.

Thank you for the opportunity to submit these comments.

Sincerely,

Michael Tritico, Biologist and President of RESTORE
Restore **E**xplicit **S**ymmetry **T**o **O**ur **R**avaged **E**arth



ED_017064B_00000017-00030

Response to Comments from RESTORE:

Thank you for your interest in the LDEQ 2022 Annual Monitoring Network Plan (AMNP) and for your comments. LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan are beyond the scope of the AMNP.

Comment: The fact that there are no air monitors in the State System capable of measuring Toxic Air Pollutants is inexcusable. The fact that there are only two places in the State where Volatile Organic Compounds (VOCs) are measured is inexcusable.

Response: LDEQ acknowledges the receipt of this comment, however, this plan is used to determine Louisiana's compliance with the NAAQS and does not address the monitoring of toxic air pollutants. Unlike many other states, Louisiana has established Louisiana Ambient Air Standards for approximately 100 air toxics. These standards are contained in the Louisiana Environmental Regulatory Code (LAC 33:III) in Table 51.2. The Lighthouse Lane and the Westlake monitoring sites in the Southwest Region routinely monitor for many of these substances. In addition to sampling at the two photochemical assessment monitoring stations (PAMS), LDEQ collects 24-hour canister samples every sixth day at 18 other monitoring sites and 25-minute canister strike samples in 14 monitoring stations across the state as shown as in Table A1. Also see Table A2 below for PAMS VOCs and Table A3 for Air Toxics VOCs analyzed by Method TO-15. This VOC sampling is performed and funded at the discretion of LDEQ. Once received from the lab, this data can be found on LDEQ's website at:
https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/CANISTER-DATA

Table A1: Monitoring Sites for Speciated VOCs

Site	Strike Sampling	24-hour Canister for Air Toxics via Method TO-15 Analysis	24-hour Canisters for Ozone Precursors via Method TO-12 Analysis
Capitol	Yes	Yes	Yes
Bayou Plaquemine	Yes	Yes	Yes
Pride	Yes	Yes	Yes
Dutchtown	Yes	Yes	Yes
Carville	Yes	Yes	Yes
Port Allen	Yes	Yes	Yes
Southern	Yes	Yes	Yes
LSU	Yes	Yes	Yes
New Roads	No	Yes	Yes
Madisonville	No	Yes	Yes
Westlake	Yes	Yes	Yes
Lighthouse	Yes	Yes	Yes
Monroe	No	Yes	Yes
Shreveport	No	Yes	Yes
Kenner	No	Yes	Yes
Chalmette Vista	Yes	Yes	Yes

St Rose[1]	Yes	Yes	Yes
Marrero[2]	Yes	Yes	Yes
French Settlement	Yes	No	No

(1) Monitoring period: May 2018 - June 2023
(2) Monitoring started in January 2018

Table A2: PAMS VOCS Determined by GC/FID
Using SOP TAE006-03
Based on EPA /600-R-98/161

Ethylene	Benzene
Acetylene	2,2,4-Trimethylpentane
Ethane	Toluene
Propylene	Ethylbenzene
Propane	*m/p*-Xylene
Isobutane	Styrene
1-Butene	*o*-Xylene
1,3-Butadiene	Isopropylbenzene (Cumene)
n-Butane	*m*-Ethyltolene (1-Ethyl-3- Methylbenzene)
trans-2-Butene	*p*-Ethyltolene(1-Ethyl-4- Methylbenzene)
cis-2-Butene	*o*-Ethyltoluene(1-Ethyl-2- Methylbenzene)
Isopentane	1,2,4-Trimethylbenzene
n-Pentane	1,2,3-Trimethylbenzene
Isoprene(2-Methyll-1,3-Butadiene	*n*-Undecane
n-Hexane	TNMOC

Table A3: Air Toxics VOCs Determined by GC/MS
Using SOP TAE007-04
Based on EPA Method TO-15

Freon-12	Carbon Tetrachloride
Chloromethane	2-Nitropropane
Freon-114	1,2-Dichloropropane
Vinyl Chloride	Trichloroethylene
1,3-Butadiene	Methyl Methacrylate
Bromomethane	*cis*-1,3-Dichloropropene
Chloroethane	4-Methyl-2-Pentanone
Acetonitrile	*trans*-1,3-Dichloropropene
Acetone	1,1,2-Trichloroethane
Freon-11	Toluene
Acrylonitrile	Ethyl Methacrylate
Diethyl ether	2-Hexanone
1,1-Dichloroethene	1,2-Dibromoethane
Methylene Chloride	Tetrachloroethylene

Allyl Chloride	Chlorobenzene
Carbon Dislufide	Ethylbenzen
Freon-13	*m/p*-Xylene
1,1-Dichloroethane	Styrene
MTBE	*o*-Xylene
Methacrylontrile	1,1,2,2-Tetrachloroethane
2-Butanone	1,3,5-Trimethylbenzene
cis-1,2-Dicloroethane	1,2,4-Trimethylbenzene
Methyl Acrylate	Benzyl Chloride
Chloroform	1,3-Dichlorobenzene
Tetrahydrofuran	1,4-Dichlorobenzene
1,2-Dichloroethane	1,2-Dichlorobenzene
Chloroacetonitrile	Nitrobenzene
1,1,1-Trichloroethane	1,2,4-Trichlorobenzene
Chlorobutane	1,3-Hexachlorobutadiene
Benzene	

Comment: The fact that the PWEI system of deciding which populated areas get how many monitors shows itself to be absurd.

Response: LDEQ acknowledges the receipt of this comment, however, the use of the population weighted emissions index (PWEI) is specified in federal, not state regulations, and used specifically to determine the number of SO_2 monitors that are required for a Core Based Statistical Area (CBSA). Therefore, the minimum number of SO_2 monitoring sites required is determined using the PWEI as detailed in 40 C.F.R. Part 58, Section 4.4. Additionally as specified in 40 C.F.R. Part 58, Section 4.4.2(a), "for a CBSA with a calculated PWEI value equal or greater than 5,000, but less than 100,000, a minimum of one SO_2 monitor is required within that CBSA." As provided on Page 17 and in Table D of LDEQ's Annual Monitoring Network Plan, the PWEI calculated for the Lake Charles CBSA is 3,875. Therefore, Table D contains an error and based on the PWEI, an SO_2 monitor is not required for the Lake Charles CBSA. However, as stated in these responses, LDEQ operates more monitors/analyzers statewide than are required by 40 C.F.R. Part 58.

Comment: the placement of the SO_2 monitor used by LDEQ to get its baseline is NOT in the downwind direction that would register emissions from those two major sources. I am going to attach a wind rose diagram which shows that no more than 12% of the time would emissions from Rain CII Carbon and CITGO be carried by the wind to the LDEQ SO_2 station.

Response: LDEQ acknowledges the receipt of this comment. As stated in the response above, a SO_2 monitor is not required for the Lake Charles CBSA. However, LDEQ believes that the current location of the SO_2 monitor is the best location to capture SO_2 from the facilities the area.

Comment: The PWEI system gives Shreveport an SO_2 monitor even though the formula would require more than doubling of the index number calculated for Shreveport to qualify for that monitor. If Shreveport can get coverage regardless of the numbers, why cannot other places?

Response: As provided on Page 17 and in Table D of LDEQ's Annual Monitoring Network Plan, the PWEI calculated for the Shreveport/Bossier City CBSA is 2,004. Therefore, in accordance with

40 C.F.R. Part 58, Section 4.4.2(a), a SO_2 monitoring site is not required for the area. As mentioned numerous times in these responses, LDEQ operates more monitors/analyzers statewide than are required by 40 C.F.R. Part 58.

Comment: Besides the inconsistencies in allotment of sulfur dioxide monitors, there is no coherent pattern in the assignment of other types of monitors around the state. For example, Baton Rouge has a monitor for every 26,000 people whereas Lafayette has a monitor for every 96,000 people. Monroe has one for every 102,000 people, Hammond one for 68,000. I realize that air quality is not homogeneous statewide, but these assignments are based on baseline assumptions that would be obliterated if there were a meaningful network of data gathering monitors.

Response: LDEQ acknowledges the receipt of this comment. The monitoring sites described in this plan are located in accordance with 40 C.F.R. Part 58, Appendix E.

Comment: Such a seriously-deficient Air Monitoring Network can, in no way at all, meet any one of the three stated objectives for having such a network:

Sub Comment 1. Provide the public with air pollution data in a timely manner.

Response: LDEQ acknowledges the receipt of this comment. All data generated at LDEQ's ambient air monitoring sites is available on LDEQ's website. Data from continuous analyzers is updated hourly and can be located at: https://airquality.deq.louisiana.gov/. For hourly, ten minute, or five minute data, see the following website: https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/AIR-MONITORING- DATA-WITH-INTERVAL-5-OR-10-MINUTES.

Data from summa canister samples can also be located on LDEQ's website at: https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/CANISTER- DATA
Be advised, canister data is analyzed at a contract laboratory and the data is generally not available for 1-2 months.

In addition, LDEQ's Communications Division routinely responds to requests from the media regarding air quality conditions and forecasts. The staff of the Communications Section is dedicated to providing reporters, writers, photographers, members of the media and concerned citizens with accurate information regarding DEQ activities, events and general information.

Sub Comment 2. Support compliance with standards and development of an Emissions strategy.

Response: LDEQ's Annual Monitoring Network Plan supports compliance with ambient air quality standards and emissions strategy development. The data captured from LDEQ's monitoring sites is used to compare ambient air monitoring data against the NAAQS.

Sub Comment 3. Support air pollution research studies such as health effects Assessments.

Response: The Louisiana Department of Health routinely requests ambient air monitoring data and works with LDEQ to evaluate potential health effects. LDEQ has also assisted universities and students in collocating equipment, site tours, and discussing air monitoring.

Comment: Having other NCore and PAMS type stations capable of detecting dangerous molecules is not prohibited by EPA and such should be installed in MANY places in Louisiana.

Response: Refer to the response above responding to the comment regarding Air Toxics monitoring.

From: Alexander, Theresa
To: Jason Meyers
Cc: Belk, Ellen; Robinson, Jeffrey; Peter Cazeaux
Subject: Informal Comments on LDEQ"s Proposed 2023 Annual Monitoring Network Plan
Date: Tuesday, April 11, 2023 10:01:44 AM

We are writing to provide informal comments on the state's proposed 2023 Annual Monitoring Network Plan (AMNP). The network review process presents an opportunity for the EPA and the LDEQ to collaborate on the air monitoring network design.

As LDEQ considers comments received during the public comment period on the proposed 2023 AMNP and develops the final 2023 AMNP to submit to EPA, we encourage the state to carefully consider environmental justice in responding to the comments received, and in considering whether it may be appropriate to propose additional monitoring. We notice that, although the 2022 AMNP included Environmental Justice Considerations, the proposed 2023 AMNP does not contain this type of section. Please add environmental justice considerations in response to comments received prior to submitting the final 2023 AMNP.

We wanted to provide some recommendations for the LDEQ to consider for installing one or more monitors in the Mississippi River corridor between Baton Rouge and New Orleans, and in Calcasieu Parish. Part of our recommendations stem from the repeated modeled exceedances of the $PM_{2.5}$ standard in New Source Review (NSR) permitting projects in recent years in St. James Parish. We've noted those modeled exceedances where Air Quality Dispersion Modeling (AERMOD) predicted 24-hour $PM_{2.5}$ concentrations exceeding the NAAQS standards. Most of these permits were issued because the proposed source did not significantly contribute to the modeled violation, but there is a responsibility to address the modeled air quality concern. One way to do so, might be to deploy additional monitors in the area of the modeled violations to determine if there are violations occurring. Other approaches could be to require sufficient reductions at the sources causing the modeled NAAQS exceedances to eliminate the problem. We have also noted similar modeled exceedances in the Calcasieu Parish area that potentially need to be addressed. In any case, Louisiana has a responsibility to address the issue to ensure protection of public health. Therefore, we are recommending the LDEQ consider deployment of additional $PM_{2.5}$ monitoring in St. James Parish and in the Calcasieu Parish in areas where modeled exceedances have been predicted to ensure that public health is being protected and to verify the NAAQS exceedances are not actually occurring.

Regarding the Temporary Located Community (TLC) air monitors that were previously operating at the Irish channel site (Orleans Parish) and at St. Rose (St. Charles Parish), we notice that TLC monitoring at the Irish Channel and St. Rose sites are not included in the 2023 AMNP. We recommend installing permanent monitoring along the Irish Channel, preferably at the site where the LDEQ began operating a temporary monitor on July 18, 2021, with regular collection of $PM_{2.5}$ data beginning on July 23, 2021. As we have mentioned previously, analysis on July 12, 2022, indicated the average $PM_{2.5}$ concentration from the site was 13.2 micrograms per cubic meter, which was above the annual NAAQS of 12.0. We understand that the LDEQ did not believe the data is NAAQS comparable. However, the data indicated the potential for values above the standard. Given the potential problems, and the

possibility that the PM NAAQs will be lowered and the extensive community concerns, we encourage the LDEQ to reestablish $PM_{2.5}$ and SO_2 monitoring at the Irish Channel location. For the St. Rose area, we recommend re-installing monitoring there as well. We recommend the monitors provide NAAQS comparable quality data so ongoing community concerns can be fully addressed. For additional monitoring, as you are aware, the EPA Regional Administrator and the responsible State or local air monitoring agency must work together to design and/or maintain the most appropriate monitoring network to service the variety of data needs in an area.

In the Ninth Ward, we appreciate that the LDEQ was working with local environmental groups to address environmental concerns and we were supportive of the LDEQ's plans in the 2022 AMNP to establish an air monitoring site for $PM_{2.5}$ and SO_2 in the area. We notice that the TLC air monitoring that was planned in the Ninth Ward in the 2022 AMNP is not included in the 2023 AMNP and encourage the LDEQ to continue working with the community to address air quality concerns in the area.

For the Romeville area of St. James Parish, based on community concerns and recent community monitoring data showing potential exceedances of the PM_{10} standards, we recommend new PM_{10} monitoring to the west/northwest of the Romeville area where there may be both industrial operations and vessel loading operations on the Mississippi River. Further, we strongly encourage the LDEQ to continue evaluating siting options and potential options for installation of additional $PM_{2.5}$ and PM_{10} monitoring in the above areas around the Irish Channel and in St. James Parish. In making these recommendations to the LDEQ, we request that the LDEQ consider using EJScreen to help determine if there are optimal locations that such monitoring could be sited and where the EJ Index for Particulate Matter 2.5 indicates PM near or above the 80^{th} percentile for PM exposure in both Louisiana and the United States.

In response to community concerns, we request the LDEQ consider deploying an additional SO_2 monitor near Mosaic Uncle Sam. For details of our review of the State's assessment and recommendations for these modeled sources, please see the letter from David Garcia to Jason Meyers dated March 3, 2023.

We look forward to our continued partnership with the LDEQ on our common goals to establish and maintain an approvable and comprehensive ambient air monitoring.

Please contact me (alexander.theresa@epa.gov) or Ellen Belk of my staff (belk.ellen@epa.gov) if you need further information or have questions.

Theresa H. Alexander, Section Supervisor
Air Monitoring Section
Air Permits, Monitoring and Grants Branch
Air and Radiation Division
US Environmental Protection Agency, Region 6
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Phone: (214) 665-8571

Alexander.theresa@epa.gov

Response to Informal Comments from the U.S. Environmental Protection Agency (EPA):

Thank you for your interest in the LDEQ 2022 Annual Monitoring Network Plan (AMNP) and for your comments. As EPA acknowledged in their March 3, 2023 approval letter for LDEQ's 2022 Annual Monitoring Network Plan (EDMS Doc. # 13786976), but omits from these comments, "The EPA acknowledges the update regarding environmental justice considerations provided in the 2022 Plan, including the LDEQ's Temporary Located Community Air Monitor Program and the Mobile Air Monitoring Lab, neither of which are specifically required by federal monitoring requirements in 40 CFR Part 58; but rather are at the discretion of Louisiana." As acknowledged, LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan are beyond the scope of the AMNP.

Comment: We notice that, although the 2022 AMNP included Environmental Justice Considerations, the proposed 2023 AMNP does not contain this type of section. Please add environmental justice considerations in response to comments received prior to submitting the final 2023 AMNP.

Response: LDEQ acknowledges the receipt of this comment. As EPA acknowledged in their March 3, 2023 approval letter for LDEQ's 2022 Annual Monitoring Network Plan (EDMS Doc. # 13786976), "The EPA acknowledges the update regarding environmental justice considerations provided in the 2022 Plan, including the LDEQ's Temporary Located Community Air Monitor Program and the Mobile Air Monitoring Lab, neither of which are specifically required by federal monitoring requirements in 40 CFR Part 58; but rather are at the discretion of Louisiana." Other issues not associated with this plan, including environmental justice considerations, are beyond the scope of the AMNP.

Comment: Louisiana has a responsibility to address the issue to ensure protection of public health. Therefore, we are recommending the LDEQ consider deployment of additional $PM_{2.5}$ monitoring in St. James Parish and in the Calcasieu Parish In areas where modeled exceedances have been predicted to ensure that public health is being protected and to verify the NAAQS exceedances are not actually occurring.

Response: LDEQ acknowledges the receipt of this comment. LDEQ is currently in the planning stages of setting up a St. James air monitoring site with American Rescue Plan (ARP) grant money that is forthcoming from EPA to LDEQ. EPA has been aware of the St. James LDEQ air monitoring project for some time.

Comment: Regarding the Temporary Located Community (TLC) air monitors that were previously operating at the Irish channel site (Orleans Parish) and at St. Rose (St. Charles Parish), we notice that TLC monitoring at the Irish Channel and St. Rose sites are not included in the 2023 AMNP. We recommend installing permanent monitoring along the Irish Channel, preferably at the site where the LDEQ began operating a temporary monitor on July 18, 2021, with regular collection of $PM_{2.5}$ data beginning on July 23, 2021. As we have mentioned previously, analysis on July 12, 2022, indicated the average PM2 concentration from the site was 13.2 micrograms per cubic meter, which was above the annual NAAQS of 12.0. We understand that the LDEQ did not believe the data is NAAQS comparable. However, the data indicated the potential for values above the standard.

Given the potential problems, and the possibility that the PM NAAQs will be lowered and the extensive community concerns, we encourage the LDEQ to reestablish PM25 and S02 monitoring at the Irish Channel location.

Response: LDEQ acknowledges the receipt of this comment, however, as EPA acknowledged in their March 3, 2023 approval letter for LDEQ's 2022 Annual Monitoring Network Plan (EDMS Doc#13786976) "The EPA acknowledges the update regarding environmental justice considerations provided in the 2022 Plan, including the LDEQ's Temporary Located Community Air Monitor Program and the Mobile Air Monitoring Lab, neither of which are specifically required by federal monitoring requirements in 40 CFR Part 58; but rather are at the discretion of Louisiana." Other issues not associated with this plan, including TLC monitoring, are beyond the scope of the AMNP.

LDEQ also notes that EPA has concurred with the determination that the $PM_{2.5}$ data collected with the Beta-Attenuation Mass (BAM) Monitor at Irish Channel is not comparable to the NAAQS. LDEQ demonstrated BAM data was not sufficiently comparable to BAM data following the required procedures of 40 C.F.R. Part 58.11(e) (EDMS Doc. # 12196110) and EPA concurred with that determination, with the exclusion of the Capital Monitoring Site (EDMS Doc. # 12196118).

Comment: In the Ninth Ward, we appreciate that the LDEQ was working with local environmental groups to address environmental concerns and we were supportive of the LDEQ's plans in the 2022 AMNP to establish an air monitoring site for $PM_{2.5}$ and SO_2 in the area. We notice that the TLC air monitoring that was planned in the Ninth Ward in the 2022 MNP is not included in the 2023 AMNP and encourage the LDEQ to continue working with the community to address air quality concerns in the area.

Response: LDEQ acknowledges the receipt of this comment, however, as EPA acknowledged in their March 3, 2023 approval letter for LDEQ's 2022 Annual Monitoring Network Plan (EDMS Doc. # 13786976) "The EPA acknowledges the update regarding environmental justice considerations provided in the 2022 Plan, including the LDEQ's Temporary Located Community Air Monitor Program and the Mobile Air Monitoring Lab, neither of which are specifically required by federal monitoring requirements in 40 CFR Part 58; but rather are at the discretion of Louisiana." Other issues not associated with this plan, including TLC monitoring, are beyond the scope of the AMNP.

As EPA is aware, LDEQ received grant funding from the EPA to begin operation of the Lower Ninth Ward Site (among others) and has participated in monthly conference calls with EPA staff over the past year regarding the same.

Comment: We strongly encourage the LDEQ to continue evaluating siting options and potential options for installation of additional $PM_{2.5}$ and PM_{10} monitoring in the above areas around the Irish Channel and in St. James Parish. In making these recommendations to the LDEQ, we request that the LDEQ consider using EJScreen to help determine if there are optimal locations that such monitoring could be sited and where the EJ Index for Particulate Matter 2.5 indicates PM near or above the 80^{th} percentile for PM exposure in both Louisiana and the United States.

Response: LDEQ acknowledges the receipt of this comment, however, as EPA acknowledged in their March 3, 2023 approval letter for LDEQ's 2022 Annual Monitoring Network Plan (EDMS Doc#13786976) "The EPA acknowledges the update regarding environmental justice considerations provided in the 2022 Plan, including the LDEQ's Temporary Located Community Air Monitor Program and the Mobile Air Monitoring Lab, neither of which are specifically required by federal monitoring requirements in 40 CFR Part 58; but rather are at the discretion of Louisiana." Other issues not associated with this plan, including TLC monitoring, are beyond the scope of the AMNP.

Comment: In response to community concerns, we request the LDEQ consider deploying an additional SO_2 monitor near Mosaic Uncle Sam.

Response: LDEQ acknowledges the receipt of this comment, however, as EPA acknowledged in their March 3, 2023 approval letter for LDEQ's 2022 Annual Monitoring Network Plan (EDMS Doc#13786976) "The EPA acknowledges the update regarding environmental justice considerations provided in the 2022 Plan, including the LDEQ's Temporary Located Community Air Monitor Program and the Mobile Air Monitoring Lab, neither of which are specifically required by federal monitoring requirements in 40 CFR Part 58; but rather are at the discretion of Louisiana." Other issues not associated with this plan, including TLC monitoring, are beyond the scope of the AMNP.

As EPA is aware, LDEQ has received notice of future grant funding, from EPA, and this funding will be used to establish a TLC site in St. James Parish that will monitor SO_2. This site will be approximately 2 miles from Uncle Sam, though the final site has not been selected.

April 12 2023

Louisiana Department of Environmental Quality
Office of Environmental Assessment
Air Planning and Assessment Division
CC: EPA Region 6 Air Toxics Program

RE: 2023 Louisiana Annual Monitoring Network Plan AI Number 168755 PER99999999

Concerned Citizens Around Murphy ("Concerned Citizens") is an association of residents in St Bernard Parish. Concerned Citizens appreciate the opportunity to submit comments to the Louisiana Department of Environmental Quality ("LDEQ") on our State's Annual Monitoring Network Plan, AI Number 168755 PER99999999.

We request LDEQ conduct statewide public hearings and public meetings in Q&A format to address the 2023 monitoring network plan. LDEQ could incorporate technology to conduct in-person public hearings simultaneously with the use of a web conferencing platform.

Louisiana's air monitoring network does not protect our State's most vulnerable residents. Throughout our State, residents experience the ill health effects of poor air quality and the State of Louisiana is still advocating adding more harmful air toxins via numerous "economic development" projects. This is not sustainable for the human habitat. Louisiana needs to change its poor planning decisions that site heavy industry in close proximity to residential districts and its irresponsible decisions to site too many pollution-causing facilities in one area.

We can't remember a time when the air quality in St Bernard was attainment for sulfur dioxide, and now the EPA Refinery Rules benzene fenceline monitoring two week averages demonstrate persistent issues in the industrial corridor along West St Bernard Highway in Chalmette. [1] We have years of monitoring data for both the benzene and the sulfur problem and no meaningful solutions for either. What we need is lower air permit limits and more consistent compliance, without which attainment may never occur. Real-time fenceline monitoring at all industries in St Bernard would be one step closer to continuous enforcement of the Clean Air Act. According to EPA's 2022 Docket EPA R06 OAR 2017 0558 Finding of Failure to Attain the Primary 2010 one-hour sulfur dioxide national ambient air quality standard (NAAQS), "In St Bernard strict compliance with Title V permit limits is paramount to air quality attainment, as emissions limits used in modeled design values are within a thin margin of attainment ("little margin of safety")."

It should not be a surprise that some neighborhoods in St Bernard are in the 90 to 95% NATA Cancer Risk national percentiles, &, 95 to 100% NATA Diesel particulate matter national percentiles. The St Bernard industries do not just harm Chalmette, Arabi, and Meraux; the air toxins harm Orleans Parish. Directly across the Mississippi River from Chalmette in Orleans Parish Lower Algiers are also low income neighborhoods in the 70 to 80% NATA Cancer Risk national percentiles, &, 90 to 95% NATA Diesel particulate matter national percentiles. Some of these Orleans Parish neighborhoods are 95 to 100% national percentile population people of color and some are 80 to 90% national percentile linguistically isolated.

According to a recent report by the University of Massachusetts Political Economy Research Institute, Chalmette Elementary in St Bernard Parish is ranked in the third national percentile for air quality. Nearby Martin Luther King, Jr Charter K-12 School for Science and Technology in Orleans Parish Lower Ninth Ward is ranked in the tenth national percentile for air quality.
Our children deserve better.

Louisiana's Air Monitoring Network

We support the comments submitted by RESTORE (Restore Explicit Symmetry To Our Ravaged Earth). The State of Louisiana has a seriously deficient air monitoring network that is incapable of meeting any one of the three stated objectives for having such a network:

1. provide the public with air pollution data in a timely manner
2. support compliance with standards and development of emissions strategy
3. support air pollution research studies such as public health and human health risk

The baseline assumptions used to place monitors is flawed. If Louisiana had a more meaningful network of data gathering monitors, the assignment of monitors and type of monitors would be different and that assignment and type would provide more meaningful data.

The kind of air monitoring network Louisiana has in place now UNDERMINES the above objectives by providing deeply flawed data.

Funding

The Louisiana State Legislature should increase LDEQ's industry fees to at least the national average and write legislation to require industries found in violation of the Clean Air Act to install more monitoring equipment. LDEQ should treat all excess emissions as violations and impose monetary penalties. The increased revenues could be dedicated to help fund a more protective air monitoring network. This would be just one step to solve many issues, including the inability of LDEQ to classify many parishes as either attainment or nonattainment because of significant inadequacies and other deficiencies in Louisiana's state air monitoring network.

Air dispersion modeling and additional monitor in Violet, St Bernard Parish

To better assist the State with its site selection process for international terminaling, ports, and container yards, LDEQ should conduct air pollution dispersion modeling for the PONO proposal now, during the beginning of the NEPA process. Air modeling would provide a more meaningful comparison of alternative site selections based on comprehensive environmental and socio-economic effects, and residual human risk factors. Air modeling could assist LDEQ with its State SIP to expeditiously bring and keep St Bernard in attainment, not only for sulfur dioxide, but also for particulate matter and ozone.

Should the next governor allow his/her appointed commissioners at the Port of New Orleans (PONO) to proceed with their proposed industrial incursion into one of our residential districts to operate a mega international port, terminaling complex, auxiliary warehousing and services, and container yard, with its heavy truck and rail traffic, we expect LDEQ at the very least require PONO provide for fenceline monitoring and an additional air monitor in Violet, St Bernard.

Additional monitoring in Lower Algiers and Lower Ninth Ward Orleans Parish

The consistent pattern of numerous odor and adverse health reports received by LDEQ from residents of Orleans Parish document the need for more monitoring in these neighborhoods: Lower Aligiers, Aurora Gardens, Holy Cross, and Lower Ninth Ward. For sulfur dioxide, if LDEQ re-installed the former "Entergy" air monitor across the Mississippi River from St Bernard's Chalmette, that "westbank" data along with air dispersion modeling of the Chalmette industries, would more than likely demonstrate Orleans Parish nonattainment for sulfur dioxide. Such a finding of nonattainment in Orleans may finally dispense the political hindrances to enforcement and trigger more meaningful action to lower emissions at facilities in St Bernard.

Lower emissions would immediately and significantly improve air quality, public health, and quality of life, especially for those of us living along the fencelines.

Given St Bernard has been nonattainment for sulfur dioxide for many years and the additional number of years gifted to the “lion’s share” source Rain CII Carbon Chalmette to comply with the Clean Air Act, conducting more air monitoring in Lower Algiers / Aurora Gardens and Lower Ninth Ward / Holy Cross neighborhoods is appropriate. LDEQ should require Rain CII Carbon Chalmette [AI # 2557] and PBF Energy Chalmette Refining [AI # 1376] provide funding for these air monitors; the monitors should be similar to the LDEQ Ch_Vista monitor. As discussed below, we also recommend advanced real-time fenceline monitoring around all St Bernard facilities, including PBF Energy’s new diesel renewals plant currently under construction.

Chalmette Vista Monitor
https://airquality.deq.louisiana.gov/Data/Site/CHALMETTEVISTA/Date/2023-04-05

We appreciate LDEQ’s change at Ch_Vista monitor for particular matter to NAAQS comparable. We hope this enables LDEQ to avoid another nonattainment status in our community.

LDEQ’s Chal_Vista monitor is located adjacent to a special needs children’s playground. The Ch_Vista monitor location should remain where it is. We are suffering because the “lion’s share” source is either unwilling or incapable of changing operations; this unjustly delays implementing long term solutions. At the same time, LDEQ permitted a new diesel renewals plant at PBF Energy’s east tank farm campus. LDEQ should conduct additional monitoring west of the Chal_Vista monitor, in western Chalmette, Arabi, and the Holy Cross and Lower Ninth Ward neighborhoods, and on the “westbank” in Lower Algiers, Lower Aurora, and other afflicted neighborhoods. As described below, LDEQ should require real-time fenceline monitoring around PBF Energy Chalmette [AI #1376], PBF Energy's diesel renewals plant, Rain CII Carbon [AI # 2557], Veolia Water Services [AI # 85188], Associated Terminals [multiple AIs including AI # 32756] St Bernard Port Harbor and Terminal [multiple AIs including AI # 19531] and American (Domino) Sugars Refining [AI # 1329].

On April 5 2023 at 9am the Ch_Vista monitor measured 168.1 parts per billion (PPB) sulfur dioxide and 19 PPB hydrogen sulfide. No further public information is available at this time about the source or the cause. If both PBF Energy and Rain had enhanced real-time fenceline monitoring the industry may have been able to adjust processing and avoid the negative health effects, the obnoxious odors, and an exceedance of EPA’s 75 PPB sulfur dioxide one-hour health standard. We don't have the ability to run air dispersion models for each possible startup, shutdown, or malfunction event in St Bernard. We need LDEQ to ratchet down the air permit limits and enforce strict compliance. Otherwise, we’ll never reach attainment.

Meraux Monitor https://airquality.deq.louisiana.gov/Data/Site/MERAUX/Date/2023-04-02

LDEQ’s Meraux monitor is located adjacent to an elementary school play yard on Mistrot Drive. We suggest this monitoring station move further west or LDEQ add another Meraux monitor. Additionally, Valero Energy Meraux should install advanced real-time fenceline monitoring and enter into an agreement with EPA and LDEQ regarding its “Community Monitor”.

LDEQ’s plan includes a system modification change to the LDEQ Meraux monitor’s sulfur dioxide classification from background to source. While this seems like a good step towards clean air for all communities, we believe the distance from LDEQ’s Meraux monitor on Mistrot Drive is too far away from Meraux’s major source of sulfur (Valero Energy Meraux Refinery [AI

1238] and its adjacent terminaling and dock areas [AI # 93523]) to provide meaningful data. According to EPA, the LDEQ Meraux monitor is too far east from the major source (Valero Energy) to justify sole use of monitor data to determine attainment status for sulfur dioxide. [EPA's 2022 Docket EPA R06 OAR 2017 0558 Finding of Failure to Attain]. Valero Energy Meraux is significantly further away from the LDEQ Meraux monitor than the distance the Chalmette major sources (PBF Energy and Rain CII) are from the LDEQ Ch_Vista monitor.

LDEQ should relocate the LDEQ Meraux monitor further west to the future site of St Bernard Parish Public Library in the 3100 block of East Judge Perez Drive in Meraux. Should LDEQ determine it requires the current Mistrot Drive location for Ozone data, then we suggest LDEQ add an additional monitor at or around the future public library site.

LDEQ should consider the benefits of two LDEQ Meraux monitors (Mistrot and new library) and a NAAQS Comparable Valero Energy Meraux "Community Monitor". The Valero Energy "Community Monitor" is operated under the Valero EPA consent decree (Civil Action No 3:10-cv-00563-bbc); the monitor is located on Ventura Drive in Chalmette, just north and slightly west of the Valero refinery. Both LDEQ Meraux monitors would be located to the east of the refinery. Having both LDEQ Meraux monitors (Mistrot and new library) and the Valero Energy "Community Monitor" NAAQS Comparable would provide more useful data and assist LDEQ in reaching its attainment and network goals. [https://lena.providenceeng.com/Default.aspx]

Given St Bernard Parish is still nonattainment for the one-hour sulfur dioxide health standard, we request Valero Energy, EPA, and LDEQ enter into an agreement for Valero Energy to continue to maintain its "Community Monitor" as a NAAQS Comparable monitor even after the EPA consent decree may terminate.

<u>Enhanced fenceline monitoring and infrared or thermal imaging</u>
Real-time fenceline monitoring benefits everyone: it's a money-saving device for refinery managers to control leaks/loss of product, it protects workers, and it can help our first responders protect themselves and the community. Real-time fenceline monitoring would assist LDEQ to get our fragile air quality into attainment. Infrared or thermal imaging could help facilities operate more efficiently, and truck and rail transports could use advanced imaging to protect the community from leaks. Thermal imaging devices for rail could help avoid derailments caused from overheating. Community safety should be the priority.

Valero Energy, PBF Energy, Rain CII Carbon, and Veolia Water could all be good neighbors and provide the types of real-time fenceline monitoring that some of these companies already provide in other States, including monitoring for hydrogen sulfide, sulfur dioxide, benzene, and other pollutants. It should include easy public access to real time data, notifications of spikes in pollution levels, and appropriate monitors (such as "point monitors" for hydrogen sulfide), which set a lower, more protective level to trigger corrective action, including odor abatement and emissions reduction.

We deserve the same degree of protection from environmental and health hazards as provided in other States. Instead of access to real time benzene data, we have months-long delayed access to bi-weekly or annual averages of "net" benzene levels IF "reportable" to EPA, and years-long delay into identifying suspected sources and implementing protective solutions. Instead of fenceline monitoring with lower trigger levels for hydrogen sulfide and sulfur dioxide, we have odor abatement programs dependent on residents telephoning the refinery and "complaining", and plant managers dispatching employees to drive around and sniff the area. That is just backwards.

Below are examples of what PBF Energy and Valero Energy provide at other sites, and the people of St Bernard Parish and Orleans Parish deserve no less.

PBF Energy Martinez https://www.fenceline.org/martinez/index.php
PBF Energy Torrance https://torc.data.spectrumenvsoln.com/data
Valero Energy Wilmington https://wilmingtonrefinerymonitoring.org/

Louisiana Be Better, Demand Better.

Respectfully submitted
On behalf of Concerned Citizens
Suzanne Kneale, Chalmette, LA

> Concerned Citizens Around Murphy is a neighborhood organization, whose members are dedicated to the revitalization of St. Bernard Parish, Louisiana, renewal of the environment, and advocacy for all residents. We encourage citizens to actively engage in public participation so that local residents may affect the ever-changing decisions that concern their neighborhood and community.Concerned Citizens' air quality committee formed to address pollution issues through public outreach and education, community meetings, and active involvement in the public participation process.

[1] Benzene monitoring
Benzene has been reported as high as 56 and 38 ug/m3 two week average !!
9 ug/m3 two week average benzene is the EPA Refinery Rules measure for corrective action.
One can only imagine the real time actual levels of exposure.
Benzene exposure is a dangerous human health risk.
Clearly, this is an urgent public health situation.
And yet, this situation is still not resolved.

September 2022 to December 2022 : 2 week averages benzene as high as 15,12,10, 9.3, 9.9, 38, 35, 17, 11, 16, 16, 22 ug/m3
https://edms.deq.louisiana.gov/app/doc/view?doc=13700866

July 2022 to August 2022 two week averages benzene as high as 16, 11, 11, 21, 21, 12 ug/m3
https://edms.deq.louisiana.gov/app/doc/view?doc=13569016

March 2022 to June 2022 two week averages benzene as high as 9, 12, 14, 7, 27, 56, 22 ug/m3
https://edms.deq.louisiana.gov/app/doc/view?doc=13569018

2019 through 2020 supplemental information for first quarter 2019 through fourth quarter 2020 for when the rolling annual average benzene was greater than 9 ug/m3; this report is about corrective actions taken https://edms.deq.louisiana.gov/app/doc/view?doc=13673146

Reports in LDEQ EDMS for the EPA Refinery Rules benzene fenceline monitoring indicate years-long benzene issues in that industrial corridor in Chalmette along West St Bernard Highway. More recently, there is a disturbing issue at a suspected offsite source.

We appreciate that PBF Energy Chalmette stepped up and invested in its sludge centrifuge and other refinery investments for corrective actions to reduce benzene emissions. We appreciate that PBF Energy Chalmette invested in field gas chromatograph monitoring to aid in determining potential benzene sources. Our understanding is that based on near real time results and correlation to meteorological data the indicators point to two suspected offsite sources (one to the West and one to the South of Chalmette refining).

We suggest EPA and LDEQ trust but independently verify PBF Energy's findings.

We expect the offsite source to be more expeditiously identified and enforcement requirements to make immediate reductions in these harmful air toxin levels.This is the corridor where the new PBF Energy diesel renewals plant is under construction. We are concerned about what type of offensive odors the renewals operations might generate in our neighborhoods and how LDEQ plans to address the new odor nuisances and adverse health effects, when the agency can not resolve the existing intolerable conditions forced upon us.

West --- Potential sources of benzene west of PBF Energy Chalmette would likely be either Rain CII Carbon Chalmette or Veolia Wastewater or facilities at Associated Terminals or at the St Bernard Port Harbor and Terminal.

South — The pedestrian and vehicle ferry is located south of PBF Energy Chalmette and other likely sources may be the wharf(s), dock or the numerous barges stored on the Mississippi River; one can only guess. But, shouldn't LDEQ know by now what the sources of these high benzene levels are? Shouldn't LDEQ have already implemented requirements to reduce benzene levels?

Response to Comments from Concerned Citizens Around Murphy:

General: Thank you for your interest in the LDEQ 2022 Annual Monitoring Network Plan (AMNP) and for your comments. LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan are beyond the scope of the AMNP.

Comment: We request LDEQ conduct statewide public hearings and public meetings in Q&A format to address the 2023 monitoring network plan. LDEQ could incorporate technology to conduct in-person public hearings simultaneously with the use of a web conferencing platform.

Response: LDEQ acknowledges the receipt of this comment. LDEQ is required by 40 C.F.R. § 58.10 to make the AMNP available to the general public for a 30-day public comment period prior to submission to the EPA on July 1. LDEQ solicits such comments from the public each year, see EDMS Doc. # 13704719. 40 C.F.R. §58.10 does not require a public hearing on the AMNP.

Comment: Louisiana's air monitoring network does not protect our State's most vulnerable residents. Throughout our State, residents experience the ill health effects of poor air quality and the State of Louisiana is still advocating adding more harmful air toxins via numerous "economic development" projects. This is not sustainable for the human habitat. Louisiana needs to change its poor planning decisions that site heavy industry in close proximity to residential districts and its irresponsible decisions to site too many pollution-causing facilities in one area.

Response: Thank you for your interest in the LDEQ 2022 Annual Monitoring Network Plan (AMNP) and for your comments. LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, including economic development projects, are beyond the scope of the AMNP.

Comment: We can't remember a time when the air quality in St. Bernard was attainment for sulfur dioxide, and now the EPA Refinery Rules benzene fenceline monitoring two week averages demonstrate persistent issues in the industrial corridor along West St. Bernard Highway in Chalmette.

Response: LDEQ acknowledges the receipt of this comment. LDEQ's Chalmette Vista and Meraux monitoring sites both continue to monitor attainment for SO_2 for a number of years. In fact, the 2019-2021 design values are 47ppb for the Chalmette Vista site and 9ppb for the Meraux site, both well below the NAAQS of 75ppb. Additionally, LDEQ is currently working with EPA and facilities in the area to update the modeling and propose re-designation of the area to attainment.

In regards to your comment on the EPA Refinery Rule, this monitoring plan is used to determine compliance with the NAAQS and is not intended for general fenceline monitoring. Therefore, benzene fenceline monitoring is beyond the scope of this plan.

Comment: According to a recent report by the University of Massachusetts Political Economy Research Institute, Chalmette Elementary in St Bernard Parish is ranked in the third national percentile for air quality. Nearby Martin Luther King, Jr Charter K-12 School for Science and Technology in Orleans Parish Lower Ninth Ward is ranked in the tenth national percentile for

air quality.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as the above referenced report, are beyond the scope of the AMNP.

Comment: The State of Louisiana has a seriously deficient air monitoring network that is incapable of meeting any one of the three stated objectives for having such a network:

Sub Comment 1: Provide the public with air pollution data in a timely manner.

Response: LDEQ acknowledges the receipt of this comment. All data generated at LDEQ's ambient air monitoring sites is available on LDEQ's website. Data from continuous analyzers is updated hourly and can be located at: https://airquality.deq.louisiana.gov/. For hourly, ten minute, or five minute data, see the following website:

https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/AIR-MONITORING-DATA-WITH-INTERVAL-5-OR-10-MINUTES

Data from summa canister samples can also be located on LDEQ's website at:

https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/CANISTER- DATA

Be advised, canister data is analyzed at a contract laboratory and the data is generally not available for 1-2 months.

In addition, LDEQ's Communications Division routinely responds to requests from the media regarding air quality conditions and forecasts. The staff of the Communications Section is dedicated to providing reporters, writers, photographers, members of the media and concerned citizens with accurate information regarding DEQ activities, events and general information.

Sub Comment 2: Support compliance with standards and development of emissions strategy.

Response: LDEQ's Annual Monitoring Network Plan supports compliance with ambient air quality standards and emissions strategy development. The data captured from LDEQ's monitoring sites is used to compare ambient air monitoring data against the NAAQS.

Sub Comment 3: Support air pollution research studies such as public health and human health risk

Response: The Louisiana Department of Health routinely requests data and works with LDEQ to evaluate potential health effects. LDEQ has also assisted universities and students in collocating equipment, and discussing air monitoring.

Comment: The Louisiana State Legislature should increase LDEQ's industry fees to at least the national average and write legislation to require industries found in violation of the Clean Air Act to install more monitoring equipment.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as funding for LDEQ, are beyond the scope of the AMNP.

Comment: Air dispersion modeling and additional monitor in Violet, St Bernard Parish.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as modeling, are beyond the scope of the AMNP.

Comment: Additional monitoring in Lower Algiers and Lower Ninth Ward Orleans Parish.

Response: LDEQ acknowledges the receipt of this comment. Though not federally required and beyond the scope of this plan, in the spring of 2023, LDEQ installed a Temporary Located Community (TLC) monitoring site in the Ninth Ward. TLC monitoring sites are installed at LDEQ's discretion. The Lower Ninth Ward site is located on 1575 Jourdan Ave., 70117, New Orleans. The site monitors H_2S, SO_2, VOCs, Methane, NMOC, $PM_{2.5}$, wind speed and wind direction.

As previously mentioned, LDEQ locates monitoring sites in accordance with the requirements of 40 C.F.R. Part 58, Appendix E and operates more monitors/analyzers than are required by federal regulation. As such, there are sufficient monitoring sites in the area to satisfy the requirements of this plan.

Comment: On April 5, 2023, at 9am the Ch_Vista monitor measured 168.1 parts per billion (PPB) sulfur dioxide and 19 PPB hydrogen sulfide. No further public information is available at this time about the source or the cause.

Response: LDEQ acknowledges the receipt of this comment. The release was identified by air monitoring staff and the incident was forwarded to LDEQ Surveillance Division for further investigation.

Comment: We believe the distance from LDEQ's Meraux monitor on Mistrot Drive is too far away from Meraux's major source of sulfur (Valero Energy Meraux Refinery [AI# 1238] and its adjacent terminal and dock areas [AI # 93523])

Response: As previously mentioned, LDEQ locates monitoring sites in accordance with 40 C.F.R. Part 58, Appendix E and operates more monitors/analyzers than required by federal regulation. As such, there are sufficient monitoring sites in the area to satisfy the requirements of this plan.

Comment: Real-time fenceline monitoring benefits everyone: it's a money-saving device for refinery managers to control leaks/loss of product, it protects workers, and it can help our first responders protect themselves and the community.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as enhanced fenceline monitoring and thermal imaging, are beyond the scope of the AMNP.

Comment: Benzene monitoring.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as benzene monitoring, are beyond the scope of the AMNP.

TULANE LAW SCHOOL
TULANE ENVIRONMENTAL LAW CLINIC

Via Email to:

Louisiana Department of Environmental Quality
Public Participation Group
deq.publicnotices@la.gov

Dr. Earthea Nance, Administrator
EPA Region 6
Nance.Earthea@epa.gov

Re: Comments on 2023 Louisiana Annual Monitoring Network Plan, AI #168755, PER99999999

Dear LDEQ Public Participation Group and Dr. Nance,

On behalf of our clients Patricia Charles, Raphael Sias, Ronald Carrier, Larry Allison, Karl Prater, McKeever Edwards, Carolyn Peters, Stafford Frank, and Peggy Anthony ("Mossville community members"), as well as Myrtle Felton, Barbara Washington, Gail LeBeouf, Inclusive Louisiana, and Louisiana Bucket Brigade (collectively, "St. James Community Members"), the Central Louisiana Coalition for a Clean and Healthy Environmenta, and the Sierra Club, we respectfully submit these comments on Louisiana Department of Environmental Quality's ("LDEQ's") proposed 2023 Annual Air Monitor Network Plan ("Plan") for the State of Louisiana. We are aware that LDEQ is responsible for proposing the Plan and EPA must approve. Therefore, we submit these comments to both agencies.

Environmental justice mandates and the obligations imposed on LDEQ as public trustee of the environment under Article IX, section 1, of the Louisiana Constitution and the Supreme Court's interpretation of that article in *Save Ourselves, Inc., v. La. Env't Control Comm'n*, 452 So. 2d 1152 (La. 1984), require that LDEQ do more for the communities of Mossville and St. James Parish than what is required under federal Clean Air Act regulations. Below, we detail the needs of the environmental justice communities represented by the commenters.

I. The Objectives of the Clean Air Act Air Monitoring Network Requirements and Environmental Justice Mandate that LDEQ Conduct Additional Monitoring in and Near Mossville.

The federal Clean Air Act ("CAA") requires Louisiana to establish and maintain an air quality monitoring network. Louisiana's network must meet three objectives: "(a) Provide air pollution data to the general public in a timely manner . . . ; (b) Support compliance with ambient air quality standards and emissions strategy development . . . ; [and] (c) Support for air pollution

research studies . . . ." 40 C.F.R. Part 58 App. D ¶ 1.1. Monitoring data are important for determining whether areas comply with National Ambient Air Quality Standards ("NAAQS"). 40 C.F.R. Part 58 App. A ¶ 1.1(a). The United States Environmental Protection Agency ("EPA") has established NAAQS for six criteria pollutants, including Ozone (O_3) and nitrogen dioxide (NO_2). To determine whether an area meets a NAAQS, EPA compares monitoring data to the NAAQS. 40 C.F.R. Part 58 App. D ¶ 1.1(b).

Each year, Louisiana must demonstrate compliance with federal minimum monitoring requirements. 40 C.F.R. § 58.10(a)(1), (b). The monitoring network plan must include detailed information about the network's design, including the exact location of each monitor in the network, how each monitor operates, and proposed changes to individual monitors. 40 C.F.R. § 58.10(b)(1)-(5), Part 58 App. D. Federal regulations prescribe only minimum design criteria for State and Local Area Monitoring Stations ("SLAMS") networks to monitor for criteria pollutants, leaving room for states to establish enhanced air monitoring as areas in their states require. See 40 C.F.R. § 58.1; see also 40 C.F.R. Part 58 App. D ¶¶ 4.1-8.1. Although LDEQ meets the minimum federal regulations, Mossville constitutes an area in Louisiana which requires more stringent monitoring given its proximity to industrial pollution and high levels of criteria pollutant emissions.

Mossville residents are Black Americans severely overburdened by industrial pollution. For the past several decades, Mossville residents have suffered the deterioration of their health and well-being and the loss of their historic community due to extremely high levels of harmful air pollution emitted from fourteen surrounding industrial facilities. These facilities have emitted millions of pounds of harmful pollutants. For example, in 2021, the Sasol Lake Charles Chemical Complex (Sasol) emitted over 200 tons of $PM_{2.5}$,over 890 tons of total VOCs, and over 1229 tons of NO_x.[1] That same year, another nearby facility, the Phillips 66 Co. Lake Charles Refinery, emitted over 160 tons of $PM_{2.5}$, over 900 tons of total VOCs, and over 860 tons of NO_x. [2] Two other facilities in the area, the Entergy Lake Charles Power Station and the Westlake Chemical Westlake Petrochemical Complex, emitted over 52 and 163 tons of total VOCs, and over 125 and 770 tons of NO_x respectively.[3] Mossville community members continue to be concerned about the impacts from air pollution emitted by these facilities, as well as serious permit violations repeatedly committed by such facilities. According to EPA data, the Phillips 66 facility located adjacent to Mossville had had "high priority violations of its air permits in every quarter since April 2019, through 2023.[4] *See* Figure 1.

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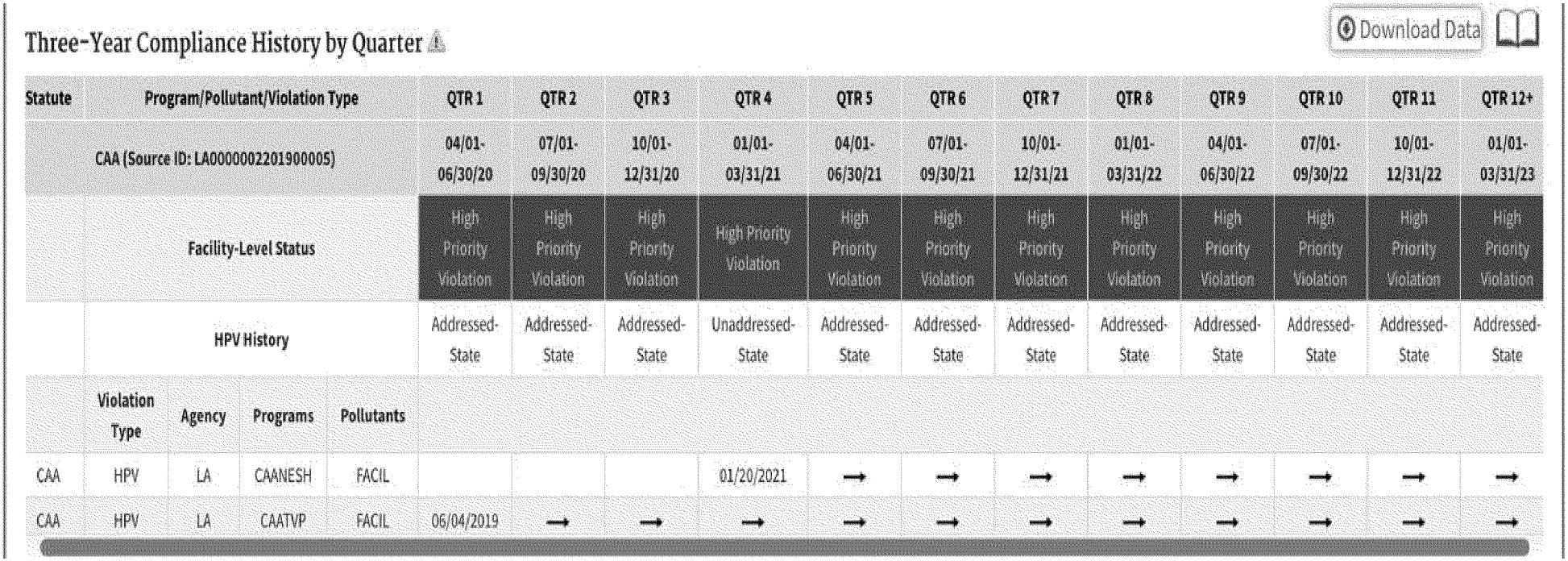
[1] Sasol Chemicals (USA) LLC – Lake Charles Chemical Complex, Emissions Inventory for 2021, https://edms.deq.louisiana.gov/app/doc/view?doc=13297128 (Apr. 30, 2022).
[2] Phillips 66 Co. – Lake Charles Refinery, Emissions Inventory for 2021, https://edms.deq.louisiana.gov/app/doc/view?doc=13297256 (Apr. 27, 2022).
[3] Entergy Louisiana LLC – Lake Charles Power Station, Emissions Inventory for 2021, https://edms.deq.louisiana.gov/app/doc/view?doc=13266551 (Apr. 26, 2022); Westlake Chemical OpCo LLC – Westlake Petrochemical Complex, Emissions Inventory for 2021, https://edms.deq.louisiana.gov/app/doc/view?doc=13347330 (June 15, 2022).
[4] *See* EPA, ECHO Database, https://echo.epa.gov/detailed-facility-report?fid=110000539757#pane3110000539757 (last visited Apr. 4, 2022).



