Attachment 6

March 10, 2022

Chase T. Brockstedt
Baird Mandalas Brockstedt LLC
1413 Savannah Rd.
Lewes, DE 19958

Reference: New-Indy Mill, Catawba, SC—Proposed EPA Consent Decree, Lodged 12/29/21, Civ. No. 21-cv-02053-SAL

Subject: Ambient Air Quality Monitoring Comments on Proposed Consent Decree

Dear Mr. Brockstedt:

Per your request, I have reviewed the US Environmental Protection Agency's (EPA's) proposed New-Indy Consent Decree lodged on December 29, 2021 and have prepared the comments below in response. I understand the Consent Decree is intended to resolve the EPA's July 29, 2021 Complaint issued against New-Indy that included EPA's May 13, 2021 Emergency Order. However, as explained below, the proposed Consent Decree's approach to ambient air monitoring is grossly inadequate in several important respects and fails to inform EPA and the public about numerous malodorous and potentially toxic emissions that continue to be emitted by the New-Indy mill.

Given my extensive experience in air monitoring and related fields, I have concentrated on the ambient air quality monitoring issues raised by the proposed Consent Decree. I have reviewed and analyzed hundreds of air emission documents related to the New-Indy Mill, including EPA and South Carolina Department of Health and the Environment (DHEC) documents posted on their websites and obtained through various Freedom of Information Act (FOIA) requests. Most of the information presented herein has been presented previously to EPA in my September 24, 2021 and December 23, 2021 letter reports and in a Zoom presentation to EPA officials on December 16, 2021. However, my concerns with and recommendations to correct the inadequacies of the air monitoring of New-Indy's emissions apparently have been ignored since the proposed Consent Decree does not address them at all They are offered again here in support of my concerns with the adequacy of the proposed Consent Decree.

My *curriculum vita* (Attachment A) summarizes my education and career, and provides examples of my experience in air monitoring and related fields.

INTRODUCTION

In reviewing the proposed Consent Decree, I considered whether its provisions would commit New-Indy to adequately quantify the mill's emissions, and monitor their ambient impacts in order protect the community from harm.

Specific air monitoring technical comments follow. The initial comments are keyed to the sections in the proposed Consent Decree's Appendix A – Work to Be Performed. A subsequent section identifies provisions that must be added to the Consent Decree to ensure it effectively meets the objective expressed above.

CONSENT DECREE PROVISIONS

II. Fence-Line Monitoring

The proposed Consent Decree largely continues the existing, inadequate three site fence-line monitoring program that New-Indy has already been implementing. My opinions on the deficiencies of the program were shared with EPA in my September 24 letter report (Attachment B) and during a Zoom call with EPA officials on December 16, 2021. Attachment C, presented during that call, summarizes the current fence-line monitoring program's major deficiencies and identifies needed improvements.

Fence-line monitoring issues of major concern are:

1. A number of important air pollutants are not monitored at all.

    a. New-Indy's foul condensate and other emission sources emit methyl mercaptan, dimethyl sulfide, and dimethyl disulfide, in addition to hydrogen sulfide (H_2S). These compounds all have disagreeable odors, with very low odor thresholds. Collectively, these are the major constituents of total reduced sulfur (TRS). Foul condensate generated by New-Indy also can contain significant concentrations of methanol, ethanol, terpenes and other volatile and malodorous chemical compounds.

    b. The fence-line monitoring program is limited to H_2S—a compound for which the mill does not even have emission limits. Table 6-1 in New Indy's Corrective Action Plan estimates that the non-H_2S constituents of TRS constitute up to 90% of the TRS emitted from some WWTP components. Monitoring exclusively for H_2S likely overlooks the majority of the TRS and other chemical releases that are traversing the mill's fence-line.