Three-Year Compliance History by Quarter

Download Data

Statute	Program/Pollutant/Violation Type				QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8	QTR 9	QTR 10	QTR 11	QTR 12+
CAA (Source ID: LA0000002201900005)					04/01-06/30/20	07/01-09/30/20	10/01-12/31/20	01/01-03/31/21	04/01-06/30/21	07/01-09/30/21	10/01-12/31/21	01/01-03/31/22	04/01-06/30/22	07/01-09/30/22	10/01-12/31/22	01/01-03/31/23
	Facility-Level Status				High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation	High Priority Violation
	HPV History				Addressed-State	Addressed-State	Addressed-State	Unaddressed-State	Addressed-State	Addressed-State	Addressed-State	Addressed-State	Addressed-State	Addressed-State	Addressed-State	Addressed-State
	Violation Type	Agency	Programs	Pollutants												
CAA	HPV	LA	CAANESH	FACIL				01/20/2021	→	→	→	→	→	→	→	→
CAA	HPV	LA	CAATVP	FACIL	06/04/2019	→	→	→	→	→	→	→	→	→	→	→

Figure 1. Three-year compliance history of the Facility 66 facility. Accessed at https://echo.epa.gov/detailed-facility-report?fid=110000539757#pane3110000539757.

The EPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[5] The EPA further states that this goal will be achieved only when everyone enjoys "[t]he same degree of protection from environmental and health hazards, and [e]qual access to the decision-making process to have a healthy environment in which to live, learn, and work."[6] Throughout the United States, communities of color face greater exposure to toxic pollutants than other communities.[7] In Louisiana, communities of color are exposed to seven to twenty-one times higher emissions of criteria pollutants (depending on the pollutant) than predominantly White communities, and Mossville is no different.[8]

In 2022, LDEQ's proposed Annual Monitoring Network Plan addressed the issue of environmental justice for the first time. Specifically, LDEQ referred to its establishment of its Temporary Located Community (TLC) Air Monitor Program, which supposedly targets environmental justice concerns.[9] According to LDEQ, the TLC Air Monitors collect ambient air quality data in "underserved communities."[10] As of 2022, LDEQ collected data from TLC Air Monitors in three neighborhoods it categorized as environmental justice communities, St. Rose, Marrero, and the Irish Channel.[11] However, despite receiving comments from Mossville residents the last three years, LDEQ's environmental justice discussion failed to mention Mossville. Further, LDEQ's 2023 Annual Monitoring Network Plan does not even mention environmental justice as a concern like it did in its 2022 Plan. Mossville and neighboring communities remain overburdened by air pollution. Over the last decade LDEQ permitted increases in industrial emissions from facilities in the Mossville area like Sasol, and yet, rather than correspondingly increase the protections offered by robust ambient air monitoring, the agency has eliminated or deactivated monitors in the area. LDEQ could have addressed the Mossville community's concerns regarding environmental justice and monitoring in its 2022 Plan but instead decided to eliminate environmental justice as a consideration in this year's Plan. LDEQ must make environmental justice a priority and should revise its 2023 Plan to address environmental justice goals that include communities like Mossville.

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[5] EPA, *Environmental Justice*, https://www.epa.gov/environmentaljustice, (last visited Mar. 4, 2023).
[6] *Id.*
[7] *See* Bongki Woo et al., *Residential Segregation and Racial/Ethnic Disparities in Ambient Air Pollution*, 11 Race & Soc. Problems 60, 64 (2018).
[8] *See* Kimberly A. Terrell & Gianna St. Julien, *Discriminatory Outcomes of Industrial Air Permitting in Louisiana, United States*, 10 Env't Challenges 5 (2023), *available at* https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4276748.
[9] *See* LDEQ, 2022 Annual Monitoring Network Plan (2022), *available at* https://edms.deq.louisiana.gov/app/doc/view?doc=13228415.
[10] *Id.*
[11] *Id.*

For these reasons, and those below, LDEQ should 1) consider additional monitoring for ozone at the Westlake monitoring site; 2) ensure that its monitoring for NO_2 in Calcasieu Parish is adequate to capture the areas of highest concentrations; 3) maintain $PM_{2.5}$ monitoring sufficient to ensure compliance with any updated NAAQS for said pollutant; and 4) provide additional clarity and transparency regarding VOC monitoring and comparison to standards.

a. In order to better protect the surrounding communities, including Mossville, LDEQ should re-evaluate its ozone monitoring network in Calcasieu Parish and re-activate the ozone monitor at the Westlake monitoring site.

Mossville residents commented to LDEQ on both its 2021 and 2022 Annual Monitoring Network Plans. Those comments emphasized that LDEQ requires much more robust monitoring to adequately protect the Mossville community and to comply with environmental justice requirements. Mossville residents argued that LDEQ should place monitors for $PM_{2.5}$, VOCs, and ozone in Mossville.[12] In 2021, LDEQ installed a federal equivalent $PM_{2.5}$ monitor in Westlake (at EPA's urging and with its support), which constitutes an improvement. However, the Mossville community still urgently needs adequate ozone monitoring nearby.

The Clean Air Act network design criteria for ozone monitoring networks requires that, "within an [ozone] network, at least one [ozone] site for each MSA … must be designed to record the maximum concentration for that particular metropolitan area. More than one maximum concentration site may be necessary in some areas." 40 C.F.R. Part 58 App. D ¶ 4.1(b). While LDEQ operates an ozone monitor in Carlyss, the agency's 2023 Air Monitoring Network Plan gives that monitor's purpose as "Background,"[13] rather than the separate purpose of [s]ite[] located to determine the highest concentrations expected to occur in the area covered by the network." 40 C.F.R. Part 58 App. D ¶ 1.1.1(a).

In 2015, LDEQ deactivated an ozone monitor in Westlake,[14] despite having just permitted a substantial expansion of Sasol's Lake Charles Chemical Complex. Reported emissions of both NOx and VOCs have been increasing since that monitor was deactivated, with hundreds of tons per year of additional VOC emissions from Sasol alone in that time.[15] Federal regulations require the consideration of numerous factors in designing ozone monitoring

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[12] *See* LDEQ, 2022 Annual Monitoring Network Plan (2022).
[13] *See* LDEQ, 2023 Annual Monitoring Network Plan (2023).
[14] *See* LDEQ, 2015 Louisiana Annual Network Assessment, 4 (2015), *available at* https://deq.louisiana.gov/assets/docs/Air/Ambient_Air_Data/2015/LDEQ_2015_Annual_Network_Assessment.pdf.
[15] *Compare* Sasol Chemicals (USA) LLC – Lake Charles Chemical Complex, Emissions Inventory for 2014, https://edms.deq.louisiana.gov/app/doc/view?doc=9761916 (Apr. 29, 2015) *with* Sasol Chemicals (USA) LLC – Lake Charles Chemical Complex, Emissions Inventory for 2021, https://edms.deq.louisiana.gov/app/doc/view?doc=13297128 (Apr. 30, 2022).

networks,[16] and that the design of those networks "be re-examined in periodic network assessments."[17] LDEQ should re-examine its ozone monitoring network in Calcasieu Parish and locate an additional monitor in the area of highest concentration.

Further, because ozone causes adverse health impacts, LDEQ should also monitor for the pollutant in areas where people live, specifically in Westlake, where nearby industry emits high levels of ozone precurosrs.[18] Given that Calcasieu Parish has the highest emissions of nearly every criteria pollutant than any other parish in Louisiana (except for PM_{10}), the Westlake monitoring system must also monitor for ozone to best protect human health within an adequate margin of safety.[19]

b. Public health requires enhanced NO_2 air quality monitoring in Lake Charles MSA and surrounding communities, like Mossville.

The highly industrialized nature of Lake Charles MSA, and Mossville in particular, are overburdened by high levels of harmful nitrogen dioxide ("NO_2"). NO_2 is part of a group of highly reactive nitrogen oxides, which can cause or worsen respiratory diseases like asthma, reduce lung function, and increase inflammation in airways.[20] Studies have also shown that exposure to NO_2 can lower chances of survival for cancer patients, and may cause cardiovascular harm, lower birth weight in newborns, and increased risk of premature death.[21] Nitrogen oxides are also precursors for ground-level ozone and smog.[22] NO_2 reacts with sunlight and VOCs in the atmosphere to create photochemical smog, a harmful type of smog (of which ozone is a constituent).[23] Elevated risks of death and respiratory illness have been observed in areas with high concentrations of photochemical smog.[24] Given the harmful nature of NO_2, it is imperative that LDEQ carefully evaluate the optimal NO_2 monitor locations to capture the highest measured

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[16] For example, in locating a site to measure the highest concentration areas, the agency must use emissions inventory data and meteorological data to determine where the area of highest ozone concentrations is likely to be. *See* 40 C.F.R. Part 58 App. D ¶ 4.1(e)-(f).
[17] *Id.* at 4.1(b).
[18] *See* Yuxiu Zhang et al., *Distribution Characteristics of Volatile Organic Compounds and Contribution to Ozone Formation in a Coking Wastewater Treatment Plant*, 17 Int'l J. Env't Pub. Health 553, 553 (2020) ("Volatile organic compounds (VOCs) are main precursors of ozone formation . . . .").
[19] *See* LDEQ, https://business.deq.louisiana.gov/Eric/EricReports/ParishReport (last visited Apr. 11, 2023) (reporting 2021 reported emissions in Louisiana). Calcasieu Parish 2021 emissions include: PM2.5 (2,196 tons), NOx (16,380 tons), SO2 (19,148 tons), PM10 (2,834 tons).
[20] See American Lung Association, Nitrogen Dioxide (last visited Apr. 11, 2023), https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/nitrogen-dioxide.
[21] *Id.*
[22] Edgar R. Stephens et al., *Reactions of Nitrogen Dioxide and Organic Compounds in Air*, 48 Industrial & Engineering Chemistry 1498, 1498 (1956).
[23] Bina Rani et al., *Photochemical Smog Pollution and its Mitigation Measures*, 2 J. Advanced Sci. Rsch. 28, 28-9 (2011).
[24] *Id.* at 29.

concentrations and inform and protect communities overburdened with NO_2 emissions. LDEQ's proposed 2023 monitoring plan is insufficient to meet the monitoring needs of communities disproportionately exposed to NO_2.

LDEQ's 2023 monitoring plan includes the bare minimum number of monitors in the Lake Charles area despite federal regulations demonstrating an expectation that more than the minimum number of monitors will be required to achieve monitoring network objectives. 40 C.F.R. § Pt. 58, App. D § 1.1.2 ("The total number of monitoring sites that will serve the variety of data needs will be substantially higher than these minimum requirements provide."). However, LDEQ only operates four monitors in the entire Southwest Louisiana region. And only one of those — the Westlake monitor — measures NO_2. As explained below, solely monitoring NO_2 at Westlake location does not support the mandatory objective of assuring compliance with the NAAQS, because it is not in the area where the highest concentrations of NO_2 are expected.

The current NO_2 monitor is not placed in the locations and manner that captures the peak predicted NO_2 concentrations, as required by EPA regulations. 40 C.F.R. Pt. 58, App. D. ¶ 1.1. The regulation necessitates that LDEQ place monitors in locations that will capture the peak pollution concentrations caused by a particular source. *Id.* LDEQ failed to place monitors in locations with the highest predicted concentration of NO_2 pollution.[25] Figure 3 demonstrates that LDEQ's NO_2 monitor placement for the Lake Charles area does not capture peak predicted impacts in the area.[26]

Additionally, LDEQ fails to consider environmental justice in its monitoring of NO_2. Communities like Mossville, which are severely overburdened by harmful pollutants like NO_2, should have access to adequate and reliable data regarding NO_2 emissions. The EPA stressed that placement of air monitors, particularly NO_2 monitors, should include "a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations." 40 C.F.R. Pt. 58, App. D. ¶ 4.3.4(a). Further, additional monitors may be necessary "where an area has the potential to have concentrations that may violate or contribute to the violation of the NAAQS . . . or in locations with susceptible and vulnerable populations, which are not monitored under the minimum monitoring provisions described above." 40 C.F.R. Pt. 58, App. D. ¶ 4.4.3. In sum, LDEQ must place NO_2 monitors in areas where the highest concentrations of NO_2 are expected, *and* ensure monitors capture NO_2 data in environmental justice communities overburdened by NO_2 pollution.

LDEQ must update its NO_2 monitoring data on its data reporting website because the website refers to NO_2 emissions in parts per million, as opposed to parts per billion. Even if LDEQ reports the correct data to EPA, the public should have access to data that are reliable and easy to understand. Not only do incorrect data make LDEQ seem unreliable, but incorrect publishing of data also fails to accomplish LDEQ's monitoring objective, "(a) Provide air pollution data to the general public in a timely manner . . . ." 40 C.F.R. Part 58 App. D ¶ 1.1. While LDEQ may be meeting its statutory requirements regarding monitoring, it should also

[25] *See* Figure 3. Figure excerpted from Klafka Commonwealth Report at 8, Fig. 3 (Ex. A).
[26] *Id.*

work to achieve its monitoring objectives. Currently, LDEQ fails to achieve its objectives. LDEQ must correct its NO_2 monitoring data that are posted online in addition to placing NO_2 monitors in areas overburdened by NO_2 pollution and addressing environmental justice concerns related to NO_2 emissions and monitoring.

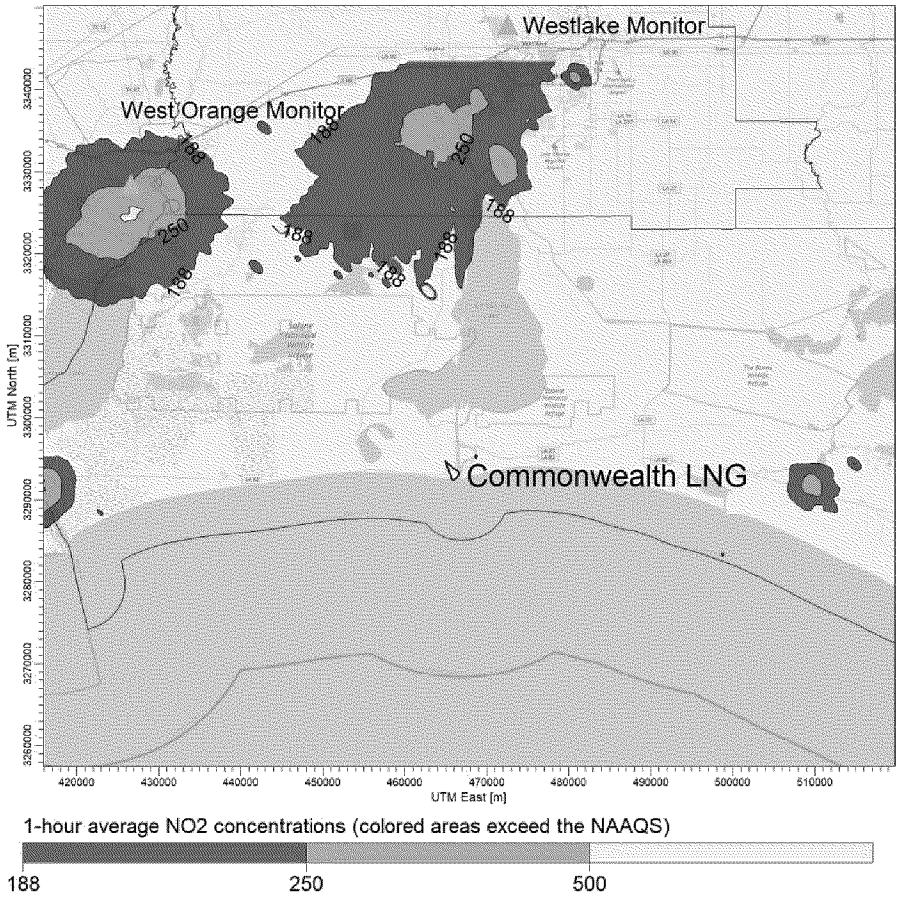

Figure 2. Modeled Exceedances of 1-hour NO_2 NAAQS in the Lake Charles area. It shows the areas with the highest concentrations of NO_2 and the monitors, which are well outside the areas with the highest NO_2 emissions.

c. *LDEQ must maintain adequate $PM_{2.5}$ monitoring in the Lake Charles MSA to comply with EPA's new $PM_{2.5}$ primary annual standard, should it be enacted.*

Given that the EPA will likely enact a new primary annual $PM_{2.5}$ standard between 8.0 and 11.0 $\mu g/m^3$, LDEQ must increase $PM_{2.5}$ monitoring in the Lake Charles MSA to ensure its compliance with the new primary annual NAAQS. Since 2012, the Westlake Monitoring site near Mossville has consistently recorded annual mean $PM_{2.5}$ concentrations at or above 9.0 $\mu g/m^3$.[27] Since 2014, when LDEQ permitted Sasol to expand its facilities, the annual average concentrations of $PM_{2.5}$ has consistently increased, regularly meeting or exceeding 10.0 $\mu g/m^3$.[28] Thus, complying with a reduction in the permitted annual $PM_{2.5}$ emissions standards will require LDEQ to increase monitoring to ensure it complies with the new annual NAAQS. Supporting this, EPA referenced modeled exceedances of the *current* standards in Calcasieu Parish that require additional monitoring to address.[29]

Table 1. Annual Mean $PM_{2.5}$ Concentrations at LDEQ's Westlake Monitoring Site in the Lake Charles MSA

Year	Westlake $PM_{2.5}$ Concentrations
2012	9.2 $\mu g/m^3$
2013	9.9 $\mu g/m^3$
2014	8.9
2015	10.6
2016	10.9
2017	11.1
2018	11.3
2019	10.8
2020	10.6*
2021	10.85
2022 (January 1, 2022, to March 31, 2022)**	10.64
2022 (April 1, 2022, to December 31, 2022)	9.98
2022 average (combining both methods)	10.14
2023 (January 1, 2023, to March 26, 2023)	9.96

*Actual values are almost certainly higher because data are missing for seventy-six days after Hurricane Laura, when there were large sources of PM2.5 nearby (fires, flaring). Moving forward, LDEQ must ensure that air quality data collection resumes immediately after a hurricane. LDEQ never explained why the Westlake monitor was non-

[27] *See* Table 1, Concentrations of $PM_{2.5}$ at the Westlake monitoring system, which is the closest monitoring system to Mossville. LDEQ, Air Monitoring Data (last visited Apr. 11, 2023), https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/AIR-MONITORING-DATA-WITH-INTERVAL-5-OR-10-MINUTES.

[28] *See id.*

[29] *See* Exhibit C, EPA Email to LDEQ Regarding 2023 Air Monitoring Plan (Apr. 12, 2023).

operational for 76 days after Hurricane Laura, long after power had been restored and the monitoring site began collecting weather data.
**The two different time periods for data collection in 2022 reflect that the Westlake monitor was upgraded in April 2022. Thus, the data from January 2022 through March 2022 came from the previous monitor, whereas from March 2022 onward, the data came from the updated Westlake monitor.

Further, in the past LDEQ has not included the Westlake monitoring data on its yearly spreadsheets regarding pollutant data because the Westlake monitor was not NAAQS comparable. Because the Westlake monitor has been updated and is now NAAQS comparable, Westlake monitoring data should be included in LDEQ's yearly spreadsheets.

d. LDEQ should improve transparency regarding VOC monitoring data in Calcasieu Parish, including publicly comparing results to Louisiana Ambient Air Standards and speciating out ethylene oxide from its Westlake VOC monitor.

Finally, although the Westlake location monitors for some VOCs, LDEQ does not provide data from that monitor in a manner easily accessible and understandable to the public. LDEQ's website does not provide annual average concentrations for the Toxic Air Pollutants (TAPs) that it monitors. Nor does LDEQ compare these values to the Louisiana Ambient Air Standards anywhere online. And, importantly, the TAP monitoring data are reported in parts per billion (ppb), whereas ambient air standards are reported in $\mu g/m^3$. While LDEQ meets the federal requirements for monitoring, it does not achieve one of its objectives under 40 C.F.R. Part 58 App. D ¶ 1.1, namely, that it should provide the public with air pollution data. It is not enough for LDEQ to simply report collected data to EPA; it must make data available to the public because communities deserve to see reliable data recorded in the areas that they live. Lastly, ethylene oxide is a VOC that poses significant health concerns. Currently, the VOC monitor in Westlake does not record data regarding ethylene oxide. Accordingly, LDEQ must (1) provide on its website user-friendly statistics for each criteria pollutant (e.g., annual average) that are compared against the Ambient Air Standards, (2) provide detailed pollution data in the same units as the Ambient Air Standards, and (3) speciate ethylene oxide data from the Westlake VOC monitor.

Sources near Mossville emit hundreds of thousands of pounds per year of toxic VOCs, including ethylene oxide,[30] known human carcinogen.[31] Despite the increased publicity around Mossville and ethylene oxide pollution, the EPA's most recent Risk Screening Environmental Indicators (RSEI) microdata revealed that the air in Mossville remains more toxic than nearly anywhere else in the nation. These high toxicity values are centered on Sasol's Lake Charles Chemical Complex (Fig. 2), which dismantled the historic community of Mossville through what amounted to forced displacement of lifelong residents, to allow a massive expansion of this

[30] *See, e.g.*, https://edms.deq.louisiana.gov/app/doc/view?doc=13297128 (showing that in 2021, Sasol's Lake Charles Chemical Complex emitted over 246 lbs. of toxic VOCs).
[31] *See* Wen-Tien Tsai, *A Survey on Toxic Volatile Organic Compounds (VOCs): Toxicological Profiles, Health Exposure Risks, and Regulatory Strategies for Mitigating Emissions from Stationary Sources in Taiwan*, 14 Atmosphere 242, 242 (2023).

facility in 2014.[32] The remaining residents of Mossville face extreme pollution-related health risks yet have limited information about their neighborhood's air quality because LDEQ does not operate air monitors in Mossville proper. Fine scale air monitoring data are essential for communities like Mossville where massive industrial sources operate in extreme proximity to residences because research has proven that levels of air pollutants can vary by up to eight times within one city block.[33] The census block groups that represent Mossville are in the 99.6th percentile or higher for toxicity concentration, out of more than 200,00 census block groups across the United States.[34]

Figure 3. Satellite imagery from Google Earth Pro, illustrating industrialization and destruction of Mossville from 2013to 2018. Yellow lines indicate the approximate boundaries of historic Mossville.

This includes block group 220190027001 (RSEI toxicity concentration = 109,231; 99.6th percentile) and block group 220190027002 (RSEI toxicity concentration = 246,087; 99.9th percentile).[35] Both block groups are affected by 109 toxic air pollutants from industrial facilities.[36] But there is no information about the ambient concentrations of any of these 109 pollutants in Mossville.[37] Further, LDEQ does not operate a monitor specifically for ethylene oxide, the major driver of Mossville's pollution-related cancer risk, anywhere in the Lake Charles MSA. Therefore, LDEQ should operate a speciated VOCs monitor at its Westlake monitoring location to specifically identify ethylene oxide emissions near the Mossville community.

[32] *See* University Network for Human Rights, *Environmental Racism, Forced Displacement, and the Industrial Buyout of Mossville, Louisiana*, (last visited Apr. 4, 2023), https://www.humanrightsnetwork.org/mossville.
[33] *See* Joshua S. Apte et al., *High-Resolution Air Pollution Mapping with Google Street View Cars: Exploiting Big Data*, 51 Environmental Science & Technology 6999 (2017), *available at* https://pubs.acs.org/doi/full/10.1021/acs.est.7b00891.
[34] EPA 2020 Aggregated Census Block Group Microdata, (last visited May 25, 2022), http://abt-rsei.s3-website-us-east-1.amazonaws.com/?prefix=microdata2020/census_agg/.
[35] Tulane Environmental Law Clinic, Comments on 2022 Louisiana Annual Monitoring Network Plan (May 26, 2022).
[36] *Id.*
[37] *Id.*

II. LDEQ must monitor for all NAAQS-Regulated Emissions in St. James Parish to determine compliance with the NAAQS.

Commenters Myrtle Felton, Barbara Washington, Gail LeBeouf,[38] Inclusive Louisiana, and Louisiana Bucket Brigade (collectively, "St. James Community Members") have major concerns about air pollution and the lack of air monitoring in St. James Parish, Louisiana, as well as concerns over LDEQ's failure to address these issues. The LDEQ's stated objective of "provid[ing] air pollution data to the general public in a timely manner" is an impossibility in St. James Parish, which has a single ozone monitor and no other air monitoring in the entire – heavily-industrialized – parish.[39] Likewise, the LDEQ's stated objective of "provid[ing] insight into how well industrial sources are controlling their pollutant emissions" is impossible to realize without any data from "monitoring locations near major air pollution sources." Finally, the LDEQ's third stated objective of "support[ing] air pollution research studies such as health effects assessments" is a fantasy in the absence of any information to begin such studies in St. James.

St. James Parish is burdened with hotspots of air pollution that are among the most severe both in Louisiana and in the entire United States. Yet LDEQ has only one federally-mandated ambient air monitor for ozone in St. James Parish, and it does not monitor for any other criteria pollutant.[40] This is the bare minimum for the area and falls far from meeting the stated goals of the monitoring program.

Part of the area known as the Cancer Alley corridor, St. James Parish is home to a diverse population of approximately 20,000 residents,[41] and large swaths of the Parish fall within the 95th-100th national percentile for cancer risk.[42] The 2023 Plan provides an opportunity to address the disproportionate risk faced by St. James Parish residents as the result of excessive air pollution. All criteria pollutants are emitted in significant quantities in the parish, and LDEQ should revise its plan to include EPA-acceptable air monitors for all criteria pollutants, placed and operated in a manner that will allow them to be relied upon to determine NAAQS compliance, as well as to communicate information about air quality to local residents. Only ozone levels can be communicated now, which provides woefully incomplete data to the

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[38] Ms. Felton, Ms. Washington, and Ms. LeBeouf are residents of St. James Parish, Louisiana and members of the community group Inclusive Louisiana. Ms. Felton and Ms. Washington are residents of Romeville, which is adjacent to the Nucor steel facility.

[39] *See* 40 C.F.R. Part 58 App. D ¶ 1.1; see also Louisiana Annual Monitoring Network Plan, March 2, 2023, EDMS Doc. No. 13704719 p.2 (stating objectives of the program).

[40] Air Monitoring Sites, Louisiana DEQ (last accessed Apr. 11, 2023), https://airquality.deq.louisiana.gov/.

[41] St. James Parish, Louisiana, U.S. Census Bureau, https://www.census.gov/quickfacts/table/PST045216/22093,22. Based on the 2022 data, Black residents constitute approximately 48.1 percent of the population of St. James Parish. *Id.*

[42] Information about cancer risks found on the EPA's EJScreen tool, located at https://ejscreen.epa.gov/mapper/

residents making decisions about daily activities. Only the addition of new monitors near major air pollution sources will enable LDEQ to actually fulfill its stated program goals.

St. James Parish is part of Louisiana's largest industrial corridor and home to some of the most toxic air pollution in the entire country. The area known as Cancer Alley, stretching along the Mississippi River from Baton Rouge to New Orleans, holds the second greatest number of petrochemical-producing facilities in the United States, only behind Texas, where facilities are spread across a far greater area.[43] St. James Parish is home to eleven EPA-identified Toxics Release Inventory Facilities ("TRI Facilities").[44] In addition to TRI reported emissions, industrial companies in the area pump a litany of hazardous chemical compounds and particulate matter into the air on a daily basis.

In the past few years, St. James residents have made national news for their experience living in Cancer Alley under such toxic conditions.[45] The United Nations has identified Cancer Alley as an area of particular environmental justice concern for the disproportionate and significant risk of cancer and other negative health impacts affecting the majority Black residents.[46] A recent study published in the peer-reviewed *Environmental Research Letters* shows air pollution to have a strong correlative effect on cancer rates in Louisiana.[47] The authors of the study suggest that the connection between air toxicity and cancer incidence could explain the disproportionate occurrence of cancer in Black Louisianans living in industry-heavy parishes.[48]

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[43] *Inside Louisiana's horrifying 'Cancer Alley,' an 85-mile stretch of pollution and environmental racism that's now dealing with some of the highest coronavirus death rates in the country*, Business Insider (Apr. 9, 2020), https://www.businessinsider.com/louisiana-cancer-alley-photos-oil-refineries-chemicals-pollution-2019-11#in-total-about-150-facilities-line-the-alley-its-the-second-biggest-producer-of-petrochemicals-in-the-country-after-texas-but-the-key-difference-is-that-texas-industry-is-spread-out-over-hundreds-of-miles-5.

[44] 2021 TRI Factsheet: County – St. James Parish, LA, EPA, https://enviro.epa.gov/triexplorer/tri_factsheet.factsheet?pzip=&pstate=LA&pcity=&pcounty=St.%20James%20Parish&pyear=2021&pParent=TRI&pDataSet=TRIQ1

[45] *See e.g.,* Ava Kofman, The EPA Administrator Visited Cancer-Causing Air Pollution Hot Spots Highlighted by ProPublica and Promised Reforms, ProPublica (Nov. 24, 2021), https://www.propublica.org/article/the-epa-administrator-visited-cancer-causing-air-pollution-hot-spots-highlighted-by-propublica-and-promised-reforms; Antonia Juhasz, Louisiana's 'Cancer Alley' Is Getting Even More Toxic–But Residents Are Fighting Back, Rolling Stone (Oct. 30, 2019), https://www.rollingstone.com/politics/politics-features/louisiana-cancer-alley-getting-more-toxic-905534/.

[46] *USA: Environmental racism in "Cancer Alley" must end – experts*, U.N. Human Rights Office of the High Commissioner (Mar. 2, 2021), https://www.ohchr.org/en/press-releases/2021/03/usa-environmental-racism-cancer-alley-must-end-experts.

[47] Kimberly A. Terrell and Gianna St. Julien, *Air pollution linked to higher cancer rates among black or impoverished communities in Louisiana*, 17 Environmental Research Letters 1 (Jan. 13, 2022), *available at* https://iopscience.iop.org/article/10.1088/1748-9326/ac4360/pdf.

[48] *Id.*

On behalf of the St. James Community Members, we respectfully request that LDEQ amend the 2023 Plan to include reliable monitors for SO_2, PM_{10}, $PM_{2.5}$, CO, and NOx in St. James Parish, Louisiana. Increased monitoring is essential to the health, wellbeing, and economic viability of the St. James Parish community.

a. St. James Parish's history of industrial emissions

St. James Parish was one of the original nineteen parishes of Louisiana.[49] The parish covers banks on either side of the Mississippi River.[50] Part of Cancer Alley and home to a litany of industrial companies, St. James Parish has been identified as an area of particular environmental justice concern. Based on EPA data, it is clear that St. James Parish residents disproportionately suffer the negative consequences of industrial emissions in excess of permitted limits.

EPA United States Environmental Protection Agency

EJScreen Report (Version 2.11)

County: St. James Parish, LOUISIANA, EPA Region 6

Approximate Population: 21,142

Input Area (sq. miles): 252.83

Selected Variables	Value	State Avg.	%ile in State	USA Avg.	%ile in USA
Pollution and Sources					
Particulate Matter 2.5 ($\mu g/m^3$)	9.2	9.2	54	8.67	68
Ozone (ppb)	35.1	37	10	42.5	11
Diesel Particulate Matter* ($\mu g/m^3$)	0.351	0.297	69	0.294	70-80th
Air Toxics Cancer Risk* (lifetime risk per million)	64	40	96	28	95-100th
Air Toxics Respiratory HI*	0.45	0.45	77	0.36	80-90th
Traffic Proximity (daily traffic count/distance to road)	20	640	16	760	14
Lead Paint (% Pre-1960 Housing)	0.17	0.2	56	0.27	44
Superfund Proximity (site count/km distance)	0.02	0.076	29	0.13	18
RMP Facility Proximity (facility count/km distance)	0.4	0.96	50	0.77	54
Hazardous Waste Proximity (facility count/km distance)	0.32	1.4	40	2.2	38
Underground Storage Tanks (count/km^2)	0.83	2.2	48	3.9	45
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.0042	0.37	61	12	62

Figure 4. EJ Screen Report showing the population percentile for St James Parish for risk factors as compared to the state of Louisiana, the EPA Region 6, and the country. Data for EJ Screen are provided by the United States EPA.

[49] Parish History, St. James Parish, Louisiana (accessed 4/11/2023), https://stjamesla.com/240/Parish-History.
[50] *Id.*

As shown in Figure 4, St. James Parish falls entirely within the 95-100th national percentile for cancer risk due to air toxicity.[51] Industrial companies in Cancer Alley, and notably St. James Parish, have established a pattern of emitting toxic or otherwise hazardous chemicals, resulting in increased air toxicity, which has been identified by EPA as contributing to increased health risks. The presence of toxic or otherwise hazardous chemicals undoubtably has an impact on the ambient air quality, and therefore it is crucial that LDEQ implement greater monitoring throughout the state, namely in St. James Parish.

Currently, there is only one ambient air monitor in St. James Parish. Located in Convent, St. James Parish's sole monitor measures only ozone through U.V. absorption and is part of the federally-mandated SLAMS network.[52] The proposed Plan does not propose to change this: a single air monitor, measuring only ozone, for this entire, heavily-industrialized parish. This is insufficient, as industrial facilities located in St. James Parish emit large quantities of toxic chemicals for which monitoring is necessary, including SO_2, PM_{10}, $PM_{2.5}$, CO, and NO_x.[53] Because there are no monitors for any of these toxic chemicals, there is no way to determine their current levels and thus there is insufficient data to determine the ambient air quality.

Sulfur Dioxide (SO_2)

Sulfur dioxide (SO_2) has been identified by the World Health Organization ("WHO") as a key pollutant contributing to the toxification and consequential carcinogenic qualities of outdoor ambient air.[54] Under 40 C.F.R. § 50.17, regarding the national ambient air quality standards for sulfur oxides, SO_2 levels are determined by hourly measurements.[55] The primary ambient air standards for SO_2, against which current levels are to be compared, are determined using 24-hour averages.[56] Thus, without proper ambient air monitoring, it is impossible both to set an appropriate primary standard for SO_2, and to properly determine whether a facility is within that designated standard.

While LDEQ has recently focused its attention on reducing SO_2 pollution in St. Bernard Parish (with a 68% White population),[57] the agency does not even operate an SO_2 monitor in St. James Parish, where far more SO_2 is emitted, and these emitters are located adjacent to predominantly Black communities.[58] Comparison of emissions and monitoring sites across

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[51] EJ Screen Report generated for St. James Parish using the EJScreen tool available at: https://ejscreen.epa.gov/mapper/ejscreen_SOE.aspx (generated on 4/11/2023).
[52] *See* Louisiana Annual Monitoring Action Plan, p.17
[53] *See* LDEQ ERIC Annual Certified Emissions. Updated 3/22/2023. Accessed 4/11/2023.
[54] Ambient (outdoor) air pollution, WHO (Dec. 19, 2022), https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health.
[55] 40 C.F.R. § 50.17.
[56] 40 C.F.R. § 50.4.
[57] U.S. Census Bureau Quickfacts. Accessed 4/11/2023 via https://www.census.gov/quickfacts/stbernardparishlouisiana.
[58] See population data in St. James Parish EJScreen report, available at https://ejscreen.epa.gov/mapper/ejscreen_SOE.aspx

southeastern Louisiana (i.e. LDEQ's Capitol and Southeast monitoring regions) reveals that St. James is an obvious gap in LDEQ's SO_2 monitoring network (Figure 5). St. James Parish has two massive SO_2 emitters: the Gramercy Coke Plant (AI 32804; 4,157 tons in 2021) and Mosaic Uncle Sam (AI 2532; 1,249 tons in 2021).[59] Just these two facilities emit an amount of SO_2 that is greater than the *total reported SO_2 emissions for St. Bernard Parish*,[60] which LDEQ declared non-attainment for SO_2 in 2022. This disparity leaves residents of St. James wondering how their parish can possibly be in attainment for SO_2 when a single facility (Gramercy Coke Plant) emits more than double the emissions of an entire non-attainment parish. LDEQ's stated air monitoring program goals should require that LDEQ operate SO_2 monitors in Gramercy and Romeville and that these monitors be located to reliably detect emissions from Gramercy Coke Plant and Mosaic Uncle Sam.

[59] Based on the most recent year of complete data available (2021) from the LDEQ ERIC Annual Certified Emissions; updated 3/22/2023. Accessed 4/11/2023.
[60] St. Bernard Parish emissions were 2,080 tons in 2021, the most recent year of complete data available from LDEQ's ERIC emissions by parish search tool. St. James Parish SO2 emissions for the same year were 5,461 tons. Accessed 4/11/2023.

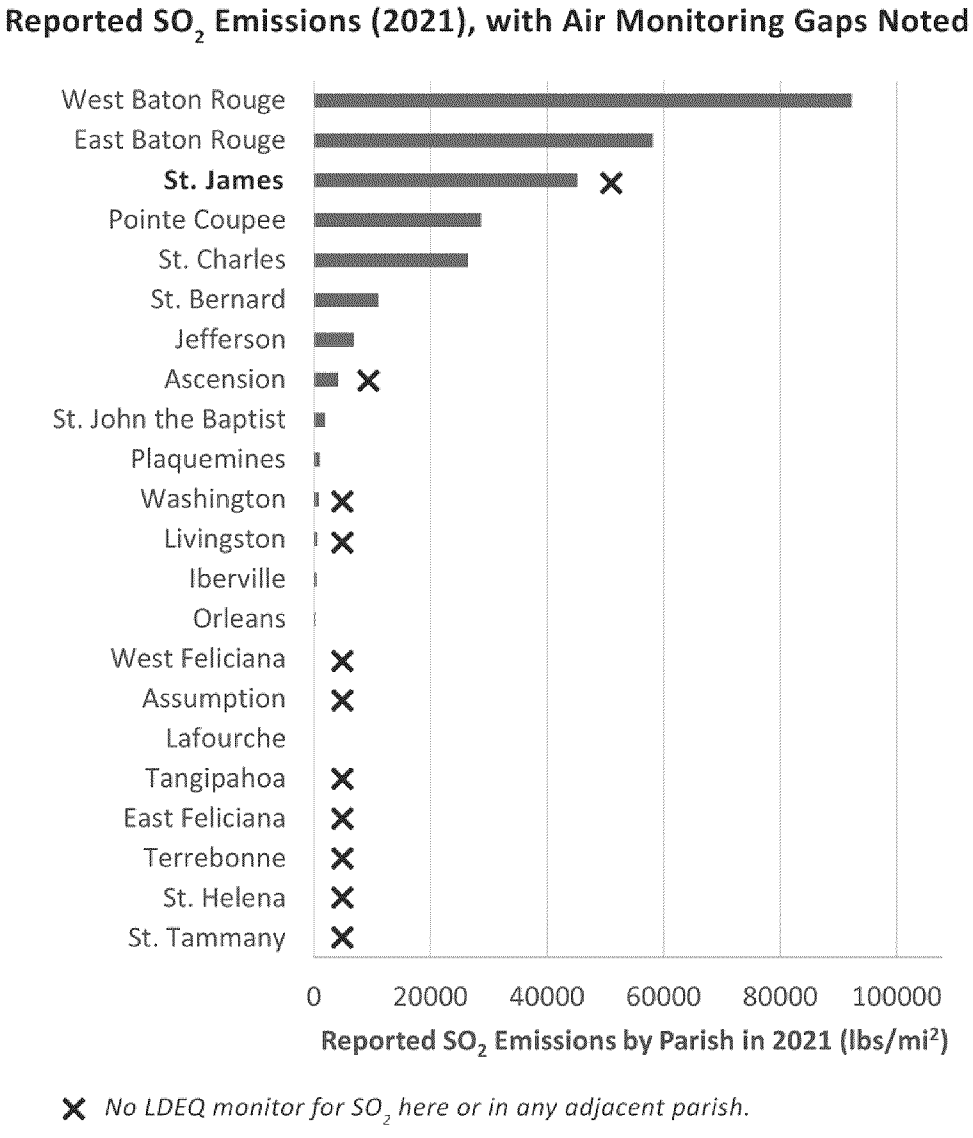

Figure 5. Total reported SO_2 emissions among parishes in southeastern Louisiana (i.e. Capitol and Southeast monitoring regions), based on the most recent year of complete data available from LDEQ's ERIC parish-level emissions inventory (accessed 4/11/2023). A red "×" denotes a parish where there is no SO_2 monitor present *and* no SO_2 monitor in any adjacent parish, based on LDEQ's proposed 2022 Air Monitoring Network Plan.

Fine Particulate Matter ($PM_{2.5}$ and PM_{10})

Like SO_2, particulate matter, both PM_{10} and $PM_{2.5}$ have been identified by WHO as critical and cancer-causing ambient air pollutants.[61] Both PM_{10} and $PM_{2.5}$ are easily inhaled and

[61] Ambient (outdoor) air pollution, WHO (Sept. 22, 2021), https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health.

can make their way into human lungs, where they contribute to major health problems.[62] One of the primary sources of PM_{10} and $PM_{2.5}$ are smokestacks from industrial and power plants.[63]

The importance of particulate matter pollution – and the lack of any monitoring within the parish – has been noticed by the EPA, which submitted comments to LDEQ stating in part, "For the Romeville area of St. James Parish, based on community concerns and recent community monitoring data showing potential exceedances of the PM_{10} standards, we recommend new PM_{10} monitoring to the west/northwest of the Romeville area, where there may be both industrial operations and vessel loading operations on the Mississippi River."[64] Further, the EPA "strongly encourage[d] LDEQ to continue evaluating siting options and potential options for installation of additional PM_{10} and $PM_{2.5}$ monitoring in . . . . St. James Parish."[65] The community members and organizations submitting these comments reiterate these concerns and suggestions.

Moreover, when scientists unaffiliated with LDEQ or EPA installed PM_{10} monitors in St. James, Parish, they immediately detected what the modeling suggested; *i.e.,* that the area's PM_{10} concentrations exceeded the NAAQS. In a letter detailing their monitoring and results sent to the EPA Region 6 Administrator, the scientists noted:

> Our monitoring detected levels of PM_{10} in Romeville, St. James Parish that exceeded a 24-hour concentration of 150 $\mu g\ m^{-3}$ on 4 days in the first 6 months of 2022. Specifically, on March 17, March 27, May 4, and May 11, 2022 the 24-hour averaged Quant-AQ measured PM_{10} concentrations were 164 $\mu g\ m^{-3}$, 213 $\mu g\ m^{-3}$, 167 $\mu g\ m^{-3}$, and 325 $\mu g\ m^{-3}$ respectively. Under the NAAQS, PM_{10} concentrations of 150 $\mu g\ m^{-3}$ are "not to be exceeded more than once per year on average over 3 years." With 4 likely exceedances of 150 $\mu g\ m^{-3}$ in the first 6 months of 2022, the data already suggest a violation of the PM_{10} NAAQS. Clearly, PM_{10} concentrations are a significant potential health issue for residents of St. James Parish and should be examined by regulatory agencies in more detail with daily, continuous FEM or FRM monitoring for the minimum duration necessary to reliably determine NAAQS compliance, given the frequency of exceedances observed with Quant-AQ sensors.[66]

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[62] Particulate Matter (PM) Basics, EPA, https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#:~:text=PM%20stands%20for%20particulate%20matter,seen%20with%20the%20naked%20eye.
[63] *Id.*
[64] EPA Email to DEQ, April 11, 2023, EDMS Doc. No. 13758862.
[65] *Id.*
[66] Exhibit B, Letter to Dr. Earthea Nance from Dr. Kim Terrell and Dr. DeCarlo, Nov. 14., 2022. *See also* Exhibit C, EPA Email to LDEQ regarding 2023 Air Monitoring Network Plan (Apr. 12, 2023).

As the EPA and these scientists have stated – and as the community members and organizations reiterate – the air around Romeville in St. James Parish is not adequately monitoring for PM_{10} or $PM_{2.5}$.

While LDEQ operates a relatively large number of $PM_{2.5}$ monitors compared to other pollutants, these monitors are not strategically located and fail to protect the communities that are burdened with the highest $PM_{2.5}$ emissions. This is particularly true in St. James Parish, which, along with neighboring St. John Parish, represents the largest and most obvious gap in $PM_{2.5}$ monitoring in southeastern Louisiana (Figure 6). Gramercy and Romeville are two communities in St. James where NAAQS-comparable $PM_{2.5}$ monitoring is urgently needed. There are two large industrial facilities within 1 mile of Gramercy that reported emitting over 100 tons of $PM_{2.5}$ in 2021: the Gramercy Coke Plant (AI 32804; 138 tons) and Louisiana Sugar Refining (AI 165286; 112 tons). Romeville is another high-priority site for $PM_{2.5}$ monitoring, given the large emissions of SO_2 (a major precursor of secondary $PM_{2.5}$[67]) and its proximity to Mosaic Faustina (AI 2425; 98 tons of $PM_{2.5}$ in 2021).

[67] See https://www.epa.gov/so2-pollution/sulfur-dioxide-basics and https://www.epa.gov/sites/default/files/2016-07/documents/fact-sheet-final-pm25-impl-rule.pdf.

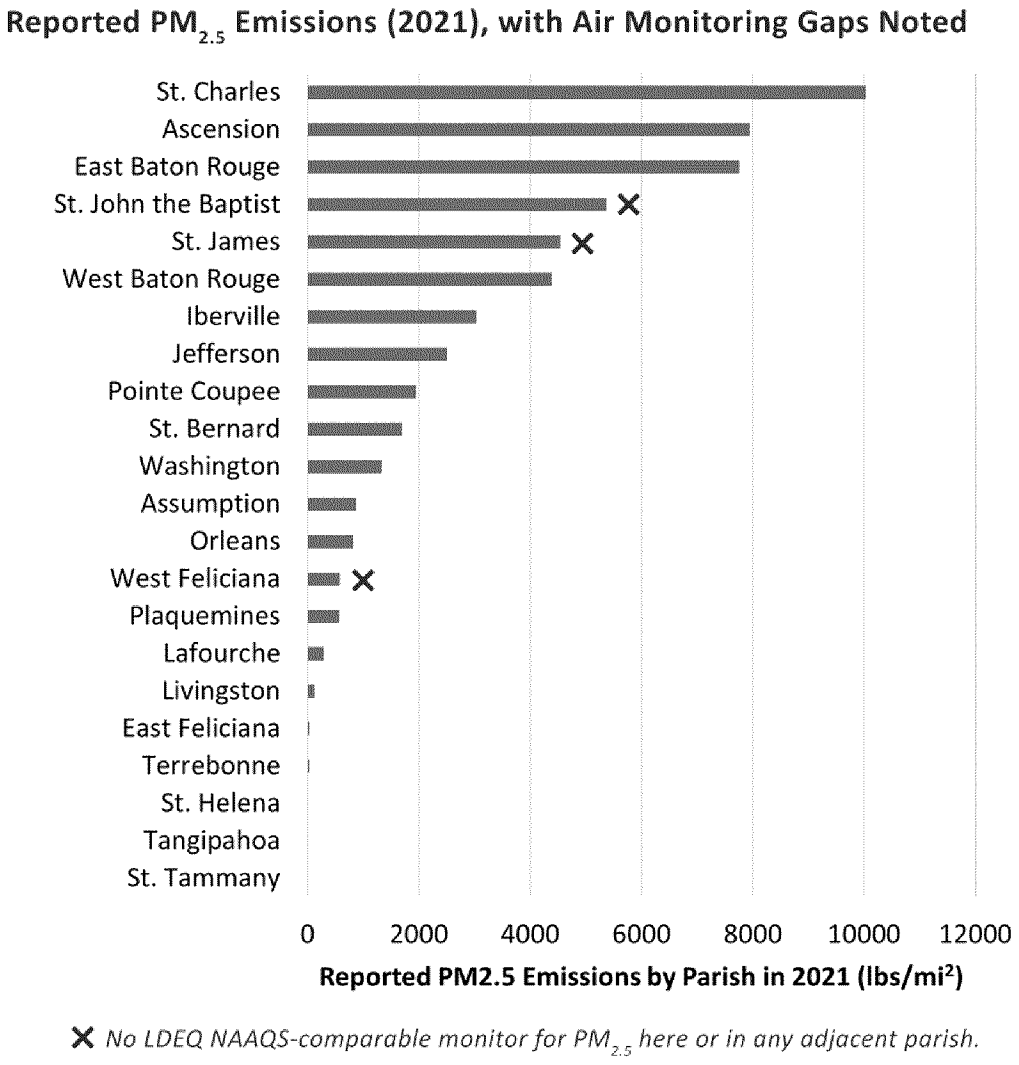

Figure 6. Total reported $PM_{2.5}$ emissions among parishes in southeastern Louisiana (i.e., Capitol and Southeast monitoring regions), based on the most recent year of complete data available from LDEQ's ERIC parish-level emissions inventory (accessed 4/11/2023). A red "×" denotes a parish where there is no $PM_{2.5}$ monitor present *and* no NAAQS-comparable $PM_{2.5}$ monitor in any adjacent parish, based on LDEQ's proposed 2023 Air Monitoring Network Plan.

Nitrogen Oxides (NO_x)

NO_x is a grouping of nitrogen oxides, including nitrogen dioxide, nitrous acid, and nitric acid.[68] NO_2 is often used as an indicator for other nitrous oxides.[69] NO_2 is particularly harmful for the respiratory system, and can contribute to asthma and respiratory infections.[70] NOx is emitted by multiple St. James Parish facilities, most notably Atalco (formerly Noranda) Alumina, but it is not monitored anywhere in the parish.[71]

Crucially, both NO_x and NO_2 react with other chemicals once emitted to create particulate matter and ozone.[72] Thus, not only is particulate matter emitted directly by industrial plants across Louisiana but is likely being formed by the industrial release of NO_x as well; a further argument for directly monitoring all NAAQS rather than calculating emissions based on permitted or reported emissions.

Also, Nucor Steel, in St. James Parish, provided modeling in support of its 2019 air permit that actually showed a violation of the NAAQS for NOx. The 1-hour NOx standard is 189 micrograms per cubic meter; the modeled ambient NOx in 2018 around the Romeville plant was 1,263 micrograms per cubic meter.[73] It is plain from modeling that NOx emissions in St. James are excessive and contributing to poor air quality, and LDEQ cannot fulfill its duties to the public nor meet its stated goals for the air monitoring program while continuing to avoid monitoring more than ozone in St. James.

Carbon Monoxide (CO)

Carbon Monoxide (CO) is a harmful chemical that is released in the industrial burning process, and which is deadly in high concentrations.[74] Although high concentrations of this magnitude are typically seen indoors, heightened outdoor concentrations can exacerbate heart

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[68] Basic Information about NO2, EPA, https://www.epa.gov/no2-pollution/basic-information-about-no2.
[69] *Id.*
[70] *Id.*
[71] Atalco released 428.49 tons of NOx in 2022. *See* Atalco, 2022 2nd Semiannual NOx Emissions Report, AI No. 1388; EDMS Doc. No. 13753268. The Shell Convent Complex, currently shuttered, has applied for a new air permit to conduct new operations that would entail 1,022 tons per year of NOx emissions. *See* Equilon Enterprises, Shell Convent Complex, Title V Permit Modification Application, https://edms.deq.louisiana.gov/app/doc/view?doc=13448846.
[72] Basic Information about NO2, EPA, https://www.epa.gov/no2-pollution/basic-information-about-no2.
[73] Nucor Permit V6 (2019), https://edms.deq.louisiana.gov/app/doc/view?doc=11715097.
[74] Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution, EPA, https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#:~:text=Breathing%20air%20with%20a%20high,%2C%20confusion%2C%20unconsciousness%20and%20death.

disease by reducing the amount of oxygen available to the lungs.[75] Similarly to the other harmful pollutants listed in this comment, CO is a NAAQS criteria pollutant, only to be emitted in minute quantities every year.[76] Because CO is emitted regularly through the process of industrial burning in facilities across St. James Parish and Cancer Alley, it is crucial to the communities in our state that LDEQ implement ambient air monitoring of CO.

b. St. James Parish should be considered independently in the calculations of its weighted emissions.

In its Plan, LDEQ considers St. James Parish as within the New Orleans/Metairie/Kenner area for the purposes of a population weighted index for SO_2, despite being geographically separate from and having considerably more industry Orleans Parish.[77] In 2021, the EPA identified eleven facilities in St. James Parish as Toxics Release Inventory Facilities ("TRI Facilities"), releasing an estimated of 2.3 million pounds of toxic chemical pollutants.[78] In contrast, Orleans Parish has only two TRI Facilities and generates an estimated 5.2 thousand pounds of pollutants.[79] It is therefore unreasonable to not consider St. James Parish as independent and apart from the greater New Orleans area for monitoring purposes. If, for example, St. James Parish's SO_2 emissions were weighed against the population of only St. James Parish, it is reasonable to assume that, given the density of industrial facilities and smaller population, the weighted index for SO_2 would be considerably higher than that calculated for the combined emissions and populations of St. James Parish and the Greater New Orleans area.

c. LDEQ's reliance on mobile monitoring data undermines its refusal to install additional monitors to meet its stated goals.

LDEQ has two Mobile Air Monitoring Laboratories (MAMLs) that, when convenient for its purposes, are used to support permitting decisions such as those in St. James Parish. For example, in the Statement of Basis submitted by the agency as part of the proposed new Nucor air permit, LDEQ claims that because its Mobile Air Monitoring Laboratory (MAML) conducted ambient air monitoring in Romeville Park in Convent and obtained results that were below applicable NAAQS and Louisiana ambient air standards, this finding supports the proposed emissions limits set out in the permit.[80]

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[75] *Id.*
[76] NAAQS Table, EPA, https://www.epa.gov/criteria-air-pollutants/naaqs-table.
[77] *See* Louisiana Annual Monitoring Action Plan, p.25.
[78] 2021 TRI Factsheet: County – St. James Parish, LA, EPA, https://enviro.epa.gov/triexplorer/tri_factsheet.factsheet?pzip=&pstate=LA&pcity=&pcounty=St.%20James%20Parish&pyear=2021&pParent=TRI&pDataSet=TRIQ1
[79] 2021 TRI Factsheet: County – Orleans Parish, LA, EPA, https://enviro.epa.gov/triexplorer/release_fac?p_view=COFA&trilib=TRIQ1&sort=_VIEW_&sort_fmt=1&state=22&county=22071&chemical=All+chemicals&industry=ALL&year=2021&tab_rpt=1&fld=TRIID&fld=NUMFR&fld=NUMFA&fld=RELLBY&fld=TSFDSP
[80] LDEQ, Statement of Basis at 14-15, Nucor Steel Louisiana Proposed Part 70 Operating Permit 3086-V10 (EDMS Doc. ID 13468402) ("Statement of Basis").

It is highly inappropriate for LDEQ to use the MAML data, collected over 5 total days, in any way as support for this permit, for several reasons, as detailed below. But more importantly, it is contrary to the stated goals of the LDEQ air monitoring program to deploy MAMLs to address short term specific "hot spots" where long term and reliable, publicly available data is necessary to fulfill the stated goals of providing public information, determining how well industrial sources are controlling their pollutant emissions and providing data sets for air pollution research studies.

First, community members around Nucor requested that LDEQ engage in meaningful ambient air monitoring that generated representative information about their typical exposure as residents of the area and which could be used to establish the ambient air quality. Instead, LDEQ collected only 5 days' worth of data and reported on only PM2.5, SO2, CO, and H2S.[81] After this extremely limited, 5-day sampling effort, LDEQ informed residents that there was no evidence of a NAAQS violation in Romeville. Yet, as LDEQ is aware, it is virtually impossible to determine a NAAQS violation from 5 days of air monitoring.

Further, LDEQ failed when using the MAML to first identify pollutants of concern based on the pending Nucor permit or the community's expressed pollutants of concern. A representative monitoring plan would have begun by identifying pollutants of concern and then collected enough data to develop representative data and have established air quality standards to use in evaluating the data collected. Finally, several pollutants of concern were conspicuously omitted from the Romeville sampling, including PM_{10}, NO_2, and ammonia. LDEQ's mobile laboratory is equipped to measure these pollutants. The absence of NO2 is of particular concern where Nucor previously modeled a NAAQS exceedance and is now seeking an increase in permitted NO2 emissions.

In short, LDEQ has MAMLs and uses them when the agency feels it needs additional monitoring support when considering proposed permit applications or responding to public concerns. LDEQ can and does exceed the bare minimum required by the federal air monitoring rules by strategically deploying the MAMLs units. It makes far more sense to actually install reliable and complete air monitoring in those areas – such as St. James – where the MAMLs are being used.

III. LDEQ Should Conduct Additional Monitoring for PM2.5 in Central Louisiana, Specifically Near the Clean Harbors Colfax Facility.

The Central Louisiana Coalition for a Clean and Healthy Environment requests that LDEQ add to its air monitoring plan additional monitoring for PM2.5 in Central Louisiana sufficient to ensure compliance with the NAAQS, particularly given the evidence from both EPA's modeling and air monitoring conducted by the LSU Superfund Research Program that

[81] LDEQ, Statement of Basis at 14-15, Nucor Steel Louisiana Proposed Part 70 Operating Permit 3086-V10 (EDMS Doc. ID 13468402) ("Statement of Basis").

shows elevated concentrations of PM2.5 in Grant Parish, and specifically in the vicinity of the Clean Harbors Colfax open burn/open detonation facility.

Currently, the **only** air monitoring conducted by LDEQ in Central Louisiana is a PM2.5 monitor south of Alexandria, designated as a "Background" monitor.[82] This monitor does not appear on LDEQ's interactive online map, and continuous monitoring data from it does not appear to be available online. LDEQ conducts no other monitoring, despite the presence of an environmental justice community in Grant Parish near the Clean Harbors facility.[83]

In its own "Environmental Justice" analysis in support of the recent proposed RCRA and Clean Air Act permits for the Clean Harbors Colfax facility, LDEQ states that EPA's EJScreen tool gives an estimated annual average PM2.5 concentration of 9.44 $\mu g/m^3$.[84] In March 2022, the LSU Superfund Research Program (SRP) began conducting air monitoring of the area surrounding the Clean Harbors Colfax sites and presented preliminary findings of that monitoring at the public hearing on this draft permit on December 15, 2022. The LSU SRP deployed two high volume monitors for weekly samples of particulate matter (PM) with a 50% cutpoint of 2.5 μm ($PM_{2.5}$), fine particles that are small enough to reach the lung. Passive samplers for fine and total PM were deployed at 10 sites over three months. Additionally, $PM_{2.5}$ was measured on a 2-minute frequency with low-cost sensors at 10 sites. The low-cost sensor concentration data were calibrated to the concentrations measured by the high volume samplers. Samplers were deployed in The Rock community directly south of Clean Harbors as well as in points west, northwest, and south, including in the Town of Colfax and a reference location 9 miles south of the facility.

These findings included observations of elevated $PM_{2.5}$ concentrations:

- Monthly average levels of $PM_{2.5}$ measured with the high volume samplers increased when there was an increase in emissions calculated from the OB/OD facility's activity records ("burn logs") provide by the facility to the LDEQ for days when complaints were filed by Colfax residents.[85] Because the facility only provides burn logs when requested by LDEQ following complaints, the available logs are only a partial record of the facility's operations.

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[82] LDEQ, 2023 Louisiana Air Monitoring Plan

[83] *See* Comments on Behalf of Brenda Redmond, the Central Louisiana Coalition for a Clean and Healthy Environment, and Louisiana Environmental Action Network on the Clean Harbors Colfax Draft RCRA Permit Renewal, at 15-17 (Jan. 13, 2023), https://edms.deq.louisiana.gov/app/doc/view?doc=13656400.

[84] *See* LDEQ, Air Permit Briefing Sheet – Clean Harbors Colfax, LCC, p. 25, *available at* https://edms.deq.louisiana.gov/app/doc/view?doc=13716091.

[85] Jennifer Richmond-Bryant, et al., Louisiana State University Superfund Research Program Data Collection from Colfax, LA, December 15, 2022, p. 18. A copy of this report was provided to LDEQ during the public comment period on the Clean Harbors Colfax RCRA hazardous waste permit, and is available at https://edms.deq.louisiana.gov/app/doc/view?doc=13656400.

- Weekly average $PM_{2.5}$ concentrations measured with the high volume samplers exceeded the level of the National Ambient Air Quality (NAAQS) annual standard for $PM_{2.5}$ on numerous occasions.[86]
- On more than 600 occasions, $PM_{2.5}$ concentrations measured with the low-cost samplers were at such a level that all people should avoid extended time outdoors, and on at least 24 occasions, $PM_{2.5}$ concentrations constituted emergency conditions.[87]
- Concentrations of $PM_{2.5}$ measured by the low-cost sensors were above levels considered safe for any individual in more than half of samples.[88]

As LDEQ is no doubt aware, EPA has recently proposed that the primary annual NAAQS for PM2.5 be lowered to 9.0 $\mu g/m^3$ – which would suggest that Central Louisiana may face attainment issues in the near future. In order to meet the objectives of a state air monitoring network for criteria pollutants, LDEQ must conduct additional monitoring sufficient to determine compliance with the NAAQS in a location in Central Louisiana where it would expect maximum concentrations of PM2.5**.**

I. Conclusion

LDEQ's air monitoring obligations extend beyond the provisions of 40 C.F.R. Part 58 and include the obligation to achieve environmental justice and, as public trustee, to avoid environmental harm to the maximum extent possible.[89] LDEQ must address how its monitoring program meets that obligation with respect to Mossville and the environmental justice communities of St. James and Grant Parishes. LDEQ must also address its federal regulatory obligation to "support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma) . . . ." 40 C.F.R. § 58.10(d)." Robust monitoring for environmental justice communities is essential to comply with these duties. The proposed air monitoring Plan fails to achieve that duty by allowing inadequate monitoring coverage throughout Mossville, St. James Parish, and Central Louisiana to remain as the status quo.

Louisiana's air monitoring network plan has three stated goals:

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[86] *Id.* at 17.
[87] *Id.*
[88] *Id.* at 16.
[89] "[N]o group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental, and commercial operations or programs and policies. EPA, Plan EJ 2014 at 3, available at https://nepis.epa.gov/Exe/ZyPDF.cgi/P100DFCQ.PDF?Dockey=P100DFCQ.PDF; *see also* Basis for Decision for FG LA Complex, EDMS Doc. No. 11998452 (AI No. 198351), Part IX: Environmental Justice/Civil Rights Title VI Issues, at pdf p. 35 (in which LDEQ endorses this definition). *See also In re Am. Waste and Pollution Control Co.*, 633 So. 2d 188, 194 (La. App. 1st Cir. 1993) (describing public trust duty).

1. Provide air pollution data to the general public in a timely manner. Data can be presented to the public in a number of different ways including through air quality maps, newspapers, internet sites, and as a part of weather forecasts and public advisories.
2. Support compliance with ambient air quality standards and emissions strategy development. Data from the monitors for National Ambient Air Quality Standards (NAAQS) pollutants will be used for comparing an area's air pollution levels against the NAAQS. Data of various types can be used in the development of attainment and maintenance plans. Data can also be used to track trends to determine the impact of air pollution abatement control measures on improving air quality. In monitoring locations near major air pollution sources, source-oriented monitoring data can provide insight into how well industrial sources are controlling their pollutant emissions.
3. Support for air pollution research studies such as health effects assessments.[90]

The plan as proposed will meet none of those goals for Mossville, St. James Parish, or Central Louisiana communities like that surround Clean Harbors Colfax.

For the foregoing reasons, Mossville community members request that LDEQ 1) consider additional monitoring for ozone at the Westlake monitoring site; 2) ensure that its monitoring for NO_2 in Calcasieu Parish is adequate to capture the areas of highest concentrations; 3) maintain $PM_{2.5}$ monitoring sufficient to ensure compliance with any updated NAAQS for said pollutant; and 4) provide additional clarity and transparency regarding VOC monitoring and comparison to standards.

Community members of St. James Parish respectfully request that LDEQ amend its 2023 Annual Monitoring Network Plan to include SLAMS SO_2, $PM_{2.5}$, PM_{10}, NO_x, and CO monitors in multiple spots near heavily polluting facilities in St. James Parish to determine the impact of significant sources of air pollutants on the air quality in St. James Parish. Monitors must be positioned as to fairly and reasonably assess the true quality of air that is breathed in by St. James Parish residents, as well as in compliance with NAAQS regulations for the placement of such monitors, in order to actually fulfill the stated goals of this Plan.

Finally, the Central Louisiana Coalition for a Clean and Healthy Environment respectfully requests that LDEQ amend its 2023 Annual Monitoring Network Plan to include additional PM2.5 monitoring in Central Louisiana – specifically in the areas of expected highest concentration, including potentially near the Clean Harbors Colfax facility – sufficient to determine the area's compliance with the NAAQS.

[90] *See* Plan at 2.

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Commonwealth LNG

Cameron Parish, Louisiana

Evaluation of Compliance with the 1-hour NAAQS for NO_2

March 18, 2022

Conducted by:

Steven Klafka, P.E., BCEE

Wingra Engineering, S.C.

Madison, Wisconsin

1. Introduction

Wingra Engineering, S.C. was hired by the Sierra Club to conduct an air modeling impact analysis to determine if large emission sources were causing exceedences of the 1-hour nitrogen dioxide (NO_2) national ambient air quality standard (NAAQS) in Cameron Parish, Louisiana. This document describes the procedures and results for the evaluation of 926 individual sources of NO_2 located in Cameron Parish and adjacent parishes and county in Louisiana and Texas.

The dispersion modeling analysis predicted ambient air concentrations for comparison with the 1-hour NO_2 NAAQS. The modeling was performed using the most recent version of AERMOD, AERMET, and AERMINUTE, with data provided to the Sierra Club by regulatory air agencies and through other publicly-available sources. The analysis was conducted following all available USEPA guidance for evaluating source impacts on attainment of the 1-hour NO_2 NAAQS via aerial dispersion modeling. This guidance included: the AERMOD Implementation Guide; modeling guidance promulgated by USEPA in Appendix W to 40 CFR Part 51; USEPA's September 30, 2014 memorandum, Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard [1], USEPA's March 1, 2011 memorandum, Additional Clarification Regarding Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 NAAQS[2], and USEPA's June 28, 2010 memorandum, Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 NAAQS[3].

To comply with the Prevention of Significant Deterioration (PSD) requirements of the Clean Air Act, TRC Environmental Corporation (TRC) conducted an air quality modeling study on behalf of the Commonwealth LNG liquefied natural gas facility in Cameron Parish, Louisiana.[4] Commonwealth LNG submitted that modeling report to the Louisiana Department of Environmental Quality (DEQ) in October 2021 as part of the PSD permit application. The enclosed modeling analysis updates that evaluation, and provides additional comments.

TRC conducted an analysis to determine if regional sources, including the proposed Commonwealth LNG project, complied with the 1-hour NAAQS for NO_2. The results of the 1-hour NO2 cumulative modeling results were presented in Table 6.2 of the TRC report. The analysis predicted exceedances of the NAAQS. TRC concluded that the Commonwealth project did not contribute significantly to the predicted NAAQS exceedences, so conducted no further evaluation of the predicted NAAQS exceedences.

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[1] https://www.epa.gov/sites/production/files/2020-10/documents/no2_clarification_memo-20140930.pdf
[2] https://www.epa.gov/sites/production/files/2020-10/documents/additional_clarifications_appendixw_hourly-no2-naaqs_final_03-01-2011.pdf
[3] https://www.epa.gov/sites/production/files/2020-10/documents/clarificationmemo_appendixw_hourly-no2-naaqs_final_06-28-2010.pdf
[4] TRC Environmental Corporation, Class II Modeling Report in Support of Part 70 (Title V) Operating Permit and Prevention of Significant Deterioration Permit for Commonwealth LNG, Cameron, Louisiana, October 2021.

It should be noted that the TRC analysis for NAAQS compliance only considered receptor locations where the Commonwealth project was predicted to have a significant impact. Therefore, all locations where violations of the NAAQS may occur would not have been identified.

The enclosed modeling analysis used the same input files as the TRC analysis and were obtained from DEQ. It utilized the same information as accepted by DEQ for the PSD permit application for the Commonwealth LNG project. This information is as follows:

1. Latest version of AERMOD (v21112) with the regulatory default option in the rural mode;

2. Surface and upper-air meteorological data collected at the National Weather Service (NWS) station at the Lake Charles Regional Airport in Lake Charles, LA for the period 2015-2019 to generate AERMOD-ready meteorological data. These data were processed using the most recent version of AERMET (v21112);

3. A fixed background NO_2 concentration was obtained from the ambient monitoring station (Monitor ID 48-361-1001) located in West Orange, Texas.

4. Tier-2 Ambient Ratio Method (ARM2) method to predict the conversion of NO_x to NO_2; and,

5. Regional source inventory of 926 sources of NO_x emissions including the proposed Commonwealth LNG project.

The purpose of this new analysis was to determine the full extent of NAAQS exceedences in Cameron Parish as well as adjacent parishes and counties. For this reason, two change were made to the original modeling files:

1) the modeling domain was extended to the full 50-kilometer distance approved by USEPA for use by AERMOD. This new receptor grid was centered Commonwealth LNG facility.

2) the TRC modeling analysis removed approximately 400 acres of land around Commonwealth LNG from consideration for compliance with the NAAQS. While this land may be owned by the company, there was no description of a fence or other measures that would be employed to preclude public access to the property. Therefore, the updated modeling analysis included receptors on this property.

2. Modeling Results

2.1 1-hour NO_2 SIL and NAAQS

The significant impact level or SIL for NO_2 for the 1-hour averaging period is 7.5 $\mu g/m^3$. This is based on the average of the maximum 1-hour concentrations for each year using five years of meteorology.

The 1-hour NO_2 NAAQS takes the form of a three-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations, which cannot exceed 100 parts per billion (ppb).[5] Compliance with this standard was verified using USEPA's AERMOD air dispersion model, which produces air concentrations in units of $\mu g/m^3$. The 1-hour NO_2 NAAQS of 100 ppb equals 188 $\mu g/m^3$, and this is the value used for determining whether modeled impacts exceed the NAAQS. The 98th percentile of the annual distribution of daily maximum 1-hour concentrations corresponds to the eighth-highest value at each receptor for a given year.

2.2 Commonwealth LNG Facility and Comparison with the Significant Impact Level

The 1-hour average SIL for NO_2 is 7.5 $\mu g/m^3$. If emissions from the Commonwealth LNG facility are predicted to exceed the SIL, the facility is obligated to determine if its emissions combined with those from other regional sources comply with the NAAQS for NO_2. The 2021 analysis by TRC determined that the Commonwealth LNG facility exceeded the SIL so included a NAAQS compliance analysis.

The modeling for comparison with the SIL was updated for the enclosed analysis. The Commonwealth LNG facility was predicted to have a maximum 1-hour average impact of 37.7 $\mu g/m^3$. Since this exceeds the SIL, a NAAQS compliance analysis would be required.

In its guidance for NO2 modeling, USEPA states: [6]

If a project's impacts exceed the SIL at any receptors based on this initial impact analysis, then a cumulative impact assessment should be completed to determine whether the project will cause or contribute to any modeled violations of the NAAQS.

Figure 1 shows the extent in which the Commonwealth LNG facility exceeds the 1-hour SIL of 7.5 $\mu g/m^3$ for NO_2. The SIL was predicted to be exceeded in both Cameron and Calcasieu Parishes. The maximum distance to a SIL exceedance is 40 km. Table 1 provides the highest Cameron LNG

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[5] USEPA, Additional Clarification Regarding Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 NAAQS, March 2, 2011.

[6] Ibid, p.3.

concentrations which exceed the 1-hour SIL. These are the 5-year average of the 1-hour maximum concentrations for unique locations and hours.

Table 1 - Commonwealth LNG Maximum Impacts Exceeding 1-hour Average SIL of 7.5 µg/m³

X	Y	Average	NO_2 Concentration (µg/m³)
463766	3293009	1-HR	37.7
463666	3293009	1-HR	37.6
463766	3293109	1-HR	37.6
463866	3293009	1-HR	37.6
463866	3293109	1-HR	37.6
463666	3293109	1-HR	37.5
463566	3293009	1-HR	37.4
463966	3293109	1-HR	37.4
463966	3293009	1-HR	37.4
463566	3293109	1-HR	37.4

2.3 Compliance with the 1-hour NO_2 NAAQS

The 1-hour NO_2 NAAQS takes the form of a three-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations, which cannot exceed 100 parts per billion (ppb).[7] Compliance with this standard was verified using USEPA's AERMOD air dispersion model, which produces air concentrations in units of µg/m³. The 1-hour NO_2 NAAQS of 100 ppb equals 188 µg/m³, and this is the value used for determining whether modeled impacts exceed the NAAQS. The 98th percentile of the annual distribution of daily maximum 1-hour concentrations corresponds to the eighth-highest value at each receptor for a given year.

The TRC modeling analysis predicted a maximum impact of 229 µg/m³ including background. This exceeded the NAAQS of 188 µg/m³. The greatest distance to receptors exceeding the NAAQS was 39 kilometers.

After expanding the size of the receptor grid and number of receptors, the updated modeling analysis predicted a maximum impact of 1,537 µg/m³ including background. This again exceeded the NAAQS of 188 µg/m³. The greatest length of the area exceeding the NAAQS was 50 kilometers, the full extent of the modeling domain. NAAQS exceedences were predicted to occur in Cameron and Calcasieu Parishes in Louisiana, and in Orange and Jefferson Counties in Texas.

[7] Ibid, p. 1.

Figure 2 shows the full extent of predicted exceedances of the 1-hour NAAQS for NO_2. Boundaries of parishes in Louisiana and counties in Texas are show in black.

2.5 Conservative Modeling Assumptions

The modeling results presented in the report may under-estimate NO2 concentrations for the following reasons:

1) The inventory of regional emission sources included substitutions for rates and stack parameters if these were missing or considered inappropriate. These substitutions may underestimate the air quality impact of these sources.

2) The 50-kilometer receptor grid was centered on the Commonwealth LNG facility. Emission sources are located throughout this grid and may individually be culpable for NAAQS exceedences. The receptor grid would need to be centered on each source to fully determine if the source is capable of exceeding the NAAQS.

3) The downwash effect of buildings and structures was evaluated only for the proposed Commonwealth LNG project. It was not considered for the other regional sources. The consideration of downwash may increase in the predicted impacts of the regional sources.

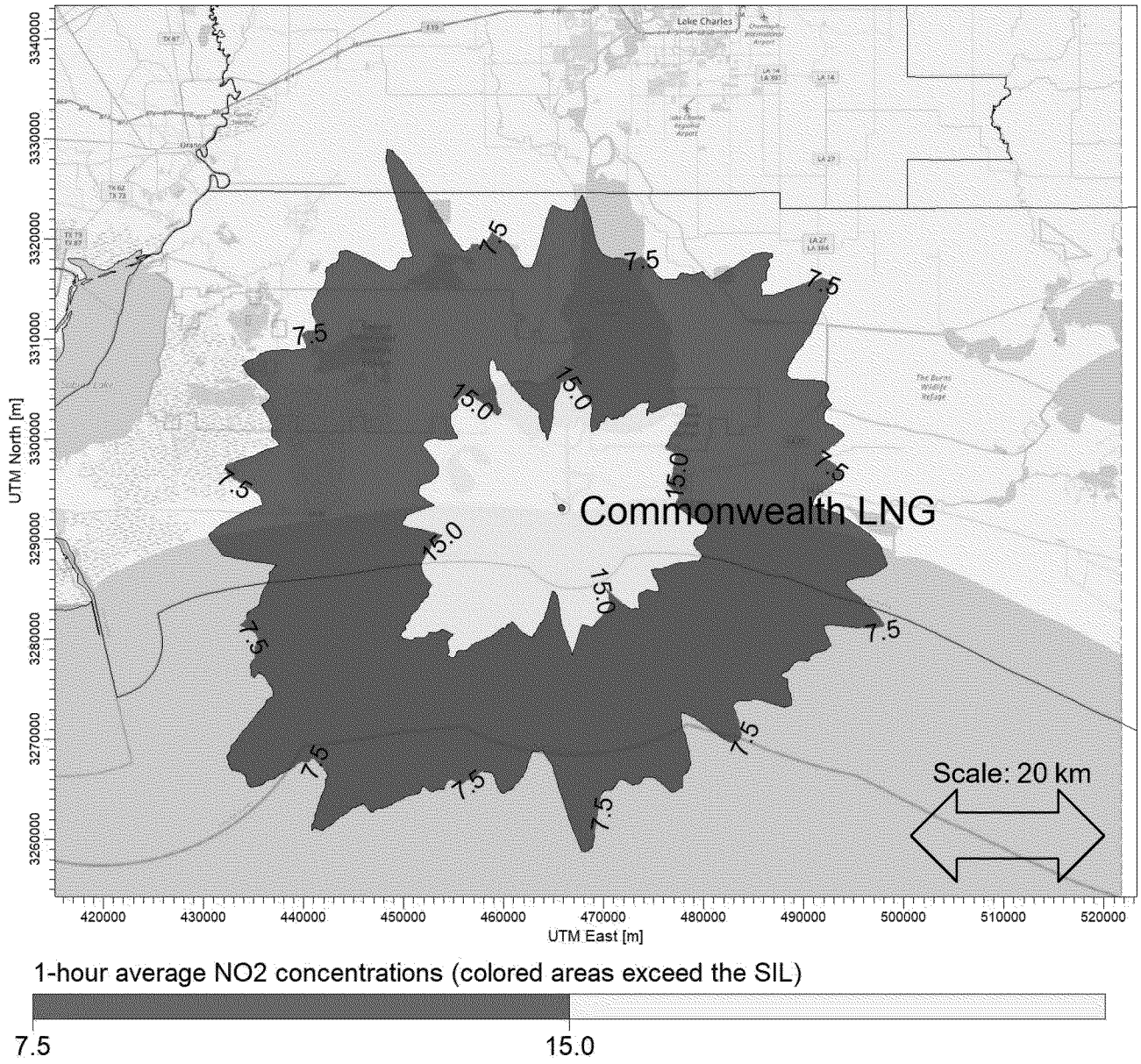

Figure 1 – Exceedences of the 1-hour Average NO_2 SIL by Commonwealth LNG

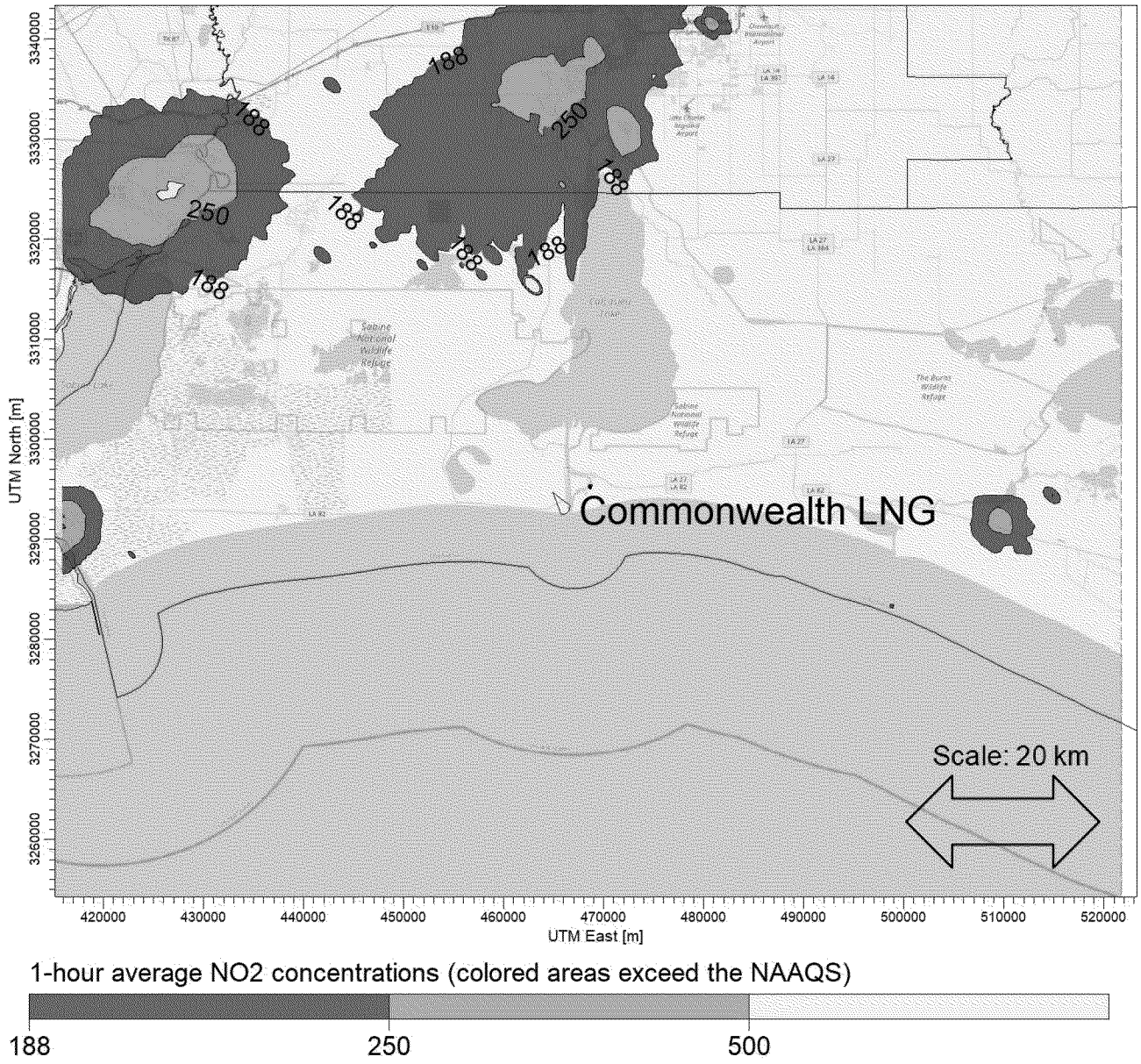

Figure 2 – Exceedences of the 1-hour Average NAAQS for NO_2 by Commonwealth LNG and Regional Sources

3. Modeling Methodology

3.1 Air Dispersion Model

The modeling analysis used the most recent version of USEPA's AERMOD program, v. 21112. AERMOD, as available from the Support Center for Regulatory Atmospheric Modeling (SCRAM) website, was used in conjunction with a third-party modeling software program, *AERMOD View*, sold by Lakes Environmental Software.

3.2 Control Options

The AERMOD model was run with the following control options:

- 1-hour average air concentrations
- Regulatory defaults

In its October 2021 modeling report, TRC conducted an evaluation to determine if the modeled facility was located in a rural or urban setting using USEPA's methodology outlined in Section 7.2.3 of the Guideline on Air Quality Models.[8] For urban sources, the URBANOPT option is used in conjunction with the urban population from an appropriate nearby city and a default surface roughness of 1.0 meter. Methods described in Section 4.1 were used to determine whether rural or urban dispersion coefficients were appropriate for the modeling analysis.

3.3 Output Options

The AERMOD analysis was based on recent meteorological data. The modeling analysis was conducted using sequential meteorological data from the 2015-19 period. Consistent with USEPA's guidance for evaluation compliance with the NO_2 NAAQS, AERMOD was used to provide a table of eighth-high 1-hour NO_2 impacts concentrations consistent with the form of the 1-hour SO_2 NAAQS.

Please refer to Section 2.0 for the modeling results.

[8] USEPA, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, Appendix W to 40 CFR Part 51, November 9, 2005.

4. Model Inputs

4.1 Geographical Inputs

The air dispersion modeling analysis used a coordinate system for identifying the geographical location of emission sources and receptors. These geographical locations are used to determine local characteristics (such as land use and elevation), and also to ascertain source to receptor distances and relationships.

The Universal Transverse Mercator (UTM) NAD83 coordinate system was used for identifying the easting (x) and northing (y) coordinates of the modeled sources and receptors. Commonwealth LNG and Cameron Parish are located in UTM Zone 15.

4.2 Emission Rates and Source Parameters

The emissions and stack parameters for the 926 sources included in the modeling analysis are summarized in the October 2021 modeling report submitted by TRC to DEQ. Non-Commonwealth source information was obtained by TRC from the DEQ Emissions Reporting and Inventory Center.[9] Additionally, stack parameters for major sources in Texas were obtained by TRC through a Public Information Request to the Texas Commission of Environmental Quality. Procedures for assembling the regional source inventory, as well as all modeling procedures, were described in the October 2021 modeling report submitted by TRC to DEQ.

4.3 Downwash

The downwash effect of buildings and structures was considered for only the proposed Commonwealth LNG project. Downwash effects for other regional sources was not considered.

4.4 Receptors

Three receptor grids were employed:

1. A 100-meter Cartesian receptor grid centered on Commonwealth LNG and extending out 5 kilometers.
2. A 500-meter Cartesian receptor grid centered on Commonwealth LNG and extending out 10 kilometers.
3. A 1,000-meter Cartesian receptor grid centered on Commonwealth LNG and extending out 50 kilometers. 50 kilometers is the maximum distance accepted by USEPA for the use of the

[9] https://business.deq.louisiana.gov/Eric/EricHome

AERMOD dispersion model.[10]

A flagpole height of 1.5 meters was not used for all modeled receptors.

Elevations for receptors were obtained from National Elevation Dataset (NED) GeoTiff data. GeoTiff is a binary file that includes data descriptors and geo-referencing information necessary for extracting terrain elevations. These elevations were extracted from 1 arc-second (30 meter) resolution NED files. The USEPA software program AERMAP v. 18081 is used for these tasks.

4.5 Meteorological Data

The same meteorological data used for the October 2021 TRC modeling analysis was used for the updated modeling analysis presented in this report. Surface and upper-air meteorological data collected at the National Weather Service (NWS) station at the Lake Charles Regional Airport in Lake Charles, LA for the period 2015-2019 to generate AERMOD-ready meteorological data. These data were processed using the most recent version of AERMET (v. 21112).

Procedures used for processing of the meteorological data would have been evaluated and approved by DEQ as part of the PSD air permit application review process.

4.5.1 Surface Meteorology

Surface meteorology was obtained for Lake Charles Regional Airport in Lake Charles located approximately 41 km northeast the Commonwealth LNG project.

4.5.2 Upper Air Data

Upper-air data are collected by a "weather balloon" that is released twice per day at selected locations. As the balloon is released, it rises through the atmosphere, and radios the data back to the surface. The measuring and transmitting device is known as either a radiosonde, or rawindsonde. Data collected and radioed back include: air pressure, height, temperature, dew point, wind speed, and wind direction. The upper air data are processed through AERMET Stage 1, which performs data extraction and quality control checks.

Concurrent 2015-2019 upper air data from twice-daily radiosonde measurements obtained at the most representative location were used. This location was the Lake Charles Regional Airport measurement station.

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[10] USEPA, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, Appendix W to 40 CFR Part 51, Section A.1.(1), November 9, 2005.

4.5.3 AERSURFACE

AERSURFACE is a program that extracts surface roughness, albedo, and daytime Bowen ratio for an area surrounding a given location. AERSURFACE uses land use and land cover (LULC) data in the U.S. Geological Survey's National Land Cover Dataset to extract the necessary micrometeorological data. The current version of AERSURFACE v. 20060. It was used by TRC with National Land Cover Database for 2016 including land cover, canopy and impervious surfaces.

4.5.4 Data Review

Missing meteorological data were not filled as the data file met USEPA's 90% data completeness requirement.[11] The AERMOD output file shows there were 1.0% missing data across the entire 2015-19 meteorological period.

5. Background NO_2 Concentrations

A fixed 1-hour average background NO_2 concentration was obtained from the ambient monitoring station (Monitor ID 48-361-1001) located in West Orange, Texas.

6. Reporting

All files from the programs used for this modeling analysis are available to regulatory agencies.

[11] USEPA, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-05, February 2000, Section 5.3.2, pp. 5-4 to 5-5.

Dr. Earthea Nance
Regional Administrator
EPA Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270
By email to: Nance.Earthea@epa.gov
Cc: Shaikh.Taimur@epa.gov, Dwyer.Stacey@epa.gov

Nov 14, 2022

Dear Dr. Nance and EPA Region 6 Staff,

As scientists, we are deeply concerned about the growing evidence of violations of National Ambient Air Standards (NAAQS) in St. James Parish. This evidence includes PM_{10} exceedances documented by Dr. DeCarlo's independent air *monitoring*, as well as exceedances of $PM_{2.5}$ and NO_x predicted by Nucor Steel's and Formosa Plastics' air *modeling*. We appreciate Dr. Nance recognizing the importance of this information in the August 30, 2022 meeting with Inclusive Louisiana, which Dr. Terrell attended at the community's request.[1] In preparing this letter, we were alarmed to discover that many major source facilities in St. James Parish have **never** been required by LDEQ to demonstrate NAAQS compliance through air dispersion modeling. Of the facilities that have submitted dispersion modeling reports to LDEQ, nearly all have failed to demonstrate compliance with at all of the relevant NAAQS (i.e. for a pollutant the facility emits above the major source threshold). Only one St. James Parish facility has conducted modeling for all relevant NAAQS (the proposed Formosa Plastics complex), and the model *predicted exceedances* of $PM_{2.5}$ and NO_x standards. As we describe in more detail below, the weight of evidence indicates that air quality in St. James Parish does not meet NAAQS for PM_{10}, $PM_{2.5}$ or NO_x.

PM_{10} Monitoring

We monitored ambient PM_{10} concentrations in Romeville utilizing medium-cost PM sensors from Quant-AQ (https://www.quant-aq.com) that quantify PM_1, $PM_{2.5}$, and PM_{10} using optical methods. These sensors are not FEM or FRM methods but include both nephelometry and optical particle counters (OPC) to span size distributions up to 10 microns. Additionally, these sensors employ a science-based humidity correction in the data processing algorithm. In a separate measurement project by the DeCarlo laboratory at Johns Hopkins, the coarse fraction of PM (PM_{10}-$PM_{2.5}$) was compared to 24-hour gravimetric PM over a similar size range collected by micro-orifice uniform deposit impactor. This direct comparison to gravimetric mass showed excellent agreement and the utility of including an OPC in addition to nephelometry to measure PM mass across a broader size range (manuscript in preparation). This comparison suggests that the values observed in our Louisiana measurements are a reasonable approximation of what an FEM or FRM measure of PM_{10} concentration would be.

Our monitoring detected levels of PM_{10} in Romeville, St. James Parish that exceeded a 24-hour concentration of 150 $\mu g\ m^{-3}$ on 4 days in the first 6 months of 2022. Specifically, on March, 17, March

[1] The Tulane Environmental Law Clinic, where Dr. Terrell is employed, currently represents Inclusive Louisiana on several issues related to air quality concerns in St. James Parish, Louisiana.

27, May 4, and May 11, 2022 the 24-hour averaged Quant-AQ measured PM_{10} concentrations were 164 $\mu g\ m^{-3}$, 213 $\mu g\ m^{-3}$, 167 $\mu g\ m^{-3}$, and 325 $\mu g\ m^{-3}$ respectively. Under the NAAQS, PM_{10} concentrations of 150 $\mu g\ m^{-3}$ are "not to be exceeded more than once per year on average over 3 years." With 4 likely exceedances of 150 $\mu g\ m^{-3}$ in the first 6 months of 2022, the data already suggest a violation of the PM_{10} NAAQS. Clearly, PM_{10} concentrations are a significant potential health issue for residents of St. James Parish and should be examined by regulatory agencies in more detail with daily, continuous FEM or FRM monitoring for the minimum duration necessary to reliably determine NAAQS compliance, given the frequency of exceedances observed with Quant-AQ sensors.

NAAQS Modeling

Relevance to Environmental Justice

Despite longstanding environmental justice concerns in this region, LDEQ has permitted over a dozen industrial facilities in and around St. James Parish in a discriminatory spatial pattern that protects majority-White neighborhoods at the expense of majority-Black neighborhoods (Fig. 1; Table 1). By all metrics, residents of these industrialized neighborhoods face exceptionally high risk of cancer and respiratory disease from air pollution.[2] Yet, there is no state or federal air monitoring station for any pollutant except ozone in St. James Parish, or within 10 miles of the parish boundary.[3]

In the absence of air monitoring, regulators must necessarily rely on air dispersion *modeling* to ensure NAAQS compliance. This modeling is particularly relevant to environmental justice because LDEQ equates NAAQS compliance with environmental justice.[4] (Notably, EPA's Office of Environmental Justice and External Civil Rights disagrees with this interpretation of environmental justice because it does not address disparate impacts.[5])

[2] EPA Risk-Screening Environmental Indicators (RSEI) 2020 data. Available at https://edap.epa.gov/public/extensions/EasyRSEI/EasyRSEI.html; See also EPA 2017 Air Tox Screen. Available at https://www.epa.gov/AirToxScreen/2017-airtoxscreen-assessment-results#nationwide

[3] LDEQ Air Monitoring Sites. Accessed Sep 16, 2022. https://experience.arcgis.com/experience/1bc3c0ad43be455ab7224f0324aabaf2/

[4] LDEQ Response to Title VI Complaint (#04R-22-R6) regarding discriminatory air permitting. June 20, 2022. Pages 8-10.

[5] EPA Office of Environmental Justice and External Civil Rights. Letter of Concern RE: EPA Complaint Nos. 01R-22-R6, 02R-22-R6, and 04R-22-R6. Oct 12, 2022.

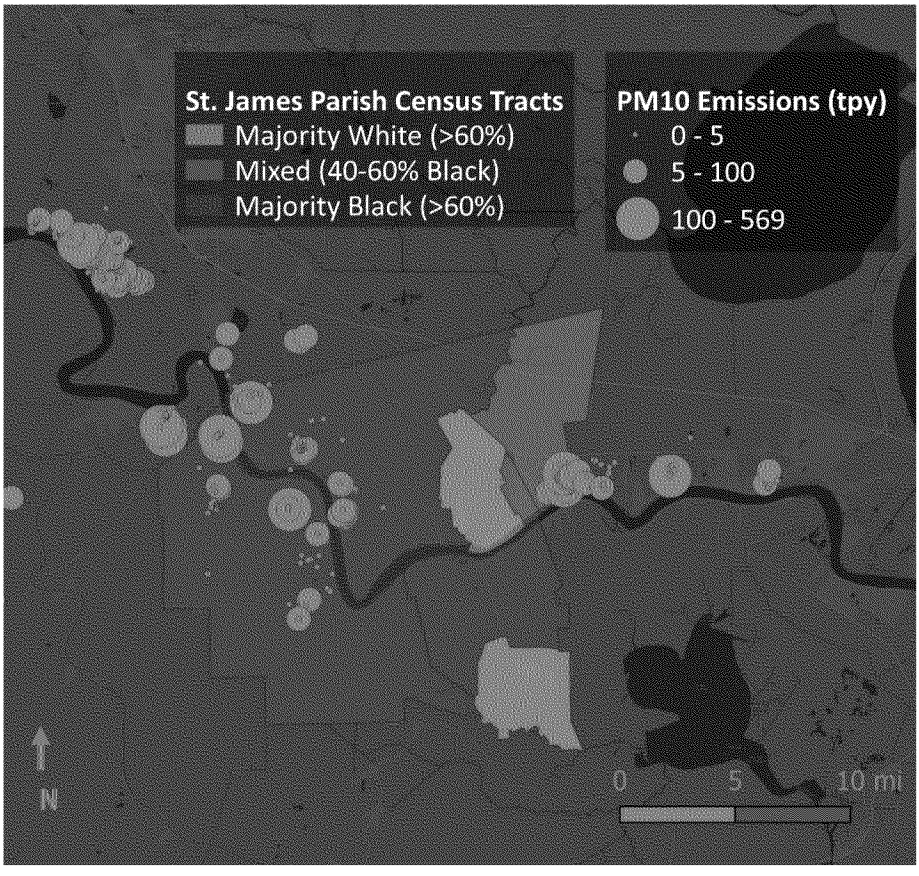

Figure 1. Permitted industrial PM_{10} emissions (tons per year) within 10 miles of St. James Parish, relative to the racial composition of census tracts. Emissions are plotted as individual point sources, as represented in current Major Source air permits.

Major Gaps in NAAQS Modeling

Because LDEQ relies on NAAQS modeling to ensure environmental equity, one would expect LDEQ to require NAAQS modeling for all major sources of criteria pollutants. However, that is not the case. One would also expect that LDEQ would require facilities to submit updated NAAQS modeling when new, more protective NAAQS are enacted. This too is not the case.

In St. James Parish, half of the major source facilities (8/15) have **never** submitted NAAQS modeling to LDEQ (Table 2). Nearly all of the remaining facilities (6/7) have **never** evaluated compliance with at least one of the current NAAQS (Table 3). For example, the Mosaic Faustina plant in St. James Parish is currently permitted to emit over 400 tpy of $PM_{2.5}$, but, according to its pending application for Title V permit renewal, Mosaic Faustina has **never** submitted air dispersion modeling for $PM_{2.5}$.[6] The result of LDEQ's approach is that communities do not have reliable and up-to-date information about ambient air quality across their region. In St. James Parish, 30%-100% of permitted emissions (depending on the

[6] Mosaic Faustina Title V Air Permit Application. Jan 31, 2022. Page 21 of 303 https://edms.deq.louisiana.gov/app/doc/view?doc=13116024

pollutant) from major source facilities have **never** been modeled for their potential to cause or contribute to an exceedance of the current NAAQS (Tables 4 & 5).

LDEQ's Narrow Focus on "Projects"

Many of the gaps in NAAQS modeling appear to be the result of LDEQ's narrow focus on project-related emissions. From a review of current air permits for major sources in St. James Parish, it appears that LDEQ only requires NAAQS modeling when a facility is proposing to significantly increase its emissions. And even then, LDEQ seems to focus on whether the *project* would cause a NAAQS exceedance, as opposed to the overall facility operations.

As a result of this narrow focus, LDEQ has allowed major source facilities to rely on extremely outdated air dispersion modeling (Table 4). Reliance on outdated modeling is problematic for multiple reasons, including that it fails to account for revisions to the NAAQS. These revisions have created new or more protective standards for NO_2 (enacted in 2010), SO_2 (2010), and $PM_{2.5}$ (2012).

In 2005, LDEQ granted a Title V permit renewal for Compressor Station 63 in Convent (St. James Parish) to the Transcontinental Gas Pipe Line Corp that included a massive 3,028 tpy of NO_x emissions.[7] At that time, an hourly NO_2 standard did not exist.[8] The facility has modified its air permit twice since the hourly NO_2 standard was implemented in 2010, but in both cases, LDEQ did not require the applicant to conduct air dispersion modeling "based on the magnitude of emissions changes."[9] Thus, the largest source of NO_x emissions in St. James Parish has **never** modeled hourly NO_2 concentrations around its facility, despite evidence of hourly NO_2 exceedances in the area revealed by Nucor and Formosa Plastics' modeling (described below). Similarly, earlier this year, LDEQ approved a modification of Americas Styrenics PSD permit that relied on air dispersion modeling conducted 25 years ago.[10] As a result, the facility has **never** been required to evaluate NAAQS compliance for current $PM_{2.5}$ and NO_2 standards, despite being permitted to emit 112 tpy and 938 tpy of these pollutants, respectively.[11]

Predicted PM2.5 and NO2 Exceedances

The only two facilities in St. James Parish to conduct NAAQS modeling in the last decade have predicted NAAQS violations (Table 4).[12] Formosa Plastics submitted modeling to LDEQ in July 2018 that predicted 24-hr average $PM_{2.5}$ concentrations up to 37 $\mu g/m^3$ (versus the limit of 35 $\mu g/m^3$) and 1-hr average NO_2

[7] See Compressor Station 63 air permit (2560-00037-V2) page 2. Oct 3, 2005. https://edms.deq.louisiana.gov/app/doc/view?doc=5095822

[8] https://www.epa.gov/no2-pollution/timeline-nitrogen-dioxide-no2-national-ambient-air-quality-standards-naaqs#footnote%203

[9] Compressor Station 63 air permit (2560-00037-V5) page 4. Mar 24, 2020. https://edms.deq.louisiana.gov/app/doc/view?doc=12115801 See also Compressor Station 63 air permit (2560-00037-V4) page 4. June 2, 2014. https://edms.deq.louisiana.gov/app/doc/view?doc=9347523

[10] Americas Styrenics PSD Air Permit (PSD-LA-551 M-14). Feb 2022. Doc # 13154407. Page 17. https://edms.deq.louisiana.gov/app/doc/view?doc=13154407

[11] America's Styrenics Title V Permit #2560-00007-V17. Oct 2021. Page 2. Doc # 12943769. https://edms.deq.louisiana.gov/app/doc/view?doc=12943769

[12] Based on a Sep 14, 2022 review of current permits and corresponding applications.

concentrations up to 422 µg/m^3 (versus the limit of 188 µg/m^3).[13] Although LDEQ granted the permit, a Louisiana District Court judge vacated the permit in Sep 2022, concluding:

"Simply put, LDEQ failed to address the core problem posed by FG LA's model, the only record evidence on point: people working, living, traveling, or recreating in St. James Parish could suffer serious health consequences from breathing this air, even from short-run exposure."[14]

Analogous NAAQS violations were predicted by Nucor Steel's air modeling in April 2019. Specifically, Nucor predicted 24-hr average $PM_{2.5}$ concentrations up to 59 µg/m3 and 1-hr average NO_2 concentrations up to 1,263 µg/m^3 (Fig. 2).[15] Yet LDEQ granted Nucor its current permit despite these predicted exceedances.[16] While LDEQ's justification was that Nucor did not cause or contribute to the exceedance, this same justification was found to be "arbitrary and capricious" by the September 2022 District Court ruling in the context of the Formosa air permitting.[17]

Importantly , LDEQ has made no apparent attempt to identify the cause of the modeled exceedances and has not established any monitoring sites for permitted pollutants in St. James Parish. Because LDEQ relies on NAAQS compliance to ensure environmental equity, one would expect LDEQ to diligently investigate predicted exceedances. A diligent investigation would require at least three years of air *monitoring* (based on the form of the NAAQS) at the sites of the highest predicted $PM_{2.5}$ and NO_2 concentrations.

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[13] FGLA Air Dispersion Modeling Report. July 2018. Doc # 11246153.
[14] 19th Judicial District Court of LA. Judge Trudy White. Written Reasons for Judgement. Sep 14, 2022. Pages 15-16. Docket 694,029.
[15] Nucor Steel Title V Air Permit 3086-V9. June 2020. Doc # 12252342. See also corresponding May 2020 permit application Doc # 12175457. Page 36 of 107.
[16] Nucor Steel Title V Air Permit 3086-V9. June 2020. Doc # 12252342.
[17] 19th Judicial District Court of LA. Judge Trudy White. Written Reasons for Judgement. Sep 14, 2022. Page 14. Docket 694,029.

VII. Effects on Ambient Air

Emissions were reviewed by the LDEQ to ensure compliance with the National Ambient Air Quality Standards (NAAQS) and Louisiana Ambient Air Standards (AAS). Emissions from the facility do not cause or contribute to any NAAQS or AAS exceedances.

Model used: AERMOD (2018)

Pollutant	Averaging Period	Calculated Maximum Ground Level Concentration ($\mu g/m^3$)	NAAQS or AAS ($\mu g/m^3$)
PM_{10}	24-hour	125.76	150
$PM_{2.5}$	24-hour	59.13 (a)	35
	Annual	11.87	12
NO_2	1-hour	1,263.7 (b)	188.6
CO	1-hour	31,019.02	40,000
	8-hour	3,384.96	10,000

(a) The project's contribution at the maximum modeled concentration is 0.045 or 0.145 with secondary concentrations. The greatest contribution of this project at any modeled exceedance is 0.4822 or 0.5822 with secondary concentrations.

(b) The project's contribution at this maximum modeled concentration is 0.012. The greatest contribution of this project at any modeled exceedance is 2.33.

Figure 2. Nucor Steel's current air permit (3086-V9). June 2020. Page 7 of 59. Doc # 12252342.

Lack of Transparency

A review of major source permits in St. James Parish revealed that many permits contain the statement, "Emissions associated with the proposed renewal/modification were reviewed by LDEQ to ensure compliance with the NAAQS and AAS. LDEQ did not require the applicant to model emissions."[18] From these documents, it is not clear what method LDEQ used to make this determination, and whether the method has been approved by EPA. Regardless, LDEQ's failure to provide any supporting detail or methodology for these assessments prevents public oversight and independent expert review.

Importantly, LDEQ does not provide maps of predicted ambient air concentrations in the material sent out for public comment of draft air permits. Without this fundamental information, residents cannot evaluate the extent to which they are impacted by the proposed project or by cumulative emissions. This lack of knowledge prevents effective public participation in the decision-making process.

[18] For example, see page 16 of Mosaic Faustina's 2016 air permit (#2560-00021-V6), which included a 451 tpy increase in PM2.5 emissions.

Call to Action

Collectively, the evidence presented here strongly indicates that St. James Parish residents are exposed to unsafe levels of air pollution, potentially in violation of the NAAQS. This evidence includes frequent PM_{10} spikes above 150 $\mu g/m^3$, and modeled $PM_{2.5}$ and NO_2 concentrations that are 2 to 6-fold higher than the corresponding NAAQS. It is imperative that EPA intervene in this situation, because LDEQ has demonstrated strong scientific bias in its approaches to air modeling and air monitoring. This bias is evident from 1) the major gaps in NAAQS modeling for major source facilities in St. James Parish, 2) LDEQ's inadequate July 2022 air sampling effort in Romeville (St. James Parish), and 3) a recent letter detailing concerns with LDEQ's "flawed" approach to environmental justice analysis from EPA's Office of Environmental Justice and External Civil Rights Compliance.[19] With respect to LDEQ's Romeville monitoring, after this extremely limited, 5-day sampling effort, LDEQ informed residents that there was no evidence of a NAAQS violation in Romeville. Yet, as LDEQ is aware, it is virtually impossible to generate evidence of a NAAQS violation from 5 days' of air monitoring. Further, several pollutants of concern were conspicuously omitted from the Romeville sampling, including PM_{10}, NO_2, and ammonia. Not only is LDEQ's mobile laboratory equipped to measure these pollutants, LDEQ told the community (in writing) that these pollutants would be included in the sampling.[20] As scientists, we call on EPA to educate St. James Parish residents about the evidence for existing NAAQS violations and take immediate action to install NAAQS-comparable monitors in all areas of St. James Parish where NAAQS exceedances are predicted.

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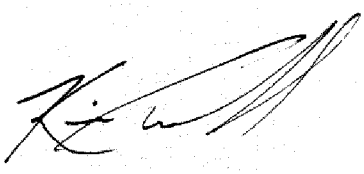
Whiting School of Engineering
Johns Hopkins University



Kimberly Terrell, Ph.D.
Research Scientist and Director of Community Engagement
Environmental Law Clinic
Tulane University Law School

[19]EPA Office of Environmental Justice and External Civil Rights. Letter of Concern RE: EPA Complaint Nos. 01R-22-R6, 02R-22-R6, and 04R-22-R6. Oct 12, 2022.

[20] July 13, 2022 email from Denise Bennett, LDEQ Deputy Secretary, to St. James Parish residents Myrtle Felton and Gail LeBeouf.

Table 1. Current Permitted Emissions for Major Sources of Criteria Pollutants in St. James Parish.*

Major Source Facility	AI	Permit Limits for Criteria Pollutants above Major Source Thresholds (tpy)					
		PM10	PM2.5	NOx	CO	SO2	VOC
Americas Styrenics	2384	120	112	938	1,121	28	209
Mosaic Faustina	2425	413	407	22	18	4	3
Mosaic Uncle Sam	2532	234	116	208	100	3,148	17
Convent Refinery	2719	753	711	2,182	1,444	997	2,148
Occidental	3544	22	22	433	35	1	26
Transcontinental Compressor Station 63	7129	6	6	3,005	487	0	88
Marathon Capline Station	9292	0	0	0	0	0	207
Shell Sugarland Pipeline	32798	1	1	16	84	0	166
Rain II C Carbon	32804	448	368	397	234	6,353	16
Nustar Terminal	36538	12	4	84	88	24	323
Plains Marketing Terminal	129733	3	3	76	112	2	253
Nucor Steel	157847	145	108	160	1,051	27	38
Louisiana Sugar Refining	165286	63	32	168	127	2	14
Formosa Plastics	198351	363	339	1,242	2,768	82	1,667
Tampa Port Services Faustina	200116	43	41	907	582	3	181

*As of Sep 14, 2022. Only includes facilities that emit >100tpy of PM10, PM2.5, NOx, CO, SO2, or VOCs. Numbers rounded down to nearest whole number.

Table 2. Major Source Facilities in St. James Parish that have never evaluated compliance for any NAAQS.*

Major Source Facility	AI	Permit Limits for Criteria Pollutants above Major Source Thresholds (tpy)					
		PM10	PM2.5	NOx	CO	SO2	VOC
Rain II C Carbon	32804	449	368	397	234	6,353	-
Transcontinental Compressor Station 63	7129	-	-	3,005	-	-	-
Occidental	3544	-	-	433	-	-	-
Louisiana Sugar Refining	165286	-	-	168	127	-	-
Plains Marketing Terminal	129733	-	-	-	112	-	253
Marathon Capline Station	9292	-	-	-	-	-	207
Nustar Terminal	36538	-	-	-	-	-	323
Shell Sugarland Pipeline	32798	-	-	-	-	-	166
TOTAL (tpy)		**449**	**368**	**4,003**	**473**	**6,353**	**949**

*According to Section 18 of the most recent approved permit application, the facility has never completed air quality dispersion modeling in accordance with LAC 33:III that was approved by LDEQ.

Table 3. Major Source Facilities in St. James Parish that have never evaluated NAAQS compliance for at least one pollutant. [*]

Major Source Facility	AI	Permit Limits for Non-Evaluated Pollutants				
		PM10	PM2.5	NOx	CO	SO2
Tampa Port Services Faustina	200116	-	-	907	582	-
Mosaic Faustina	2425	-	407	-	-	-
Americas Styrenics	2384	-	112	938[**]	-	-
Convent Refinery	2719	-	711	2,182[**]	1,444	997
Mosaic Uncle Sam	2532	234	116	208	100	-
Nucor Steel	157847	-	-	160[†]	-	-

[*]According to Section 18 of the most recent approved permit application; in addition to the facilities listed in Table 1.

[**]Modeling conducted for annual limit, but not hourly limit.

[†]Modeling conducted for hourly limit, but not annual limit.

Table 4. Major Source Facilities in St. James Parish that modeled their emissions against current NAAQS. [*]

Major Source Facility	AI	Permit Limits for Relevant Pollutants					Modeling Year
		PM10	PM2.5	NOx	CO	SO2	
Formosa Plastics	198351	363	339	1242	2768	82[†]	2018[**]
Nucor Steel	157847	145	108	160[‡]	1,051	27[†]	2019[**]
Americas Styrenics	2384	120	-	938[†]	1,121	-	1996
Convent Refinery	2719	753	-	2,182[†]	-	-	2002
Mosaic Faustina	2425	413	-	-	-	4[†]	2006
Mosaic Uncle Sam	2532	-	-	-	-	3,148[†]	2009[§]
Total Emissions Evaluated for NAAQS Compliance		**1,794**	**447**	**1,402 (1-hr) 4,362 (annual)**	**4,940**	**0 (1-hr) 3,257 (3-hr)**	

[*]Does not include potential emissions increases subsequent to NAAQS modeling; based on Section 18 of most recent permit applications.

[**]Exceedances predicted.

[†]Did not include comparison against 1-hr standard.

[‡]Did not include comparison against annual limit.

[§]Presumed year of modeling from permitting history; year not listed in Section 18 of the most recent approved permit application.

Table 5. Percentages of Emissions Evaluated by Permit Applicant for Potential to Cause or Contribute to NAAQS Exceedance.*

Category	PM10	PM2.5	NOx	CO	SO2
Total emissions evaluated for NAAQS compliance (tpy)	1,794	447	1,402 (1-hr) 4,362 (annual)	4,940	3,257
Total permitted emissions from major sources of criteria pollutants (tpy)	2,626	2,270	9,838	8,251	10,671
Percentage of all emissions modeled for NAAQS compliance	**68%**	**20%**	**14% (1-hr) 44% (annual)**	**60%**	**0% (1-hr) 31% (3-hr)**

* As of Sep 14, 2022. Only includes facilities that emit >100tpy of PM10, PM2.5, NOx, CO, SO2, or VOCs. Based on information provided in Section 18 of most recently accepted air permit applications.

Tommie Milam

From: Jennifer Zimmer
Sent: Wednesday, April 12, 2023 11:43 AM
To: Tommie Milam; Laura Ambeau
Subject: Fw: Informal Comments on LDEQ's Proposed 2023 Annual Monitoring Network Plan

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From: Pete Cazeaux
Sent: Wednesday, April 12, 2023 6:40:07 AM
To: Jennifer Zimmer
Subject: FW: Informal Comments on LDEQ's Proposed 2023 Annual Monitoring Network Plan

Good Morning,
We have received our first response to our 2023 network plan, see email below. They basically just repeated their original letter.

The comment period is over. Have you received any public comments?

- Pete

From: Jason Meyers <Jason.Meyers@LA.GOV>
Sent: Tuesday, April 11, 2023 10:22 AM
To: Pete Cazeaux <Pete.Cazeaux@la.gov>
Subject: FW: Informal Comments on LDEQ's Proposed 2023 Annual Monitoring Network Plan

FYI.

Thanks,
Jason

From: Alexander, Theresa <Alexander.Theresa@epa.gov>
Sent: Tuesday, April 11, 2023 10:00 AM
To: Jason Meyers <Jason.Meyers@LA.GOV>
Cc: Belk, Ellen <Belk.Ellen@epa.gov>; Robinson, Jeffrey <Robinson.Jeffrey@epa.gov>; Peter Cazeaux <peter.cazeaux@la.gov>
Subject: Informal Comments on LDEQ's Proposed 2023 Annual Monitoring Network Plan

We are writing to provide informal comments on the state's proposed 2023 Annual Monitoring Network Plan (AMNP). The network review process presents an opportunity for the EPA and the LDEQ to collaborate on the air monitoring network design.

As LDEQ considers comments received during the public comment period on the proposed 2023 AMNP and develops the final 2023 AMNP to submit to EPA, we encourage the state to carefully consider environmental justice in responding to the comments received, and in considering whether it may be appropriate to propose additional monitoring. We notice that, although the 2022 AMNP included Environmental Justice Considerations, the

proposed 2023 AMNP does not contain this type of section. Please add environmental justice considerations in response to comments received prior to submitting the final 2023 AMNP.

We wanted to provide some recommendations for the LDEQ to consider for installing one or more monitors in the Mississippi River corridor between Baton Rouge and New Orleans, and in Calcasieu Parish. Part of our recommendations stem from the repeated modeled exceedances of the $PM_{2.5}$ standard in New Source Review (NSR) permitting projects in recent years in St. James Parish. We've noted those modeled exceedances where Air Quality Dispersion Modeling (AERMOD) predicted 24-hour $PM_{2.5}$ concentrations exceeding the NAAQS standards. Most of these permits were issued because the proposed source did not significantly contribute to the modeled violation, but there is a responsibility to address the modeled air quality concern. One way to do so, might be to deploy additional monitors in the area of the modeled violations to determine if there are violations occurring. Other approaches could be to require sufficient reductions at the sources causing the modeled NAAQS exceedances to eliminate the problem. We have also noted similar modeled exceedances in the Calcasieu Parish area that potentially need to be addressed. In any case, Louisiana has a responsibility to address the issue to ensure protection of public health. Therefore, we are recommending the LDEQ consider deployment of additional $PM_{2.5}$ monitoring in St. James Parish and in the Calcasieu Parish in areas where modeled exceedances have been predicted to ensure that public health is being protected and to verify the NAAQS exceedances are not actually occurring.

Regarding the Temporary Located Community (TLC) air monitors that were previously operating at the Irish channel site (Orleans Parish) and at St. Rose (St. Charles Parish), we notice that TLC monitoring at the Irish Channel and St. Rose sites are not included in the 2023 AMNP. We recommend installing permanent monitoring along the Irish Channel, preferably at the site where the LDEQ began operating a temporary monitor on July 18, 2021, with regular collection of $PM_{2.5}$ data beginning on July 23, 2021. As we have mentioned previously, analysis on July 12, 2022, indicated the average $PM_{2.5}$ concentration from the site was 13.2 micrograms per cubic meter, which was above the annual NAAQS of 12.0. We understand that the LDEQ did not believe the data is NAAQS comparable. However, the data indicated the potential for values above the standard. Given the potential problems, and the possibility that the PM NAAQs will be lowered and the extensive community concerns, we encourage the LDEQ to reestablish $PM_{2.5}$ and SO_2 monitoring at the Irish Channel location. For the St. Rose area, we recommend re-installing monitoring there as well. We recommend the monitors provide NAAQS comparable quality data so ongoing community concerns can be fully addressed. For additional monitoring, as you are aware, the EPA Regional Administrator and the responsible State or local air monitoring agency must work together to design and/or maintain the most appropriate monitoring network to service the variety of data needs in an area.

In the Ninth Ward, we appreciate that the LDEQ was working with local environmental groups to address environmental concerns and we were supportive of the LDEQ's plans in the 2022 AMNP to establish an air monitoring site for $PM_{2.5}$ and SO_2 in the area. We notice that the TLC air monitoring that was planned in the Ninth Ward in the 2022 AMNP is not included in the 2023 AMNP and encourage the LDEQ to continue working with the community to address air quality concerns in the area.

For the Romeville area of St. James Parish, based on community concerns and recent community monitoring data showing potential exceedances of the PM_{10} standards, we recommend new PM_{10} monitoring to the west/northwest of the Romeville area where there may be both industrial operations and vessel loading operations on the Mississippi River. Further, we strongly encourage the LDEQ to continue evaluating siting options and potential options for installation of additional $PM_{2.5}$ and PM_{10} monitoring in the above areas around the Irish Channel and in St. James Parish. In making these recommendations to the LDEQ, we request that the LDEQ consider using EJScreen to help determine if there are optimal locations that such monitoring could be sited and where the EJ Index for Particulate Matter 2.5 indicates PM near or above the 80^{th} percentile for PM exposure in both Louisiana and the United States.

In response to community concerns, we request the LDEQ consider deploying an additional SO_2 monitor near Mosaic Uncle Sam. For details of our review of the State's assessment and recommendations for these modeled sources, please see the letter from David Garcia to Jason Meyers dated March 3, 2023.

We look forward to our continued partnership with the LDEQ on our common goals to establish and maintain an approvable and comprehensive ambient air monitoring.

Please contact me (alexander.theresa@epa.gov) or Ellen Belk of my staff (belk.ellen@epa.gov) if you need further information or have questions.

Theresa H. Alexander, Section Supervisor
Air Monitoring Section
Air Permits, Monitoring and Grants Branch
Air and Radiation Division
US Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102
Phone: (214) 665-8571
Alexander.theresa@epa.gov

Response to Comments from Tulane Environmental Law Clinic:

Thank you for your interest in the LDEQ 2022 Annual Monitoring Network Plan (AMNP) and for your comments. LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan are beyond the scope of the AMNP.

Comment: The objectives of the Clean Air Act Air Monitoring Network Requirements and Environmental Justice mandate that LDEQ conduct additional monitoring in and near Mossville. Although LDEQ meets the minimum federal regulations, Mossville constitutes an area in Louisiana which requires more stringent monitoring given its proximity to industrial pollution and high levels of criteria pollutant emissions.

Response: LDEQ acknowledges the receipt of this comment, and points out LDEQ's Westlake monitoring site is located on the border of what is depicted as the boundaries of the Historic Mossville community (Tulane's comments Page 11 of 27). Therefore, LDEQ is already monitoring near Mossville. Additionally, as mentioned in these responses, LDEQ operates more monitors/analyzers statewide than are required by 40 C.F.R. Part 58. Therefore, additional monitoring is not required.

Comment: LDEQ must make environmental justice a priority and should revise its 2023 Plan to address environmental justice goals that include communities like Mossville.

Response: LDEQ acknowledges the receipt of this comment. LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, including environmental justice considerations, are beyond the scope of the AMNP.

LDEQ would note that EPA acknowledged in their March 3, 2023 approval letter for LDEQ's 2022 Annual Monitoring Network Plan (EDMS Doc. # 13786976), "The EPA acknowledges the update regarding environmental justice considerations provided in the 2022 Plan, including the LDEQ's Temporary Located Community Air Monitor Program and the Mobile Air Monitoring Lab, neither of which are specifically required by federal monitoring requirements in 40 CFR Part 58; but rather are at the discretion of Louisiana."

Comment: In order to better protect the surrounding communities, including Mossville, LDEQ should re-evaluate its ozone monitoring network in Calcasieu Parish and re-activate the ozone monitor at the Westlake monitoring site.

Response: LDEQ acknowledges the receipt of this comment. For the Lake Charles CBSA, LDEQ operates more ozone monitors than are required by 40 C.F.R. Part 58. In addition, in the approval of the 2014 AMNP, EPA considered and approved the request to discontinue the ozone monitor at the Westlake site, and further stated "the discontinuance of this monitor will not compromise the data collection needed for implementation of the O_3 NAAQS, and 40 CFR Part 58, Appendix D ambient air monitoring requirements will continue to be met." (EDMS Doc. # 9548268)

Comment: Public health requires enhanced NO_2 air quality monitoring in Lake Charles MSA and surrounding communities, like Mossville.

Response: LDEQ acknowledges the receipt of this comment. As stated in the AMNP, LDEQ satisfies the requirements of 40 C.F.R. Part 58 by operating a NO_x analyzer at the Westlake site.

Comment: LDEQ must update its NO_2 monitoring data on its data reporting website because the website refers to NO_2 emissions in parts per million, as opposed to parts per billion.

Response: NO, NO_2, and NO_x data are reported to LDEQ's website in parts per billion (ppb).

Comment: LDEQ must maintain adequate $PM_{2.5}$ monitoring in the Lake Charles MSA to comply with EPA's new $PM_{2.5}$ primary annual standard, should it be enacted.

Response: LDEQ is not proposing any modification for PM monitoring in the Lake Charles MSA and meets the $PM_{2.5}$ monitoring requirement for the area. Additionally, LDEQ will comply with any required change in the PM NAAQS, should the proposal become final.

Comment: LDEQ should improve transparency regarding VOC monitoring data in Calcasieu Parish, including publicly comparing results to Louisiana Ambient Air Standards and speciating out ethylene oxide from its Westlake VOC monitor.

Response: LDEQ acknowledges the receipt of this comment. LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as ethylene oxide and VOC monitoring, are beyond the scope of the AMNP.

Comment: LDEQ must monitor for all NAAQS-Regulated Emissions in St. James Parish to determine compliance with the NAAQS. [W]e respectfully request that LDEQ amend the 2023 Plan to include reliable monitors for SO_2, PM_{10}, $PM_{2.5}$, CO, and NO_x in St. James Parish, Louisiana.

Response: LDEQ acknowledges the receipt of these comment, and as previously mentioned, locates monitoring sites in accordance with the requirements of 40 C.F.R. Part 58, Appendix E and operates more monitors/analyzers than are required by federal regulation. However, LDEQ has received notification of funding of an American Rescue Plan Enhanced Air Quality Monitoring for Communities Grant from the EPA to operate a TLC monitoring site in St. James Parish.

Comment: LDEQ's stated air monitoring program goals should require that LDEQ operate SO_2 monitors in Gramercy and Romeville and that these monitors be located to reliably detect emission from Gramercy Coke Plant and Mosaic Uncle Sam.

Response: LDEQ acknowledges the receipt of this comment. LDEQ locates monitoring sites

in accordance with the requirements of 40 C.F.R. Part 58, Appendix E and operates more monitors/analyzers than are required by federal regulation. As shown on Table D of the AMNP and based on the calculated population weighted emissions index (PWEI), only one SO_2 monitor is required in the New Orleans CBSA, however, LDEQ currently operates three. Therefore, the SO_2 monitoring described in this plan are sufficient and exceeds the requirements of 40 C.F.R. Part 58.

Comment: While LDEQ operates a relatively large number of $PM_{2.5}$ monitors compared to other pollutants, these monitors are not strategically located and fail to protect the communities that are burdened with the highest $PM_{2.5}$ emissions.

Response: LDEQ acknowledges the receipt of this comment. LDEQ locates monitoring sites in accordance with the requirements of 40 C.F.R. Part 58, Appendix E and operates more monitors/analyzers than are required by federal regulation. Therefore, the location of the PM sites described in this plan are sufficient and exceed the requirements of 40 C.F.R. Part 58.

Comment: Because CO is emitted regularly through the process of industrial burning in facilities across St. James Parish and Cancer Alley, it is crucial to the communities in our state that LDEQ implement ambient air monitoring of CO.

Response: LDEQ acknowledges the receipt of this comment. LDEQ locates monitoring sites in accordance with the requirements of 40 C.F.R. Part 58, Appendix E and operates more monitors/analyzers than are required by federal regulation. In the case of CO, LDEQ operates the number of CO monitors required by 40 C.F.R Part 58, therefore, additional CO monitoring is not required.

Comment: St. James Parish should be considered independently in the calculations of its weighted emissions.

Response: LDEQ acknowledges the receipt of this comment. The comment states "LDEQ considers St. James Parish as within the New Orleans/Metairie/Kenner area for the purposes of a population weighted index for SO2". However, the areal extent of geographical areas are based on core based statistical areas (CBSAs) and CBSAs are designated by EPA.

Comment: LDEQ's reliance on mobile monitoring data undermines its refusal to install additional monitors to meet its stated goals.

Response: LDEQ acknowledges the receipt of this comment. LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as permitting, are beyond the scope of the AMNP.

Comment: LDEQ should conduct additional monitoring for $PM_{2.5}$ in Central Louisiana, specifically near the Clean Harbors Colfax facility.

Response: LDEQ acknowledges the receipt of this comment. LDEQ locates monitoring sites in accordance with the requirements of 40 C.F.R. Part 58, Appendix E and operates more monitors/analyzers than are required by federal regulation. Therefore, additional monitoring in

Central Louisiana is not required.

Comment: Currently, the only air monitoring conducted by LDEQ in Central Louisiana is a $PM_{2.5}$ monitor south of Alexandria, designated as a "Background" monitor.[82] This monitor does not appear on LDEQ's interactive online map, and continuous monitoring data from it does not appear to be available online. LDEQ conducts no other monitoring, despite the presence of an environmental justice community in Grant Parish near the Clean Harbors facility.

Response: LDEQ acknowledges the receipt of this comment. The Alexandria PM monitor is a filter based federal reference method (FRM) and not a continuous monitor. Filters must be collected and sent to a lab for weighing. Therefore, this sitedoes not provide real-time data.

Comment: Monthly average levels of $PM_{2.5}$ measured with the high volume samplers increased when there was an increase in emissions calculated from the OB/OD facility's activity records ("burn logs") provide by the facility to the LDEQ for days when complaints were filed by Colfax residents.[85] Because the facility only provides burn logs when requested by LDEQ following complaints, the available logs are only a partial record of the facility's operations. Weekly average $PM_{2.5}$ concentrations measured with the high volume samplers exceeded the level of the National Ambient Air Quality (NAAQS) annual standard for PM2.5 on numerous occasions.[86] On more than 600 occasions, $PM_{2.5}$ concentrations measured with the low-cost samplers were at such a level that all people should avoid extended time outdoors, and on at least 24 occasions, $PM_{2.5}$ concentrations constituted emergency conditions.[87] Concentrations of $PM_{2.5}$ measured by the low-cost sensors were above levels considered safe for any individual in more than half of samples.[88]

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as low-cost sensor operation, are beyond the scope of the AMNP.

Comment: The plan as proposed will not meet the AMNP goals for Mossville, St. James Parish, or Central Louisiana communities like that surround Clean Harbors Colfax.

Sub Comment: Provide the public with air pollution data in a timely manner.

Response: LDEQ acknowledges the receipt of this comment. All data generated at LDEQ's ambient air monitoring sites is available on LDEQ's website. Data from continuous analyzers is updated hourly and can be located at: https://airquality.deq.louisiana.gov/. For hourly, ten minute, or five minute data, see the following website:
https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR- MONITORING/AIR-MONITORING-DATA-WITH-INTERVAL-5-OR-10-MINUTES.

Data from summa canister samples can also be located on LDEQ's website at: https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/CANISTER- DATA
Be advised, canister data is analyzed at a contract laboratory and the data is generally not available for 1-2 months.

In addition, LDEQ's Communications Division routinely responds to requests from the media regarding air quality conditions and forecasts. The staff of the Communications Section is dedicated to providing reporters, writers, photographers, members of the media and concerned citizens with accurate information regarding DEQ activities, events and general information.

Sub Comment: Support compliance with standards and development of an Emissions strategy.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as compliance, are beyond the scope of the AMNP.

Sub Comment: Support air pollution research studies such as health effects Assessments.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as compliance, are beyond the scope of the AMNP.

Jefferson, Orleans, & Irish channel Neighbors

JOIN for clean air

April 13, 2023

RE: Comments on Louisiana Annual Monitoring Network Plan, AI number 168755
PER99999999

Dear LDEQ and EPA,

JOIN for Clean Air submits these comments on LDEQ's 2023 Annual Monitoring Network Plan (i.e. "monitoring plan"). We are a grassroots community organization focused on addressing air quality problems that span political boundaries. Our members include environmental scientists, petroleum engineers, attorneys, and other individuals with professional expertise relevant to air quality monitoring. Most of our members live in the Irish Channel neighborhood of New Orleans (Orleans Parish) and in Harvey (Jefferson Parish). This combined area is responsible for approximately 1 in 3 air quality complaints in LDEQ's database since 2020. Thus, JOIN for Clean Air is especially qualified to provide constructive comments on LDEQ's monitoring plan.

We strongly support EPA Region 6's recommendation for LDEQ to establish a permanent, NAAQS-comparable air monitoring site in the Irish Channel neighborhood of New Orleans.[1] As both EPA and LDEQ are aware, monitoring conducted by LDEQ from July 2021 to July 2022 indicated an annual average PM2.5 concentration of 13.2 $\mu g/m^3$ at the Irish Channel site. While LDEQ (incorrectly) claims that the data cannot be compared to NAAQS, EPA has correctly observed that "the data indicated the potential for values above the standard."[2] Simply put, the best available science (generated by LDEQ) suggests an exceedance of the PM2.5 NAAQS in the Irish Channel. If LDEQ considered the data unreliable, the logical next step would be to

[1] April 11, 2023 Email from Theresa Alexander (EPA Region 6) to Jason Meyers (LDEQ) – see Exhibit A attached.
[2] *Id.*

collect additional data using a more robust methodology. Instead, LDEQ surreptitiously dismantled the Irish Channel monitoring site without any advanced notice to – or consultation with – the community. The LDEQ has *never* met with residents of the Irish Channel to answer questions about the monitoring data collected in their neighborhood.[3]

A larger concern is that LDEQ – a chronically underfunded agency – is spending staff time and money collecting air quality data that cannot be compared against the NAAQS. This practice is a wasteful use of the agency's limited resources. Community organizations are better equipped to collect non-NAAQS-comparable air quality data, and can do so for a fraction of the cost relative to LDEQ's monitoring. For example, our organization could have installed a low-cost sensor to collect non-NAAQS-comparable PM2.5 data in the Irish Channel for approximately $150. We estimate that LDEQ spent at least $15,000 in staff time and other resources to collect PM2.5 data in our neighborhood – and subsequently disregarded the data. The LDEQ must focus its limited air monitoring resources exclusively on collecting data that can be compared against legally-enforceable air quality standards.

We are concerned that LDEQ has completely overlooked air quality issues in Harvey (Jefferson Parish), a neighborhood that is affected by the same PM2.5 sources impacting the Irish Channel. A petrochemical terminal facility in the neighborhood, BWC Harvey, reported that an air quality sample collected on May 25, 2021 along its north fenceline exceeded the OSHA and ACGIH standards for total dust.[4] Thus, the best available evidence indicates that the residents of

[3] The LDEQ presentation of air monitoring data to the New Orleans City Council in December 7, 2021 did not constitute community engagement, since residents were not permitted to ask LDEQ questions at that presentation. At that meeting, LDEQ staff told City Councilmembers that there were no significant findings from the air monitor and did not disclose the evidence for a PM2.5 exceedance.
[4] BWC Terminals IH Assessment, included within the March 24, 2022 EPA Inspection Report, at PDF page 25 – see Exhibit B attached.

Harvey are exposed to unsafe levels of particulate matter. To fulfill its constitutional mandate to protect the health and well-being of Louisiana residents, LDEQ must install PM10 and PM2.5 monitors in Harvey.

The LDEQ must also improve its practices for receiving – and responding to – reports of air quality problems (i.e. "citizen complaints")[5] from residents. The LDEQ's current system for reporting air quality problems is not user friendly. For example, the text of the online reporting website is extremely small when accessed on a smart phone. The site also requires that the reporter use military time (an unnecessary opportunity for confusion), and that they identify the AI number of the source of the air quality problem – information that most residents do not have. While LDEQ has a phone number for reporting air quality problems, calls are only accepted between 8:30am and 4:30pm. These reports are relevant to LDEQ's air monitoring plan because, when considered holistically, they can provide unique and valuable information about local air quality that can inform LDEQ's siting of monitors. The LDEQ must also publish a science-based, objective protocol for responding to reports of air quality problems. In our members' experience, LDEQ investigators respond to these reports by identifying possible sources and then asking those facilities whether there were any upset conditions or permit violations at the time. The LDEQ needs to recognize that air quality problems can exist in situations where facilities are complying with permit requirements. Further, LDEQ needs to recognize the transient nature of air quality problems and end its practice of dispatching investigators to conduct "surveillance" during times when residents are not reporting air quality problems. In short, LDEQ must make significant changes to remove barriers and bias from its system for handling air quality problems in neighborhoods.

[5] The LDEQ characterizes reports of air quality problems as "citizen complaints," which has a negative connotation and effectively discourages non-citizen residents from reporting air quality problems.

Finally, we support EPA Region 6's recommendation to establish additional monitoring sites among vulnerable neighborhoods in the Lower Ninth Ward, St. Rose, St. James Parish, and Calcasieu Parish. We firmly agree with EPA Region 6 that LDEQ must consider environmental justice and community concerns in its monitoring plan and that additional monitoring sites must be established in coordination with the EPA Regional Administrator. We thank EPA Region 6 for its commitment to protecting environmental quality in Louisiana, and we look forward to improvements in LDEQ's air monitoring network.

Sincerely,
Kimberly Terell, Ph.D.
Justin Vittitow
Tyler Dauzat
Gina Lanier
Kelly Donahue
Treb Winegar
On behalf of
Jefferson, Orleans, and Irish Channel Neighbors for Clean Air

Tommie Milam

From: Jennifer Zimmer
Sent: Wednesday, April 12, 2023 11:43 AM
To: Tommie Milam; Laura Ambeau
Subject: Fw: Informal Comments on LDEQ's Proposed 2023 Annual Monitoring Network Plan

---

From: Pete Cazeaux
Sent: Wednesday, April 12, 2023 6:40:07 AM
To: Jennifer Zimmer
Subject: FW: Informal Comments on LDEQ's Proposed 2023 Annual Monitoring Network Plan

Good Morning,
We have received our first response to our 2023 network plan, see email below. They basically just repeated their original letter.

The comment period is over. Have you received any public comments?

- Pete

From: Jason Meyers <Jason.Meyers@LA.GOV>
Sent: Tuesday, April 11, 2023 10:22 AM
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We look forward to our continued partnership with the LDEQ on our common goals to establish and maintain an approvable and comprehensive ambient air monitoring.

Please contact me (alexander.theresa@epa.gov) or Ellen Belk of my staff (belk.ellen@epa.gov) if you need further information or have questions.

Theresa H. Alexander, Section Supervisor
Air Monitoring Section
Air Permits, Monitoring and Grants Branch
Air and Radiation Division
US Environmental Protection Agency, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102
Phone: (214) 665-8571
Alexander.theresa@epa.gov

EPA United States Environmental Protection Agency

Region 6 - Enforcement & Compliance Assurance Division

INSPECTION REPORT

Inspection Date(s):	03/24/2022	
Media Program:	Air	
Regulatory Program(s)	Louisiana SIP, NESHAP (40 CFR Part 63), NSPS (40 CFR Part 60)	
Company Name:	**BWC Harvey LLC**	
Facility Name:	**BWC Harvey Terminals**	
Facility Physical Location:	81805 Fourth Street	
(city, state, zip code)	Harvey, LA 70058	
Mailing address:	81805 Fourth Street	
(city, state, zip code)	Harvey, LA 70058	
County/Parish:	Jefferson Parish	
Facility Phone Number	(225) 331-4000	
Facility Contact:	Jessica Sisto	HSEQ Manager
	jsisto@bwcterminals.com	
FRS Number:	110000448766	
Identification/Permit Number:	LDEQ Agency Interest (AI) Facility ID 2119, Air Permit 1340-00005-12	
Media Identifier Number:	ICIS-Air LA0000002205100005	
NAICS:	493190 Other Warehousing and Storage	
SIC:	4226 Special Warehousing and Storage, Not Elsewhere Classified	

Personnel participating in inspection:		
Prince Nfodzo	EPA Region 6 ECDAP	Environmental Engineer
Aimee Boss	EPA Region 6 ECDAP	Physical Scientist
Brian Fontenot	LDEQ, New Orleans	Environmental Scientist
Jodi Holewka	LDEQ, New Orleans	Environmental Scientist
Jessica Sisto	BWC Harvey Terminal	HSEQ Manager
Jack Fernandez	BWC Harvey Terminal	Director of Operations
Blake Chatagnier	BWC Harvey Terminal	Terminal Manager

EPA Lead Inspector Signature/Date		05/09/2022
	Prince Nfodzo	Date
Branch Chief Signature/Date		05/09/2022
	Steve Thompson	Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

EPA Region 6 inspectors Prince Nfodzo and Aimee Boss, and LDEQ inspectors Brian Fontenot and Jodi Holewka arrived at the BWC Harvey Storage and Transfer Terminal ("BWC Harvey") at 8:30 am on March 24, 2022, for an unannounced inspection. We met with BWC Harvey representatives Jessica Sisto (HSEQ Manager), Blake Chatagnier (Terminal Manager), and Jack Fernandez (Director of Operations). I (Prince Nfodzo) presented my credentials to Jessica Sisto and informed them that this was an EPA inspection to determine compliance with the facility's Air Permit and the Clean Air Act. The facility is the subject of several citizen complaints regarding strong asphalt odors. The scope of the inspection is a full compliance evaluation (FCE) under applicable provisions of the CAA, and includes evaluation of the compliance of the facility with its operating permit.

FACILITY DESCRIPTION

BWC Harvey is a bulk liquid storage and transfer facility located in Harvey, Louisiana. The facility is situated on the west bank of the Mississippi River in Jefferson Parish. The facility receives, and ships products by barge, vessels, rail cars, and trucks. Products handled by BWC Harvey include asphalt, slurry oil, pet tar, coal tar, low sulfur fuel, creosote, caustic soda, and other special branded products. The products are stored in above ground storage tanks until further distribution to end users. The facility's current permit includes an affected source under 40 CFR 60 Subpart JJJJ - NSPS for Stationary Spark Ignition Internal Combustion Engines and 40 CFR 63 Subpart ZZZZ - NESHAP for Stationary Reciprocating Internal Combustion Engines, and affected sources under 40 CFR 60 Subpart Dc - NSPS for Small Industrial-Commercial-Institutional Steam Generating Units.

The facility was previously operated as Chemtura Corporation – Gretna Facility ("Chemtura"). On December 17, 2009, Chemtura notified LDEQ that the facility had been shut down, decommissioned, demolished, and closed since 2008, and requested the closure of the site's air permit. BWC Harvey LLC, formerly Blackwater Harvey LLC, purchased the site from Chemtura on July 11, 2013, and applied for its initial permit to operate the facility as a for-hire bulk liquid terminal on August 19, 2013.

Section II – OBSERVATIONS

Prior to making entry to the facility, EPA inspectors conducted fenceline and community surveillance on March 21, 2022, from 4:22 pm to 4:52 pm, March 23, 2022, from 2:35 pm to 3:30 pm, and March 24, 2022, from 7:50 am to 8:15 am. We did not observe any visible emissions, and did not observe any hydrocarbon emissions with a Forward Looking Infrared (FLIR) optical gas imaging (OGI) camera. We perceived an asphalt odor along Fourth Street, outside of BWC Harvey's boundary, at 4.50 pm on March 21, 2022, but we could not identify the source of the odor.

A. Generators

BWC Harvey's air permit includes one emergency generator which has not been constructed/installed. There is no indication that BWC Harvey intends to install and operate the generator (***see Area of Concern (AOC) #1***).

B. Process Heater and Boilers

BWC Harvey operates two (2) process heaters and two (2) boilers with no emission control equipment. However, BWC Harvey's permit includes only one process heater (***see AOC #2***). We did not observe any visible emissions. I viewed the exhaust vents with a FLIR OGI camera and did not observe any hydrocarbon emissions. BWC Harvey is meeting emission limit requirements by using sweet natural gas as fuel. I reviewed fuel records and verified that BWC meets the fuel and recordkeeping requirements. BWC Harvey has also maintained the heater and boilers per manufacturer' specifications.

C. Storage Tanks and Loading Operations

BWC Harvey's air permit includes 53 storage tanks. Specific Requirement (SR) 27 of the permit requires that products which are stored in the tanks must have a true vapor pressure not exceeding 0.75 pounds per square inch (psia). The storage tanks are equipped with temperature gauges, and BWC Harvey monitors the temperature of each tank's contents during each shift to ensure that maximum temperatures required to meet the vapor pressure limits are not exceeded. I reviewed the temperature monitoring records and noted that BWC Harvey maintained product temperatures below the design maximum. A sample of the temperature monitoring record (Shift Steam Report) is included as **Appendix 3**.

During the inspection, we observed loading of fuel oil from a marine vessel to Tanks 1003 and 5080. The temperature at the tanks at the time of the inspection was about 90 degrees Fahrenheit (°F) and 100°F, respectively. We did not perceive any unusual or disagreeable odors, and did not observe any visible emissions. I viewed the tanks and ancillary equipment with a FLIR OGI camera and did not observe any hydrocarbon emissions. I reviewed storage tank operation and maintenance records, and noted that BWC Harvey's permit included tanks that have been demolished, not constructed, or not in service (***see AOC #3***).

SR 28 and SR 31 of BWC Harvey's permit require that toxic air pollutants (TAPs) and volatile organic compounds (VOCs) emissions from the tanks shall not exceed 10.00 tons/year and 64.79 tons/year, respectively. I reviewed emissions records for calendar years 2019 to 2022 and noted that BWC Harvey did not exceed the annual TAP and VOC emission limits.

I reviewed records of the volumes and types of material loaded, and noted that BWC Harvey maintained records as required by SR 26. I also noted that records were maintained for contents and throughput of each storage vessel on a monthly basis in accordance with SR 25.

D. Other Observations

In response to the several complaints regarding odor in the neighboring community, BWC Harvey, under no obligation by any statutory requirement, implemented corrective measures to address the community's concerns. BWC Harvey installed: two (2) odor neutralization systems on its asphalt holding tanks in October and November 2020; a 2000-pound capacity activated carbon adsorption system on the creosote tank in April 2021; and a 1000-pound capacity activated carbon adsorption system on its truck loading rack in March 2021. Photographs of the 2000-pound activated carbon adsorption system, and one of the odor neutralization systems are included as **Photo No. 1** and **Photo No. 2**, respectively in

Appendix 1. BWC Harvey also engaged a third party to conduct an industrial hygiene assessment at the facility. The audit report, excluding Appendices, is included as **Appendix 4**.

E. Forward Looking Infrared (FLIR) Optical Gas Imaging Surveillance

I used a FLIR OGI camera ("the camera") during the field inspection to look for the presence of hydrocarbon emissions. I used the camera to view specifically Tanks #s 16-2, 1003, 1204, 2505, 2507, 5052, 5055, 5057, and 5080 from ground level, and a broader view of all the tanks from the roof of Tank 5055. I used the camera to view loading of fuel oil from a ship to Tanks 1003 and 5080. I also used the camera to view process heater and boiler vents, compressors, and ancillary pipe works. I did not observe hydrocarbon emissions at any point during the field inspection.

Section III – AREAS OF CONCERN

1. BWC Harvey's air permit 1340-00005-12 includes a provision for the construction and installation of one (1) emergency generator, represented as EQT 0047. However, this generator has not been installed. Since BWC has not shown any intent to construct/install the generator, EQT 0047 with its associated emission representations should be removed from the permit.
2. BWC Harvey operates two (2) process heaters, but only one (1) heater (represented as EQT 0057) is included in the permit. BWC Harvey is potentially operating the second heater without appropriate emission authorization.
3. BWC Harvey's storage tank records show a total of 57 tanks, out of which five (5) have not been constructed or have been demolished, and two (2) which are out of service (i.e., constructed, but without associated lines to receive or transfer product). Tanks 26-1, 1207, and 2504 have not been constructed, and Tank 16-2 is not in service, but all three tanks are included in the permit. BWC Harvey should remove these tanks and associated emission representations from the permit since the facility has not shown the intent to construct and/or operate these tanks.

EPA Region 6 inspectors Prince Nfodzo and Aimee Boss conducted a closing conference for the inspection at BWC Harvey at 4:22 pm on March 24, 2022. During the closing conference, I presented preliminary findings of the inspection, and reviewed AOC #1, which was noted during the inspection. I informed the representatives of the review process that will follow the field inspection, and that the inspection report will be made public on EPA's web site. Additionally, AOC #s 2 and 3 were determined after the conclusion of the inspection, and were not included in the closing conference debriefing to BWC Harvey. The sign-in sheets for the opening and closing conferences are included as **Appendix 2**. Since no hydrocarbon emissions were observed with the FLIR OGI camera, there was no video recorded during the inspection, or included with this report.

Section IV – FOLLOW UP

After the EPA inspection team exited the Facility on March 24, 2022, BWC Harvey uploaded all the information requested during the inspection to an EPA shared OneDrive folder by April 1, 2022. On April 8, 2022, I had a follow-up call with BWC Harvey representatives to discuss some of the records provided, and also requested additional information regarding emissions records and safety data sheets (SDS) for each product BWC Harvey handles. The additional information regarding emissions records and SDS were uploaded to the shared folder by April 18, 2022. Additional information to supplement what was requested on site also was uploaded to the shared folder on April 18, 2022.

Section V – LIST OF APPENDICES

Appendix 1 – Photo Log – 2 photos taken 3/24/2022
Appendix 2 – Opening and closing conference sign-in sheets
Appendix 3 – Shift Steam Report
Appendix 4 – Industrial Hygiene Audit Report

Appendix 1

Photograph Log

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 1

Location: BWC Harvey Terminals		
City: Harvey	County/Parish: Jefferson	State: Louisiana

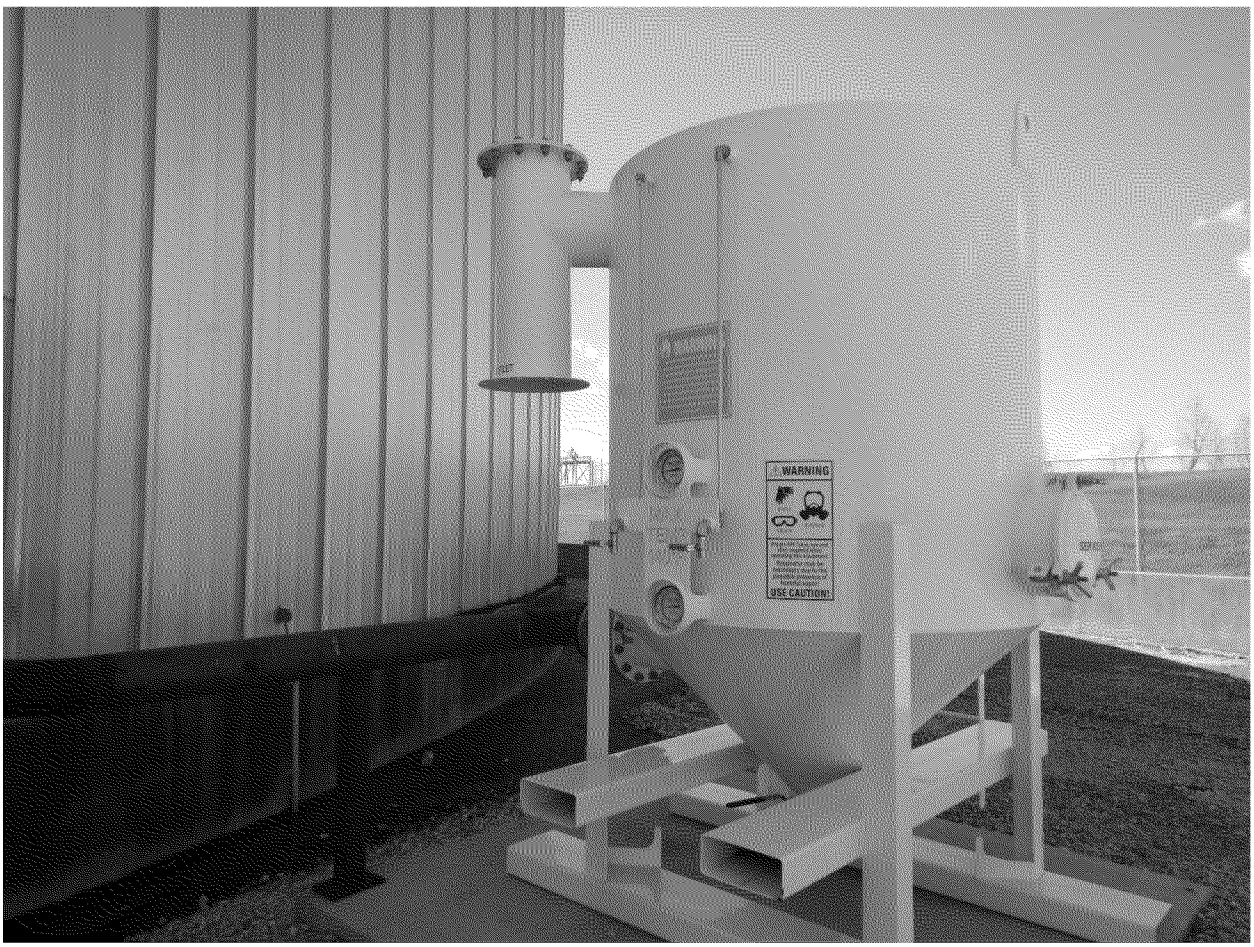

Photo File Name:	DSCN0774.JPG
Date of Photo:	March 24, 2022
Time of Photo:	2:25 pm
Photographer:	Aimee Boss
Description:	2000 lb Activated Carbon Adsorption System

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Photograph Log

Photo No. 2

Location: BWC Harvey Terminals		
City: Harvey	County/Parish: Jefferson	State: Louisiana

Photo File Name: DSCN0772.JPG
Date of Photo: March 24, 2022
Time of Photo: 2:34 pm
Photographer: Aimee Boss
Description: Odor Neutralization System

Appendix 2
Opening and closing conference sign-in sheets

Opening/Pre-Inspection Meeting

Commence opening/pre-inspection meeting 03/24/2022 Time: 8:36 am

Name	Title	Representing	Telephone No.
Prince Nfodzo	Environmental Engineer	EPA Region 6	(214) 665-7491
Aimee Boss	Physical Scientist	EPA Region 6	(214) 665-7397
Jessica Sista	HSEQ Manager	BWC Terminals	(504)340-3000
Jodi Holewka	Environmental Scientist	LDEQ	504-736-7748
BRIAN FONTENOT	SR. ENVIRONMENTAL SCIENTIST	LDEQ	337-262-5577
Blake Chatagnier	Terminal Manager	BWC Terminals	(504)558-4021
JACK FERNANDEZ	DIRECTOR OF OPS	BWC TERMINAL	504-610-6054

Conclude opening/pre-inspection meeting 03/24/2022 Time: 9:15

Initials / Date: PN / 3/24/22

Exit interview / Out-briefing Meeting

Commenced meeting March 24, 2022 Time: 4:22 pm

Name	Title	Representing	Telephone No.
Prince Nfodzo	Environmental Engineer	EPA Region 6	(214) 665-7491
Aimee Boss	Physical Scientist	EPA Region 6	(214) 665-7397
Jessica Sisto	HSEQ Manager	BWC Terminals	(504)340-3000
JACK FERNANDEZ	DIRECTOR OF OPS	BWC TERMINALS	504-610-6054
Jodi Holewka	Environmental Scientist	LDEQ	504 736 7748
BRIAN FONTENOT	SR. ENVIRONMENTAL SCIENTIST	LDEQ	337-262-5577
Blake Chatagnier	Terminal Manager	BWC Terminals	504-558-4021

Conclude meeting March 24, 2022 Time: 4:40 pm

Initials / Date: PN /

Appendix 3
Shift Steam Report

BW TERMINALS HARVEY DAILY SHIFT STEAM CHECK SHEET									
	Product Name	Time	Steam On or Steam Off	Tank Inventory Level	Current Temperature	Maximum Temperature per Customer	Tank Circulation or Sparging	Comments	Operator Initials
2501	XTOL 651	0700	Off			210			
		1500	Off						
		2300	Off	11-11-1/8 OUT	200		Off		A
2503	Liqrene D	0700	Off			210			
		1500	Off						
		2300	On	20-8-5/8 OUT	180		Off		A
1202	Morlife 5000	0700	Off			140			
		1500	Off						
		2300	Off	32-1-5/8 OUT	45		Off		A
1204	Morlife 5000	0700	Off			140			
		1500	Off						
		2300	Off	17-8-1/4 OUT	57		Off		A
1206	Morlife 5000	0700	Off			140			
		1500	Off						
		2300	Off	T/T	86		Off		A
5066	Pitch	0700	Off			210			
		1500	Off						
		2300	Off	6-3-3/8 OUT	190		Off		A
2507	Petroleum Tar	0700	Off			160			
		1500	Off						
		2300	Off	32-4-1/2 OUT	135		Off		A
2508	Coal Tar	0700	Off			160			
		1500	Off						
		2300	Off	46-1-15/16 OUT	79		Off		A
5067	Creosote	0700	Off			160			
		1500	Off						
		2300	Off	19-3-0 OUT	138		Off		A
1501	Clarified Oil	0700	Off			210			
		1500	Off						
		2300	Off	15-3-1/2 OUT	78		Off		A
2402	Clarified Oil	0700	Off			210			
		1500	Off						
		2300	Off	T/T	102		Off		A
2505	Slurry Oil	0700	Off			210			
		1500	Off						
		2300	Off	43-6-5/8 OUT	75		Off		A
2506	Slurry Oil	0700	Off			210			
		1500	Off						
		2300	Off	2-10-3/8 OUT	75		Off		A
2502	Asphalt	0700	Off			330			
		1500	Off						
		2300	On	23-2-3/8 OUT	325		Off		A
5053	Asphalt	0700	Off			330			
		1500	Off						
		2300	On	2-11-1/2 OUT	300		Off		A
5055	Asphalt	0700	Off			330			
		1500	Off						
		2300	On	9-1-0 OUT	325		Off		A
5057	Asphalt	0700	Off			330			
		1500	Off						
		2300	Off	9-9-3/4 out	250		Off		A
5058	Asphalt	0700	Off			330			
		1500	Off						
		2300	Off	32-6-3/4 OUT	155		Off		A
5068	Asphalt	0700	Off			330			
		1500	Off						
		2300	On	3-6-0 OUT	260		Off		A
5069	Asphalt	0700	Off			330			
		1500	Off						
		2300	Off	32-2-1/2 OUT	125		Off		A
5070	Asphalt	0700	Off			330			
		1500	Off						
		2300	Off	30-2-0 OUT	330		Off		A

5065	Membrane Caustic	0700	Off						
		1500	Off						
		2300	Off	11-5-1/4 OUT	78		Off		A
5075	Fuel Oil	0700	Off						
		1500	Off			120			
		2300	Off	6-8-1/4 OUT	69		Off		A
5076	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	28-8-1/8 OUT	70	120	Off		A
5077	Ultra Low Sulfur Diesel	0700	Off						
		1500	Off						
		2300	Off	38-0-1/4 OUT	61		Off		A
5078	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	3-1-7/8 OUT	82		Off		A
5079	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	32-7-1/8 OUT	62	120	Off		A
5080	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	10-5-3/4 OUT	87	120	Off		A
5081	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	25-7-1/8 OUT	100	120	Off		A
5082	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	37-7-7/8 OUT	100	120	Off		A
10002	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	9-6-5/16 OUT	93	120	Off		A
10003	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	4-11-15/16 OUT	90	120	Off		A
10004	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	38-1-3/4 OUT	80	120	Off		A
10005	Fuel Oil	0700	Off						
		1500	Off						
		2300	Off	45-5-0 OUT	55	120	Off		A

Appendix 4
Industrial Hygiene Audit Report

CTEH®

THE SCIENCE OF READY℠

BWC TERMINALS

IH ASSESSMENT

Harvey, Louisiana

Project Date May 7, 13, and 25, 2021

Project #114368

Report Submitted on June 16, 2021

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1.0 SUMMARY

On May 7, 13, and 25, 2021, an industrial hygienist from CTEH®, LLC (CTEH) conducted an industrial hygiene assessment at the BWC Terminals facility in Harvey, Louisiana. As part of the assessment, the industrial hygienist collected both personal and area air samples for benzene, toluene, ethyl benzene, and xylenes (BTEX) and total hydrocarbons as hexane, asphalt fumes as benzene-soluble fraction with total dust, coal tar pitch, and petroleum distillates in the breathing zones of workers while they performed routine job tasks. The industrial hygienist also collected area air samples for volatile organic compounds (VOCs) via EPA TO-15 around the perimeter of the facility for a twelve-hour period.

Two types of personal air samples were collected during the assessment: 8-hour Time-Weighted Average (TWA) samples and 15-minute Short-Term Exposure Limit (STEL) samples. All TWA personal air sampling results were below the Occupational Safety and Health Administration (OSHA) Action Level (AL), OSHA Permissible Exposure Limit—Time-Weighted Average (PEL-TWA), and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value—Time-Weighted Average (TLV-TWA) where applicable. Additionally, all STEL personal air sampling results were below the OSHA PEL-STEL, OSHAL PEL-Ceiling, and the ACGIH TLV-STEL where applicable.

Results of the area air samples for asphalt fumes as benzene-soluble fraction with total dust, coal tar pitch, and petroleum distillates were below the occupational exposure values (OEVs) set by OSHA and the ACGIH for an 8-hour TWA were established except for one sample for total dust taken along the North fence line on 5/25/21. Results for the Minican™ evacuated canister samples for VOCs were below OSHA and ACGIH OEVs and the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) where established.

2.0 BACKGROUND

BWC Terminals contacted CTEH and requested that an industrial hygienist perform an IH assessment, including both personal and area air sampling, at the BWC Terminals facility located in Harvey, Louisiana. The goal of this assessment was to evaluate potential employee and community exposures related to terminal operations. The terminal stores and ships petroleum products including asphalt, pitch, and slurry by means of tanker truck and rail car.

3.0 CTEH ACTIVITIES

On May 7, 13, and 25, 2021, a CTEH industrial hygienist conducted personal and area air sampling. During the assessment, 10 employees had air samples collected in their breathing zones. Additionally, area air samples were taken at four locations around the facility. Table 1 identifies the number of personal and area air samples collected during the assessment.

Table 1 Summary of Personal Air Samples and Noise Monitoring

Analyte(s)	Sample Type	Number Collected
BTEX and total hydrocarbons as hexane	TWA	4
BTEX and total hydrocarbons as hexane	STEL	2
Asphalt fumes as benzene-soluble fraction with total dust	TWA	4
Petroleum distillates	TWA	4
Coal tar pitch	TWA	4
Asphalt fumes as benzene-soluble fraction with total dust	Area	12
Petroleum distillates	Area	12
Coal tar pitch	Area	12
VOCs via EPA TO-15	Area	12
Total		**66**

3.1 Observations

During the industrial hygiene assessment, the CTEH industrial hygienist observed the work activities of the area operators. Tasks observed by the industrial hygienist included operator rounds, tank gauging, and truck loading. Two STEL samples were obtained for BTEX and total Hydrocarbons on two operators performing truck loading and tank gauging operations. These tasks were selected by site management. Historical weather data was obtained for each day of sampling to reference environmental conditions that may impact the sampling events. Wind direction, temperature, and humidity may dictate the concentrations of potential contaminants at each sample point. Table 2 provides a summary of tasks associated with each STEL sample.

Table 2 Summary of STEL Sample Activities

Name	Job Title	Task

3.1.1 Engineering Controls

Operators utilized a vapor recovery system located on the truck loading rack that recovered vapors emitted during the product loading process which controls the potential buildup of chemical vapors.

3.1.2 Personal Protective Equipment

Operators wore personal protective equipment including flame-resistant clothing, safety glasses, hard hats, ear plugs, and personal hydrogen sulfide monitors. Operators also utilized face shields for certain tasks with potential splash hazards.

3.1.3 Environmental Conditions

May 7, 2021

Time	Temperature	Dew Point	Humidity	Wind	Wind Speed	Wind Gust	Pressure	Precip.	Condition
12:53 AM	73 °F	56 °F	55 %	N	3 mph	0 mph	30.13 in	0.0 in	Fair
1:53 AM	65 °F	59 °F	81 %	CALM	0 mph	0 mph	30.12 in	0.0 in	Fair
2:53 AM	64 °F	59 °F	84 %	CALM	0 mph	0 mph	30.10 in	0.0 in	Fair
3:53 AM	63 °F	59 °F	87 %	W	3 mph	0 mph	30.10 in	0.0 in	Fair
4:53 AM	63 °F	59 °F	87 %	CALM	0 mph	0 mph	30.10 in	0.0 in	Fair
5:53 AM	63 °F	59 °F	87 %	CALM	0 mph	0 mph	30.11 in	0.0 in	Fair
6:53 AM	63 °F	59 °F	87 %	W	3 mph	0 mph	30.13 in	0.0 in	Fair
7:53 AM	71 °F	62 °F	73 %	WNW	3 mph	0 mph	30.16 in	0.0 in	Fair
8:53 AM	76 °F	57 °F	52 %	NNW	7 mph	0 mph	30.18 in	0.0 in	Fair
9:53 AM	76 °F	57 °F	52 %	NW	12 mph	0 mph	30.19 in	0.0 in	Fair
10:53 AM	78 °F	57 °F	48 %	NW	10 mph	0 mph	30.20 in	0.0 in	Fair
11:53 AM	81 °F	55 °F	41 %	VAR	6 mph	0 mph	30.18 in	0.0 in	Fair
12:53 PM	82 °F	53 °F	37 %	NNW	9 mph	0 mph	30.15 in	0.0 in	Fair
1:53 PM	83 °F	52 °F	34 %	NW	8 mph	0 mph	30.14 in	0.0 in	Fair
2:53 PM	85 °F	50 °F	30 %	NNW	10 mph	0 mph	30.12 in	0.0 in	Fair
3:53 PM	85 °F	51 °F	31 %	N	9 mph	0 mph	30.10 in	0.0 in	Fair
4:53 PM	85 °F	51 °F	31 %	NW	9 mph	0 mph	30.08 in	0.0 in	Fair
5:53 PM	84 °F	51 °F	32 %	NW	8 mph	0 mph	30.07 in	0.0 in	Fair
6:53 PM	82 °F	53 °F	37 %	NNW	7 mph	0 mph	30.07 in	0.0 in	Fair
7:46 PM	79 °F	58 °F	48 %	NNW	3 mph	0 mph	30.07 in	0.0 in	Fair
7:53 PM	79 °F	58 °F	48 %	NNW	3 mph	0 mph	30.07 in	0.0 in	Fair
8:53 PM	79 °F	57 °F	47 %	N	5 mph	0 mph	30.08 in	0.0 in	Fair
9:53 PM	76 °F	58 °F	54 %	NE	3 mph	0 mph	30.09 in	0.0 in	Fair
10:53 PM	77 °F	56 °F	48 %	ENE	5 mph	0 mph	30.08 in	0.0 in	Fair
11:53 PM	76 °F	56 °F	50 %	E	3 mph	0 mph	30.08 in	0.0 in	Fair

May 13, 2021

Time	Temperature	Dew Point	Humidity	Wind	Wind Speed	Wind Gust	Pressure	Precip.	Condition
12:53 AM	71 °F	62 °F	73 %	NE	12 mph	0 mph	30.15 in	0.0 in	Cloudy
1:53 AM	70 °F	62 °F	76 %	NE	9 mph	0 mph	30.13 in	0.0 in	Cloudy
2:53 AM	69 °F	62 °F	78 %	NE	7 mph	0 mph	30.12 in	0.0 in	Mostly Cloudy
3:53 AM	70 °F	62 °F	76 %	NE	10 mph	0 mph	30.13 in	0.0 in	Cloudy
4:53 AM	70 °F	61 °F	73 %	NE	9 mph	0 mph	30.13 in	0.0 in	Cloudy
5:53 AM	69 °F	61 °F	75 %	NNE	6 mph	0 mph	30.13 in	0.0 in	Mostly Cloudy
6:51 AM	70 °F	63 °F	78 %	NNE	10 mph	0 mph	30.15 in	0.0 in	Mostly Cloudy
6:53 AM	69 °F	62 °F	78 %	NE	9 mph	0 mph	30.15 in	0.0 in	Mostly Cloudy
7:05 AM	69 °F	62 °F	78 %	NE	10 mph	0 mph	30.16 in	0.0 in	Mostly Cloudy
7:53 AM	70 °F	62 °F	76 %	NE	10 mph	0 mph	30.17 in	0.0 in	Mostly Cloudy
8:00 AM	70 °F	62 °F	76 %	NE	10 mph	0 mph	30.17 in	0.0 in	Mostly Cloudy
8:53 AM	71 °F	61 °F	70 %	NE	9 mph	0 mph	30.18 in	0.0 in	Mostly Cloudy
9:53 AM	73 °F	61 °F	66 %	NNE	10 mph	0 mph	30.19 in	0.0 in	Partly Cloudy
10:53 AM	75 °F	61 °F	62 %	NE	9 mph	0 mph	30.20 in	0.0 in	Mostly Cloudy
11:53 AM	75 °F	61 °F	62 %	NNE	12 mph	0 mph	30.20 in	0.0 in	Partly Cloudy
12:53 PM	76 °F	60 °F	58 %	NNE	12 mph	21 mph	30.19 in	0.0 in	Partly Cloudy
1:53 PM	77 °F	58 °F	52 %	NE	13 mph	0 mph	30.18 in	0.0 in	Mostly Cloudy
2:53 PM	77 °F	59 °F	54 %	NE	10 mph	0 mph	30.17 in	0.0 in	Cloudy
3:53 PM	77 °F	58 °F	52 %	NNE	10 mph	0 mph	30.16 in	0.0 in	Mostly Cloudy
4:53 PM	77 °F	58 °F	52 %	NNE	12 mph	0 mph	30.15 in	0.0 in	Mostly Cloudy
5:53 PM	77 °F	58 °F	52 %	NNE	8 mph	0 mph	30.15 in	0.0 in	Mostly Cloudy
6:53 PM	76 °F	57 °F	52 %	VAR	7 mph	0 mph	30.14 in	0.0 in	Partly Cloudy
7:53 PM	75 °F	58 °F	55 %	NNE	5 mph	0 mph	30.17 in	0.0 in	Fair
8:53 PM	74 °F	58 °F	57 %	N	3 mph	0 mph	30.18 in	0.0 in	Fair
9:53 PM	74 °F	57 °F	55 %	NNE	5 mph	0 mph	30.19 in	0.0 in	Fair
10:53 PM	73 °F	57 °F	57 %	NE	6 mph	0 mph	30.21 in	0.0 in	Fair
11:53 PM	72 °F	57 °F	59 %	E	5 mph	0 mph	30.20 in	0.0 in	Fair

May 25, 2021

Time	Temperature	Dew Point	Humidity	Wind	Wind Speed	Wind Gust	Pressure	Precip.	Condition
12:53 AM	71 °F	62 °F	73 %	NE	12 mph	0 mph	30.15 in	0.0 in	Cloudy
1:53 AM	70 °F	62 °F	76 %	NE	9 mph	0 mph	30.13 in	0.0 in	Cloudy
2:53 AM	69 °F	62 °F	78 %	NE	7 mph	0 mph	30.12 in	0.0 in	Mostly Cloudy
3:53 AM	70 °F	62 °F	76 %	NE	10 mph	0 mph	30.13 in	0.0 in	Cloudy
4:53 AM	70 °F	61 °F	73 %	NE	9 mph	0 mph	30.13 in	0.0 in	Cloudy
5:53 AM	69 °F	61 °F	75 %	NNE	6 mph	0 mph	30.13 in	0.0 in	Mostly Cloudy
6:51 AM	70 °F	63 °F	78 %	NNE	10 mph	0 mph	30.15 in	0.0 in	Mostly Cloudy
6:53 AM	69 °F	62 °F	78 %	NE	9 mph	0 mph	30.15 in	0.0 in	Mostly Cloudy
7:05 AM	69 °F	62 °F	78 %	NE	10 mph	0 mph	30.16 in	0.0 in	Mostly Cloudy
7:53 AM	70 °F	62 °F	76 %	NE	10 mph	0 mph	30.17 in	0.0 in	Mostly Cloudy
8:00 AM	70 °F	62 °F	76 %	NE	10 mph	0 mph	30.17 in	0.0 in	Mostly Cloudy
8:53 AM	71 °F	61 °F	70 %	NE	9 mph	0 mph	30.18 in	0.0 in	Mostly Cloudy
9:53 AM	73 °F	61 °F	66 %	NNE	10 mph	0 mph	30.19 in	0.0 in	Partly Cloudy
10:53 AM	75 °F	61 °F	62 %	NE	9 mph	0 mph	30.20 in	0.0 in	Mostly Cloudy
11:53 AM	75 °F	61 °F	62 %	NNE	12 mph	0 mph	30.20 in	0.0 in	Partly Cloudy
12:53 PM	76 °F	60 °F	58 %	NNE	12 mph	21 mph	30.19 in	0.0 in	Partly Cloudy
1:53 PM	77 °F	58 °F	52 %	NE	13 mph	0 mph	30.18 in	0.0 in	Mostly Cloudy
2:53 PM	77 °F	59 °F	54 %	NE	10 mph	0 mph	30.17 in	0.0 in	Cloudy
3:53 PM	77 °F	58 °F	52 %	NNE	10 mph	0 mph	30.16 in	0.0 in	Mostly Cloudy
4:53 PM	77 °F	58 °F	52 %	NNE	12 mph	0 mph	30.15 in	0.0 in	Mostly Cloudy
5:53 PM	77 °F	58 °F	52 %	NNE	8 mph	0 mph	30.15 in	0.0 in	Mostly Cloudy
6:53 PM	76 °F	57 °F	52 %	VAR	7 mph	0 mph	30.14 in	0.0 in	Partly Cloudy
7:53 PM	75 °F	58 °F	55 %	NNE	5 mph	0 mph	30.17 in	0.0 in	Fair
8:53 PM	74 °F	58 °F	57 %	N	3 mph	0 mph	30.18 in	0.0 in	Fair
9:53 PM	74 °F	57 °F	55 %	NNE	5 mph	0 mph	30.19 in	0.0 in	Fair
10:53 PM	73 °F	57 °F	57 %	NE	6 mph	0 mph	30.21 in	0.0 in	Fair
11:53 PM	72 °F	57 °F	59 %	E	5 mph	0 mph	30.20 in	0.0 in	Fair

4.0 EXPOSURE STANDARDS AND GUIDELINES

OSHA has promulgated standards designed to protect the health and safety of workers from occupational exposure to air contaminants, including benzene (OSHA 29 CFR 1910.1000; 29 CFR 1910.1028;). Additionally, the ACGIH has developed guidelines to assist in the control of health hazards (ACGIH 2021a) (ACGIH 2021b). Although the ACGIH values are not enforceable, they are included for reference.

Results of personal samples collected during this assessment were compared to applicable occupational exposure values (OEVs) including the OSHA AL, OSHA PEL-TWA, OSHA PEL-STEL, OSHA PEL-Ceiling, ACGIH

TLV-TWA, and ACGIH TLV-STEL where established. Evacuated canister air samples for VOCs were compared to the OSHA PEL-TWA, ACGIH TLV-TWA, and ATSDR MRLs where established.

5.0 METHODS

5.1 Personal and Area Air Sampling

Personal and area air samples for BTEX and total hydrocarbons, EPA TO-15 analytes, and asphalt fumes as benzene-soluble fraction with total dust, coal tar pitch, and petroleum distillates were analyzed using the sampling methods outlined in Table 3.

Table 3 Summary of Air Sampling Methods

Method	Analyte	Sample Type[1]	Sampling Media	Flow Rate[2]	LOQ[3]
NIOSH 1501/1501M	BTEX and total hydrocarbons as hexane	Passive	525 assay badges	Passive	Varies
		Active	226-01 sorbent tubes	0.2 L/min	Varies
NIOSH 5042	Asphalt fumes as benzene-soluble fraction with total dust	Active	Pre-weighted PTFE Cassette	1-4	30
NIOSH 1550	Petroleum distillates	Active	226-01 sorbent tubes	0.01-0.2	50
OSHA 58	Coal tar pitch	Active	GFF Cassette	2.0	60
OSHA PV2120/EPA TO-15	VOCs	Active	Minican™ evacuated canister	NA	NA

[1]TWA = Time-Weighted Average; STEL = Short-Term Exposure Limit
[2]L/min = liters per minute
[3]LOQ = Limit of Quantitation determined by the laboratory
µg = micrograms; L/min = liters per minute

Active samples for BTEX and total hydrocarbons as hexane, asphalt fumes as benzene-soluble fraction with total dust, petroleum distillates, and coal tar pitch were collected using sampling pumps attached to media specified in each respective sampling method. Before and after each use, the volumetric airflow rate for each pump was calibrated using a BIOS DryCal Defender primary flow meter. After connecting the sampling media to the flow meter, the pump was activated, the flow rate was allowed to stabilize, and three consecutive airflow measurements were taken. The average of these measurements was recorded as the flow rate. Each pump was calibrated in the flow rate range specified in the sampling method. The active air samples for VOCs via EPA TO-15 were conducted using evacuated canisters and an air intake regulator.

Both active and passive personal air samples were collected in the workers' breathing zones to best represent their exposure. The breathing zone is defined by OSHA in its Technical Manual as a hemisphere forward of the shoulders within a radius of approximately six to nine inches from the nose or mouth. Analytical air samples were obtained utilizing a sample collection tripod to collect air approximately four feet above the ground.

As a quality control measure, field blanks were also collected, and all air samples and field blanks were sent to Analytics Corporation and Pace Analytical Laboratory, which are an American Industrial Hygiene Association-accredited laboratory under a chain of custody.

6.0 RESULTS AND DISCUSSION

A summary of personal air sampling results compared to applicable OEVs is provided in Appendix A. Area air monitoring results and OEVs are provided in Appendix B, and evacuated canister VOC sampling results are provided in Appendix C. The laboratory reports are provided in Appendix D, and employee notification letters are provided in Appendix E.

6.1 Air Sampling Discussion

6.1.1 Personal Air Sampling Discussion

All personal air sampling results were below OSHA and ACGIH OEVs where established.

6.1.2 Area Air Sampling Discussion

Results of the area air samples for asphalt fumes as benzene benzene-soluble fraction with total dust, coal tar pitch, and petroleum distillates were below the occupational exposure values set by OSHA TLV-TWA, ACGIH TLV-TWA where applicable except for one total dust sample taken along the North fence line on 5/25/21 which was over the OSHA and ACGIH OEL. Detectable levels of asphalt fumes as benzene-soluble fraction were detected along the West, South, and East fence line samples on 5/7/21 and North fence line sample on 5/25/21 but were below the OEL established by the ACGIH. The sample along the North fence line on 5/25/21 was greater than ½ the OEL established by the ACGIH for asphalt fumes as benzene-soluble fraction. Currently, there are no defined 24-hour OSHA or ACGIH OELs to compare the Minican™ evacuated canister samples to. Because of this, the Minican™ evacuated canister samples were compared to available 8-hour OELs set by OSHA and ACGIH. Results for the Minican™ evacuated canister samples for the EPA TO-15 analytes were below the OSHA and ACGIH 8-hour TWA and the ATSDR MRLs where applicable.

7.0 REPRESENTATIVENESS

The tasks performed on May 7, 13, and 25, 2021, are considered representative of normal activities and work practices associated with BWC Terminals based upon conversations with management and other employees.

8.0 CONCLUSION

Results of the personal and area air sampling conducted at BWC Terminals in Harvey, Louisiana, on May 7, 13, and 25, 2021, were below OEVs established by OSHA, ACGIH, and the ATSDR where established with the exception of one sample along the North Fence line on 5/25/21 for total dust.

9.0 RECOMMENDATIONS

The following recommendations are based on the sampling and monitoring conducted at BWC Terminals in Harvey, Louisiana.

- Notify workers of their individual air sampling results within 15 days of receipt of the final report.
- Routine area and personal monitoring for asphalt fumes as benzene-soluble fraction and total dust.
- The workplace may need to be re-evaluated if the following occur:
  - If the conditions in the facility change,
  - If new processes are added, and/or
  - If significant changes are made to existing processes.

10.0 REFERENCES

ACGIH (2021a) Documentation of Threshold Limit Values and Biological Exposure Indices. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists.

ACGIH (2021b) Guide to Occupational Exposure Values. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists.

Andrews, R. and O'Connor, P. F. (eds.) (2020) NIOSH Manual of Analytical methods (NMAM). 5th edn: NIOSH. Available at: https://www.cdc.gov/niosh/nmam/pdf/NMAM_5thEd_EBook-508-final.pdf

OSHA. Air contaminant--permissible exposure limits 29CFR1910.1000. Available at: https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9991.

Response to Comments from JOIN:

General: Thank you for your interest in the LDEQ 2022 Annual Monitoring Network Plan (AMNP) and for your comments. LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan are beyond the scope of the AMNP.

Comment: While LDEQ (incorrectly) claims that the data cannot be compared to NAAQS, EPA has correctly observed that "the data indicated the potential for values above the standard." Simply put, the best available science (generated by LDEQ) suggests an exceedance of the $PM_{2.5}$ NAAQS in the Irish Channel. If LDEQ considered the data unreliable, the logical next step would be to collect additional data using robust methodology.

Response: LDEQ acknowledges the receipt of this comment. Please note, the Irish Channel monitoring site is a Temporary Located Community (TLC) monitoring site and, as such, is not federally required and beyond the scope of this plan. (See LDEQ's website for more information regarding TLC monitoring: https://www.deq.louisiana.gov/page/tlc-air-monitoring). However, the data generated at this site is reliable. Additionally, LDEQ chose to use the BAM1020 Federal Equivalent Method (FEM) sampler because, unlike filter based Federal Reference Method (FRM) samplers, the BAM provides near real time continuous data. LDEQ monitors the BAM data, other analyzers operating at the site and meteorological conditions (wind speed, direction) to attempt to determine a potential source of odors. However, over the monitoring period, LDEQ was unable to link complaints with a source.

Comment: The LDEQ has *never* met with residents of the Irish Channel to answer questions about the monitoring data collected in their neighborhood. The LDEQ presentation of air monitoring data to the New Orleans City Council in December 7, 2021 did not constitute community engagement, since residents were not permitted to ask LDEQ questions at that presentation. At that meeting, LDEQ staff told City Councilmembers that there were no significant findings from the air monitor and did not disclose the evidence for a PM2.5 exceedance.

Response: LDEQ acknowledges the receipt of this comment. Please note, the Irish Channel monitoring site is a Temporary Located Community (TLC) monitoring site and, as such, is not federally required and beyond the scope of this plan.

Comment: A larger concern is that LDEQ – a chronically underfunded agency is spending staff time and money collecting air quality data that cannot be compared against the NAAQS.

Response: LDEQ acknowledges the receipt of this comment. Please note, the Irish Channel monitoring site is a Temporary Located Community (TLC) monitoring site and, as such, is not federally required and beyond the scope of this plan.

LDEQ disagrees with JOIN's assertion that monitoring for any constituent other than the criteria pollutants is a waste of department resources. See previous responses regarding VOC sampling conducted by LDEQ.

LDEQ met with JOIN, via Zoom, on two occasions prior to the establishment of the Irish Channel monitoring site. At this meeting, concerns were presented to LDEQ regarding the potential presence of polycyclic aromatic hydrocarbons (PAHs) in the area. In response to these concerns, LDEQ conducted sampling for PAHs, even though PAHs are not normally part of the list of constituents monitored at TLC sites. Sampling for PAHs is costly and require significant staff time. The analyte list of PAHs do not contain any criteria pollutants, and are therefore not comparable to a NAAQS. Additionally, other concerns such as H_2S, methane, and THC are not criteria pollutants and similarly are not comparable to a NAAQS.

Comment: A petrochemical terminal facility in the neighborhood, BWC Harvey, reported that an air quality sample collected on May 25, 2021 along its north fenceline exceeded the OSHA and ACGIH standards for total dust. Thus, the best available evidence indicates that the residents of Harvey are exposed to unsafe levels of particulate matter.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as OSHA and ACGIH standards, are beyond the scope of the AMNP.

Comment: The LDEQ must also improve its practices for receiving and responding to reports of air quality problems from residents.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as citizen complaints, are beyond the scope of the AMNP.

Comment: These reports are relevant to LDEQ's air monitoring plan, because when considered holistically, they can provide unique and valuable information about local air quality that can inform LDEQ's siting of monitors.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as citizen complaints, are beyond the scope of the AMNP.

For federally required sites, LDEQ adheres to the siting requirements provided in 40 C.F.R. Part 58, Appendix E. However, TLC monitoring sites are not federally required, and are sited and operated at the discretion of LDEQ. LDEQ relies on these reports to determine future locations. The installation of the Irish Channel TLC site is a great example of the importance of these air reports and how they are used.

Comment: The LDEQ needs to recognize that air quality problems can exist in situations where facilities are complying with permit requirements. Further, LDEQ needs to recognize the transient nature of air quality problems and end its practice of dispatching investigators to conduct "surveillance" during times when residents are not reporting air quality problems. In short, LDEQ must make significant changes to remove barriers and bias from

its system for handling air quality problems in neighborhoods.

Response: LDEQ's Annual Monitoring Network Plan (AMNP) and the activities detailed in this plan are used to determine Louisiana's compliance with the National Ambient Air Quality Standards (NAAQS). Other issues not associated with this plan, such as permitting and surveillance concerns, are beyond the scope of the AMNP.

Measurement of total $PM_{2.5}$ mass (nonvolatile plus semivolatile) with the Filter Dynamic Measurement System tapered element oscillating microbalance monitor

Brett D. Grover,[1] Michael Kleinman,[1] Norman L. Eatough,[1] Delbert J. Eatough,[1] Philip K. Hopke,[2] Russell W. Long,[3] William E. Wilson,[3] Michael B. Meyer,[4] and Jeffrey L. Ambs[4]

Received 7 May 2004; revised 23 September 2004; accepted 2 December 2004; published 7 April 2005.

[1] Field studies have been performed in Lindon, Utah (February 2003) and Rubidoux, California (July 2003) to determine if the Rupprecht and Patashnick (R&P) Filter Dynamic Measurement System (FDMS) determines total fine particulate mass, including the semivolatile ammonium nitrate and organic material. Collocated measurements were made with the FDMS, a conventional tapered element oscillating microbalance (TEOM) monitor with a heated filter, an R&P differential TEOM monitor, the Brigham Young University (BYU) Real-Time Total Ambient Mass Sampler (RAMS), the BYU particle concentrator-organic sampling system (PC-BOSS), a $PM_{2.5}$ Federal Reference Method (FRM), a $PM_{2.5}$ speciation sampler, an R&P continuous nitrate monitor, and two Sunset continuous carbon monitors (one to measure quartz filter-retained particulate carbon and one to measure particulate semivolatile carbonaceous material lost from the particles on a filter during sampling). The RAMS and PC-BOSS samplers have been shown to determine fine particulate material, including both the semivolatile and the nonvolatile components. Linear regression analysis at the Lindon site between the FDMS (X) and the PC-BOSS (Y), and the FDMS (X) and the RAMS (Y), resulted in zero-intercept slopes of 1.01 ± 0.06 ($r^2 = 0.63$) and 1.00 ± 0.01 ($r^2 = 0.69$), respectively. At the Rubidoux sampling site, linear regression analysis between the PC-BOSS (X) and the FDMS (Y) gave a zero-intercept slope of 0.96 ± 0.02 ($r^2 = 0.90$). Linear regression analysis between the FDMS (X) and the RAMS (Y) resulted in a zero-intercept slope of 0.99 ± 0.01 ($r^2 = 0.80$). Measurements made at the two sites indicate that the FDMS and the R&P differential TEOM monitors do measure total fine particulate mass, including the semivolatile ammonium nitrate and organic material. Both the heated TEOM monitor and $PM_{2.5}$ FRM did not measure the semivolatile material. The difference between the FDMS and a heated TEOM monitor was explained by the semivolatile ammonium nitrate and organic material measured by the various chemical composition monitors.

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1. Introduction

[2] It is desirable to monitor fine particulate mass on a continuous basis. Such data would allow for the better understanding of atmospheric processes and sources which contribute to fine particulate pollution and for timely public reporting and forecasting of air pollution exposure. An instrument commonly used for this purpose is the Tapered Element Oscillating Microbalance (TEOM) monitor [*Patashnick and Rupprecht*, 1991]. However, semivolatile nitrate and organic material associated with fine particles is not accurately measured with a conventional TEOM monitor because the filter is heated to avoid collection of particle-bound water [*Long et al.*, 2003; *Mignacca and Stubbs*, 1999]. The real time total ambient mass sampler (RAMS) [*Eatough et al.*, 2000, 2003] is a modified TEOM monitor with a combination of a particle collection filter (TX40) and a charcoal-impregnated, glass-fiber filter on the oscillating tapered element of a TEOM monitor to retain the semivolatile species and allow determination of total

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fine particulate material mass, including the semivolatile species. The RAMS uses diffusion denuders and Nafion dryers to remove interfering gas phase material, including water, from the aerosol prior to the collection of particles. While the RAMS does measure total fine particulate mass, including the semivolatile ammonium nitrate and semivolatile organic components, the sampler is not suitable for routine use in field sampling because it requires regular observation and maintenance.

[3] R&P recently developed the differential TEOM monitor as a reference standard for particulate matter mass as described by *Patashnick et al.* [2001], and subsequently developed the Filter Dynamics Measurement System (FDMS) [*Meyer et al.*, 2002], both of which attempt to correct for loss of semivolatile species from the TEOM filter by alternately making measurements with particle-containing and particle-free air passing through the filters on the tapered element oscillating microbalance of a TEOM monitor. In this study, the new FDMS monitor is being evaluated by comparison of measurements with a RAMS and a differential TEOM system similar to that described by *Meyer et al.* [2002]. In addition, integrated average particulate mass and composition data were obtained using a particle concentrator-Brigham Young University organic sampling system (PC-BOSS) [*Lewtas et al.*, 2001], which provides an alternate method for measurement of nonvolatile and semivolatile species, to allow interpretation of any differences which may be seen between the FDMS and RAMS monitors. Measurements have been made during field studies in January–February 2003 in Lindon, UT and July 2003 in Rubidoux, CA. This paper compares the various results from these studies related to the measurement of semivolatile fine particulate material with the FDMS monitor.

2. Experimental Sampling Methods

2.1. R&P TEOM Monitor

[4] One-hour averaged, nonvolatile $PM_{2.5}$ mass concentrations were determined using an R&P TEOM monitor heated above ambient temperature to avoid water condensation [*Patashnick and Rupprecht*, 1991]. As stated above, semivolatile PM will evaporate at the standard operating temperature of the instrument (50°C, 30°C during winter months), which is required to remove particle-bound water [*Eatough et al.*, 2003; *Long et al.*, 2003; *Mignacca and Stubbs*, 1999]. This technique measures nonvolatile PM. In this study we used the TEOM to obtain a direct measurement of the mass without the corrections normally used to give better agreement with the Federal Reference Method (FRM) samplers.

2.2. R&P FDMS

[5] The Rupprecht and Patashnick Filter Dynamics Measurement System (FDMS, Series 8500) is designed to account for both the semivolatile and nonvolatile components of particulate matter, reporting the combination as a mass concentration result. This result is accomplished by measuring the semivolatile portion of the sample independently from the total incoming sample, and using this fraction in calculating the $PM_{2.5}$ mass concentration. To accomplish this, the FDMS unit constantly samples ambient air and uses a switching valve to change the path of the main flow every 6 min. The sampling process consists of an alternate sample and purge (filtered) air stream passing through the exchangeable filter in the TEOM mass sensor. The purge filter in the FDMS removes aerosols at 4°C prior to passage of the sampled air to the TEOM monitor. The sample and purge air flows alternately pass through the exchangeable filter in the TEOM microbalance, which generates a direct measurement of the collected mass. The system automatically adjusts the mass concentrations from the particle-laden air stream by correcting the measurement for the mass change that may occur during purging. For example, if the FDMS unit measures a decrease of filter mass during the 6-min purging period prior to or after collection of particle-laden air, this mass decrease is added back to the mass measurement obtained with the particle-laden air.

2.3. R&P Differential TEOM Monitor

[6] The differential TEOM monitor is an R&P research instrument which incorporates a modification of the technology used in the FDMS. Instead of removing the particles with a cold filter in the purge step of the measurement, the differential TEOM removes the particles with an electrostatic precipitator [*Meyer et al.*, 2002; S. Yi et al., Evaluation of a prototype electrostatic precipitator (ESP) for a differential TEOM system, submitted to *Aerosol Science and Technology*, 2004]. Calculation of the $PM_{2.5}$ concentration is then based on the measurement of mass with a TEOM microbalance during the particle-laden air cycle, corrected for any mass loss measured from the TEOM monitor filter when the particles are removed with the electrostatic precipitator before or after the particle-laden air measurement period.

2.4. RAMS

[7] The Real-Time Total Ambient Mass Sampler (RAMS), based on diffusion denuder, Nafion dryer and TEOM monitor technology, was used for the real-time determination of total $PM_{2.5}$ mass, including semivolatile species [*Eatough et al.*, 2000]. The RAMS measures total $PM_{2.5}$ mass with a TEOM monitor using a sandwich filter to retain semivolatile ammonium nitrate and organic material which may be lost from particles in a conventional TEOM monitor. The sandwich filter consists of a Teflon-coated particle collection filter (R&P TX40) followed by a charcoal-impregnated glass fiber filter (CIG, Schleicher and Schuell, Dassell, Germany) to collect any semivolatile compounds lost from the particles during sampling.

[8] Care must be taken to remove from the sample stream all gas phase species that can be absorbed by the CIG filter in order to prevent over-determination of $PM_{2.5}$ mass. Gas removal is accomplished with a series of denuders to remove gas phase organic compounds, O_3, NO_2, SO_2 and HNO_3 and two Nafion dryers to remove gas phase water. The configuration and operation of the RAMS as used in this study has been previously described [*Eatough et al.*, 2000, 2003; *Long et al.*, 2003]. The configuration includes an active blank sampler to monitor and correct for gas phase compounds not removed before the sandwich filter which can be sampled with the CIG. RAMS data were averaged over 1-hour periods for each of the two studies for comparison with 1-hour averaged FDMS, differential TEOM

and conventional heated filter TEOM data. The RAMS data were also averaged as needed for comparison with results obtained with the PC-BOSS sampler.

2.5. PC-BOSS

[9] The combination of technology used in the High-Volume Brigham Young University Organic Sampling System (BIG BOSS) [*Tang et al.*, 1994] and the Harvard particle concentrator [*Sioutas et al.*, 1994] has resulted in the Particle Concentrator-Brigham Young University Organic Sampling System (PC-BOSS) [*Ding et al.*, 2001; *Lewtas et al.*, 2001]. The configuration and operation of the PC-BOSS has been previously described [*Eatough et al.*, 2003; *Lewtas et al.*, 2001].

[10] The PC-BOSS was used for sample collection to determine fine particulate mass, sulfate, carbonaceous material (elemental and organic), nitrate, semivolatile organic material, and semivolatile nitrate. Samples for the chemical characterization of $PM_{2.5}$ in the minor flow following a particle concentrator and a BOSS diffusion denuder were collected in a filter pack containing a prefired 47 mm quartz filter (Pallflex) followed by 47 mm charcoal impregnated glass fiber filter (CIG, Schliecher and Schuell, Dassel, Germany) to determine fine particulate carbonaceous material and nitrate, including semivolatile species lost from the particles during sampling. A second parallel filter pack containing a 47 mm Teflon (Whatman) filter followed by a 47 mm Nylon (Gelman, Nylasorb) filter was used to determine $PM_{2.5}$ filter retained (nonvolatile) mass, sulfate and nitrate, and any nitrate lost from the particles during sample collection. A side flow filter pack, prior to the particle concentrator, contained a 47 mm polycarbonate (Whatman, Nuclepore, 0.4 m pore size) filter followed by a 47 mm CIG to collect particles (excluding semivolatile species lost during sampling) and gas phase organic material after the 2.5 m outlet cut. The various quartz and CIG filter collection areas were reduced to 4 cm^2 with a stainless steel mask to improve measurement sensitivity. The side-flow data were compared to data from the minor flow filters to determine the particle concentrator efficiency [*Ding et al.*, 2001; *Lewtas et al.*, 2001]. Multiple 3-hour samples were collected at selected times periods at each sampling site for comparison with 3- or 6-hour averaged FDMS TEOM, differential TEOM and RAMS results.

[11] Temperature Programmed Volatilization [*Tang et al.*, 1994; *Ellis and Novakov*, 1982] was used in the analysis of collected samples for total carbonaceous material. In this method, a 2 cm^2 portion of each filter is heated from ambient to a final temperature at a known ramp rate. The ramp rate and termination temperatures are dependent on the type of filter being analyzed. Quartz filters are heated to 800°C in an N_2/O_2 atmosphere. Charcoal impregnated filters are heated to 450°C in an N_2 atmosphere. Carbon in compounds desorbed from the filters during the heating process is catalytically converted to CO_2 and detected by nondispersive infrared absorption. Sulfate and nitrate concentrations were determined by ion chromatography.

2.6. R&P Continuous Nitrate Monitor

[12] Hourly average fine particulate nitrate were determined using an R&P Model 8400N nitrate monitor [*Long and McClenny*, 2004].

2.7. Sunset Laboratory Carbon Aerosol Field Instruments

[13] The Sunset instrument is a semicontinuous, real-time carbon aerosol analysis monitor. The inlet is a 2.5 μm sharp cut cyclone (R&P) with a total flow of 16 L/m. Eight L/m of the flow goes to the carbon monitor and the remaining flow is directed to a modified Sunset instrument described below. After the flow split, the sampled air passes through a parallel plate charcoal impregnated filter denuder similar to that described for the BYU RAMS [*Eatough et al.*, 2000] and supplied by Sunset Laboratory with the instrument. This denuder is intended to remove gas phase organic compounds which can be absorbed by a quartz filter, thus eliminating any positive quartz filter artifact for the data obtained with the monitor [*Eatough et al.*, 2003; *Turpin and Huntzicker*, 1994]. The particles in the sampled air stream are then collected on an 12.3 mm diameter quartz filter for a controlled time period (45 min in the study reported here). Sample collection is then interrupted and the sample analyzed, using a volatilization method comparable to the NIOSH Method 5040. Instruments were used which had either an FID (Lindon site) or an NDIR (Rubidoux site) detector. The data analysis step is followed with a calibration step for each analysis.

[14] A second Sunset Monitor was modified to allow for the determination of semivolatile organic carbonaceous material, SVOC, lost from particles during the 45 min sample collection period. The modified instrument sampled the second of the two split flow lines after the sharp cut cyclone inlet. A diffusion denuder, identical to that used in the unmodified instrument, removed gas phase material with an expected efficiency of better than 99%. After the removal of the gas phase material, the particles were removed from the sampled air stream immediately before the entrance to the Sunset Monitor using a prefired (800°C) 47-mm quartz filter in a MACE in-line Teflon filter holder. The particle-free air (with any SVOC lost from the particles during sample collection) passed into the filter collection region of the Sunset Monitor. The quartz filter normally used in the unmodified instrument was preceded by a charcoal impregnated glass fiber filter (CIG, Schleicher and Schuell, Dassell, Germany). The quartz filter was kept after the CIG to provide additional support for the CIG filter. Any SVOC lost from particles collected on the inlet quartz filter were collected with high efficiency by this CIG filter. At the end of the 45 min sample period, the SVOC collected on the CIG were analyzed by thermal evolution. This analysis was done in a three-step temperature program in a He atmosphere to separate any gas phase VOC not removed by the denuder from fine particulate SVOC. Details of the measurements with the two Sunset instruments have been published [*Grover et al.*, 2004].

2.8. Sample Collection

[15] Initial studies were conducted in February 2003 in Lindon, UT. The Lindon sampling site has been previously described [*Long et al.*, 2003]. In these experiments, results obtained with the FDMS were compared to 1-hour averaged fine particulate mass determined with a conventional TEOM monitor operated at 30°C, to results obtained with a RAMS, and also to fine particulate mass determined in 3-hour integrated samples with the PC-BOSS. More extensive

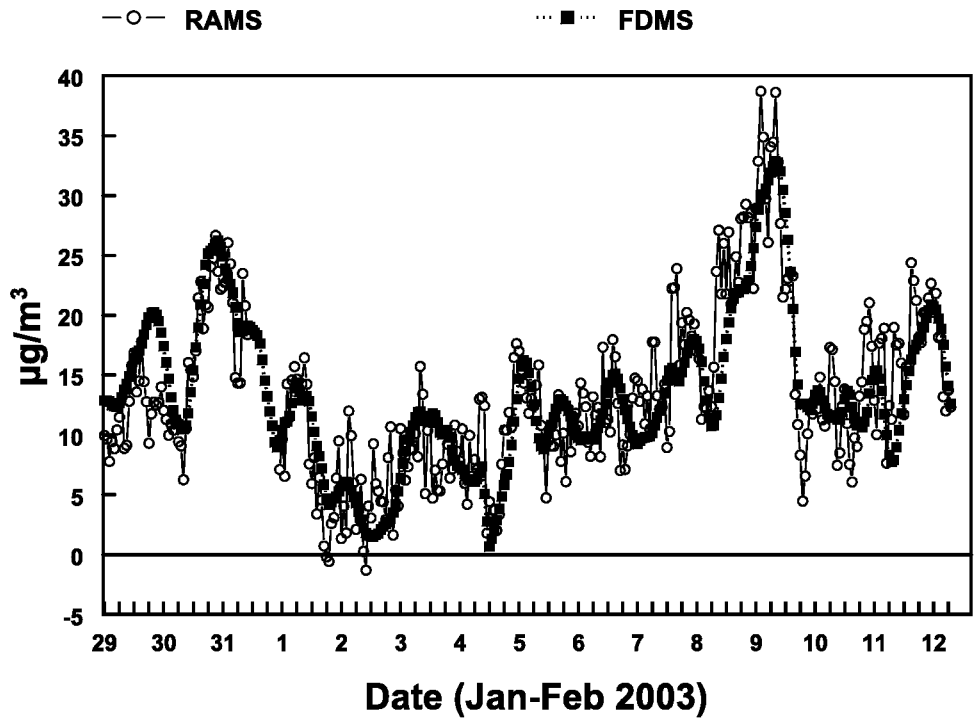

Figure 1. Data from the Lindon 2003 study. One-hour average $PM_{2.5}$ mass determined with the RAMS and FDMS in Lindon, UT, during January and February 2003.

studies were conducted during July 2003 at the SCAQMD sampling site in Rubidoux, CA. In these studies, both the FDMS and differential TEOM monitors were used. Results were compared with 1-hour averaged RAMS and TEOM monitor measurements, 1-hour average R&P particulate nitrate measurements, 1-hour average Sunset Laboratory nonvolatile and semivolatile C measurements, and 3-hour integrated PC-BOSS sampler results. Particle separation for all continuous mass measurements was done with an R&P PM_{10} 16.67 L/min inlet followed by an R&P 2.5 µm Sharp Cut Cyclone.

3. Results

3.1. Lindon Study FDMS and RAMS Results

[16] One-hour average $PM_{2.5}$ mass measured in Lindon, UT during a two week period in January–February 2003 using the RAMS, and the FDMS are given in Figure 1. As indicated, there was good agreement between the RAMS and the FDMS results as shown in Figure 2 and Table 1. Linear regression analysis results and the bias corrected precision of the comparison are given in Table 1. The precision of the comparison is limited by the expected ±2 to 3 µg/m^3 uncertainty in the RAMS data [*Eatough et al.*, 2003; *Long et al.*, 2003]. The uncertainty in the comparison is $\sigma = \pm 2.8$ µg/m^3 (±21%), consistent with the expected precision of the RAMS results and therefore, within the precision of the RAMS measurement the RAMS and FDMS results agreed.

3.2. Rubidoux Study FDMS, Differential TEOM, and RAMS Results

[17] Both an FDMS and a differential TEOM monitor were used at Rubidoux. The results obtained with these two instruments when both instruments were operational are given in Figure 2a. The two measurements are generally in good agreement. Significant exceptions occurred only at peak concentrations. Of the total 474 data points, the 38 peak values have FDMS concentrations which are biased 21 µg/m^3 higher than the differential TEOM concentrations. The reasons for this bias are not currently understood. Linear regression analysis of the FDMS and differential TEOM data, (excluding the 38 peak concentrations; see remaining data in Figure 3) are shown in Table 1. The average concentration is 34.6 µg/m^3 and the FDMS concentrations are biased only 1.2 µg/m^3 higher than the differential TEOM concentrations. The bias corrected uncertainty in the comparison is $\sigma = \pm 3.8$ µg/m^3 (±11%).

[18] Comparison between the FDMS and RAMS measurements are shown in Figure 2b. Note that the data points in Figures 2a and 2b are not completely the same because of some differences in when the various instruments were producing valid data. The very high concentrations in Figure 2b are associated with fireworks and a local fire near the Rubidoux site on the night of 4 July. Differential TEOM data were not obtained during the 4 July time period. The FDMS and RAMS measurements are generally in agreement. The uncertainty in the RAMS data during the 1 to 9 July period is about three times larger than that of the RAMS data during the latter part of the study. The poor precision was due to incomplete control of humidity in the RAMS measurements during the first part of the study. The humidity control in the RAMS was improved after 9 July. This same problem was evident in only a small fraction of the samples after 18 July. Linear regression analysis statistic of the FDMS and RAMS data (for the valid data during both the 1–9 and 18–31 July time periods) are given in Table 1. The uncertainty in the comparison is $\sigma = \pm 5.8$ µg/m^3

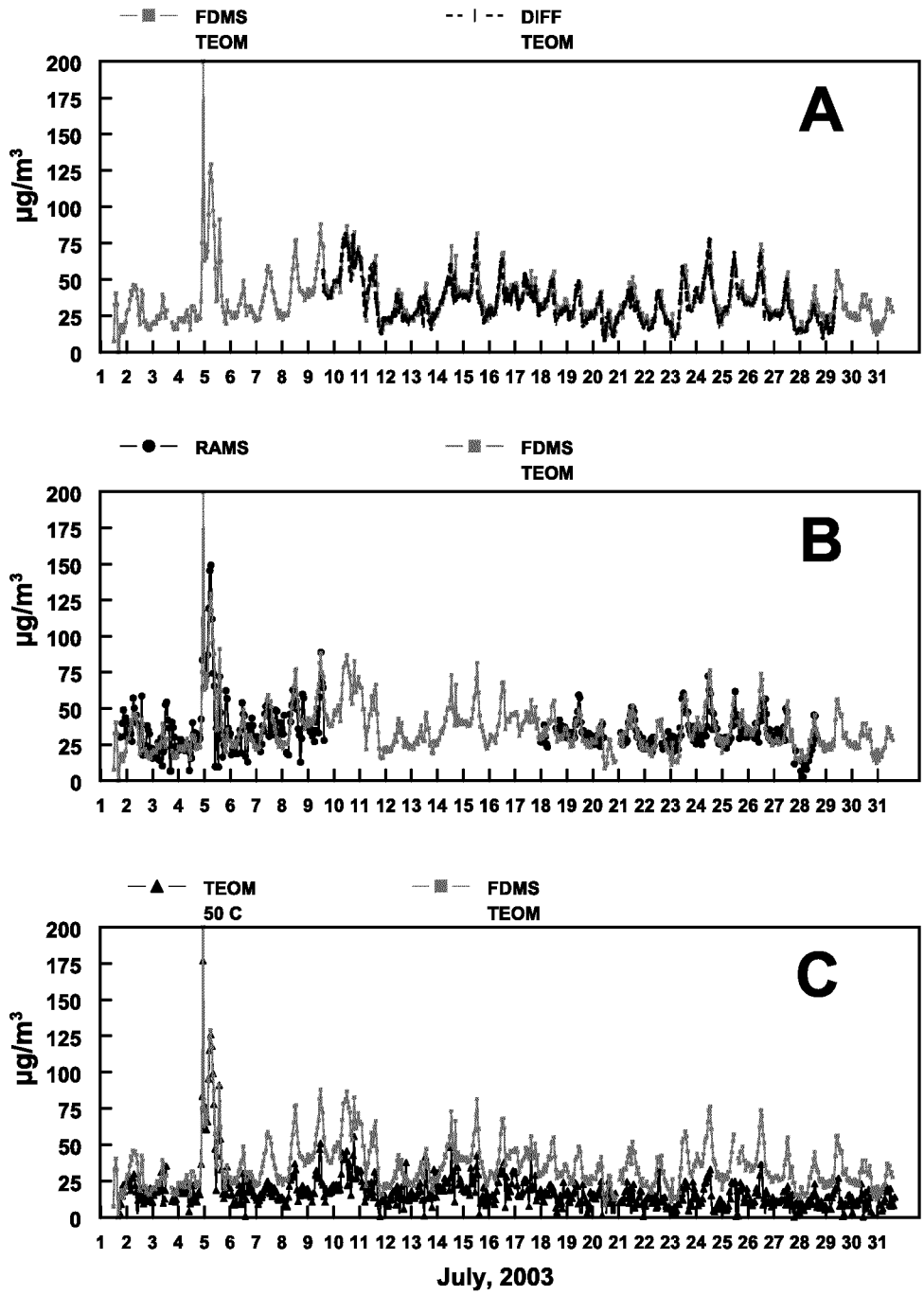

Figure 2. Data from the Rubidoux July 2003 study. (a) Comparison of 1-hour average FDMS and differential TEOM $PM_{2.5}$ mass measurements. (b) Comparison of 1-hour average FDMS and RAMS $PM_{2.5}$ mass measurements. (c) Comparison of 1-hour average FDMS and 50°C TEOM monitor $PM_{2.5}$ mass measurements.

(±17%) and is again limited by the precision of the RAMS data. The average concentration for these samples was 30.6 µg/m^3 and the bias between the RAMS and FDMS data sets was only 0.4 µg/m^3. The RAMS and FDMS $PM_{2.5}$ data were in agreement.

[19] The FDMS and 50°C TEOM data are given in Figure 2c. As expected, high concentrations of ammonium nitrate and semivolatile organic material, as detailed below, result in the concentrations measured with the heated filter of the TEOM monitor being substantially lower than those obtained with the FDMS, differential TEOM or RAMS monitors.

4. Discussion

[20] A second check on the accuracy of the FDMS data for each sampling site was made by comparison with the constructed mass obtained from the PC-BOSS integrated samples. Sulfate and nitrate were assumed to be present as the ammonium salts. Both nonvolatile (NVOM) and

Table 1. Results of the Statistical Analysis of $PM_{2.5}$ Measurements During the Lindon and Rubidoux Studies

X versus Y	n	r^2	Slope[a]	Intercept, $\mu g/m^3$	X Average, $\mu g/m^3$	X-Y Bias, $\mu g/m^3$	σ, $\mu g/m^3$	σ, %
			Lindon					
FDMS TEOM versus RAMS $PM_{2.5}$[a]	332	0.69	1.00 ± 0.01	0 ± 4.0	13.5	0.2	2.8	20.9
		0.69	0.92 ± 0.03	1.3 ± 3.9				
FDMS TEOM versus PC-BOSS $PM_{2.5}$[b]	11	0.63	1.01 ± 0.06	0 ± 2.7	13.0	0.3	1.8	13.9
		0.66	0.89 ± 0.21	1.8 ± 2.8				
			Rubidoux					
FDMS versus Diff TEOM $PM_{2.5}$[a,e]	426	0.85	0.97 ± 0.01	0 ± 5.3	34.6	1.2	3.8	11.2
		0.85	0.98 ± 0.02	−0.6 ± 5.3				
FDMS TEOM versus RAMS $PM_{2.5}$[a]	337	0.80	0.99 ± 0.01	0 ± 8.2	34.6	0.4	5.9	16.8
		0.81	0.93 ± 0.02	2.4 ± 8.2				
PC-BOSS versus FDMS TEOM $PM_{2.5}$[b]	33	0.90	0.96 ± 0.02	0 ± 3.9	39.4	1.8	3.0	7.7
		0.90	0.96 ± 0.06	−0.3 ± 3.9				
FDMS TEOM versus FRM $PM_{2.5}$[c]	29	0.87	0.70 ± 0.02	0 ± 3.3	35.8	11.3	NA[d]	
		0.90	0.96 ± 0.06	−9.3 ± 3.9				
PC-BOSS versus R&P nitrate[b]	31	0.61	0.89 ± 0.04	0 ± 2.9	10.8	0.5	2.2	21.0
		0.73	0.65 ± 0.07	3.3 ± 2.4				
PC-BOSS versus Sunset C_{total}[b]	21	0.91	0.99 ± 0.02	0 ± 2.2	18.8	−0.1	1.8	9.6
		0.93	0.90 ± 0.06	2.0 ± 2.1				

[a]The 1-hour average results.
[b]The 3-hour average results.
[c]The 24-hour average results.
[d]NA, σ could not be calculated because of the large bias.
[e]Here 38 peak concentrations with bias greater than 15 $\mu g/m^3$ (FDMS > Diff TEOM) not included in statistical analysis.

semivolatile (SVOM) organic material were assumed to be 62% C [*Turpin and Lim*, 2001]. For the Lindon site, the PC-BOSS data were obtained on a 3-hour average basis (about 3 samples/day) on 29 January and 7–8 and 10–12 February (see Figure 1). Linear regression analysis statistics of the FDMS and PC-BOSS data are given in Table 1. The intercept calculated slope is lower, but uncertainty in the slope includes unity and the uncertainty in the intercept includes zero. The uncertainty in the comparison of the FDMS and PC-BOSS $PM_{2.5}$ results is $\sigma = \pm 1.8$ $\mu g/m^3$ (±14%), consistent with the expected precision of the PC-BOSS results. In contrast, the measurements obtained with the 30°C TEOM monitor and the FDMS unit were very different. The 30°C TEOM monitor gave an average $PM_{2.5}$ concentration (N = 265) of 6.1 $\mu g/m^3$. For the same data points, the FDMS unit averaged 14.8 $\mu g/m^3$ The mass measured with the 30°C TEOM monitor was consistently lower than that measured with the FDMS unit. The difference between the two measurement is consistent with the concentrations of semivolatile organic material and ammonium nitrate measured with the PC-BOSS sampler.

[21] The precision of two of the components included in the calculation of the PC-BOSS calculated mass for the Rubidoux study can be estimated by comparison with an independent measurement of that component by a second sampler. Either 4 or 8 three-hour PC-BOSS samples were collected on 2, 8, 11, 16, 17, 23, 26, and 30 July. In addition, a single 24-hour PC-BOSS sample was collected on 5, 14, 26 and 29 July. These 24-hour samples were collected on days when speciation sampler results were available. The fine particulate nitrate concentrations were determined in both 1-hour averaged measurements with the R&P nitrate monitor and 3-hour average measurements with the PC-BOSS. The R&P nitrate data were obtained over the time period from 9 through 20 July. The R&P nitrate data were averaged over the PC-BOSS 3-hour sampling time periods. These data are compared to the PC-BOSS fine particulate nitrate concentrations in Table 1. There is a definite bias between the two measurements at the higher concentrations, with the PC-BOSS data being higher in concentration. It has been suggested that this difference is due to incomplete volatilization of the sampled ammonium nitrate at higher concentrations (and higher relative humidity) for the R&P monitor [*Long and McClenny*, 2004].

[22] If only the concentrations below 20 $\mu g/m^3$ are included in the regression analysis, the zero intercept slope (n = 31, R^2 = 0.44) is 0.96 ± 0.06 and the precision of the comparison is $\sigma = \pm 2.0$ $\mu g/m^3$ (±20%). This result is taken as an estimate of the uncertainty in the PC-BOSS nitrate results. The corresponding uncertainty in ammonium nitrate

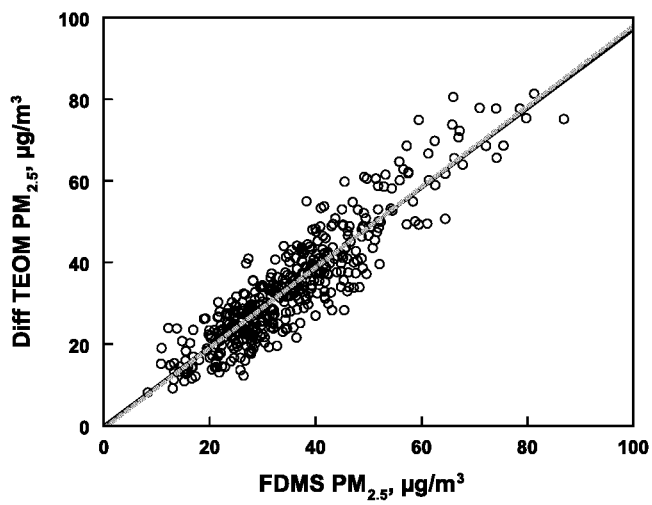

Figure 3. Comparison of 1-hour average $PM_{2.5}$ mass determined with the FDMS and differential TEOM in Rubidoux, CA. The solid line is the regression slope with a zero intercept, and the dashed line is the regression line with a calculated intercept.

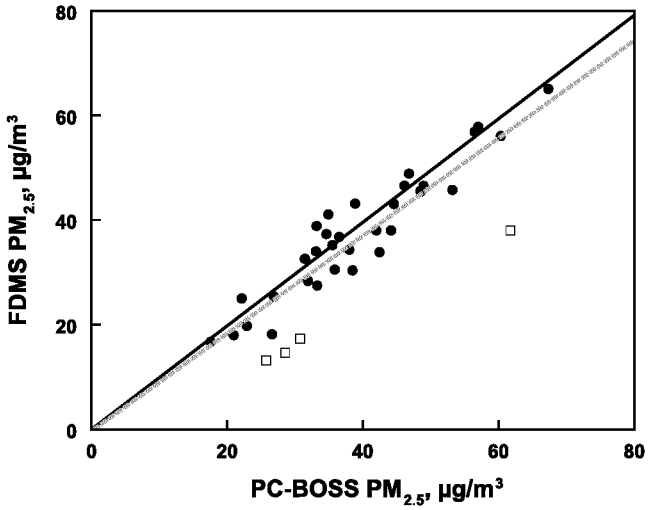

Figure 4. Comparison of 3-hour average $PM_{2.5}$ mass determined with the PC-BOSS and FDMS in Rubidoux, CA. The solid line is the regression slope with a zero intercept, and the dashed line is the regression line with a calculated intercept. The four data points where the difference between the two measurements is greater than 3σ compared to the remaining data are indicated with a square data point; see text.

is ±2.6 μg/m^3. The uncertainty in ammonium sulfate can be estimated by comparison with 24-hour SCAQMD speciation sampler results (N = 10) to be ±1.9 μg/m^3. The uncertainty in the PC-BOSS ammonium nitrate results obtained by comparison with the SCAQMD speciation sampler results (N = 9) is ±2.1 μg/m^3.

[23] The second 1-hour average $PM_{2.5}$ component which can be compared to the PC-BOSS results is total fine particulate carbonaceous material. Both nonvolatile and semivolatile fine particulate carbonaceous material were determined using the PC-BOSS and the two Sunset monitors [*Grover et al.*, 2004]. The Sunset measurements were available for the time period from 13 through 26 July. Comparison between these two measurements is given in Table 1. As indicated, the two measurements are in good agreement. Assuming that the organic material is 62% carbon [*Turpin and Lim*, 2001] the uncertainty in the comparison of these two measurements is ±2.9 μg/m^3. The combination of the ammonium nitrate, ammonium sulfate and carbonaceous material precision estimates leads to an expected uncertainty in the calculated PC-BOSS $PM_{2.5}$ mass of ±2.9 μg/m^3.

[24] The FDMS and PC-BOSS determined $PM_{2.5}$ mass results are compared in Table 1 and Figure 4. Included in Figure 4 are four data points (given as open squares) for which the differences between the two measurements were different from the rest of the data set by greater than 3σ. These four data points are not included in the statistical analysis summarized in Table 1. The four data points were obtained in four 3-hour sequential samples, beginning at midnight on 23 July. As indicated by the data in Figure 2a, the FDMS and differential TEOM data were in good agreement during this time period. However, the carbon measurements made with the PC-BOSS and the Sunset monitors were also in good agreement. R&P nitrate measurements were not made during this time period. However, the eight 3-hour nitrate concentrations determined with the PC-BOSS for the entire day and the results of the SCAQMD 24-hour results from the speciation sampler this day are in agreement. Thus there is nothing in the data set which allows one to ascertain which of the two measurements (PC-BOSS versus the FDMS) is the more accurate.

[25] For the data points included in the statistical analysis, the PC-BOSS and FDMS data are in good agreement with a regression slope (N = 33, R^2 = 0.90) of 0.96 and σ = ±3.0 μg/m^3 (±7.7%)., with a bias between the two measurements of only 1.8 μg/m^3. Included in the analysis are four time periods (1200–1500 and 1500–1800 on 11 and 23 July) when PC-BOSS, FDMS and differential TEOM data were all available and there was a significant bias between the FDMS and differential TEOM during peak concentrations, with the FDMS averaging 9.0 μg/m^3 higher than the differential TEOM monitor. These time periods include five of the 38 peak concentrations not included in the FDMS versus differential TEOM comparison as previously discussed. The PC-BOSS and FDMS measurements agreed during this time periods, with a bias of only 0.3 μg/m^3, providing an indication that the occasional significant difference seen between the FDMS and the differential TEOM monitor cannot be attributed to systematically inaccurate measurements by the FDMS. This point deserves further study.

[26] The measurements made with the FDMS can also be compared with the 24-hour average mass measurements obtained with the $PM_{2.5}$ single filter FRM monitor. The comparison between these two measurements is given in Table 1 and Figure 5. As indicated, there is a consistent bias between the two measurements (N = 29), with the FRM averaging 11.3 μg/m^3 (32%) lower than the FDMS measurements. While data coverage for the study period was not complete for the speciation data, for the time periods associated with these comparisons, the average concentration of ammonium nitrate was 12 μg/m^3 and for SVOM was 13 μg/m^3. Thus some combination of partial loss of ammo-

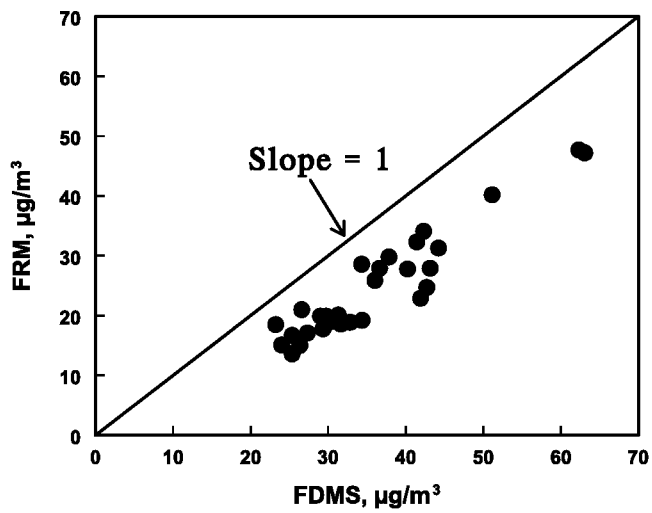

Figure 5. Comparison of 24-hour average $PM_{2.5}$ mass determined with the FDMS and the single filter $PM_{2.5}$ FRM sampler in Rubidoux, CA. The solid line is the slope equals 1.

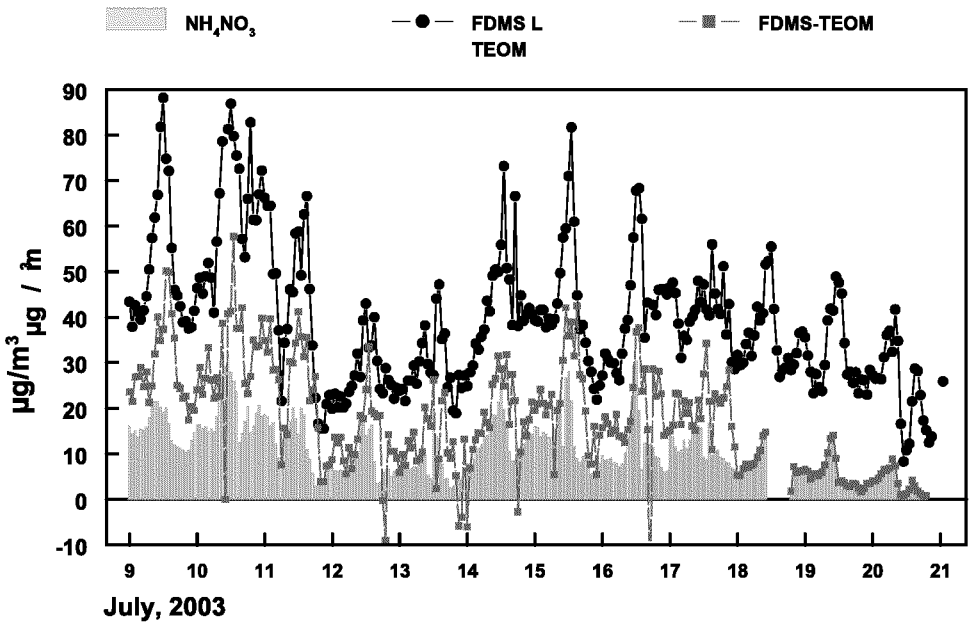

Figure 6. Data from the Rubidoux July 2003 study. The circles indicate 1-hour average FDMS $PM_{2.5}$ mass, the squares the difference between 1-hour average FDMS and 50°C TEOM monitor $PM_{2.5}$ mass, and the bars 1-hour average R&P $PM_{2.5}$ ammonium nitrate mass measurements.

nium nitrate and SVOM during sampling with the single filter FRM can account for the under-measurement of $PM_{2.5}$ mass with this sampler.

[27] The average difference between the FDMS $PM_{2.5}$ mass measurement and that of a conventional TEOM monitor operating with the filter at 50°C is shown in Figure 2c. The conventional TEOM monitor measured mass is consistently lower than the FDMS measured mass. Where both measurements were made, the FDMS data averaged 36.8 µg/m^3 and the heated TEOM monitored averaged 18.4 µg/m^3. The bias between the two measurements averaged 18.5 µg/m^3 (50% of the FDMS $PM_{2.5}$ mass). The difference between the two measurements can be directly compared with the hourly average measurements of ammonium nitrate by the R&P nitrate monitor and SVOM by the modified Sunset C monitor. The comparison with the ammonium nitrate data is shown in Figure 6 for the time period when all three measurements (FDMS, heated

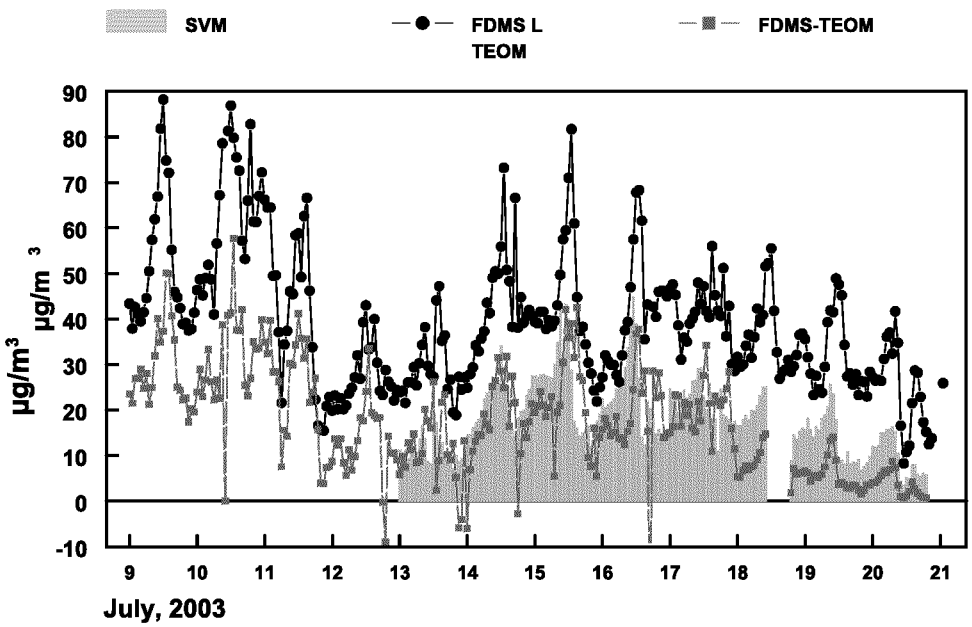

Figure 7. Data from the Rubidoux July 2003 study. The circles indicate 1-hour average FDMS $PM_{2.5}$ mass, the squares the difference between 1-hour average FDMS and 50°C TEOM monitor $PM_{2.5}$ mass, and the bars the sum of 1-hour average R&P $PM_{2.5}$ ammonium nitrate mass measurements and the modified Sunset monitor semivolatile organic material (SVOM) mass measurements. This sum is indicated as SVM, semivolatile material.

TEOM and R&P nitrate, expressed as ammonium nitrate) were monitored. As indicated, the difference between the FDMS and heated TEOM monitors is usually greater than the measured ammonium nitrate concentration. Part, but not all of the difference between the FDMS and heated TEOM monitor $PM_{2.5}$ mass measurements can be attributed to the loss of ammonium nitrate from the 50°C filter of the heated TEOM monitor. During part of the time period given in Figure 7, both ammonium nitrate and SVOM measurements were made. The sum of these two measurements is referred to as semivolatile material, SVM, and is compared to the difference in the FDMS and heated TEOM monitor $PM_{2.5}$ mass in Figure 7. With few exceptions, the total SVM material is either equal to or somewhat greater than the difference between the FDMS and heated TEOM monitors. It appears that most of the SVM is generally lost from the heated filter of the TEOM monitor on an hourly average measurement basis.

5. Summary

[28] The data obtained in the Lindon and Rubidoux studies indicate that the FDMS and differential TEOM monitors both measure total $PM_{2.5}$, including the semivolatile particulate matter. In contrast, neither the conventional heated TEOM monitor nor the $PM_{2.5}$ FRM single filter sampler measured the semivolatile material. Semivolatile particulate matter includes both the ammonium nitrate and semivolatile organic material. None of the continuous samplers used in the studies reported here measure fine particulate water content because of the use of Nafion dryers. Precision of the comparison of the R&P FDMS and differential TEOM monitor sampler $PM_{2.5}$ is ±11% (±3.8 $\mu g/m^3$). Precision of the comparison of the FDMS and PC-BOSS $PM_{2.5}$ mass is ±7.7% (±3.0 $\mu g/m^3$). There is a suggestion in the data that the results obtained with the FDMS unit may be biased about 1 to 2 $\mu g/m^3$ higher than the differential TEOM monitor for the urban environments studied here. Agreement with the RAMS and PC-BOSS monitor may be slightly better for the FDMS than the differential TEOM monitor, however, the comparison are all generally within the uncertainty of the RAMS and PC-BOSS data. The precision of both the FDMS and differential TEOM monitors was a factor of 2 to 4 better than that for the RAMS. Both the FDMS and differential TEOM monitors proved to be rugged units which needed little attention from site operators during the studies reported here.

[29] **Acknowledgments.** Appreciation is expressed to the State of Utah Air Quality Monitoring Division, and the South Coast Air Quality Management District for assistance in sample collection at Lindon and Rubidoux, respectively. The U.S. Environmental Protection Agency (EPA) through its Office of Research and Development funded the research described in this paper under contract 3C-R044-NAEX with Brigham Young University. This paper has been reviewed in accordance with EPA policy and approved for publication. However, the views expressed in this paper are those of the authors and do not necessarily reflect the views or policies of the EPA. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

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TULANE LAW SCHOOL

TULANE ENVIRONMENTAL LAW CLINIC

Via Email to:

Louisiana Department of Environmental Quality
Public Participation Group
deq.publicnotices@la.gov

Dr. Earthea Nance, Administrator
EPA Region 6
Nance.Earthea@epa.gov

Re: Comments on 2024 Louisiana Annual Monitoring Network Plan, AI #168755, PER99999999

Dear LDEQ Public Participation Group and Dr. Nance,

On behalf of Patricia Charles, Raphael Sias, Ronald Carrier, Larry Allison, Karl Prater, McKeever Edwards, Carolyn Peters, Stafford Frank, and Peggy Anthony ("Mossville community members"), as well as Inclusive Louisiana, RISE St. James, Refined Community Empowerment, Healthy Gulf, and the Sierra Club, we respectfully submit these comments on Louisiana Department of Environmental Quality's ("LDEQ's") proposed 2024 Annual Air Monitor Network Plan ("2024 Plan") for the State of Louisiana. We are aware that LDEQ is responsible for proposing the Plan and EPA must approve it. Therefore, we submit these comments to both agencies.

EPA's regulations governing the design of state monitoring networks provide that

> The ambient air monitoring networks must be designed to meet three basic monitoring objectives. … (a) Provide air pollution data to the general public in a timely manner. … (b) Support compliance with ambient air quality standards and emissions strategy development. … (c) support for air pollution research studies.[1]

Regardless of whether LDEQ's 2024 Plan meets the bare regulatory minimums for number and placement of monitors, it fails to meet these above objectives. We offer specific comments on this failure below.

I. LDEQ Ignored the Recommendations Provided by EPA in its Approval of the 2023 Annual Monitoring Network Plan

In approving LDEQ's 2023 Annual Monitoring Network Plan, EPA offered several recommendations aimed at improving the ability of LDEQ's monitoring network to determine

[1] 40 CFR Part 58, Appendix D § 1.1.

whether or not violations of the National Ambient Air Quality Standards ("NAAQS") were occurring across the state. These included 1) adding additional monitoring in the areas of modeled violations of the primary annual $PM_{2.5}$ standard in the Mississippi River corridor and Calcasieu Parish; 2) establishing a permanent, NAAQS-comparable, monitor for $PM_{2.5}$ and SO_2 at the Irish Channel site, and 3) monitoring PM_{10} in the area of Romeville in St. James Parish.[2] EPA based these recommendations on evidence that violations of the NAAQS for the relevant pollutants were occurring in each of these areas.[3]

In reviewing the 2024 Plan, it appears that LDEQ steadfastly ignored each of these recommendations. In doing so, LDEQ essentially refused to even consider investigating credible potential violations of the NAAQS and their resulting impacts on nearby communities. This "see-no-evil" approach fails to meet the goal of the air monitoring network in supporting compliance with the NAAQS. LDEQ and EPA should work together to follow through on these recommendations, or if LDEQ is unwilling to do so, EPA should disapprove the 2024 Plan.

II. LDEQ Continues to Arbitrarily Exclude PM2.5 Data from NAAQS Comparisons

In the 2024 Plan, LDEQ outlines a plan to collocate Teledyne T640s with Federal Reference Method monitors at seven sites "for comparison purposes for at least a year."[4] The plan goes on to indicate that T640s may replace current PM monitors at 10 additional sites, "pending analysis of comparability between FRM and Federal Equivalent Method (FEM) data."[5] This collocation is unnecessary and represents a waste of limited funding and staff time for LDEQ's air monitoring program. LDEQ fails to recognize that monitors designated as FEM have already undergone extensive testing and collocation to attain this gold-standard designation from EPA. LDEQ should not spend its limited resources on unnecessary and redundant air monitoring, given the many environmental justice communities in this state with no air monitoring whatsoever. Despite repeated requests,[6] LDEQ has refused to establish permanent air monitoring sites in environmental justice communities (e.g., Romeville and St. Rose), citing a lack of funding and a purported lack of legal mandate to do so.[7] Yet, LDEQ provides no justification for its plan to perform unnecessary, unmandated, and costly collocation of the seven T640 monitors.

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[2] Letter from David Garcia, Director, Air and Radiation Division, Region 6, US EPA, to Jason Meyers, Administrator, Air Planning and Assessment Division, LDEQ 2 (Jan. 24, 2024). https://edms.deq.louisiana.gov/app/doc/view?doc=14230094.

[3] *Id.*

[4] LDEQ, 2024 Louisiana Annual Monitoring Network Plan 3 (Feb. 20, 2024), *available at* https://edms.deq.louisiana.gov/app/doc/view?doc=14214151 (hereinafter cited to as "2024 AMNP"). The sites are Capitol, Chalmette, Kenner, Port Allen, Westlake, I-610 New Orleans, and Marrero.

[5] *Id.*

[6] *See, e.g.,* Tulane Env't Law Clinic, Comments on 2023 Louisiana Annual Monitoring Network Plan 4 (April 13, 2023), *available at* https://edms.deq.louisiana.gov/app/doc/view?doc=13760628.

[7] *See generally* LDEQ, 2023 Annual Monitoring Network Plan – Response to Comments (attached as Exhibit 1). LDEQ's responses to comments on the 2023 Plan largely consist of reiterating that the Plan met the minimum legal requirements or stating that comments were "outside of the scope" of the Plan, without substantively engaging with the credible evidence that the monitoring network as designed was likely missing violations of the NAAQS. Commenters also note that LDEQ never posted this document to its EDMS public records system.

Instead of conducting redundant air monitoring at these seven sites, LDEQ should use any extra resources to establish or expand air monitoring in environmental justice communities.

In addition to being unnecessary and wasteful, LDEQ's proposed collocation of the T640s is a **red herring**, since LDEQ previously used the same strategy to argue that continuous data from the BAM 1020 monitors could not be compared against the National Ambient Air Standards (NAAQS). Specifically, in July 2013, LDEQ requested EPA's approval to "remove $PM_{2.5}$ BAM data from comparison to NAAQS standards," claiming that collocation of the BAMs with FRM monitors indicated that "the BAMs have proven to be inconsistent and unreliable … ."[8] This claim was based on the observation that the $PM_{2.5}$ readings taken by the continuous BAMs were commonly higher than the readings measured by the FRMs. Yet, this claim ignored the well-established phenomenon of **evaporation loss of collected semi-volatile species during $PM_{2.5}$ sampling**.[9] Because the FRM monitors used by LDEQ collect each sample over a 24-hr period, there is significant evaporation of semi-volatile species, resulting in artificially low $PM_{2.5}$ concentrations. By contrast, continuous $PM_{2.5}$ monitors, including the BAM 1020 and the Teledyne T640, collect samples hourly, resulting in minimal evaporative loss and more accurate $PM_{2.5}$ concentrations.

A 2005 peer-reviewed study found "consistent bias" in the 24-hr average mass measurements obtained with the $PM_{2.5}$ FRM, resulting in 32% lower $PM_{2.5}$ concentrations, on average, compared to a continuous $PM_{2.5}$ sampler with FEM technology.[10] By simultaneously measuring $PM_{2.5}$ and semi-volatile species, the authors definitively attributed this bias to the partial loss of the semi-volatile species in the FRM method. Subsequent peer-reviewed studies have confirmed that 24-hr average mass measurements obtained by FRM monitors significantly underestimate $PM_{2.5}$ concentrations compared to continuous samplers. For example, Liu et al. (2014) found that, on average, 46% of ammonia, 67% of nitrate, and 74% of chloride present in the PM2.5 sample evaporated during 24-hr sampling using an FRM monitor in field conditions.[11] If LDEQ intends to collocate FRM and FEM monitors for the purpose of evaluating data **reliability, the agency must use denuder samplers to quantify semi-volatile loss during $PM_{2.5}$ sampling**, as described in detail by Liu et al. (2015).[12] Such sampling would be especially important at the Westlake site, given the large amount of semi-volatile compounds emitted in the

[8] Letter from Paul D. Miller, Administrator, LDEQ to Thomas Diggs, Associate Director for Air, Region 6, EPA (July 1, 2023), *available at* https://edms.deq.louisiana.gov/app/doc/view?doc=12196110.
[9] *See, e.g.,* Brett D. Grover et al., Measurement of total PM2.5 mass (nonvolatile plus semivolatile) with the Filter Dynamic Measurement System tapered element oscillating microbalance monitor. 110 *J of Geophysical Rsch Atmospheres* D07S03 (2005), https://doi.org/10.1029/2004JD004995 (attached as Exhibit 2); Chun-Nan Liu, et al., Sampling and conditioning artifacts of PM2.5 in filter-based samplers, 85 *Atmospheric Env't* 48 (2014). https://doi.org/10.1016/j.atmosenv.2013.11.075 (hereinafter "Liu 2014) (attached as Exhibit 3); Chun-Nan Liu, et al., Theoretical model for the evaporation loss of PM2.5 during filter sampling. 109 *Atmospheric Environment* 79 (2015), https://doi.org/10.1016/j.atmosenv.2015.03.012 (hereinafter "Liu 2015) (attached as Exhibit 4).
[10] Grover, supra note 7, at 7.
[11] Liu 2014, supra note 7, at 53.
[12] *See* Liu 2015, supra note 7, at 80

vicinity.[13] For example, 230 tons of ammonia were emitted within one mile of the Westlake monitoring site in 2022, based on self-reported industry data.[14]

Importantly, the LDEQ's attempts to disregard continuous $PM_{2.5}$ readings extends to other monitoring technologies. Specifically, the Plan indicates that "TEOMs are operated as non-FEM/non-FRM and are therefore not NAAQS comparable," with no explanation.[15] These TEOMs are Federal Equivalent Method monitors,[16] and LDEQ operates them at five sites across Louisiana.[17] There is no indication that LDEQ has ever requested EPA approval for excluding the data from its TEOM monitors from NAAQS comparisons. In previous air monitoring plans, LDEQ indicated that the TEOM data are excluded from NAAQS comparisons "due to exclusion of the comparison of the data from PM2.5 continuous BAM monitors…".[18] This justification ignores the fact that the BAM uses and entirely different technology from the TEOM monitor, and that the EPA exclusion applied to only a *subset* of BAM monitors.[19] Tellingly, the LDEQ subsequently revised this justification, to now simply state that the TEOMs are operated as non-FEM, with no further explanation.[20] Given the high cost of FEM monitors, it is a wasteful use of limited resources for LDEQ to purchase FEM monitors and operate them as non-FEM. The LDEQ must provide a legitimate justification for any proposed data exclusions, and EPA must require LDEQ to operate FEM monitors as FEM monitors.

III. LDEQ's Plan Fails to Deliver the Promised St. James Air Monitoring Site

It is alarming that the Plan does not include the new St. James air monitoring site that was announced by EPA in June 2023.[21] More than 10 months ago, the EPA awarded LDEQ nearly half a million dollars to establish this site.[22] According to St. James residents, the monitoring equipment has been purchased and delivered to the site, but the LDEQ has delayed the onset of data collection without explanation. Currently, there is no timeline for data collection to begin. The LDEQ must modify its proposed 2024 Air Monitoring Plan to include the new St. James air monitoring site. Further, LDEQ should immediately provide the community with an explanation

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[13] LDEQ Annual Certified Emissions Data 2015-Present (Feb. 14, 2024), *available at* https://www.deq.louisiana.gov/page/eric-public-reports.
[14] Available via LDEQ's Actual Emissions by Radius Report, using GPS coordinates for the Westlake site (30.2637080, -93.2826018). *See* https://business.deq.louisiana.gov/Eric/EricReports/RadiusReportSelector?.
[15] 2024 AMNP at 12.
[16] *See* Office of Research and Development; Ambient Air Monitoring Reference and Equivalent Methods: Designation of Four New Equivalent Methods, 74 Fed. Reg. Vol. 74 28,696, 28,696 (June 17, 2009), https://www.federalregister.gov/documents/2009/06/17/E9-14231/office-of-research-and-development-ambient-air-monitoring-reference-and-equivalent-methods.
[17] French Settlement, Madisonville, New Orleans City Park, Shreveport airport, and Thibodaux.
[18] *See* LDEQ, 2020 Annual Monitoring Network Plan, 11-16 (April 5, 2020) (This statement is in the footnote included on each page of Table B), *available at* https://edms.deq.louisiana.gov/app/doc/view?doc=12170694.
[19] Letter from Thomas H. Diggs, Associate Director for Air, EPA, Region 6 to Paul D. Miller, Administrator, Office of Env't Compliance Assessment Division, LDEQ 2 (Mar. 27, 2014) ("We disapprove the request to exclude the FEM BAM at the Capitol site.") (attached as Exhibit 5).
[20] 2024 AMNP at 12.
[21] EPA, Region 6, "EPA, Rep. Troy Carter Announce Grant for La. DEQ Air Monitoring Project in St. James Parish." (June 5, 2023), https://www.epa.gov/newsreleases/epa-rep-troy-carter-announce-grant-la-deq-air-monitoring-project-st-james-parish.
[22] *Id.*

for the delay in the onset of monitoring and should work to begin operating this site as soon as possible. This site **must** include NAAQS comparable, continuous $PM_{2.5}$ monitoring.

IV. LDEQ's Plan Ignores Requests from Industry and Residents to Restore Monitoring in St. Rose

Leaders from industry, local government, and the St. Rose community have asked LDEQ to restore the air monitoring site located in St. Rose, a heavily industrialized community in St. Charles Parish.[23] This includes International-Matex Tank Terminals (IMTT), who operates a large petrochemical terminal immediately adjacent to a residential community in St. Rose. Importantly, IMTT partially funded the air monitoring site that LDEQ previously operated in St. Rose; yet neither IMTT nor the community was informed when LDEQ dismantled the air monitoring site without notice in 2023.[24] This failure to communicate is especially egregious, considering that LDEQ portrayed the St. Rose air monitoring site as evidence of its commitment to environmental justice in its 2022 Louisiana Annual Monitoring Network Plan.[25] In the 2022 plan, LDEQ describes the St. Rose air monitor as a "locally-led, community-driven" solution to "improve environmental protection." Yet LDEQ never presented a final air monitoring report to the community, nor made any apparent effort to improve environmental protection based on the data collected.

IMTT has expressed willingness to help LDEQ secure funding to reestablish the air monitoring site in St. Rose.[26] Yet, there is no indication that LDEQ is pursuing this opportunity. LDEQ must reestablish the St. Rose air monitoring site and must include continuous $PM_{2.5}$ monitoring, given the large number of sources of $PM_{2.5}$ and, in particular, $PM_{2.5}$ precursors (e.g., VOCs) in the vicinity.[27] For example, there were **885 tons** of VOCs emitted within 3 miles of the former St. Rose air monitoring site in 2022, based on self-reported industry data.[28] LDEQ must also summarize and present the air monitoring data previously collected in St. Rose.[29] It is especially important that LDEQ provide summary statistics and reference values for the VOC data collected, given the massive amount of VOC emissions in this community and the regular reports of noxious odors from residents.

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[23] See April 3, 2024 letter from Michelle O'Daniels, Councilperson District V, St. Charles Parish, to LDEQ. Available at https://edms.deq.louisiana.gov/app/doc/view?doc=14231359. See also March 28, 2024 comment from Traci Johnson, Vice President ESS at IMTT. Available at https://edms.deq.louisiana.gov/app/doc/view?doc=14226700.

[24] See also March 28, 2024 comment from Traci Johnson, Vice President ESS at IMTT. Available at https://edms.deq.louisiana.gov/app/doc/view?doc=14226700.

[25] LDEQ, 2022 Annual Monitoring Network Plan 7 (Apr. 14, 2022), *available at* https://edms.deq.louisiana.gov/app/doc/view?doc=13228415.

[26] *Id.*

[27] LDEQ Annual Certified Emissions Data 2015-Present. (Feb. 14, 2024), *available at* https://www.deq.louisiana.gov/page/eric-public-reports.

[28] Available via LDEQ's Actual Emissions by Radius Report, using GPS coordinates for the site where the St. Rose monitor was previously located at 302 Adams St. (29.9548291, -90.3255732). *See* https://business.deq.louisiana.gov/Eric/EricReports/RadiusReportSelector?.

[29] "The ambient air monitoring networks must be designed to … [p]rovide air pollution data to the general public in a timely manner. …" 40 CFR Part 58, Appendix D § 1.1.

V. LDEQ's Monitoring is Meaningless if the Agency Ignores PM2.5 Exceedances

In March 2024, EPA lowered the primary annual $PM_{2.5}$ NAAQS to 9.0 $\mu g/m^3$, based on evidence that concentrations below the previous standard negatively impact human health.[30] Yet there is no evidence that either LDEQ or EPA is taking action to address the evidence that Louisiana communities are exposed to $PM_{2.5}$ concentrations above the new standard. For example, the continuous $PM_{2.5}$ monitor in Westlake, Louisiana indicates an overall average $PM_{2.5}$ concentration of 10.4 $\mu g/m^3$ since it began operating on April 1, 2022.[31] This value is within 5% of the annual averages obtained for the previous three years (2019-2021) using the BAM 1020 (Table 1)—all also above the 9.0 $\mu g/m^3$ threshold. The consistency between the two methods of data collection, which use entirely different measurement technologies, further supports the reliability of the BAM 1020 data and the evidence of an ongoing violation of the new primary annual NAAQS for PM $_{2.5}$.

Table 1. Annual Mean $PM_{2.5}$ Concentrations at LDEQ's Westlake Monitoring Site in the Lake Charles MSA

Year	PM2.5 Annual Average ($\mu g/m^3$)
2012	9.2
2013	9.9
2014	8.9
2015	10.6
2016	10.9
2017	11.1
2018	11.3
2019	10.8
2020*	10.6
2021	10.9
2022**	10.1
2023	11.0

*The actual $PM_{2.5}$ concentration is likely higher because data are missing for 76 days after Hurricane Laura, when there were large sources of $PM_{2.5}$ nearby (fires, flaring). LDEQ never explained why the Westlake monitor was non-operational for more than two months after Hurricane Laura, long after power had been restored and the monitoring site began collecting weather data.

**LDEQ replaced the BAM 1020 with a Teledyne T640 continuous $PM_{2.5}$ monitor on April 1, 2022. Method-specific average $PM_{2.5}$ concentrations were 10.6 $\mu g/m^3$ (Jan 1 – Mar 31, 2022) and 10.0 $\mu g/m^3$ (Apr 1 – Dec 31, 2022).

[30] Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, 89 Fed. Reg. 16,202, 16,202 (Mar. 6, 2024).

[31] PM2.5 data available at https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/AIR-MONITORING-DATA-WITH-INTERVAL-5-OR-10-MINUTES. Westlake data from April 1, 2022 through April 14, 2024 is are attached as Exhibit 6.

EPA recognized the need for expanded air monitoring in this heavily industrialized area, and, in early 2022, gave LDEQ funding to upgrade the Westlake $PM_{2.5}$ monitor.[32] Yet, this recognition and funding have not translated to air quality improvements, because LDEQ is—as far as the public is aware—disregarding the evidence of a $PM_{2.5}$ NAAQS violation in the Westlake area. The LDEQ must recognize these measured NAAQS exceedances and immediately take steps to declare Calcasieu Parish as non-attainment for the primary annual $PM_{2.5}$ standard.

For the foregoing reasons, Commenters believe that LDEQ must substantially revise the 2024 Annual Monitoring Network Plan to address these concerns, else EPA should disapprove of the plan in its current form.

Respectfully submitted by:

Tulane Environmental Law Clinic

/s/Devin A. Lowell
Devin A. Lowell, Supervising Attorney
6329 Freret Street
New Orleans, LA 70118
504-865-5789
dlowell@tulane.edu
Counsel for commenters

Substantially prepared by:

Kimberly Terrell, Ph.D., Staff Scientist
Tulane Environmental Law Clinic
kterrell1@tulane.edu

[32] Prior to the installation of the EPA-funded Teledyne T640 monitor, LDEQ was operating a BAM 1020 monitor at the site. Although the BAM 1020 is designated FEM, the LDEQ was operating it as a non-FEM monitor, with no explanation. This discrepancy is consistent with LDEQ's alarming pattern of disregarding data from continuous PM2.5 monitors.

CC: David Garcia
Director
Air and Radiation Division
US EPA, Region 6
garcia.david@epa.gov

Theresa H. Alexander
Ellen Belk
Air Monitoring Section
Air Permits, Monitoring and Grants Branch
Air and Radiation Division
US EPA, Region 6
alexander.theresa@epa.gov
belk.ellen@epa.gov

Message

From: Nance, Earthea [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=5A54D6F295DB49BF9B334B7D971D789F-NANCE, EART]
Sent: 4/24/2024 7:05:35 PM
To: Anne Rolfes [anne@labucketbrigade.org]
CC: Thompson, Steve [thompson.steve@epa.gov]; Garcia, David [Garcia.David@epa.gov]
Subject: Venture Global Flaring for Four Straight Days Shows Dangers of Gas Export Industry

We're on it, thanks Anne.

-E

Sent from my iPhone

On Apr 23, 2024, at 1:21 PM, Anne Rolfes <anne@labucketbrigade.org> wrote:

Dear Dr. Nance and Steve,

FYI Venture Global's CP has been out of control the last few days. Scroll down for link to photo and video folder.

This was going to be on your radar for an inspection. Any update? Steve, I'd communicated with you about this several times over the last year.

Anne Rolfes, Director, Louisiana Bucket Brigade, (504) 452-4909

Venture Global Flaring for Four Straight Days Shows Dangers of Gas Export Industry

FOR IMMEDIATE RELEASE
April 23, 2024

CONTACT:
John Allaire, **Ex. 6 Personal Privacy (PP)**

Anne Rolfes, Director of the Louisiana Bucket Brigade, 504-452-4909,
anne@labucketbrigade.org

CAMERON, LA –Venture Global, a company that is vigorously lobbying against the pause on gas export facilities, is having significant problems at its Calcasieu Pass (CP) gas export terminal. The facility has been flaring for four straight days, a clear sign that there are operational problems at the facility. While there has been no communication from Venture Global to local residents, there are alarms piercing the air and black smoke billowing from the terminal. The inability of the management to get the facility under control underscores the concerns behind the Department of Energy's recent decision to pause permitting of gas export terminals. The pause is intended to give the Biden Administration a chance to review the science and determine if building more facilities is in the public interest.

"As your neighbor when you have an emergency situation, when you're flaring and I can hear the alarms from your plants, please let me know what's going on so that I can respond accordingly for the safety of myself, my family members and my other neighbors here in Holly Beach," said **John Allaire**, a retired environmental engineer who worked in the oil and gas industry for over three decades and whose property is across the river from CP. "This incident shows exactly why we need not just a pause, but a permanent end to permitting any more facilities." Allaire reported seeing excessive, continuous flaring coming from the facility for over 95 hours and photographed flames and smoke coming from the terminal throughout the period.

When a facility is flaring, it's releasing toxic pollutants that cannot be contained. Flaring at facilities like CP is used as an emergency mechanism, and periods of high flaring are associated with shutdowns or operational problems.

"Constant flaring is a sign that Venture Global's operations are out of control," said **Anne Rolfes, Louisiana Bucket Brigade executive director**. "If you look in the government files or listen to captured politicians speak, it's clear that Venture Global spends a huge amount of time and money lobbying. They should stop spending their time in Washington D.C. and get back to Louisiana and figure out how to get the plant under control. This whole episode shows why we desperately need the federal government's pause on permitting gas export terminals and why these facilities are not in the public interest."

Venture Global has made public commitments not to flare and is only permitted for 60 hours of flaring per year. Despite nearby flames that appeared to be dozens of feet tall accompanied by black smoke, large tanker ships continued to dock throughout the incident. Residents received no notice of what had happened or what the risk level might be even as facility alarm bells could be heard throughout the area.

Ongoing operational issues and lack of transparency are nothing new for Venture Global's CP facility. Since beginning its operations, the facility has had repeated problems, as documented in its reporting to the Department of Environmental Quality. In the first half of 2023, the plant had operational problems on at least 63% of days. The accidents have been compiled in a series of reports available on the Louisiana Bucket Brigade website.

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About Louisiana Bucket Brigade
The Louisiana Bucket Brigade collaborates with communities on the fenceline of polluting industry in Louisiana. We engage in grassroots action to hasten the transition from fossil fuels. Visit labucketbrigade.org for more information.

Message

From: Nance, Earthea [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=5A54D6F295DB49BF9B334B7D971D789F-NANCE, EART]
Sent: 4/25/2024 4:30:46 AM
To: anne@labucketbrigade.org
Subject: Venture Global update
Attachments: 24-02753-R06--ICMPS Rolfes Venture Global update 4_24_24 signed.pdf; R6Delivers_Louisiana and the Mississippi River Industrial Corridor.pdf

Dear Anne,

This is in response to your recent letter. Please see attached. And please let me know if you'd like to meet.

-E

REGION 6 ADMINISTRATOR
DALLAS, TX 75270

Ms. Anne Rolfes
Director
Louisiana Bucket Brigade

Dear Ms. Rolfes:

Thank you for reaching out to the U.S. Environmental Protection Agency by email on March 14, 2024, asking for an update related to the concerns you raised about operational problems at Venture Global. We shared with LDEQ the information previously provided, and we understand from discussions with LDEQ management that enforcement negotiations are ongoing with Venture Global.

I am committed to working with communities in our region to address environmental concerns and appreciate you contacting me about this matter. Please check out our Region 6 Delivers (attached to the email) for updates on the important work the EPA Region 6 is doing in Louisiana. If you have any additional information that you would like to share or any specific compliance concerns, please provide those directly to Steve Thompson at thompson.steve@epa.gov or at (214) 665-2769 and he can follow up directly to set up any discussions.

Sincerely,

EARTHEA NANCE

Digitally signed by EARTHEA NANCE
Date: 2024.04.24 23:18:52 -05'00'

Earthea Nance, PhD, PE
Regional Administrator, Region 6

EPA United States Environmental Protection Agency

REGION 6 DELIVERS

April 2024

"EPA's commitment to environmental justice has not wavered. Under my leadership, we have embedded environmental justice into all our programs at Region 6, from permits to enforcement to grants."

Dr. Earthea Nance
Region 6 Administrator

EPA Region 6 Accomplishments in Louisiana and the Mississippi River Industrial Corridor

Grants Awarded

- $2 million in air monitoring for communities in St. John the Baptist & St. James Parishes, New Orleans.
- $3 million in EJ grants to groups in Cameron & Calcasieu Parishes, New Orleans.
- $13 million to the Deep South Center for technical aid to environmental justice communities throughout Louisiana.

Enforcement Actions

- Mosaic Fertilizer: agreed to add an ammonia monitor and donate equipment.
- Evonik Corporation: agreed to reduce 5.6 tons/year of hazardous emissions.
- Sasol Chemicals: agreed to pay $1.7 million in civil penalties.
- Denka: agreed to reduce hazardous chloroprene emissions under RCRA 3008 order; endangerment finding is awaiting trial.

Community Partnerships

Region 6 launched a project with RISE St. James and other groups to study contamination of concern to residents.

What's Coming Up?

Region 6 formed a special team to meet with communities that experienced major accidents from Dow, Marathon, and Shell.

continued

New Rules by the EPA

Petrochemical Plants

- HON Rule for hazardous air pollutant standards will reduce emissions of chloroprene and other toxics.

Pollution and Climate

- Clean Vehicle Standards
- PM 2.5 Standards

Clean Up & Protection

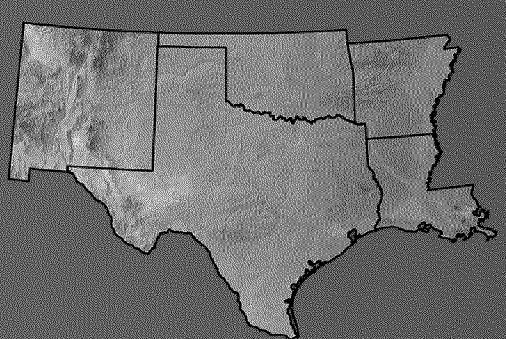
- Lead Pipe Removal
- Lead Soil Standard
- Asbestos Ban
- Exide Superfund Site Clean Up
- Open Burn/Detonation

Embedding Environmental and Climate Justice

Denka	EPA Region 6 issued the first Imminent and Substantial Endangerment Order for cancer risk. This action recognizes the justice implications of this permit. We are awaiting trial.
Open Burning/ Open Detonation	As part of our work with Colfax and surrounding communities, EPA Region 6 embedded EJ principles into national guidance for open burning and detonation.
Carbon Capture/ Sequestration	EPA Regions 6 and 9 embedded EJ principles into the EPA's UIC program. Region 6 also embedded EJ into its agreement with Louisiana for CCS permitting.

Learn more about EPA Region 6

www.epa.gov/region 6



EPA Region 6 serves Arkansas, Louisiana, New Mexico, Oklahoma, Texas, and 66 Tribal Nations

Message

From: Anne Rolfes [anne@labucketbrigade.org]
Sent: 4/1/2022 11:22:41 PM
To: Nance, Earthea [Nance.Earthea@epa.gov]
Subject: Letter of Concern from LA Bucket Brigade
Attachments: 3.31.22 Letter to EPA from La Bucket Brigade w Attachments.pdf

Dear Dr. Nance:

Please see the attached letter with our concerns in Louisiana.

Thank you for your hard work on behalf of our region.

Sincerely,

Anne Rolfes

Anne Rolfes, Director, Louisiana Bucket Brigade, (504) 452-4909

LOUISIANA BUCKET BRIGADE

Clean Air. Justice. Sustainability.

March 31, 2022

Dear Dr. Nance:

Congratulations on your appointment as Regional Administrator of Region 6. I write to you today to alert you to issues in Louisiana that need the forceful attention of Region 6. Some of the issues are in regard to specific facilities, others concern more overarching issues.

This list includes four areas of concern. Among our chief concerns is ethylene oxide emissions in Louisiana, and so I begin this letter with detail on that subject. **The items underlined and in bold** delineate our specific action request of EPA.

#1 Need for reduction of ethylene oxide emissions and a halt to new permitted sources

We would welcome a conversation with you about ethylene oxide and our concern that the state of Louisiana is not heeding the latest scientific guidance.

Despite solid scientific evidence regarding the danger of ethylene oxide (EtO), the Louisiana Department of Environmental Quality (LDEQ) continues to permit facilities that emit significant quantities of EtO. One example is the air permit given to Formosa Plastics in St. James Parish. The air permit allows for 7.7 tons of ethylene oxide to be released into the air every year. Thankfully, that permit is now facing legal challenges. As recently as March 14,2022, however, the LDEQ was in state court defending its permit.

Note that the 7.7 tons of EtO emissions per year is a conservative estimate, since Formosa estimates that its thermal oxidizers would combust 99.9% of the ethylene oxide in the gas waste streams. Yet there is not a requirement that Formosa install this kind of equipment, there is no manufacturer's guarantee that the equipment could achieve this combustion rate, and LDEQ is not going to monitor it. This is but one example of the utter lack of meaningful oversight regarding EtO.

A review of Louisiana's ongoing Ethylene Oxide emissions

The following information is derived from the EPA Toxic Release Inventory database and shows facilities with ethylene oxide emissions in Louisiana over the past five years. Louisiana is the second-largest emitter of ethylene oxide in the US, second to Texas.

The data show that there has been a decrease of nearly 13% in ethylene oxide emissions in Louisiana over the past five years. As shown in the last row of Table 1, total EtO emissions in 2016 were 45,506 pounds, while in 2020, total emissions were 39,647 pounds. However, this decrease

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is largely driven by a significant change in reported emissions by BCP Ingredients Inc starting in 2017. Absent this change, there is only a 1% decrease in EtO emissions in Louisiana.

Table 1. EtO Emissions by Facility

Company	Parish	2020 Emissions (lbs)	2019 Emissions (lbs)	2018 Emissions (lbs)	2017 Emissions (lbs)	2016 Emissions (lbs)	5-year Total (lbs)	5-year Total (Tons)
Sasol Chemicals	Calcasieu	4,705	3,176	2,237	2,105	1,496	9,014	4.51
Westlake	Calcasieu	2	8	7	3	2	20	0.01
LACC /Lotte Chemical	Calcasieu	2,488	145	-	-	-	2,633	1.32
Ineos Oxide	Iberville	106	96	262	157	169	789	0.39
Dow Chemical	Iberville	3,057	3,494	3,008	3,623	3,705	16,887	8.44
Axiall	Iberville	2	2	2	2	2	10	0.01
SE Tylose	Iberville	17	18	17	17	19	89	0.04
BCP Ingredients	Iberville	37	198	48	54	3,173	3,510	1.75
Taminco US	Iberville	188	191	160	161	166	866	0.43
BASF	Ascension	13,530	13,300	15,100	15,200	15,100	72,230	36.12
Rubicon	Ascension	77	93	68	42	83	363	0.18
Shell Chemical	Ascension	5,904	7,457	10,415	9,424	4,369	37,569	18.78
Evonik	St. John	1,731	1,658	1,820	2,575	3,224	11,008	5.50
Union Carbide	St Charles	7,803	11,012	7,922	6,767	13,998	47,502	23.75
TOTAL LOUISIANA EtO EMISSIONS		**39,647**	**40,848**	**41,066**	**40,130**	**45,506**	**202,490**	**101**

When reviewing EtO emissions by parish, the parishes of St. Charles, St. John, and Iberville decreased by approximately 50% over the five years reviewed. In the same time frame, Ascension Parish had no change in EtO emissions, while Calcasieu Parish EtO emissions increased by 380%. Calcasieu Parish had a new facility, LACC/Lotte Chemical, come on-line in 2019, which reported 145 pounds of EtO emissions. In 2020, LACC/Lotte Chemical reported 2,488 pounds of EtO emissions, a significant increase. Additionally, in Calcasieu Parish, Sasol Chemicals has consistently increased EtO emissions over the five years reviewed.

Table 2. EtO Emissions by Parish

Parish	2020 Emissions (lbs)	2019 Emissions (lbs)	2018 Emissions (lbs)	2017 Emissions (lbs)	2016 Emissions (lbs)	5-year Total (lbs)	5-year Total (Tons)
Calcasieu (3)	7,195	3,329	2,244	2,108	1,498	16,374	8.19
Iberville (6)	3,407	3,999	3,497	4,014	7,233	22,151	11.08
Ascension (3)	19,511	20,850	25,583	24,666	19,552	110,162	55.08
St. John (1)	1,731	1,658	1,820	2,575	3,224	11,008	5.50
St Charles (1)	7,803	11,012	7,922	6,767	13,998	47,502	23.75

We are alarmed by these amounts of ETO in our state, especially the new sources, and would like to work with the EPA to eliminate such emissions.

#2 Assure the LDEQ implements recommendations of the Louisiana Legislative Auditor

In January of 2021, the Louisiana Legislative Auditor released an audit (Attachment #1) entitled *Monitoring and Enforcement of Air Quality* (there was this news article about the audit). The audit painted a woeful picture of industry's emissions reporting, LDEQ's tracking of emissions reporting, and subsequent LDEQ incompetence regarding issuing of violations and enforcement. The report made recommendations for improvement on pages 10 – 20 of the audit.

We ask for your help in assuring that LDEQ implement the Legislative Auditor's recommendations. We understand that the audit was a document developed by the Louisiana Legislative Auditor and not by EPA. The Auditor, however, did find significant problems on issues that the EPA delegates to the LDEQ. Since the audit identified systemic problems within the LDEQ, we feel that implementing the recommendations is an opportunity for tangible improvement at the agency.

LOUISIANA BUCKET BRIGADE
Clean Air. Justice. Sustainability.

#3 Carbon Capture: Louisiana Primacy

Many of our partner organizations have corresponded with you regarding Louisiana's application for primacy on carbon capture and storage. We echo their concerns and urge the agency not to grant it. We refer you to the letters already submitted to the region.

#4 Facilities of Concern

Operating

Shell Norco (St. Charles Parish): This refinery has had problems with upsets for the 22 years I have been aware of it. **We request that the EPA inspect the facility and require a real – not cursory - root cause analysis of its accidents.**

There are two complexes that used to be connected via pipelines. That may still be the case. One facility is the Shell Refinery (formerly Motiva), the other is an associated chemical complex that has changed hands frequently over the years. It is now operated by WR Grace. In the past, the refinery sent chemicals to be flared at the chemical plant via underground pipes. When trying to end the flaring problems, it may be necessary to look at both complexes.

This is some information regarding the frequent flares.

1. This article from DeSmog Blog about the flaring during Hurricane Ida. Note that the flare was visible as people evacuated New Orleans via I 10. While refineries understandably have challenges in preparing for storms, the intensity and frequency of the flaring before, during and after Hurricane Ida demonstrates the facility's long-term failure to prepare for the inevitable storms in this region.
2. This Twitter feed chronicles the facility's ongoing flares over time. The most recent photos and videos document flaring and smoke during Hurricane Ida, but if you scroll back you will see consistent reports over the years of ongoing flares.
3. This database is a compilation of Shell Norco's upset reports over a ten-year span, from 2005 – 2015.

Please note that this refinery does stand out as being worse than other refineries. The flare is used often, making it appear as if the refinery has frequent upsets and that this is just its normal operating procedure. The Clean Air Act requires that facilities conduct a root cause analysis of upsets. The consistent flaring and smoke from the Shell refinery makes it seem doubtful that this has been done.

One final note: the Shell refinery was called the Motiva refinery until 2017. When it was called Motiva, Shell was still involved since Motiva was a joint venture between Saudi Aramco and Shell.

Shell is thus responsible for the recent poor operations as well as those that span the past several decades. Its sole ownership began in 2017.

Nucor Steel (St. James Parish): Request to reject any permits to expand or any renewal permits, given the terrible operational problems at the facility.

The attached letter (Attachment #2) from the Tulane Environmental Law Clinic lays out some of the problems with Nucor Steel's operations and with LDEQ's approach to Nucor. Note that the Tulane Environmental Law Clinic sent this letter to the LDEQ on behalf of the Louisiana Bucket Brigade and our partner group, Inclusive Louisiana, on July 20, 2021. We sent the letter to object to the LDEQ settlement with Nucor. We did not receive a reply from LDEQ until November 17, 2021, and that response only came after we complained to EPA headquarters that we'd been ignored by the state (LDEQ replied a week later). The LDEQ reply was a cursory dismissal of our concerns.

Thankfully, EPA at the federal level is now involved. We have had three phone conferences with regional and headquarters EPA staff and there was a notice of violation issued in January of 2022. However, this is unlikely to have any real meaning if the region does not prioritize it. This facility has spewed hydrogen sulfide and sulfuric acid mist. They do not have control of the facility and should certainly not increase production. We attached our letter to LDEQ so that a/ you could get a sense of the problems at the facility and b/ you can see how the LDEQ failed to take our legitimate concerns seriously, thus requiring the vigilance of EPA.

Denka: We have followed the announcement of renewed EPA air monitoring at the Denka site, and we know the Concerned Citizens of St. John have been a powerful voice at Region 6. However, the organization has been undermined by Region 6 in the past. We mention Denka here because it is of such concern and warrants intensive attention from by regional staff with a track record of solving problems.

Permitted / under construction

Formosa: Michael Regan recently expressed a willingness to support the Army Corps of Engineers environmental impact statement regarding Formosa. We will engage with you on what is possible from the EPA in this regard. In the meantime, we alert you to the fact that a challenge to the LDEQ's woefully flawed air permit is currently before a state judge. She has asked for documents from both parties by May 13, 2022. **We request that Region 6 use its authority to revoke the air permit issued to Formosa Plastics.** I understand that the matter is being litigated, but if and when EPA has an opening to act, we request that you do so.

Liquified Natural Gas Terminals: As you know, there are a dozen liquified gas export terminals planned for the coast of Louisiana, and each will require an air permit. **We ask that the agency**

work with the LDEQ to review these permits, especially in the light of cumulative impacts and environmental justice concerns. The facilities planned in Plaquemines Parish would destroy historic Black communities. On the other side of the state, in Cameron and Calcasieu Parishes, the already existing pollution burden requires careful consideration of additional permits. There are numerous examples – most recently, Formosa Plastics in St. James Parish – of the LDEQ simply ignoring or manipulating data to override environmental justice and cumulative impacts concerns. This is a dereliction of duty and requires the agency's urgent attention.

We are grateful for your time and look forward to working with you to improve the situation here in Louisiana. If I can be of any help to you or your staff, please reach out via my contact information detailed beneath my signature.

Sincerely,

Anne Rolfes, Director
anne@labucketbrigade.org
(504) 452 - 4909

Attachments

#1 Louisiana Legislative Auditor Report
#2 Letter to LDEQ Objecting to Settlement

MONITORING AND ENFORCEMENT OF AIR QUALITY

DEPARTMENT OF ENVIRONMENTAL QUALITY

PERFORMANCE AUDIT SERVICES
ISSUED JANUARY 20, 2021

LOUISIANA LEGISLATIVE AUDITOR
1600 NORTH THIRD STREET
POST OFFICE BOX 94397
BATON ROUGE, LOUISIANA 70804-9397

LEGISLATIVE AUDITOR
DARYL G. PURPERA, CPA, CFE

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NICOLE B. EDMONSON, CIA, CGAP, MPA

DIRECTOR OF PERFORMANCE AUDIT SERVICES
KAREN LEBLANC, CIA, CGAP, MSW

FOR QUESTIONS RELATED TO THIS PERFORMANCE AUDIT, CONTACT GINA V. BROWN, PERFORMANCE AUDIT MANAGER, AT 225-339-3800.

Under the provisions of state law, this report is a public document. A copy of this report has been submitted to the Governor, to the Attorney General, and to other public officials as required by state law. A copy of this report is available for public inspection at the Baton Rouge office of the Louisiana Legislative Auditor and online at www.lla.la.gov.

This document is produced by the Louisiana Legislative Auditor, State of Louisiana, Post Office Box 94397, Baton Rouge, Louisiana 70804-9397 in accordance with Louisiana Revised Statute 24:513. Five copies of this public document were produced at an approximate cost of $6.25. This material was produced in accordance with the standards for state agencies established pursuant to R.S. 43:31. This report is available on the Legislative Auditor's website at www.lla.la.gov. When contacting the office, you may refer to Agency ID No. 9726 or Report ID No. 40200007 for additional information.

In compliance with the Americans With Disabilities Act, if you need special assistance relative to this document, or any documents of the Legislative Auditor, please contact Elizabeth Coxe, Chief Administrative Officer, at 225-339-3800.

LOUISIANA LEGISLATIVE AUDITOR
DARYL G. PURPERA, CPA, CFE

January 20, 2021

The Honorable Patrick Page Cortez,
President of the Senate
The Honorable Clay Schexnayder,
Speaker of the House of Representatives

Dear Senator Cortez and Representative Schexnayder:

This report provides the results of our audit of the Department of Environmental Quality (DEQ). The purpose of this audit was to evaluate DEQ's monitoring and enforcement of air quality regulations.

Overall, we found DEQ could strengthen its monitoring and enforcement processes by identifying violations and issuing enforcement actions in a timelier manner.

Our analysis of U.S. Environmental Protection Agency (EPA) data found the number of good air quality days in Louisiana has increased by 20.9 percent between 2008 and 2018, while the number of unhealthy days for sensitive groups has decreased 75.1 percent. However, Louisiana has the highest toxic air emissions per square mile of any state, according to the EPA's Toxics Release Inventory, and the EPA's most recent (2014) National Air Toxics Assessment showed parts of Louisiana have high potential cancer risks and/or a high respiratory hazard index.

We found DEQ should strengthen its monitoring process to identify those permitted facilities that fail to submit their required self-monitoring reports and hold them accountable. In addition, DEQ should review these reports in a timely manner so it can identify and address facilities with self-reported violations. Automating and standardizing the submission of these self-monitoring reports could help DEQ improve its monitoring process.

In addition, we found DEQ does not issue enforcement actions in a timely manner to permitted facilities that violate air permit requirements. From fiscal years 2015 through 2019, the time it took DEQ to issue enforcement actions increased by 102.1 percent. Best practices state that effective enforcement includes swift and predictable responses to violations.

DEQ also does not effectively track the penalties it has assessed and whether facilities have paid their penalties. DEQ could improve its settlement process for penalties by developing

deadlines for when facilities must submit their settlement offers and by processing these offers more quickly. We found that, for 46 enforcement actions finalized through settlements between fiscal years 2015 and 2019, it took an average of 4.4 months for DEQ to receive a settlement offer after issuing the enforcement action and an additional 2.1 years on average, to finalize an agreement.

We found as well that DEQ faces challenges related to low staffing levels, high workloads, frequent turnover of staff, and ineffective data systems that make it more difficult to perform its regulatory work. For example, DEQ's positions dedicated to air quality regulation decreased 14.6%, from 247 in fiscal year 2010 to 211 in 2019.

The report contains our findings, conclusions, and recommendations. I hope this report will benefit you in your legislative decision-making process.

We would like to express our appreciation to the Department of Environmental Quality for its assistance during this audit.

Respectfully submitted,

Daryl G. Purpera, CPA, CFE
Legislative Auditor

DGP/ch

DEQ 2021

Louisiana Legislative Auditor

Daryl G. Purpera, CPA, CFE

Monitoring and Enforcement of Air Quality
Department of Environmental Quality

January 2021

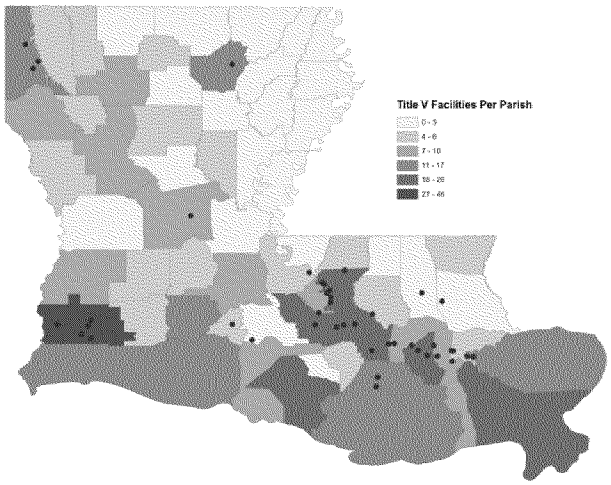
Audit Control # 40200007

Introduction

We evaluated the Louisiana Department of Environmental Quality's (DEQ) monitoring and enforcement of air quality regulations. It is important to achieve and maintain clean air to protect public health and the natural environment. We conducted this audit because Louisiana has a high concentration of industrial facilities requiring air permits, as shown in Exhibit 1. In addition, the Environmental Integrity Project compared budgets and staffing for environmental agencies across states and found that between fiscal years 2008 and 2018, Louisiana's DEQ ranked 4th among states in staffing cuts and 3rd in budget cuts[1] which may affect its ability to effectively perform its regulatory activities.

DEQ's **mission** is to provide service to the people of Louisiana through comprehensive environmental protection in order to promote and protect health, safety and welfare while considering sound policies that are consistent with statutory mandates.

Exhibit 1
Ambient Air Monitors and Major Permitted Facilities
Fiscal Year 2019



Source: Prepared by legislative auditor's staff using EPA's GreenBook data and data provided by DEQ.

According to state law[2], DEQ is the primary agency in the state concerned with environmental protection and regulation. State regulations[3] establish DEQ's Air Quality Program to maintain the purity of air resources in Louisiana consistent with the protection of the health and physical property of the people, maximum employment, and the full industrial development of the state.

DEQ regulates and monitors air quality by issuing air permits, conducting surveillance activities, such as inspections of permitted facilities, and issuing enforcement actions when permit holders violate permit conditions. DEQ issues various types of air permits depending on the amount of

[1] Environmental Integrity Project. *During a Time of Cutbacks at EPA, 30 States Also Slashed Funding for State Environmental Agencies.* December 5, 2019. https://environmentalintegrity.org/news/state-funding-for-environmental-programs-slashed/

[2] Louisiana Revised Statute (LA R.S.) 30:2011

[3] Louisiana Administrative Code (LAC) 33:III:101

pollutants a facility may emit. For example, most large industrial facilities are required to have major (Title V) permits, while smaller facilities, such as concrete plants and crematoriums, are required to have minor permits. From fiscal years 2015 through 2019, there were approximately 750 active major permits and 6,000 to 8,000 active minor permits each year.

DEQ monitors air quality through several activities, including collecting and analyzing ambient air data, inspecting permitted facilities, and reviewing self-monitoring reports submitted by facilities. DEQ and the Environmental Protection Agency (EPA) place ambient air monitors across the state to collect and analyze air samples for certain pollutants, as shown in Exhibit 1. To comply with EPA requirements, DEQ inspects 50% of major air permit holders per year and will conduct inspections of minor air permits in response to environmental incidents, such as unauthorized emission releases or spills, and citizen complaints. DEQ also receives and reviews various self-monitoring reports that facilities are required to submit throughout the year, such as permit deviations and emissions reports. When DEQ identifies permit violations, it may issue enforcement actions that require corrective action and/or monetary penalties. Penalties are often resolved through settlement agreements negotiated with facilities and may include beneficial environmental projects.

The objective of this audit was:

To evaluate DEQ's monitoring and enforcement of air quality regulations.

Our results are summarized on the next page and discussed in detail throughout the remainder of the report. Appendix A contains DEQ management's responses to our recommendations, and Appendix B contains our scope and methodology. In addition,

- Appendix C contains descriptions of the six criteria pollutants (i.e., the most common pollutants) designated by the EPA, how each are formed, and the associated health effects.
- Appendix D contains the number and description of air permits issued in fiscal years 2015 through 2019.
- Appendix E contains the numbers of active air permits by parish for fiscal years 2015 through 2019.
- Appendix F includes the top 25 pollutants in Louisiana for calendar year 2018.
- Appendix G contains the total self-reported air emissions in tons by parish.
- Appendix H is a map showing Louisiana's potential cancer risk per million, and Appendix I is a map showing Louisiana's respiratory hazard index.
- Appendix J contains the number of and description of enforcement actions issued in fiscal years 2015 and 2019.

Objective: To evaluate DEQ's monitoring and enforcement of air quality regulations.

Overall, we found that DEQ could strengthen its monitoring and enforcement processes by identifying violations and issuing enforcement actions more timely. Specifically, we found:

- **Louisiana has seen improvement in air quality since calendar year 2008. However, certain areas of the state are highly industrialized and have high concentrations of air pollution. As a result, it is important for DEQ to have robust monitoring and enforcement processes to protect human and environmental health.** According to our analysis of EPA data, the number of good air quality days in Louisiana has increased by 20.9%, from 191.9 days in calendar year 2008 to 232 days per year in calendar year 2018, while the number of unhealthy days for sensitive groups has decreased 75.1%, from 14.3 days to 3.6 days. However, according to the EPA's Toxics Release Inventory, Louisiana has the highest toxic air emissions per square mile than any other state. In addition, according to the EPA's most recent (2014) National Air Toxics Assessment (NATA), parts of Louisiana have high potential cancer risks and/or a high respiratory hazard index.

- **While DEQ conducted inspections on permitted facilities as required by the EPA, it should strengthen its monitoring process by identifying and holding accountable those facilities that fail to submit required self-monitoring reports. In addition, DEQ should review these reports in a timely manner so it can identify and address those facilities with self-reported violations.** Automating and standardizing the submission of these self-monitoring reports could help DEQ improve its regulation of air quality in Louisiana and decrease the resources needed to review these reports manually.

- **DEQ does not issue enforcement actions in a timely manner to permitted facilities that violate air permit requirements. From fiscal years 2015 through 2019, the time it took DEQ to issue enforcement actions increased by 102.1%, from an average of 289 days to an average of 585 days.** As a result, there is a risk that facilities may have violations that remain uncorrected for years. Best practices state that effective enforcement includes swift and predictable responses to violations. In addition, developing additional reports could assist DEQ in better monitoring the enforcement program overall and help it hold permitted facilities accountable.

- **DEQ does not effectively track the penalties it has assessed and whether facilities have paid their penalties. In addition, DEQ could improve its settlement process by developing deadlines for when facilities must submit settlement offers and by processing these offers more quickly.** DEQ gives facilities the option to submit an initial settlement offer after it issues a notice of potential penalty, which often involves negotiating with facilities regarding the

amount facilities must pay to resolve violations. Of the 46 enforcement actions that were finalized through settlements during fiscal years 2015 through 2019, it took an average of 4.4 months for DEQ to receive a settlement offer after issuing the enforcement action and then an additional 2.1 years on average, to finalize the settlement agreement.

- **DEQ faces challenges in performing its required regulatory duties, including low staffing levels, high workloads, frequent turnover of staff, and ineffective data systems**. Despite Louisiana's large number of Title V facilities, DEQ's positions dedicated to air regulation decreased 14.6%, from 247 in fiscal year 2010 to 211 in 2019. These challenges may impact DEQ's ability to effectively hold facilities accountable for air violations.

Our findings and our recommendations are discussed in more detail in the sections below.

Louisiana has seen improvement in air quality since calendar year 2008. However, certain areas of the state are highly industrialized and have high concentrations of air pollution. As a result, it is important for DEQ to have robust monitoring and enforcement processes to protect human and environmental health.

Nationwide, air quality has improved significantly since the passage of the Clean Air Act of 1970. According to the EPA, cleaner technology and more stringent air regulations contribute to the improvements in air quality.[4] Air pollution in Louisiana comes from a variety of sources, and the potential health risks depend on the type of air pollutant, the concentration of pollutant in the air, and frequency and duration of exposure. Although industrial facilities contribute to air pollution, other sources such as sandblasters, crematoriums, and pollution from driving cars and trucks also impact air quality. According to data from the U.S. Bureau of Labor Statistics,[5] Louisiana has the highest percentage of its jobs in chemical manufacturing and petroleum and coal manufacturing of any state. Louisiana is a desirable state for industry due to it being a major source of raw materials; its access to large amounts of water needed for production; its proximity to the Mississippi River, a major transportation artery; and its tax incentives.[6] However, a byproduct of major industry is air pollution. Louisiana has seen improvement in some aspects of air quality since 2008; however, in highly industrialized areas of the state, higher levels of

[4] https://www.epa.gov/clean-air-act-overview/progress-cleaning-air-and-improving-peoples-health & https://www.epa.gov/clean-air-act-overview/clean-air-act-solving-air-pollution-problems-science-and-technology

[5] Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2019, https://data.bls.gov/cew/apps/table_maker/v4/table_maker.htm#type=0&year=2019&qtr=A&own=5&ind=325&supp=0 & https://data.bls.gov/cew/apps/table_maker/v4/table_maker.htm#type=0&year=2019&qtr=A&own=5&ind=324&supp=0

[6] "The Economic Impact of the Chemical Industry on the Louisiana Economy: An Update," Loren C. Scott & Associates, Inc. April 2018

pollution may be present. There are various ways to measure air quality, which are explained in detail below.

According to EPA's Air Quality Index (AQI) data, Louisiana's overall air quality has improved from calendar year 2008 through 2018. The EPA's AQI defines how clean or polluted the air is and what associated health effects may be a concern. EPA calculates AQI through data collected from monitoring stations for the criteria pollutants,[7] and the higher the AQI value, the greater the level of air pollution and health concern. As shown in the text box, an AQI from 0 to 50 is considered "good," whereas an AQI of 301 to 500 is considered "hazardous." According to our analysis of EPA data, the number of good air quality days in Louisiana has increased by 20.9%, from 191.9 days in calendar year 2008 to 232 days per year in calendar year 2018, while the number of unhealthy days for sensitive groups has decreased 75.1%, from 14.3 days to 3.6 days.

EPA's Air Quality Index Ranges

0-50 = Good
51-100 = Moderate
101-150 = Unhealthy for Sensitive Groups
151-200 = Unhealthy
201-300 = Very Unhealthy
301-500 = Hazardous

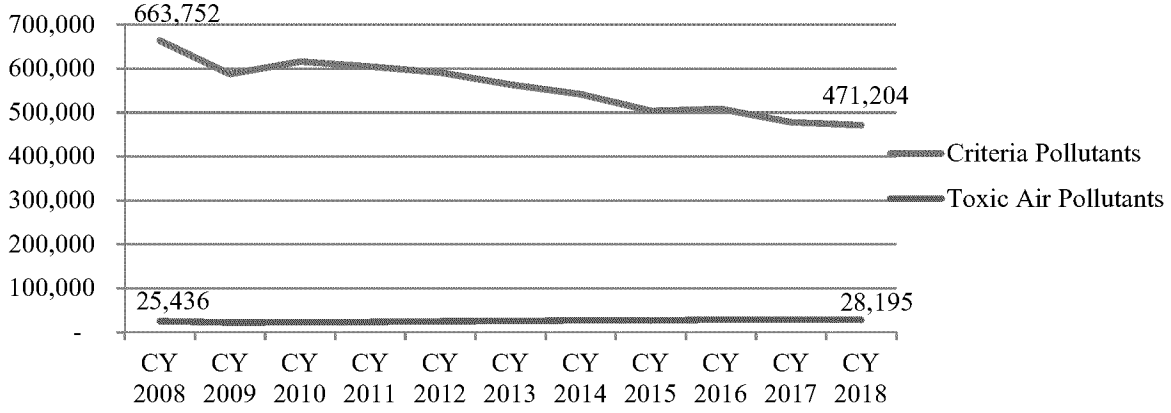
Louisiana has more parishes in attainment status than previous years. The EPA designates areas that do not meet National Ambient Air Quality Standards (NAAQS)[8] as non-attainment areas, and states must develop plans to reduce air pollution for those areas in order to comply with NAAQS. Currently, Louisiana has two non-attainment areas for sulfur dioxide, one in St. Bernard Parish and one in Evangeline Parish.[9] This is an improvement from calendar year 2016 when Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge were also in non-attainment for ozone. According to DEQ, it is working with facilities in St. Bernard and Evangeline Parish to gain attainment status within the next couple of years.

According to DEQ's Emissions Reporting and Inventory Center (ERIC),[10] overall self-reported emissions from permitted facilities have decreased 27.5%, from 689,188 tons in calendar year 2008 to 499,399 tons in calendar year 2018. Emissions of the six criteria pollutants [Carbon Monoxide (CO), Lead, Nitrogen Dioxide (NO2), Ozone (O3), Particulate Matter (PM2.5 and PM10), and Sulfur Dioxide (SO2)] have decreased 29% during this same period, from 663,752 tons per year in calendar year 2008 to 471,204. See Appendix C for how each criteria pollutant is formed and the associated health effects. Emissions from toxic air pollutants[11] increased by 10.8%, from 25,436 tons in calendar year 2008 to 28,195 tons in

[7] Criteria pollutants are regulated under Title I of the Clean Air Act, which sets a national health standard for each pollutant. The burden is on the state to set up monitoring networks, monitor the air continuously for each pollutant, and report the data to EPA. States must also submit emission summaries and control plans for each pollutant, which demonstrate to EPA that state controls and regulations will both achieve and maintain the standard.
[8] NAAQS designations are for criteria pollutants only.
[9] Based on analysis of EPA's Green Book Data https://www.epa.gov/green-book/green-book-data-download
[10] ERIC contains self-reported data that is estimated and then aggregated into the inventory. All major sources, some minor sources, and some facilities in non-attainment areas must report their emissions to ERIC by April 30th of each year.
[11] Toxic Air Pollutants (TAPs) are regulated under Title III of the Clean Air Act. TAP regulations focus on the air emissions from targeted industries, and the control technology used to limit those emissions. In general, the burden is on industries to report emissions of TAPs, and to demonstrate to the state agency that the control technology in place meets standards. In Louisiana, industries must also comply with the state regulation for toxic air pollutants.

calendar year 2018. Exhibit 2 shows the total tons in criteria and toxic air pollutants from calendar years 2008 through 2018.

Exhibit 2
Self-Reported Air Pollutant Emissions in Tons
Calendar Years 2008 through 2018



Source: Prepared by legislative auditor's staff using self-reported facility data provided by DEQ.

While emissions have decreased, some areas have higher concentrations of emissions and permitted facilities than other areas in Louisiana. For example, Calcasieu Parish and East Baton Rouge Parish made up more than 20% of the state's total emissions. Exhibit 3 shows the top 10 parishes with the highest emissions during calendar year 2018 and the number of major and minor permits in those parishes. See Appendix G for the emissions for all parishes for calendar years 2015 through 2018.

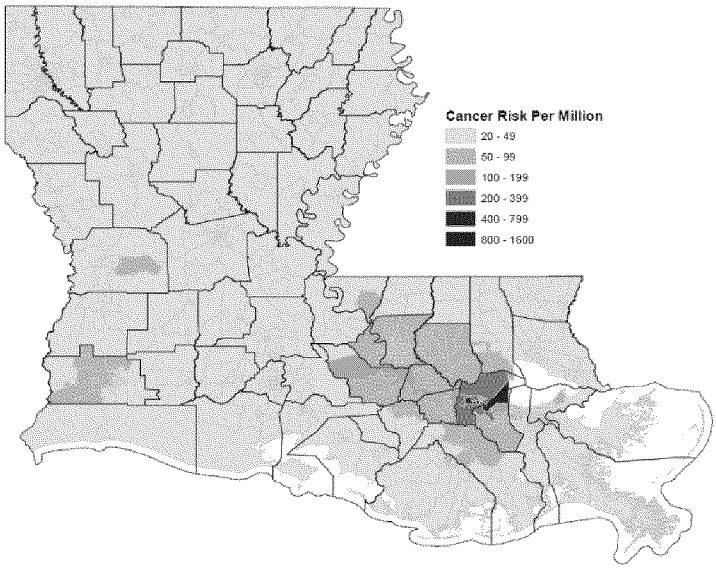
Exhibit 3
Top 10 Parish Emissions in Tons
Calendar Year 2018

Parish	Total Emissions*	Percent of State Total Emissions	Major Permits	Minor Permits
Calcasieu	70,970	14.2%	89	198
East Baton Rouge	42,678	8.5%	56	85
St. Mary	37,006	7.4%	21	105
St. Charles	34,733	7.0%	54	49
Pointe Coupee	26,040	5.2%	5	63
Ascension	25,302	5.1%	67	50
DeSoto	22,644	4.5%	9	822
Rapides	18,402	3.7%	9	56
Iberville	17,308	3.5%	55	81
Evangeline	16,701	3.3%	6	121
Top 10 Parishes Total	**311,784**	**62.4%**	**371**	**1,630**
All Other Parishes Total	**187,614**	**37.6%**	**353**	**5,008**
State Total	**499,398**	**100.0%**	**724**	**6,638**

*Emissions do not include emissions from all permits as not all permitted facilities are required to submit emission reports.
Source: Prepared by legislative auditor's staff using self-reported emissions data from DEQ.

According to the EPA's 2014 National Air Toxics Assessment (NATA),[12] parts of Louisiana have high potential cancer risks and/or a high respiratory hazard index. The EPA developed NATA as a tool to help states identify which pollutants, emission sources, and places they may wish to study further to better understand the potential risks to public health from air toxics.[13] NATA estimates health risks from a single year's emissions data by assuming a person breathes these emissions over a period of 70 years (e.g., a lifetime). According to this tool, St. John the Baptist Parish has the highest estimated potential cancer risk nationwide. Exhibit 4 shows the potential cancer risk for Louisiana by census tract. In addition, Louisiana has the second highest respiratory hazard index out of all the states. This indicates potential non-cancer risk for the respiratory system. See Appendices H and I for maps of cancer risk and respiratory hazard index information for Louisiana.

Exhibit 4
Potential Cancer Risk Per Million
By US Census Tract
2014 EPA National Air Toxics Assessment Data



According to the EPA's 2018 Toxics Release Inventory (TRI),[14] Louisiana has the highest toxic air releases per square mile than any other state. TRI calculates that Louisiana has 1,238.7 pounds of toxic air releases per square mile. Ohio, the second highest state, by comparison, has 898.9 pounds per square mile. TRI tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. It is important to note that the TRI does not reveal whether the public is exposed to toxic chemicals; however, in conjunction with other information it can be used as a starting point to evaluate the potential risks of exposure to these releases.

[12] This is the most recent assessment. NATA can be used to learn where to expand the toxics monitoring networks, help target reduction activities, and better understand risk from air toxics; however, it should not be used to pinpoint specific risk values in small areas such as census tract, characterize or compare risks between states, or examine trends from one NATA year to another.

[13] The EPA compiles the information in NATA using the National Emissions Inventory, which is released every three years based upon self-reported data provided by air agencies. The EPA then estimates the ambient concentrations of air toxics across the United States and estimates the population exposures to determine the potential public health risks.

[14] TRI annually tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. TRI is a mandatory program managed by the EPA but does not include all chemicals or all permitted facilities.

While DEQ conducted inspections on permitted facilities as required by the EPA, it should strengthen its monitoring process by identifying and holding accountable those facilities that fail to submit required self-monitoring reports. In addition, DEQ should review these reports in a timely manner so it can identify and address those facilities with self-reported violations.

DEQ's Surveillance Division Compliance Monitoring Strategy requires that it inspect 50% of the approximately 500 facilities with Title V permits annually, which translates to an inspection every other year. Each year, DEQ management determines which facilities to inspect based on factors such as facility compliance history, potential environmental impact, and the location of the facility. Inspectors then conduct an on-site inspection, checking for compliance with all active permits. After the on-site visit and reviewing any additional information requested, the inspector drafts an inspection report that must receive a technical and supervisory review. The inspection report includes any potential violations identified, called "areas of concern," which are forwarded to the Enforcement Division for further action.

While DEQ conducted the required number of inspections during fiscal years 2015 through 2019, it could make inspections less predictable and require photographs or other evidence that inspections actually occurred. State law[15] stresses the importance of unannounced inspections. We found that of 1,146 inspections, 251 (21.9%) were conducted in the same month as the previous inspection. For example, one facility was inspected on December 8, 2014, December 6, 2016, and December 12, 2018. DEQ may want to vary or randomize the months that it conducts compliance inspections each year so companies are not able to prepare for the inspection. According to DEQ, its interpretation of EPA's requirements was that facilities had to be inspected during the same quarter, but in 2017 clarified with the EPA that inspections must be conducted by the end of the second fiscal year, not within the same quarter.

In addition, to strengthen its inspection process, DEQ should require additional evidence that inspections occurred, such as photographs. In January 2019, DEQ notified the EPA's Inspector General and the Louisiana Legislative Auditor that a former employee had falsified at least three compliance inspections. DEQ staff identified that the inspections were falsified after the inspector had separated from the agency. According to DEQ, this was an isolated incident where an inspector and supervisor did not follow defined procedures. The department addressed the situation by meeting with managers and supervisors and reviewing standard operating procedures. DEQ concluded that its standard operating procedures were appropriate, and DEQ procedures uncovered the falsified inspections. However, to strengthen the inspection process, DEQ management should require additional evidence as part of inspection reports, as inspectors are not currently required to submit photographs or other types of secondary evidence to demonstrate that inspections did, in fact, occur.

[15] LA R.S. 30:2002(3)

DEQ does not identify whether a company fails to submit required self-monitoring reports or if a facility self-reported violations until its routine inspection or file review, which could take years. According to federal law,[16] facilities are required to submit semi-annual self-monitoring reports once every six months to DEQ that lists all of the emission permit deviations. Facilities are also required to submit an annual compliance certification that shows how the facility addressed these deviations and the actual compliance status from any emission deviations. According to state law,[17] DEQ should use these monitoring reports as part of its strategy to evaluate a facility's compliance with its permit conditions. According to DEQ management, when it receives reports, enforcement staff perform a cursory review to identify any potential high priority violations.[18] However, staff does not address any other violations at the time of this cursory review, such as submitting the report late or emissions that exceed permit limits. Instead, DEQ staff will review these reports in depth, including whether a facility failed to submit a required report, at the next compliance inspection or other file review, which could be years later. As a result, there is often a delay between when DEQ issues a violation or potential penalty to a facility for not submitting required self-monitoring reports and when those reports were due.

Of the 50 enforcement cases we reviewed,[19] eight (16%) included 18 instances where the facility did not submit or did not timely submit the required self-monitoring report. Of the eight enforcement actions that included issues with the submitting of self-monitoring reports, it took DEQ an average of 522 days, or almost 1.5 years, to identify if the facility was deficient in submitting the required reports. For one semiannual report, DEQ did not identify that the facility failed to submit it for 2,255 days, or approximately six years. It is important that DEQ identify and regulate facilities using these reports because air quality regulation relies heavily on self-monitoring and these reports provide DEQ with important information between routine inspections.

In addition, based on the data reliability testing we performed, some of the information DEQ collects regarding self-monitoring reports, such as postmark date and review date, is incomplete. As a result, DEQ cannot accurately query the database to determine whether facilities submitted required reports.[20] Facilities mail required reports to DEQ and staff manually scans the reports and inputs the reports' postmark dates into its database, Advantage RM.[21] Manually entering the information into the database increases the risk that information may be incomplete. According to DEQ management, it has queried the database as a starting point to identify facilities that may not have submitted self-monitoring reports and is further investigating whether these facilities submitted reports as required.

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[16] 40 CFR 70.6(c)(5)

[17] LA R.S. 30:2012(D)(1)

[18] High Priority Violations (HPVs) are a subset of Clean Air Act regulations violations that warrant additional scrutiny to ensure that enforcement agencies respond to such violations in an appropriate manner and receive federal assistance. The EPA monitors HPVs; therefore, we did not include them in our scope.

[19] We selected 50 enforcement actions, which incorporated a range of how long it took DEQ to issue the enforcement action.

[20] For example, according to Advantage RM data, 872 (10.5%) of 8,318 reports were not submitted. However, we concluded that this data field was incomplete as some of these reports were actually submitted.

[21] Advantage RM is DEQ's data system. It was formerly known as TEMPO.

Of the nine other states we surveyed,[22] eight have or are moving to electronic report submission capabilities. According to DEQ management, it is exploring the possibility of an option to submit reports electronically so that deviations can be automatically flagged by DEQ. Electronic submissions may help DEQ quickly identify facilities that have not submitted required self-monitoring reports and reduce human error, increasing the reliability of the database. In addition, receiving reports electronically would reduce the workload of enforcement staff because they would not have to process paper reports. If DEQ receives reports electronically, it could also begin to automate enforcement actions for late report submissions where the system could flag permit holders who did not submit required reports or even automatically draft an enforcement action.

Recommendation 1: DEQ should vary when it inspects facilities so that they are less predictable as state law stresses the importance of unannounced inspections.

Summary of Management's Response: DEQ agrees with this recommendation and states that during the later years of the audit timeframe (2017), approval was obtained from the United States Environmental Protection Agency-Region 6 to implement an Alternate Compliance Monitoring Strategy for scheduling and performing inspections of permitted facilities which has increased the variability of inspection dates. See Appendix A for management's full response.

Recommendation 2: DEQ should require secondary evidence, such as photographs, to ensure that inspections actually occurred.

Summary of Management's Response: DEQ disagrees with this recommendation and states that in the isolated case in the audit report, a Field Interview Form was not completed, signed, or left at the facilities as the inspector did not visit the facilities as required by DEQ's existing Standard Operation Procedures (SOP). DEQ also notes that this isolated incident was voluntarily reported to the LLA prior to the audit. See Appendix A for management's full response.

Recommendation 3: DEQ should review required self-monitoring reports timely to monitor and regulate air quality in Louisiana.

Summary of Management's Response: DEQ agrees with this recommendation and states that current staffing levels and the volume of reports received impedes the Enforcement Division staff from performing a thorough review upon receipt of every report and from immediately initiating a formal enforcement for every violation reported in either of the aforementioned reports. In addition, the Enforcement Division has been working to improve the quality of its historical data for the Semiannual Monitoring and Deviation reports and Annual Compliance Certifications, and as this data is improved, it will utilize this information to quickly pursue permittees/respondents who failed to submit the required Title V Reports. Queries of this data will be run at least twice per

[22] Arkansas, Arizona, Colorado, Maryland, New Jersey, New Mexico, New York, Texas, Washington. Texas is the only state that receives paper-based reports only.

year to determine if any permittees failed to submit its reports. See Appendix A for management's full response.

Recommendation 4: DEQ should continue to pursue electronic report submissions like other states.

Summary of Management's Response: DEQ agrees with this recommendation and states that it began researching and developing plans for electronic submission of Title V and other Air quality reports prior to this audit. An initial request for a developmental quote was submitted to a contractor in November 2020 to help better determine the cost of providing an electronic reporting submission option. In addition, the development and implementation of any the electronic submission option will be dependent upon securing sufficient funding and adequate allocation of Office of Technology (OTS) resources. DEQ is actively researching potential grants and other alternate sources of funding for this project. See Appendix A for management's full response.

DEQ does not issue enforcement actions in a timely manner to permitted facilities that violate air permit requirements. From fiscal years 2015 through 2019, the time it took DEQ to issue enforcement actions increased by 102.1%, from an average of 289 days to an average of 585 days. As a result, there is a risk that facilities may have violations that remain uncorrected for years.

According to the International Network for Environmental Compliance and Enforcement, enforcement is the backbone of environmental compliance, and for enforcement programs to be effective at deterrence there must be swift and predictable responses to violations.[23] DEQ does not have a timeline requirement in policy specifying how long it should take to issue enforcement actions, except for issuing an enforcement action within 90 days from the receipt of a referral that originated from a citizen complaint. According to DEQ, it has an informal goal of issuing an enforcement action within 180 days; however, according to our analysis, 463 (69.6%) of 665 enforcement actions issued during fiscal years 2015 through 2019 took more than 180 days. According to state law,[24] DEQ has five years from the date a violation is first reported to DEQ to commence an assessment or enforcement of any civil penalty or fine. After five years, DEQ loses the right to take action regarding the violation.

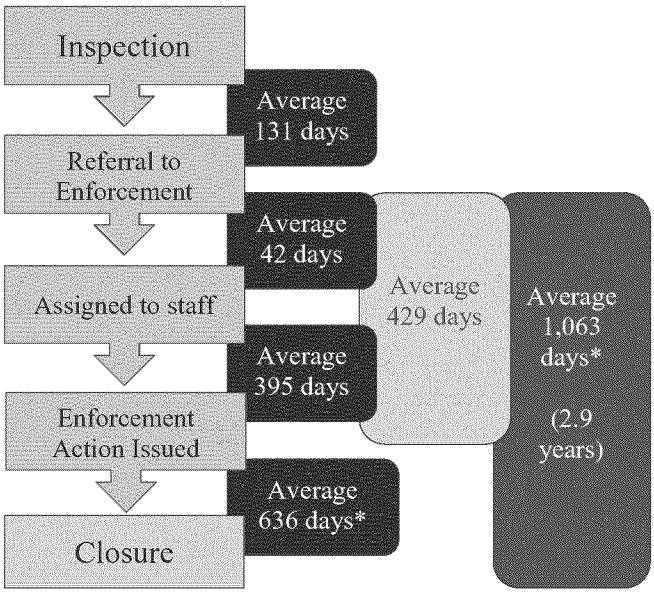
DEQ's Enforcement Division receives referrals of areas of concern identified from multiple sources, such as during inspections and from a review of emissions inventory reports. Once the Enforcement Division receives a referral, management assigns it to an environmental

[23] "Principles of Environmental Compliance and Enforcement Handbook," International Network for Environmental Compliance and Enforcement, April 2009.
[24] LA R.S. 30:2025(H)

scientist. If enforcement staff determines that a violation(s) occurred, they may then issue one of several enforcement actions depending on the severity of the violations, such as a compliance order, notice of potential penalty, or a penalty assessment. DEQ's legal division reviews each enforcement action prior to issuance. Enforcement actions may also include corrective action requirements for the facility. From fiscal years 2015 through 2019, 284 (34.1%) of 833 enforcement actions[25] were expedited penalty agreements and 243 (29.2%) were compliance orders/notice of potential penalties. See Appendix J for descriptions of enforcement actions and how many were issued in fiscal years 2015 and 2019. Once DEQ issues an enforcement action, facilities have several avenues to closure, such as settlement negotiations, appealing the violations, or paying the assessed penalty.

From fiscal years 2015 through 2019, the overall time it took DEQ to issue enforcement actions increased by 102.1%, from 289 days on average to 585 days. In addition, of the 69 enforcement actions issued in this time period from a citizen complaint, 42 (60.9%) were not issued within DEQ's goal of 90 days. According to the nine states we surveyed,[26] seven (77.8%) typically issue enforcement actions within six months of discovering a violation or receiving an enforcement referral. Exhibit 5 shows steps in the enforcement process and the average number of days between each step. From fiscal years 2015 through 2019, DEQ has shown improvement in the timeliness of all of the steps, except for the time it took to issue enforcement actions:

Exhibit 5
Enforcement Process Timeliness
Fiscal Years 2015 through 2019



*Includes 262 (39.3%) of 666 cases that were still open as of 7/31/2020.
Source: Prepared by legislative auditor's staff using DEQ's Advantage RM data.

- **Inspection to Referral** – *Decreased* 35.5%, from 161 days to 104 days
- **Referral to Staff Assignment** – *Decreased* 73.4%, from 50 days to 13 days
- **Staff Assignment to Issuing Enforcement Action** – *Increased* 126.5%, from 249 days to 563 days
- **Issuing Enforcement Action to Closure** – *Decreased* 58.2%, from 852 days to 356 days

[25] These figures only include air and multimedia (including air) enforcement actions. It does not include asbestos enforcement actions.
[26] Arizona, Arkansas, Colorado, Maryland, New Jersey, New Mexico, New York, Texas, Washington

In addition, DEQ also monitors air quality through citizen complaints. Of the 69 enforcement actions issued from fiscal years 2015 through 2019 from a citizen complaint, 42 (60.9%) were not issued within DEQ's goal of 90 days, which also contributed to the amount of time it took DEQ to issue enforcement actions. DEQ has a single point of contact hotline that citizens can call to make a complaint. After receiving a complaint, DEQ forwards the complaint to the Surveillance Division, who responds by initiating a compliance inspection, traveling to the location in the complaint, or contacting responsible parties by phone. The most common types of complaints are odor, open burning, and dust/particulates/sandblasting.

We also found that DEQ does not always address violations until years after the violation occurred, which further delays enforcement. We reviewed a targeted selection of 50 enforcement action files to determine what violations were included in the enforcement action and found that it took DEQ an average of 2.2 years to identify a violation after it occurred. Then, it took an additional 1.6 years on average to issue enforcement actions based on those violations. Of the 211 violations contained in these 50 files, 48 (22.7%) violations had occurred more than five years prior to DEQ issuing the enforcement action, and 33 (15.6%) were self-reported by the facility. These violations included emissions that exceeded permit limits, unauthorized operations, and noncompliance with monitoring requirements. In addition, taking so long to identify a violation increases the risk that DEQ will not have enough time to issue an enforcement action within the five-year deadline in law.[27]

> One enforcement action issued on December 6, 2018, included an inspection from June 11, 2013, and four file reviews. The oldest violation included in this enforcement action was from February 26, 2010, and some of the violations were self-reported by the facility. In this example, it took 3.3 years for DEQ to discover the oldest violation and then, overall, 8.8 years from the date of violation to the issuance of the enforcement action.

While air enforcement cases are often technically complex and may include many violations, developing time frame goals could help DEQ better manage cases. According to DEQ management, it has been working to clear a backlog of enforcement cases. In addition, according to management, enforcement staff workloads are high, air regulation is a highly technical and complex area, and many staff are new, less experienced employees, which also makes it more difficult to issue enforcement actions timely. While some cases may take longer to process thoroughly, DEQ should work towards addressing violations in a timely manner to effectively deter noncompliance and to hold facilities accountable with their permits.

Developing additional reports could assist DEQ in better monitoring the enforcement program overall and to help it hold permitted facilities accountable. Developing more comprehensive reports and other tools could help management ensure that all enforcement cases are addressed and could help reduce staff workloads. While enforcement management can run some reports on enforcement information, available reports are limited. For example, DEQ management can run reports to show the last action for enforcement cases and whether cases have been closed. However, DEQ has not developed reports to gauge timeliness of enforcement actions or to link enforcement cases to settlements and other activities. In addition, the department cannot accurately link all inspections to enforcement actions to determine whether all inspections with potential violations resulted in an enforcement action. Enforcement staff cannot run reports to assist in managing their workloads, and they manually track their own

[27] LA R.S. 30:2025(H)

enforcement cases, such as when to follow up on enforcement actions. According to DEQ, it is developing a proof of concept for a dashboard that would allow staff to run more comprehensive reports for enforcement activity data.

Recommendation 5: DEQ should develop formal time frame goals for how long it should take to issue enforcement actions and monitor its performance based on the time frame goals.

Summary of Management's Response: DEQ agrees with this recommendation and states that the Enforcement Division-Air Enforcement Section has made a substantial effort to address backlog referrals in recent years. This process resulted in actions issued in the later years of the audit period, including fiscal year 2019, with an increase in time from referral assignment to action issued date. While addressing of backlog referrals is continuing, processes are in place to improve this timeline. Notably, the time from referral assignment to action issuance decreased by 38.9% from fiscal year 2019 to fiscal year 2020 (average 344 days). See Appendix A for management's full response.

Recommendation 6: DEQ should develop additional reporting capabilities for enforcement staff and management to use to better monitor the enforcement process.

Summary of Management's Response: DEQ agrees with this recommendation and states that it has been developing software which will allow management and staff to develop and run more sophisticated reports to improve efficiency in tracking activities. This software will also have the capability to run automated reports which can be used as reminders or triggers for staff. DEQ will continue pursing development and implementation of this useful tool. See Appendix A for management's full response.

DEQ does not effectively track the penalties it has assessed and whether facilities have paid their penalties. In addition, DEQ could improve its settlement process by developing deadlines for when facilities must submit settlement offers and by processing these offers more quickly.

Expedited Penalties:
As outlined in LA R.S. 30:2025, DEQ may issue expedited penalties. This is meant to expedite penalty assessments for minor or moderate violations, which are defined in La. Admin Code. tit. 33, Pt I, § 705.

DEQ addresses violations using various enforcement actions including issuing penalties or negotiating the penalty through a settlement agreement. State law[28] requires DEQ to notify a facility of a potential penalty at least 10 days prior to assessing a penalty. These notices of potential penalty include descriptions of the violations but *do not* define a penalty amount. After receiving a notice of potential penalty, facilities may submit a settlement offer and enter into settlement negotiations. In addition, for certain types of violations, such as failing to submit

[28] LA R.S. 30:2050.3 C

required reports, DEQ may provide a voluntary option of paying an expedited penalty. If facilities fail to respond to notices of potential penalties with a settlement offer or do not pay an expedited penalty, DEQ may assess a formal penalty.

DEQ has a penalty matrix and a list of nine factors to consider when developing a penalty amount. Once DEQ assesses a penalty, a facility may request an adjudicatory hearing within 30 days to appeal the violations. At any point in the penalty process, the facility may enter into settlement negotiations, as allowed for in state law.[29] Settlements may also include beneficial environmental projects, which are projects that provide for environmental mitigation. During fiscal years 2015 through 2019, DEQ assessed $8,465,533 for 171 settlement agreements and beneficial environmental projects.[30] Exhibit 6 shows the number and amount of penalty actions DEQ has issued or finalized during the audit scope.

Exhibit 6
Number and Amount of Penalty Actions
Fiscal Years 2015 through 2019

Action	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Grand Total	Total Assessed
Expedited penalty	51	37	67	78	51	284	$292,350**
Finalized settlement	57	39	25	25	25	171	8,465,533*
Penalty assessment	10	9	2	2	4	27	1,249,971**
Demand letter for failure to pay a penalty	1	0	1	0	0	2	150,098
Total	**119**	**85**	**95**	**105**	**80**	**484**	**$10,157,952**

*Includes $3,861,036 in beneficial environmental projects.
**According to unaudited information provided by DEQ. Penalty figures only include air and multimedia (containing air) enforcement actions. It does not include asbestos or lead enforcement actions.
Source: Prepared by legislative auditor's staff using data from DEQ.

While DEQ knows how much in settlements it has assessed and collected, DEQ does not effectively track the penalties it has assessed and whether facilities have paid the assessed amounts. DEQ management does not currently have reports that can easily identify how much it has assessed in penalties and what penalties are outstanding or have been paid. DEQ has a monthly list that includes penalties it assessed; however, this list does not roll over from month to month. As a result, DEQ cannot effectively track which facilities currently owe payments. We requested penalty and payment information on March 24, 2020, and DEQ was eventually able to provide information on December 3, 2020, but it had to manually create a spreadsheet and we found that this spreadsheet was missing some penalties.

In January 2017, DEQ issued a $1,500 expedited penalty for three instances of failing to submit the annual criteria pollutant emissions inventory report. Expedited penalties are voluntary and if facilities want to participate and pay the penalty, they have 30 days to respond with payment. However, DEQ did not send a failure to respond letter until April 2018 and as of October 2020, the facility still has not paid.

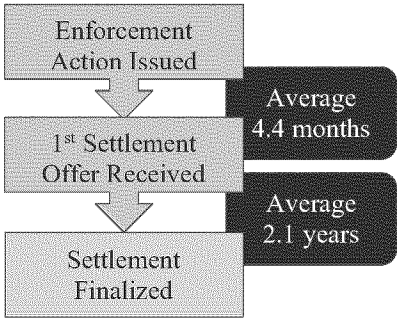
[29] LA R.S. 30:2050.7 A

[30] This can include putting money into an escrow account for the purchase of a Mobile Air Monitoring Lab (MAML) for DEQ, fund the maintenance of an air monitoring station, perform upgrades to existing ambient air monitoring networks, etc.

According to DEQ, the data contained in the Advantage RM database is not always accurate due to inconsistences in the information enforcement staff have been required to input at various times. In addition, Advantage RM does not integrate with the data system used by DEQ's Financial Services Division. As a result, DEQ cannot easily connect payments to enforcement actions to ensure that they have been paid. In addition, the Financial Services Division has a manual process to link payments to enforcement actions once payments have cleared; however, this process is not always timely. We found that during fiscal years 2017 through 2020,[31] it took DEQ more than two weeks to process 549 (45.9%) of 1,197 checks. In addition, once DEQ received the payment, it took the Financial Services Division an average of 41.5 days to communicate to the Enforcement Division that a company had paid its enforcement action penalty. Not tracking penalty assessments and payments in a timely manner increases the risk that unpaid penalties may go unnoticed.

In addition, DEQ gives facilities the option to submit an initial settlement offer after issuing a notice of potential penalty. Unlike other states,[32] Louisiana is unique in that the facility initiates the settlement instead of DEQ specifying a penalty amount. DEQ attaches a settlement request form with enforcement actions and may meet with the facilities regarding the settlement. According to DEQ, it uses this process to obtain additional information such as mitigating circumstances, monetary benefits of noncompliance, and the duration of violations, which helps in calculating the penalty amount. Facilities must have completed all required corrective action for DEQ to finalize a settlement agreement. However, DEQ should consider developing deadlines for receiving settlement offers so that enforcement cases do not remain open for long periods of time. Of the 46 enforcement actions that were issued and then finalized through settlements during fiscal years 2015 through 2019, it took an average of 4.4 months for DEQ to receive a settlement offer after issuing the enforcement action. However, 11 (23.9%) of the 46 enforcement actions took more than six months before DEQ received an initial settlement offer. Furthermore, it took at least an additional two years (24.7 months) for DEQ to finalize the settlements. Exhibit 7 illustrates the average time frames within the settlement process. According to DEQ, it may take a while to receive a settlement offer because a facility may choose to appeal their cited violations or request meetings with the agency. As noted previously, the time it takes to issue enforcement actions has increased over the past four fiscal years; therefore, it may be beneficial to require facilities to submit acceptable settlement offers within a determined time frame to better ensure that enforcement cases are closed in a timely manner.

Exhibit 7
Settlement Process
Fiscal Years 2015 through 2019



Source: Prepared by legislative auditor's staff using data from DEQ.

[31] The check logging and linking process began in fiscal year 2017.
[32] Arizona, Maryland, New Jersey, New Mexico, New York, Texas

In July 2015, DEQ issued an enforcement action, but DEQ records show no indication of a hearing or meeting request, and it did not receive the initial settlement offer of $4,113 until October 2016. The settlement offer was finalized more than a year later, in December 2017, for $8,000.

According to industry stakeholders, DEQ needs to improve its process for finalizing settlements, as it is often slow. We also identified three settlements that had no DEQ activity for more than three years. For example, one $10,000 settlement has had no activity since 2009, when the settlement offer was sent to the Attorney General for approval as required by state law.[33] However, state law also allows DEQ to finalize the settlement if the Attorney General does not reject the offer within 90 days. In this case, the settlement was never finalized. According to DEQ, delays in processing these settlements were due to turnover, which generally results in a lack of resources and familiarity with the settlement process.

Recommendation 7: DEQ should streamline the process for receiving and processing facility penalty and settlement payments. DEQ should effectively track all penalties it assesses and ensure that facilities pay the penalties.

Summary of Management's Response: DEQ agrees with this recommendation and states that it acknowledges that there may be room for improvement in the processes and/or manner by which the Financial Services Division and the Enforcement Division communicate on payments received for final Penalty Assessments and Settlement Agreements. However, to state that DEQ does not effectively track penalties it has assessed and whether facilities have paid the assessed amounts is somewhat misleading. Penalty assessments and all other issued actions are tracked by Enforcement Division management utilizing a database query. In addition, the timeframe by which DEQ processes payments will be further reviewed and changes will be immediately implemented for areas identified as needing improvement. See Appendix A for management's full response.

LLA Additional Comments: As stated in the report, while DEQ has monthly listings of penalties and has some reporting capabilities in regards to penalty amounts and payments, it was unable to easily or timely provide accurate, comprehensive data on what penalties it assessed and what had been paid.

Recommendation 8: DEQ should develop reports that can integrate payment data from the fiscal division, as well as capture information from DEQ's legal division, in order to easily identify what penalties and settlements have been paid.

Summary of Management's Response: DEQ agrees with this recommendation and states that it is currently reviewing all processes and procedures in place for penalty and settlement payment processing and will implement any improvements, as appropriate. See Appendix A for management's full response.

[33] LA R.S. 30:2050.7 E(2)(a) and (d)

Recommendation 9: DEQ should establish a process that requires facilities to submit acceptable settlement offers within a certain time frame, such as six months, and draft a penalty amount for those who do not comply.

Summary of Management's Response: DEQ agrees with this recommendation and states that some of the complexities of the enforcement process are not fully detailed in the report. For instance, Compliance Orders and Notices of Potential Penalty are subject to appeal. DEQ may grant or deny the hearing request or may enter into Informal Dispute Resolution. In addition, facilities may require compliance schedules to return to compliance or provide additional information for discussion/consideration. For these reasons, a standard deadline to submit a settlement offer is not appropriate for all facilities. See Appendix A for management's full response.

DEQ faces challenges in performing its required regulatory duties, including low staffing levels, high workloads, frequent turnover of staff, and ineffective data systems.

According to DEQ management and program staff, DEQ faces a variety of challenges. These challenges range from budget cuts, to staffing shortages, to worker turnover, and ineffective data systems, which impact DEQ's ability to ensure the environmental protection of the state.

The Environmental Integrity Project found that between 2008 and 2018, Louisiana cut its funding to environmental protection programs by 35% (ranking 3rd) and reduced its staffing by 30% (ranking 4th).

Source: "The Thin Green Line." Environmental Integrity Project. December 5, 2019.

Despite Louisiana's large number of Title V facilities, DEQ's positions dedicated to air regulation decreased 14.6%,[34] from 247 in fiscal year 2010 to 211 in fiscal year 2019, which presents a challenge for staff in performing their responsibilities. Turnover during this time averaged 10.9% and was due to high numbers of resignations, retirements, and voluntary transfers. According to DEQ management, air regulation is complex and staff experience high workloads on top of its complexity. For example, enforcement has approximately 10 staff and handles all enforcement actions for all 500 major facilities plus any other type of facility, such as minor facilities, that receive a violation. Exhibit 8 shows the number of air regulation employees assigned to enforcement functions versus permitting and surveillance duties. Enforcement actions for large facilities are also often highly complex and as a result are very time consuming. DEQ management has also stated that retention of qualified staff is a significant problem, with some staff leaving for opportunities in the private sector after DEQ has invested the time and money to train them.

Exhibit 8
Number of Air Staff
Fiscal Year 2019

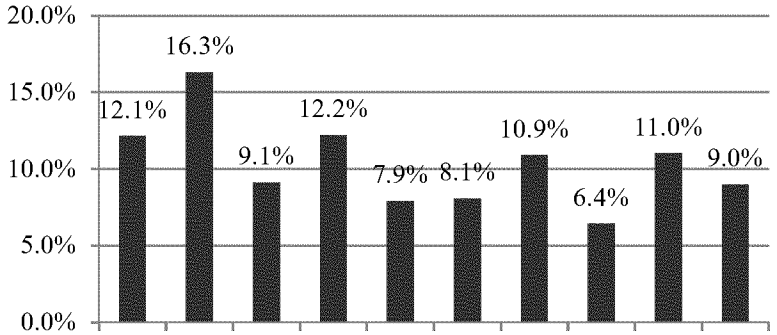
DEQ Function	Number of Staff
Air Permitting	43
Air Surveillance	27
Air Enforcement	10

Source: Prepared by legislative auditor's staff using information from DEQ and Business Objects.

[34] Turnover numbers include all inspectors as they cross media types.

The large workload combined with new staff and training creates lags in work. In addition, the workload is often coordinated among multiple divisions, like the fiscal and legal divisions within DEQ. While DEQ implemented an expedited permit program in 2007 to reduce the backlog of permit applications, high workloads still exist including the enforcement and legal sections experiencing backlogs in issuing enforcement actions. Exhibit 9 shows the turnover of air regulation employees from fiscal years 2010 to 2019.

Exhibit 9
DEQ Air Regulation Turnover
Fiscal Years 2010 through 2019



Source: Prepared by legislative auditor's staff using data from Business Objects.

DEQ management should improve its use of data to better monitor air quality in Louisiana. DEQ relies on coordination of paper-based systems among several divisions. Information is often walked from department to department and entered into its data system, Advantage RM, or scanned into a separate system for documentation. According to DEQ management, they are working on drafting regulations for electronic reporting so that facilities would not be required to physically mail in the numerous reports they are required to submit, and DEQ staff will not be responsible for scanning in each one as they currently do for self-monitoring reports. Electronic methods of delivery within the department and with the facilities they regulate may decrease the time spent on regulation activities for all divisions within DEQ.

Additional data issues exist, including accuracy and completeness, which limit the ability of DEQ management to use Advantage RM to monitor performance and compliance with required activities. DEQ management does not currently have reports that can readily identify how much it has assessed in penalties and what penalties are outstanding or have been paid. DEQ could not easily provide us this information. Not tracking penalty assessments and payments increases the risk that unpaid penalties may go unnoticed. Furthermore, according to DEQ staff, there are only a few employees that have the knowledge to pull reports from Advantage RM.

Recommendation 10: DEQ management should determine whether staffing levels are sufficient to provide quality services, and if not, request funding to hire additional staff.

Summary of Management's Response: DEQ agrees with this recommendation and states that it will analyze positions within the department and consider moving staff in the most appropriate divisions to meet the requirements of the agency. See Appendix A for management's full response.

Recommendation 11: DEQ management should continue to work towards the development and implementation of a comprehensive data system that can provide adequate management reporting.

Summary of Management's Response: DEQ agrees with this recommendation and states that its current data system, Advantage RM, is capable of tracking the Department's activities; however, the number of employees who are able to use the tools/software required to develop and run reports from the data contained in Advantage RM is limited. DEQ is in the process of developing software which will allow additional Enforcement Division and Legal Affairs Division staff to develop and run reports to ensure referrals are addressed in a timely and efficient manner. This software is currently under development with the DEQ's IT Division. See Appendix A for management's full response.

APPENDIX A: MANAGEMENT'S RESPONSE

JOHN BEL EDWARDS
GOVERNOR

CHUCK CARR BROWN, PH.D.
SECRETARY

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF THE SECRETARY

January 6, 2021

Mr. Daryl G. Purpera, CPA, CFE
Office of the Legislative Auditor
Post Office Box 94397
Baton Rouge, LA 70804-9397

Dear Mr. Purpera:

This is the Department of Environmental Quality's (DEQ) response to the reportable findings and recommendations presented in the Louisiana Legislative Auditor (LLA) Performance Audit Services report titled **"Monitoring and Enforcement of Air Quality".**

DEQ takes its responsibility to promote and protect public health through sound environmental policy very seriously and appreciates the opportunity to respond to the observations within your report. After reviewing the findings and recommendations, DEQ offers the following responses.

Finding 1: Louisiana has seen improvement in air quality since calendar year 2008. However, certain areas of the state are highly industrialized and have high concentrations of air pollution.

> ***Response:*** As noted in the report, DEQ has achieved and maintained substantial improvements in air quality over the last ten years despite facing some of the largest state environmental regulatory agency budget and staffing cuts in the nation. The comprehensive and robust air quality monitoring and enforcement activities executed by the department have contributed to a substantial decrease (75.1%) in the number of unhealthy air quality days for Louisiana citizens in sensitive groups.
>
> DEQ currently operates over 40 ambient air monitoring sites throughout the state to monitor air quality. Most of the ambient air monitoring sites are in the "highly industrialized" zones referenced in the report (Exhibit 1). DEQ collected over 1300 air quality samples during the 2019 calendar year to test for a subset of the toxic pollutants noted and explained in Appendix C. It should be noted that none of these pollutants were detected in 2019 ambient air concentrations that exceeded the Louisiana Toxic Air Pollutant Ambient Air Standards.

Finding 2; Recommendation 1: DEQ should vary when they inspect facilities so that they are less predictable as state law stresses the importance of unannounced inspections.

> ***Response:*** DEQ agrees with this recommendation, and notes that during the later years of the audit timeframe (2017), approval was obtained from the United States Environmental Protection Agency-Region 6 (USEPA-R6) to implement an Alternate Compliance Monitoring Strategy (ACMS) for scheduling and performing inspections of permitted facilities. The ACMS was successfully implemented two (2) years ago and has increased the variability of inspection dates.

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Finding 2; Recommendation 2: DEQ should require secondary evidence, such as photographs, to ensure that inspections actually occurred.

Response: DEQ disagrees with this recommendation, and offers the following information related to the inspection process. DEQ's Standard Operating Procedure (SOP) requires staff (i.e., inspectors) to leave a completed Field Interview Form (FIF) at each facility inspected, which is signed by a facility representative at the conclusion of the inspection. In the isolated case contained in the audit report, a FIF was not completed, signed, or left at the facilities as the inspector did not visit the facilities as required by existing SOP. DEQ notes that this isolated incident of SOP circumvention was voluntarily reported to your office prior to this incident being discovered during the audit and was used as the basis that formed this recommendation.

Finding 2; Recommendation 3: DEQ should review required self-monitoring reports timely to monitor and regulate air quality in Louisiana.

Response: DEQ agrees with this recommendation, and offers the following additional details related to the self-monitoring report review process. DEQ's Enforcement Division receives Semiannual Monitoring and Deviation reports and Annual Compliance Certifications for the approximately 500 Title V permitted facilities in Louisiana. Once these reports are received, key data points are entered into Advantage RM and an Environmental Scientist (ES) reviews any reported deviations to determine if High Priority Violations (HPVs) or other violations which pose significant threat to human health or the environment are reported. If any of the reported deviations fall into one of these categories, the ES will initiate preparing an addressing enforcement action. Reports which do not contain violations of this nature are submitted to DEQs Electronic Data Management System (EDMS) and are thoroughly reviewed during the next routine inspection or file review. Current staffing levels and the volume of reports received impedes the Enforcement Division staff from performing a thorough review upon receipt of every report and from immediately initiating a formal enforcement for every violation reported in either of the aforementioned reports. As suggested in Recommendation 10, DEQ management will review current staffing levels related to self-monitoring report review and may request additional funding to hire additional staff.

It should also be noted that any permittee who fails to submit a Title V semiannual or annual report is currently being identified during its routine inspection or any other file review. For the past several months, the Enforcement Division has been working to improve the quality of historical data in Advantage RM for the Semiannual Monitoring and Deviation reports and Annual Compliance Certifications. As this data is improved, the Enforcement Division will utilize this information to quickly pursue permittees/respondents who failed to submit the required Title V Reports. Queries of this data will be run at least twice per year following the report submission due dates (March 31 and September 30) to determine if any permittees failed to submit its reports. Additionally, as discussed in more detail is the response to Recommendation 4, DEQ is actively pursuing a mechanism for electronic reporting of Semiannual Monitoring and Deviation reports and Annual Compliance Certifications which should result in improved data quality, automated processing of reports into Advantage RM and EDMS, and more efficient review of reported deviations.

Finding 3; Recommendation 4: DEQ should continue to pursue electronic report submissions like other states.

Response: DEQ agrees with this recommendation. DEQ began researching and developing plans for electronic submission of Title V and other Air quality reports prior to this audit. An internal workgroup was formed and has had regular development meetings. An initial request for a developmental quote was submitted to a contractor in November 2020 to help better determine the cost of providing an electronic reporting submission option. Enforcement Division staff are currently working with the contractor to determine DEQ's exact needs so an accurate quote can be obtained. DEQ will continue pursuing electronic submission of Title V and certain other Air quality reports, as it is anticipated this method will reduce workload on staff for processing mail, reduce data errors in Title V Report tracking, improve timeliness of reports being available in the EDMS, and improve the Department's ability to query and manipulate relevant data, including reported deviations. However, it should be noted, that development and implementation of any the electronic submission option that is currently being explored will be dependent upon securing sufficient funding and adequate allocation of Office of Technology (OTS) resources. DEQ is actively researching potential grants and other alternate sources of funding for this project.

Finding 3; Recommendation 5: DEQ should develop formal timeframe goals for how long it should take to issue enforcement actions and monitor its performance based on the timeframe goals.

Response: DEQ agrees with this recommendation, and offers the following additional information related to the enforcement process. The Enforcement Division-Air Enforcement Section has made a substantial effort to address backlog referrals in recent years. This process resulted in actions issued in the later years of the audit period, including FY19, with an increase in time from referral assignment to action issued date. While addressing of backlog referrals is continuing, processes are in place to improve this timeline. Notably, the time from referral assignment to action issuance decreased by 38.9% from FY19 to FY20 (average 344 days).

In addition, all of the activities performed by Enforcement Division staff from the time a referral is assigned until an addressing enforcement action is issued are not fully outlined in the report. More specifically, when inspection referrals are received by the Enforcement Division, a Warning Letter, which is an informal enforcement action, is issued to the facility which encourages a written response to be submitted. In response to the Warning Letter, respondents often request meetings with DEQ or submit information which require further review and consideration to determine valid violations. This information may indicate violations have been corrected, provide additional clarification of the circumstances, or provide documentation that the areas of concern were not violations. These activities, which are important parts to the process, often add to the time it takes to issue an enforcement action. Additionally, many of the states surveyed by the auditor(s) do not have the same quantity or complexity of air quality facilities that are regulated by DEQ. Therefore, it may be inaccurate to compare DEQ to states with less permitted or regulated facilities and/or facilities with less complex operations. However, DEQ does recognize the importance of timely enforcement actions. The Enforcement Division will evaluate the volume and complexity of air enforcement referrals received, all duties and responsibilities involved in preparing addressing actions (as well as post issuance activities, especially the statutory and regulatory requirements respondents are entitled to) and will determine and establish timeliness goals, as appropriate.

Finding 3; Recommendation 6: DEQ should develop additional reporting capabilities for enforcement staff and management to use to better monitor the enforcement process.

Response: DEQ agrees with the recommendation, and offers the following additional information related to the enforcement process. The Enforcement Division-Air Enforcement Section currently runs multiple reports to track and monitor referrals received. These reports contain imperative information which is used to monitor the status of referrals received, issued enforcement actions, settlement offers received and/or settlement agreements. These reports also provide information such as inspection date, referral received and assigned date, and action issued date, which are used to determine timeliness of addressing these cases and identify cases in need of progress. It should be noted the audit report states that DEQ's management can run reports to show the "last action for enforcement cases." However, the reports run include all actions issued and the last task entered into Advantage RM for each action. Although the reports do not currently include information indicating which referrals or actions are already being addressed by a Settlement Agreement or Penalty Assessment, development of this type of report using data systems currently available is in progress. Separate reports are run on a routine basis to monitor the status of cases for which a settlement offer has been received as well as the status of all settlement offers.

The audit report states that the Enforcement Division cannot accurately link all inspections to enforcement actions to determine whether all inspections with violations resulted in an enforcement action. However, when inspection referrals are received by the Enforcement Division, they are immediately assigned an enforcement tracking number within Advantage RM. Once this tracking number is assigned, it remains on the reports Enforcement Division runs and utilizes until the referral is closed with an addressing enforcement action and/or other activity. After which, the violations are deemed addressed in the inspection reports in Advantage RM. This is how inspection referrals are tracked by the Enforcement Division. DEQ has been developing software which will allow management and staff to develop and run more sophisticated reports to improve efficiency in tracking activities. This software will also have the capability to run automated reports which can be used as reminders or triggers for staff. DEQ will continue pursing development and implementation of this useful tool.

Finding 4; Recommendation 7: DEQ should streamline the process for receiving and processing facility penalty and settlement payments. DEQ should effectively track all penalties it assesses and ensure that facilities pay the penalties.

Response: DEQ agrees with the recommendation and offers the following additional information related to the settlement processes. DEQ acknowledges that there may be room for improvement in the processes and/or manner by which the Financial Services Division (FSD) and the Enforcement Division communicate on payments received for final Penalty Assessments and Settlement Agreements. However, to state that DEQ does not effectively track penalties it has assessed and whether facilities have paid the assessed amounts is somewhat misleading. Penalty assessments and all other issued actions are tracked by Enforcement Division management utilizing the "Issued Action" query in Advantage RM. Additionally, this information is manually verified monthly before being posted to the DEQ's website and is also compiled and reported annually to the Louisiana Legislature.

DEQ issues two types of penalties, Penalty Assessments (PAs) and Expedited Penalty Agreements & Notices of Potential Penalties (XPs), both of which are combined under the term "penalty" in the audit report. PAs are formal enforcement actions which can be appealed, delaying the payment or closure process through hearings or Informal Dispute Resolution (IDR).

XPs are part of a voluntary expedited penalty program, and have other requirements in addition to payment in order to comply. By regulation, facilities are not in compliance with an XP until both payment and the signed XP form certifying compliance are returned to DEQ. Additionally, some XPs also require reports, such as emission inventories, be submitted before the action can be closed. In isolated cases, both XPs and PAs, may also be closed without payment (i.e., Respondent demonstrates an inability to pay or Respondent is insolvent, etc.). Since DEQ-Enforcement Division's primary goal is to obtain compliance, Air Enforcement management tracks PAs and XPs from issuance to closure to ensure all steps of the process, not just payment, are completed.

DEQ will continue tracking PAs and XPs to ensure payments are timely submitted and/or compliance is achieved in the required timeframe. The timeframe by which the FSD processes payments received for penalties and/or XPs and notifies the Enforcement Division of such will be further reviewed and changes will be immediately implemented for areas identified as needing improvement. FSD will continue to work toward faster depositing, classification, and posting of penalty payments to customer accounts and Advantage RM. It is important to note that there are often delays in receiving these payments (mail delays, mail routed to other divisions, identifying information not included, etc.). FSD will continue to work with the Enforcement Division to ensure it is kept informed of any delays in posting payments.

Finding 4; Recommendation 8: DEQ should develop reports that can integrate payment data from the fiscal division, as well as capture information from DEQ's legal division, in order to easily identify what penalties and settlements have been paid.

Response: DEQ agrees with this recommendation. DEQ is currently reviewing all processes and procedures in place for penalty and settlement payment processing and will implement any improvements, as appropriate.

Finding 4; Recommendation 9: DEQ should establish a process that requires facilities to submit acceptable settlement offers within a certain timeframe, such as six months, and draft a penalty amount for those who do not comply.

Response: DEQ agrees with this recommendation, and offers the following information related to the settlement process. Some of the complexities of the enforcement process or not fully detailed in the report. For instance, Compliance Orders and Notices of Potential Penalty (CONOPPs) are subject to appeal. DEQ may grant or deny the hearing request or may enter into Informal Dispute Resolution (IDR). In addition, facilities may require compliance schedules to return to compliance or provide additional information for discussion/consideration. For these reasons, a standard deadline to submit a settlement offer is not appropriate for all facilities. It should also be noted that DEQ has existing procedures to facilitate timely settlement offers such as the "REQUEST TO SETTLE" form and Settlement Agreement Brochure which are attached to all CONOPPs and Notices of Potential Penalty (NOPPs) that are issued by DEQ. DEQ agrees revising the "REQUEST TO SETTLE" form to include a recommended timeframe to submit a settlement offer may improve the existing process.

Finding 5; Recommendation 10: DEQ management should determine whether staffing levels are sufficient to provide quality services, and if not, request funding to hire additional staff.

Response: DEQ agrees with this recommendation. DEQ will analyze positions within the department and consider moving staff in the most appropriate divisions to meet the requirements of the agency. While we appreciate the recommendation to request additional positions for the

agency, given the current funding position of the agency and the state, the ability to obtain more positions may not be feasible at this time.

Finding 5; Recommendation 11: DEQ management should continue to work towards the development and implementation of a comprehensive data system that can provide adequate management reporting.

Response: DEQ agrees with this recommendation. DEQ's current data system, Advantage RM, is capable of tracking the Department's activities; however, the number of employees who are able to use the tools/software required to develop and run reports from the data contained in Advantage RM is limited. DEQ is in the process of developing software which will allow additional Enforcement Division and Legal Affairs Division staff to develop and run reports to ensure referrals are addressed in a timely and efficient manner. This software is currently under development with the DEQ's IT Division.

The Legal Affairs Division would like to clarify that regulations are not currently being drafted to allow/require electronic reporting for Title V and/or other air quality reports. However, DEQ is in the process of drafting regulations regarding improving Title V reporting, and is also in the process of pursing development of a system which will allow facilities to electronically file Title V and/or other Air quality reports. This system will be integrated with Advantage RM and will automate and improve many functions related to reviewing and processing the reports.

Furthermore, and as previously discussed in the responses to Recommendations 3 and 7, certain issues with data accuracy and completeness have already been identified by DEQ. Efforts to resolve these issues and implement processes to ensure data accuracy are underway. The new software under development will allow Enforcement Division management to more frequently monitor the completeness and accuracy of this data entry. DEQ will continue pursuing the development and implementation of software to provide improved reporting and tracking.

As always, we appreciate the assistance of the LLA and will continue to look for ways to optimize DEQ's air quality monitoring and enforcement processes to provide for a better environment for current and future citizens of Louisiana. We look forward to your continued assistance in this endeavor.

Sincerely,

Chuck Carr Brown, Ph.D.
Secretary

APPENDIX B: SCOPE AND METHODOLOGY

This report provides the results of our performance audit of the Louisiana Department of Environmental Quality (DEQ). We conducted this performance audit under the provisions of Title 24 of the Louisiana Revised Statutes of 1950, as amended. This audit covered DEQ's monitoring and enforcement of air quality regulations during fiscal years 2015 through 2019. Our audit objective was:

To evaluate DEQ's monitoring and enforcement of air quality regulations.

Because this audit began at the onset of the COVID-19 pandemic, we could not perform typical audit procedures such as obtaining physical evidence by participating in an air inspection, conducting extensive in-person interviews, observing the complaint procedures, etc. As a result, our audit scope was limited to DEQ's monitoring and enforcement of air quality regulations. We conducted this performance audit in accordance with generally-accepted *Government Auditing Standards* issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide reasonable basis for our findings and conclusions based on our audit objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. To answer our objective, we reviewed internal controls relevant to the audit objective and performed the following audit steps:

- Researched and reviewed relevant state and federal statutes and regulations to identify criteria relating to DEQ's responsibilities for the monitoring and enforcement air quality regulations.

- Obtained self-reported ERIC emissions data from permitted facilities for calendar years 2008 through 2018. Documented air quality trends by parishes and pollutants. Researched pollutants that pose a threat to air quality and the public health issues related to pollution. Because the ERIC data provided information only, we did not test the accuracy and completeness of this data set, but noted in our charts that the information is self-reported from companies.

- Researched past air quality related audits in Louisiana and other states, as well as recommended best practices from studies conducted by local and national environmental organizations.

- Interviewed relevant staff from DEQ to understand processes related to air quality and management of DEQ databases. We met with stakeholders including environmental advocacy groups, legislative staff, and industry lobbyists. From these agency and stakeholder interviews, we identified nine other states with similar industry characteristics we compared to DEQ's monitoring and

enforcement policies. These states include Arkansas, Arizona, Colorado, Maryland, New Jersey, New Mexico, New York, Texas, and Washington.

- Obtained and reviewed any policies and procedures on monitoring and enforcing air quality regulations. This included obtaining policies on air permitting, surveillance, enforcement, and public engagement.

- Obtained information regarding a former DEQ employee who falsified inspections. Followed up with DEQ management on how they responded to the incident.

- Reviewed DEQ's monitoring and enforcement efforts compared to what is required in law and best practices. This included evaluating DEQ's monitoring and enforcement action procedures, including how it uses self-monitoring reports, the timeliness of its enforcement process from the inspections , referrals to enforcement, the assignment of penalties to staff, the enforcement action issued, and how long it took to close an enforcement action. We also reviewed the settlement process and obtained all pending and finalized settlements that occurred within the scope. We calculated the amounts to be collected from pending and finalized settlements and assessed the reasons for delays found in the settlement process. We then reviewed the penalty payment process and obtained the check log of penalty payments to determine if penalties were paid and processed in a timely manner.

- Obtained enforcement action data to determine facilities' overall permit compliance. We categorized similar violations together and then performed various analyses to identify amounts of violations issued and the most common types of violations.

- Conducted a file review of 50 enforcement actions to determine specific information of the violation type, how long it took DEQ to identify the violation, how long it took DEQ to issue a corrective action, and the corrective action. For the section of the 50 enforcement actions, we incorporated a range of how long it took DEQ to issue the enforcement action.

- Obtained and analyzed multiple processes from DEQ's database, Advantage RM, including (1) determining the number of permits, (2) the number of variances granted on permits, (3) performing cursory testing to determine if permits were renewed in a timely manner, (4) determining the frequency and timing of semi-annual inspections, (5) frequency of various compliance status resulting full-compliance inspections, (6) the average length of time it took to forward inspection violations to the enforcement division, and (7) calculate the number of working days it took to issue an enforcement action following the receipt of a referral, as well as the days to close the enforcement action following the issuance.

- To assess the completeness and accuracy of key data fields in Advantage RM, tested key fields in key data tables against DEQ's Electronic Document Management System. Overall, we found these fields to be generally complete and reliable for the purposes of answering our audit objectives, except for data regarding semi-annual and annual self-monitoring fields relevant to our analysis. We found Advantage RM to be incomplete for this data and therefore unreliable to determine whether facilities submitted required reports. As a result, this issue was identified in report.

- Obtained submitted Title V Annual Compliance Certification reports and Semi-Annual certification reports and compared them to the entire list of Title V companies to determine how many companies had not submitted required self-monitoring reports. Even though this field was deemed unreliable in Advantage RM, we recommended that DEQ use this as a starting point when identifying companies that did not submit their required reports.

- Reviewed statute and regulations related to environmental justice. We conducted a file review to find any complaints related to environmental justice, as well as a review of commitments DEQ took in regard to environmental justice. We researched and reviewed other states best practices regarding environmental justice to compare them to DEQ's efforts.

- Obtained logs of activity from the public participation group to test if public notice, public meetings, and public hearings were conducted at the appropriate times according to statute.

- Obtained environmental incident and complaint data in order to identify if incidents and complaints were followed up on within the prescribed timeline.

- Obtained state business objects reports to analyze staffing levels and turnover of DEQ from fiscal years 2010 through 2019.

- Provided our results to DEQ to review for accuracy and reasonableness.

APPENDIX C: CRITERIA POLLUTANTS

Pollutant	How It Forms	Health Effects
Carbon Monoxide (CO)	Burning of fossil fuels, such as in cars, trucks and other vehicles or machinery.	Headache, dizziness, vomiting, and nausea while elevated levels over long periods of time may result in angina.
Lead	Ore and metal processing and piston-engine aircraft operating on leaded aviation fuel; waste incinerators, utilities, and lead-acid battery manufacturers.	Affects the nervous system, kidney function, immune system, reproductive and development systems, and the cardiovascular system, in addition to the oxygen carrying capacity of blood. Infants and young children are sensitive to low levels, which contribute to behavioral problems, learning deficits, and lowered IQ.
Nitrogen Dioxide (NO_2)	Emissions created from the burning of fuel from cars, trucks and buses, power plants, and off-road equipment.	Short-term exposure may aggravate respiratory diseases including asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms. Long-term exposure to elevated levels may contribute to the development of asthma and may increase the susceptibility to respiratory infections.
Ozone (O_3)	Chemical reactions between nitrogen oxides, such as NO_2, and other volatile organic compounds (VOC) when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and others chemically react in the presence of sunlight.	Chest pain, throat irritation, and airway inflammation; reduced lung function; damage to lung tissue; aggravate bronchitis, emphysema, asthma, and other lung diseases; increase the frequency of asthma attacks; and cause chronic obstructive pulmonary disease (COPD). Those at most risk are people with asthma, children, older adults, and people who are active outdoors.
Particulate Matter ($PM_{2.5}$ and PM_{10})	Result of reactions of other chemicals polluted from power plants, industries, automobiles, construction sites, unpaved roads, fields, smoke stacks, or fires.	Premature death in people with heart or lung disease; non-fatal heart attacks; irregular heartbeat; irritation of the airways leading to coughing or difficulty breathing, aggravated asthma, and decreased lung function.
Sulfur Dioxide (SO_2)	Burning of fossil fuels by power plants and other industrial facilities, locomotives, ships and other vehicles and heavy equipment that burn fuel with high sulfur content.	Short-term exposure can harm the respiratory system, making breathing difficult. People with asthma, especially children, are most sensitive.

APPENDIX D: PERMIT ACTION DESCRIPTIONS FISCAL YEARS 2015, 2019

Permit Actions	Description	FY 2015	FY 2019
Minor Initial Permits	The first version of a permit resulting from the initial application of a permit from a business seeking to emit air pollutants.	461	248
Title V Initial Permits		25	16
Authorization to Construct	DEQ's grant of approval for a facility to begin building the affected source following the completion of the initial permit.	18	18
Minor Administrative Amendments	Revisions to a permit for any change that would not violate any applicable requirement or standard (ex. ownership changes).	56	9
Title V Administrative Amendments		52	15
Minor Source Modifications	Modifications to a minor (state) permit.	420	277
Title V Minor Modifications	Any modification to a major source permit that would not violate any federally applicable requirement or standard. These modifications require a public participation time frame.	163	178
Title V Major Modification	Any physical change, or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any regulated pollutant.	21	17
Variance	Variances are granted when DEQ finds that by reason of exceptional circumstances strict conformity with some provisions of their permit would cause undue hardship to the owner. These may not authorize a danger to public health.	191	160
Minor Renewal (10 years)	A request for the continuation of a permit upon expiration of the current permit's term.	0	0
Title V Renewal (5 years)		133	122
Exemptions	Sources that do not require permits (ex. pesticides, mobile sources, controlled burning).	24	5
Acid Rain Permits	Puts a cap on emissions of SO2 and NOX, the primary causes of acid rain. It is incorporated with the Title V permit.	6	13
Letters	Occasionally an applicant may require clarification on a permit or seek affirmation that an activity does not require formal authorization. These responses are called Letters of Response or of No Objection.	370	621
Total		**1,940**	**1,699**

Source: Prepared by legislative auditor's staff using DEQ's permitting data.

APPENDIX E: COUNT OF ACTIVE AIR PERMITS BY PARISH
FISCAL YEARS 2015 THROUGH 2019

Parish	FY 15		FY 16		FY 17		FY 18		FY 19	
	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits
Acadia	12	117	12	125	12	111	12	106	13	107
Allen	3	50	3	55	3	53	4	52	5	49
Ascension	72	47	71	49	67	45	67	50	67	52
Assumption	9	28	7	29	6	28	6	27	7	25
Avoyelles	1	15	1	16	1	15	1	16	2	17
Beauregard	8	129	8	129	8	128	8	127	9	123
Bienville	9	798	9	756	8	729	8	657	9	299
Bossier	9	445	7	443	7	445	7	357	6	333
Caddo	11	580	11	572	11	549	10	463	12	293
Calcasieu	89	210	90	205	92	199	89	198	94	184
Caldwell	1	22	1	21	1	16	1	9	2	7
Cameron	17	134	18	133	19	128	17	118	17	113
Catahoula	0	11	0	11	0	10	0	7	0	7
Claiborne	2	306	2	309	2	309	2	288	3	287
Concordia	1	11	1	18	1	17	0	20	0	20
DeSoto	11	1180	9	1193	8	1188	9	822	11	354
East Baton Rouge	62	90	58	88	57	84	56	85	59	87

Parish	FY 15		FY 16		FY 17		FY 18		FY 19	
	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits
East Carroll	1	3	1	3	1	3	1	4	2	4
East Feliciana	4	13	4	11	4	13	4	12	5	11
Evangeline	6	129	6	128	5	123	6	121	7	117
Franklin	1	5	1	6	1	5	1	5	2	6
Grant	2	6	2	6	3	4	3	3	4	3
Iberia	8	95	7	89	7	83	8	81	9	78
Iberville	55	86	55	89	54	83	55	81	55	83
Jackson	3	378	3	376	2	364	2	364	3	56
Jefferson	12	112	12	112	10	107	10	97	11	100
Jefferson Davis	5	75	4	71	3	71	4	66	5	67
Lafayette	5	66	5	66	5	60	5	57	5	55
Lafourche	13	184	12	187	11	172	11	160	13	159
LaSalle	4	95	4	89	4	77	5	76	6	75
Lincoln	5	327	5	334	5	324	5	329	6	385
Livingston	4	27	4	27	4	25	4	23	5	21
Madison	2	10	2	9	2	9	2	9	3	9
Morehouse	2	5	2	5	2	5	2	5	3	5
Natchitoches	7	27	7	23	7	21	7	21	8	22
Orleans	6	60	6	61	6	55	6	55	7	52
Ouachita	22	91	22	85	22	72	20	59	20	58
Plaquemines	39	224	38	225	36	211	37	201	37	194
Pointe Coupee	5	71	5	69	5	63	5	63	6	63
Rapides	11	60	10	62	10	63	9	56	9	54

Parish	FY 15		FY 16		FY 17		FY 18		FY 19	
	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits
Red River	10	184	4	186	4	185	4	101	5	65
Richland	4	9	4	11	3	11	3	13	4	15
Sabine	2	96	2	96	3	94	3	17	5	19
St. Bernard	21	25	21	24	22	22	22	21	23	21
St. Charles	62	48	63	54	61	49	54	49	57	51
St. Helena	2	20	2	19	2	22	2	20	3	21
St. James	21	34	21	34	20	35	21	34	23	34
St. John the Baptist	13	29	13	32	14	29	14	25	15	24
St. Landry	7	54	7	60	7	58	7	54	8	57
St. Martin	2	69	3	74	3	68	3	68	4	69
St. Mary	24	137	22	132	21	113	21	105	22	101
St. Tammany	1	24	1	24	1	20	1	17	2	14
Tangipahoa	2	24	2	24	2	21	2	21	3	22
Tensas	1	7	1	23	1	23	1	23	2	25
Terrebonne	13	211	13	199	13	183	12	175	13	168
Union	2	31	2	32	2	32	2	30	3	27
Vermilion	13	164	13	159	13	151	12	146	13	145
Vernon	2	77	2	79	2	73	2	46	3	44
Washington	5	12	5	12	5	10	6	9	7	9
Webster	9	287	9	287	8	283	7	249	7	193
West Baton Rouge	10	48	9	46	9	45	9	51	10	53
West Carroll	1	3	1	3	1	3	1	3	2	3
West Feliciana	2	11	2	10	2	9	2	6	3	8

Parish	FY 15		FY 16		FY 17		FY 18		FY 19	
	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits	Major Permits	Minor Permits
Winn	4	10	4	9	4	7	4	5	6	5

*Major source permits are permits subject to Title V of the Clean Air Act. Minor source permit include portable source permits, general small source permits regulatory permits, state permits, synthetic minor permits, and state oil and gas permits.
Source: Prepared by legislative auditor's staff using data from DEQ's permitting data.

APPENDIX F: TOP 25 POLLUTANTS CALENDAR YEARS 2008 AND 2018

Pollutant	Tons per Year 2008	Tons per Year 2018	Percent Change
Nitrogen Oxides	185,114.2	138,414.5	-25.2%
Sulfur Dioxide	227,380.0	129,663.2	-43.0%
Carbon Monoxide	135,132.6	97,512.6	-27.8%
VOC's	68,408.0	57,252.7	-16.3%
Particulate matter (10 microns or less)	29,345.0	29,905.4	1.9%
Particulate matter (2.5 microns or less)	18,365.2	18,456.1	0.5%
Ammonia	7,078.7	10,462.1	47.8%
Methanol	5,700.7	5,655.9	-0.8%
n-Hexane	1,899.4	1,994.6	5.0%
Ethylene	1,221.6	1,000.9	-18.1%
Sulfuric Acid	1,232.1	968.8	-21.4%
Hydrochloric Acid	800.5	786.5	-1.8%
Hydrogen Cyanide	39.6	771.7	1847.8%
Hydrogen Sulfide	903.9	725.1	-19.8%
Propylene	510.9	703.3	37.7%
Toluene	828.3	451.6	-45.5%
Formaldehyde	322.0	428.6	33.1%
Xylene (mixed isomers)	574.8	363.6	-36.7%
Acetaldehyde	402.1	341.3	-15.1%
Nitric Acid	26.6	276.8	941.2%
Methyl Ethyl Ketone	339.9	258.2	-24.1%
Benzene	332.9	256.2	-23.0%
Styrene	255.7	239.6	-6.3%
Carbon Disulfide	199.8	208.7	4.5%
Chlorine	113.8	182.9	60.8%

*ERIC data is self-reported data that is estimated and then aggregated into the inventory. All major sources, some minor sources, and some facilities in non-attainment areas are required to report. Due to COVID-19 DEQ extended the due date of annual ERIC emission reports from April 30, 2020, to May 30, 2020. As of 9/21/20, only 33 permitted facilities had submitted their reports.

Source: Prepared by legislative auditor's staff using DEQ's ERIC data.

APPENDIX G: SELF-REPORTED EMISSIONS BY PARISH
CALENDAR YEARS 2016 THROUGH 2018

Parish	CY 16		CY 17		CY 18		Percent Change	
	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants
Acadia	77.7	4,538.9	80.8	4,302.1	79.2	5,275.5	1.9%	16.2%
Allen	70.7	3,143.9	63.7	2,870.0	59.1	2,741.3	-16.5%	-12.8%
Ascension	6,617.6	18,768.1	7,012.2	18,127.2	7,032.6	18,269.3	6.3%	-2.7%
Assumption	14.4	2,008.7	18.3	1,984.1	12.3	2,029.0	-14.5%	1.0%
Avoyelles	-	465.3	-	510.6	-	648.1	-	39.3%
Beauregard	310.4	40,414.7	335.8	6,470.4	326.7	6,550.0	5.2%	-83.8%
Bienville	0.7	3,151.3	5.1	2,771.8	22.9	2,519.4	3284.6%	-20.1%
Bossier	-	1,248.5	-	1,278.3	-	1,249.0	-	0.0%
Caddo	152.8	4,167.9	160.8	4,369.2	143.3	3,876.6	-6.2%	-7.0%
Calcasieu	3,055.3	61,870.2	2,488.1	65,408.5	1,953.1	69,016.6	-36.1%	11.6%
Caldwell	0.2	72.8	0.2	461.4	0.2	715.8	0.0%	883.1%
Cameron	21.5	3,057.4	35.4	5,671.2	42.8	6,657.0	99.0%	117.7%
Claiborne	0.2	416.6	0.2	299.8	0.2	410.9	0.0%	-1.4%
DeSoto	2,137.3	31,611.8	2,188.5	22,637.0	2,167.6	20,476.3	1.4%	-35.2%
East Baton Rouge	2,346.5	40,632.1	2,041.3	49,769.3	2,244.5	40,433.3	-4.3%	-0.5%
East Carroll	-	11.0	-	28.0	-	28.8	-	163.1%
East Feliciana	25.9	913.0	24.5	656.4	26.6	841.0	2.5%	-7.9%
Evangeline	107.4	12,862.6	131.4	16,183.9	146.5	16,554.0	36.5%	28.7%

Parish	CY 16		CY 17		CY 18		Percent Change	
	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants
Franklin	-	17.0	-	25.3	-	258.7	-	1422.9%
Grant	32.2	876.9	41.7	926.2	40.9	951.4	26.9%	8.5%
Iberia	53.4	3,564.0	18.1	3,394.5	17.4	3,768.2	-67.4%	5.7%
Iberville	2,373.3	14,662.5	2,803.3	13,960.8	2,722.4	14,585.9	14.7%	-0.5%
Jackson	342.7	3,899.7	492.9	4,860.8	513.6	5,423.8	49.9%	39.1%
Jefferson	381.4	16,773.3	476.6	11,956.4	513.6	11,143.3	34.7%	-33.6%
Jefferson Davis	1.3	432.8	1.2	457.2	1.1	869.5	-14.1%	100.9%
Lafayette	0.7	1,229.5	0.7	1,431.4	0.7	1,359.6	0.0%	10.6%
Lafourche	32.3	3,384.4	45.1	3,348.9	25.1	3,381.9	-22.2%	-0.1%
LaSalle	9.2	425.8	2.0	261.4	1.3	766.7	-86.1%	80.1%
Lincoln	66.3	2,708.0	67.4	2,734.8	65.5	2,686.9	-1.2%	-0.8%
Livingston	49.8	1,286.2	74.5	1,393.0	64.9	1,470.5	30.2%	14.3%
Madison	-	125.3	-	123.5	-	132.2	-	5.5%
Morehouse	13.5	708.7	17.8	1,279.0	0.4	2,090.4	-96.8%	195.0%
Natchitoches	584.2	5,462.0	574.0	4,759.9	531.1	4,631.5	-9.1%	-15.2%
Orleans	4.0	1,543.1	3.8	1,265.3	5.7	1,443.2	43.0%	-6.5%
Ouachita	1,641.8	11,407.7	1,548.8	10,978.4	1,665.0	11,825.5	1.4%	3.7%
Plaquemines	193.5	8,303.1	231.0	7,682.8	215.1	7,479.1	11.1%	-9.9%
Pointe Coupee	351.3	30,502.9	485.3	33,005.3	356.2	25,684.1	1.4%	-15.8%
Rapides	154.0	15,391.4	150.7	13,727.6	168.9	18,232.8	9.7%	18.5%
Red River	36.9	10,182.9	32.8	8,943.5	34.7	8,323.4	-5.8%	-18.3%
Richland	11.6	1,023.8	11.8	1,029.6	19.6	1,354.5	69.7%	32.3%
Sabine	100.5	1,188.6	102.3	1,226.7	118.3	1,284.4	17.7%	8.1%
St. Bernard	291.7	9,285.2	296.9	7,760.1	253.2	7,474.7	-13.2%	-19.5%
St. Charles	1,847.9	36,297.7	1,711.7	32,947.7	1,877.2	32,856.1	1.6%	-9.5%
St. Helena	-	301.8	-	322.6	-	338.2	-	12.1%

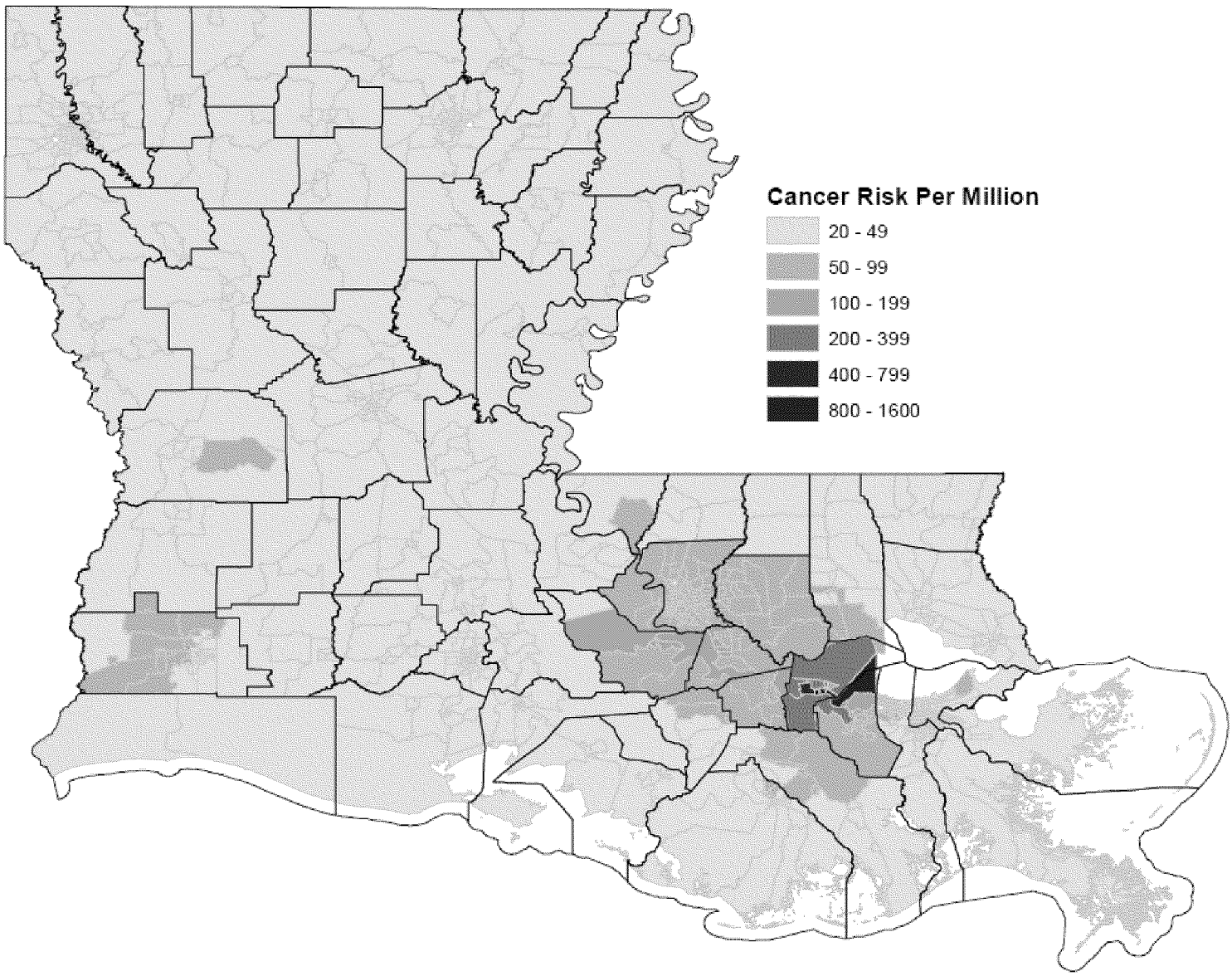
Parish	CY 16		CY 17		CY 18		Percent Change	
	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants	Toxic Air Pollutants	Criteria Pollutants
St. James	1,912.3	16,514.7	1,781.1	19,089.5	1,368.5	14,444.4	-28.4%	-12.5%
St. John the Baptist	497.6	9,304.3	472.2	9,941.5	414.2	9,996.4	-16.8%	7.4%
St. Landry	82.5	3,240.8	104.8	3,020.7	105.5	3,054.7	27.9%	-5.7%
St. Martin	17.5	1,932.2	22.1	1,998.5	24.2	1,963.4	37.9%	1.6%
St. Mary	455.6	30,048.9	503.2	33,881.7	522.3	36,483.7	14.6%	21.4%
St. Tammany	-	-	-	-	-	-	-	-
Tangipahoa	-	476.4	0.0	485.7	0.0	462.1	-	-3.0%
Tensas	-	8.5	-	8.4	-	7.6	-	-10.1%
Terrebonne	44.6	1,355.1	50.2	1,122.9	20.6	1,094.3	-53.7%	-19.2%
Union	-	363.8	2.3	396.4	1.5	421.9	-	16.0%
Vermilion	57.3	3,356.1	44.3	2,935.7	54.2	3,269.6	-5.4%	-2.6%
Vernon	1.4	42.8	0.2	40.5	0.2	79.5	-84.5%	85.7%
Washington	1,497.1	9,967.3	1,456.9	10,798.0	1,528.2	11,228.5	2.1%	12.7%
Webster	9.2	2,474.1	9.4	2,217.0	9.1	2,016.7	-0.9%	-18.5%
West Baton Rouge	238.2	12,622.3	270.9	12,209.8	229.2	12,444.1	-3.8%	-1.4%
West Carroll	-	124.2	-	129.0	-	126.0	-	1.4%
West Feliciana	316.1	2,621.9	267.3	2,854.2	311.6	2,931.8	-1.4%	11.8%
Winn	126.7	3,126.4	129.1	3,177.5	135.6	3,069.8	7.0%	-1.8%

*ERIC data is self-reported data that is estimated and then aggregated into the inventory. All major sources, some minor sources, and some facilities in non-attainment areas are required to report. Due to COVID-19 DEQ extended the due date of annual ERIC emission reports from April 30, 2020 to May 30, 2020. As of 9/21/20, only 33 permitted facilities had submitted their reports.

Source: Prepared by legislative auditor's staff using data from DEQ's emissions inventory data.

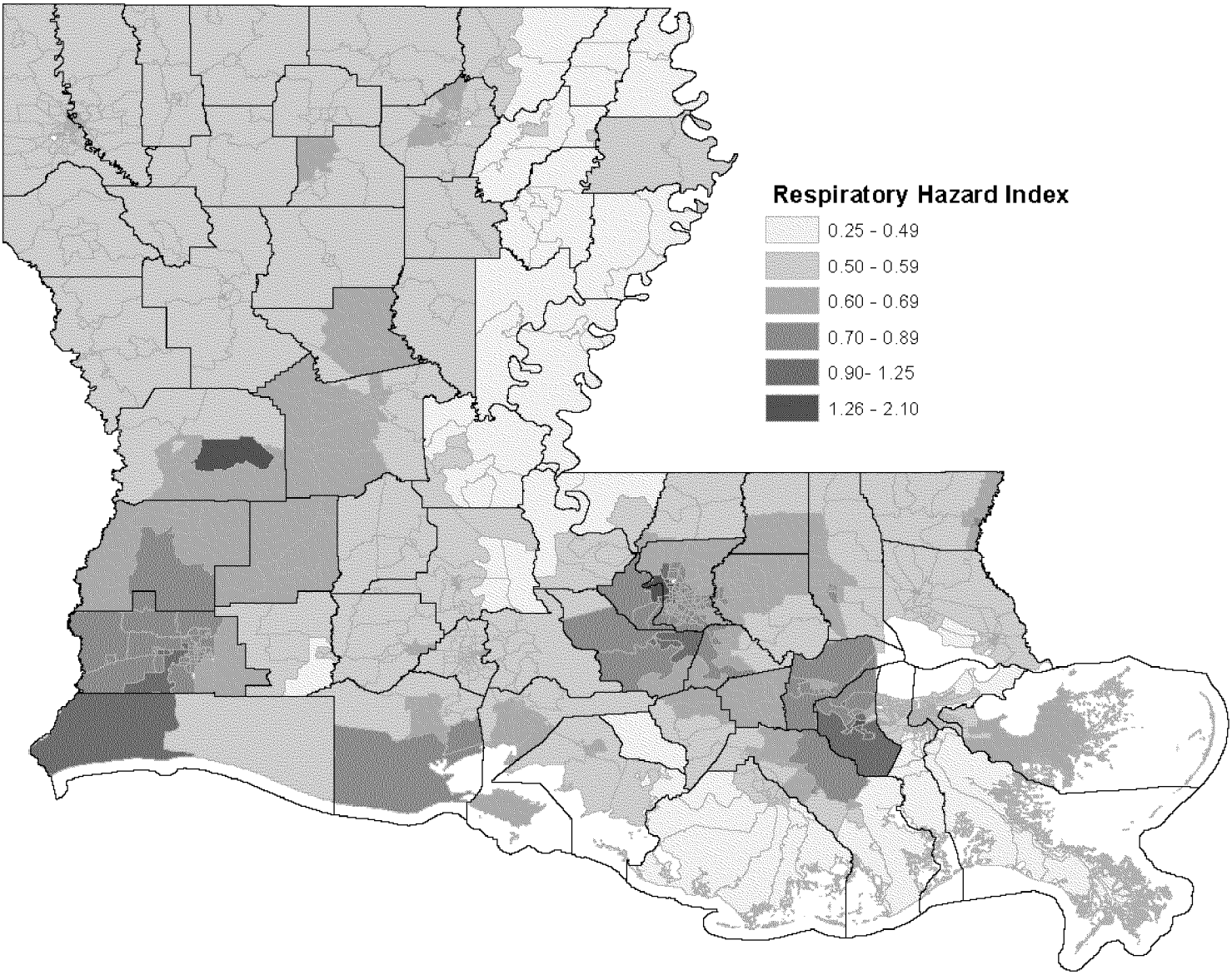
APPENDIX H: POTENTIAL CANCER RISK PER MILLION

Potential Cancer Risk Per Million
By US Census Tract
2014 EPA National Air Toxics Assessment Data



APPENDIX I: RESPIRATORY HAZARD INDEX

Respiratory Hazard Index
by US Census Tract
2014 EPA National Air Toxics Assessment



APPENDIX J: ENFORCEMENT ACTION DESCRIPTIONS

Number and Descriptions of Enforcement Actions* Fiscal Years 2015 & 2019			
Types of Enforcement Actions	**Description**	**Actions FY 15**	**Actions FY 19**
Notice of Corrected Violation (NOCV)	Can be drafted when the violation is corrected and it has been verified.	15	5
Notice of Violation (NOV)	Drafted when violations are minor but may not have been corrected timely or verified.	2	23
Compliance Order (CO)	Drafted when further action by the Respondent is needed to mitigate the violations, interim limitations are needed, or a compliance/construction schedule is needed.	4	7
Consolidated Compliance Order and Notice of Potential Penalty (CONOPP)	Drafted when further action is needed by the Respondent to mitigate the violations and that may warrant a penalty.	52	55
Notice of Potential Penalty (NOPP)	Drafted when violation has been corrected or is no longer occurring and it warrants a penalty.	40	52
Penalty Assessment (PA)	May be drafted after issuance of CONOPP or NOPP and consideration of the Nine Factors and a penalty is appropriate.	10	4
Expedited Penalty Agreement and NOPP	Minor or moderate violations are eligible to go through the expedited enforcement program. This program expedites penalties and orders requiring compliance within a specified time period.	51	51
Administrative Order (AO)	Drafted when there is no specific violation but there is an environmental concern and action is needed to correct.	0	0
Administrative Order on Consent	Similar to an AO but becomes final and effective upon signature of the Assistant Secretary and the Respondent.	2	0
Total		**176**	**197**

*Only includes air and multimedia (containing air) enforcement actions. It does not include asbestos or lead enforcement actions.
Source: Prepared by legislative auditor's staff using data from DEQ's permitting data.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270

January 24, 2022

CERTIFIED MAIL-RETURN RECEIPT REQUESTED**: 7010 1060 0002 1871 9423**

Lane Grant
Environmental Manager
Nucor Steel Louisiana LLC
9101 LA Highway 3125
Convent, Louisiana 70723

Lane.Grant@nucor.com

Re: Clean Air Act Notification of Violation and Opportunity to Confer

Dear Mr. Grant:

The United States Environmental Protection Agency, Region 6 ("EPA") has identified Nucor Steel Louisiana LLC ("Nucor") as having violated the Clean Air Act ("CAA"). This Notice of Violation and Opportunity to Confer ("Notice") is issued to Nucor for violations of the CAA, 42 U.S.C. § 7401, *et seq.*, and violations of Title 33, Part III of the Louisiana Administrative Code ("L.A.C.") at its Direct Reduced Iron ("DRI") facility in Convent, Louisiana ("Facility"). Based on information currently available, EPA finds that Nucor[1] has violated General provisions of the National Emission Standards for Hazardous Air Pollutants for Source Categories ("NESHAP") Subpart A and the conditions of Louisiana's federally approved State Implementation Plan ("SIP") as incorporated into the Facility's Title V Permit. By this letter, EPA is extending to you an opportunity to advise the Agency, via a conference call or in writing, of any further information EPA should consider with respect to the alleged violations.

This Notice is issued pursuant to Section 113(a)(1) of the CAA, 42 U.S.C. § 7413(a)(1), which requires the Administrator of the EPA to notify any person in violation of a SIP or permit of the violation(s) and serves as the finding and notice required by this Section. The authority to issue this Notice has been delegated to the Director of the Enforcement and Compliance Assurance Division, EPA Region 6.

[1] Please be advised that some companies may qualify as a "small business" under the Small Business Regulatory Enforcement and Fairness Act ("SBREFA"). The U.S. Small Business Administration has established a Table of Small Business Size Standards, which can be found at: http://www.sba.gov/sites/default/files/Size_Standards_Table.pdf. The SBREFA Information Sheet provides information on compliance assistance to entities that may qualify as small businesses as well as to inform them of their right to comment to the SBREFA Ombudsman concerning EPA enforcement activities. The SBREFA Information Sheet can be found at: http://nepis.epa.gov/Exe/ZyPDF.cgi/P100BYAV.PDF?Dockey=P100BYAV.PDF.

CAA Violations

We are sending this letter to inform Nucor of the following alleged violations at Nucor's Facility:

1. Unauthorized emissions of hydrogen sulfide during 2017, 2018, 2019, and 2020 in violation of requirements under 40 C.F.R. § 63.6(e)(1)(i), L.A.C. 33: III.501.C.2, and the Facility's Title V Permit;

2. Unauthorized emissions of sulfuric acid mist during 2017, 2018, 2019, and 2020 in violation of 40 C.F.R. § 63.6(e)(1)(i), L.A.C. 33: III.501.C.2, and the Facility's Title V Permit; and

3. Emissions of sulfur dioxide in excess of permitted limits during 2018 and 2020 in violation of 40 C.F.R. § 63.6(e)(1)(i), L.A.C. 33: III.501.C.4, and the Facility's Title V Permit.

Please review the specific violations and information we have provided in the Enclosure regarding each of the facilities at issue.

Opportunity to Confer

This Notice provides you with the opportunity to confer with EPA. We request Nucor contact Jamie Lee, Assistant Regional Counsel, at Lee.Jamie@epa.gov or 214-665-6795 within ten (10) business days to discuss this pending matter.

EPA acknowledges that the COVID-19 pandemic may impact your business. If that is the case, please contact us regarding any specific issues you need to discuss.

Sincerely,

Cheryl T. Seager

Digitally signed by Seager, Cheryl
DN: cn=Seager, Cheryl, email=Seager.Cheryl@epa.gov
Date: 2022.01.24 07:53:23 -06'00'

Cheryl T. Seager, Director
Enforcement and
Compliance Assurance Division

Enclosure

ec: Angela Marse, LDEQ (angela.marse@la.gov)

Enclosure
Nucor Steel Louisiana LLC
Notification of Violation and Opportunity to Confer

Type of Violation	CAA/LAC	Pollutant	Source	Period	Quantity (tpy)		
					Permitted	Emitted	Exceedance
Unauthorized emissions	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.2	H_2S	Entire Facility	2017	-	24.25	24.25
Unauthorized emissions	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.2	H_2S	Entire Facility	2018	-	35.27	35.27
Unauthorized emissions	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.2	H_2S	Entire Facility	2019	0.11	27.76	27.65
Unauthorized emissions	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.2	H_2S	Entire Facility	2020	9.77	12.67	2.90
Unauthorized emissions	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.2	H_2SO_4	DRI Unit 1 Process Heater	2017	-	3.21	3.21
Unauthorized emissions	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.2	H_2SO_4	DRI Unit 1 Process Heater	2018	-	7.98	7.98
Unauthorized emissions	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.2	H_2SO_4	DRI Unit 1 Process Heater	2019	-	3.50	3.50
Unauthorized emissions	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.2	H_2SO_4	DRI Unit 1 Process Heater	2020	4.70	5.19	0.49
Permit limit exceedance	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.4	SO_2	DRI Unit 1 Process Heater	2018	7.50	16.59	9.09
Permit limit exceedance	40 C.F.R. § 63.6(e)(1)(i) L.A.C. 33:III.501.C.4	SO_2	DRI Unit 1 Process Heater	2020	9.76	10.79	1.03