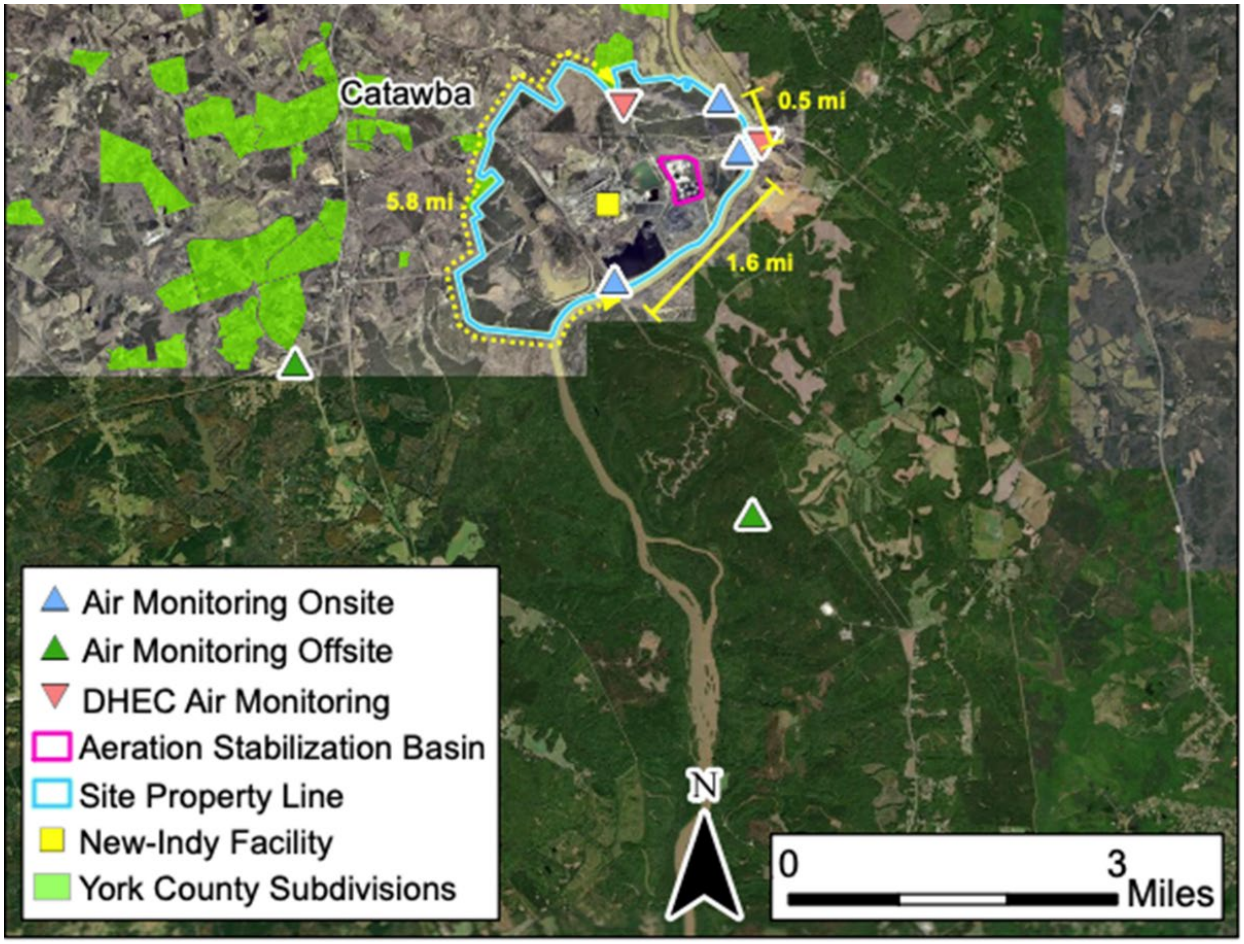
    c. New-Indy's current Title V air operating permit includes limits on TRS emissions. EPA should require New-Indy to add this parameter at each monitoring site. It is not reasonable or rational to monitor only for a pollutant for which the mill lacks emission limits and not monitor for a parameter that is regulated under the permit's terms.

    d. EPA should require New-Indy to add methyl mercaptan, dimethyl sulfide, dimethyl disulfide, methanol, ethanol, and terpenes to the monitoring program since these odoriferous pollutants can endanger public health and welfare.

2. The fence-line network design is clearly inadequate in both the number of monitoring locations and their locations.

    a. Figure 1, below, illustrates the three site fence-line monitoring network that the Consent Decree would require New-Indy to continue operating. Given the few monitoring sites and their locations, there is up to a 5.8 mile gap between two of the monitors along the Mill's greater than eight mile perimeter. A proper network would necessitate at least 18 monitoring sites—the minimum number of sites that the EPA requires for petroleum refinery fence-line monitoring systems.

Figure 1. New-Indy Fence-line Monitoring Network



The network design needs to be based on a technical analysis. Additional sites (beyond the 18 site minimum) may be required to provide adequate coverage for those portions of the fence-line that have very close to large emission sources.

The only documentation of EPA's network design that I have reviewed is the email exchange between Cary Secrest and Patrick Foley, excerpted below:

From: Secrest, Cary <Secrest.Cary@epa.gov>
Sent: Monday, May 10, 2021 3:21 PM
To: Kler, Denis <Kler.Denis@epa.gov>; Russo, Todd <Russo.Todd@epa.gov>
Cc: Foley, Patrick <Foley.Patrick@epa.gov>
Subject: 303 monitor locations

Attached is a new H2S monitor location for the ASB East monitor if the east boundary of Dove Pond is truly at the fence line.

From: *Foley, Patrick <Foley.Patrick@epa.gov>*
Sent: *Monday, May 10, 2021 3:25 PM*
To: *Secrest, Cary <Secrest.Cary@epa.gov>; Kler, Denis <Kler.Denis@epa.gov>; Russo, Todd <Russo.Todd@epa.gov>*
Subject: *RE: 303 monitor locations*

That is a big difference. Why are we limiting this to just 3 monitors? Is it because that is all they bought?

From: Secrest, Cary <Secrest.Cary@epa.gov>
Sent: Monday, May 10, 2021 3:30 PM
To: Foley, Patrick <Foley.Patrick@epa.gov>; Kler, Denis <Kler.Denis@epa.gov>; Russo, Todd <Russo.Todd@epa.gov>
Subject: Re: 303 monitor locations

I suggest 3 monitors because they already have 3 monitors running there and they could be relocated more quickly than mobilizing more from TRC; the ASB East monitor would be 0.4 miles more to the east, which is closer than the highest concentration stationary measurement.

Given the size of the ASB is seems that 3 should be adequate.

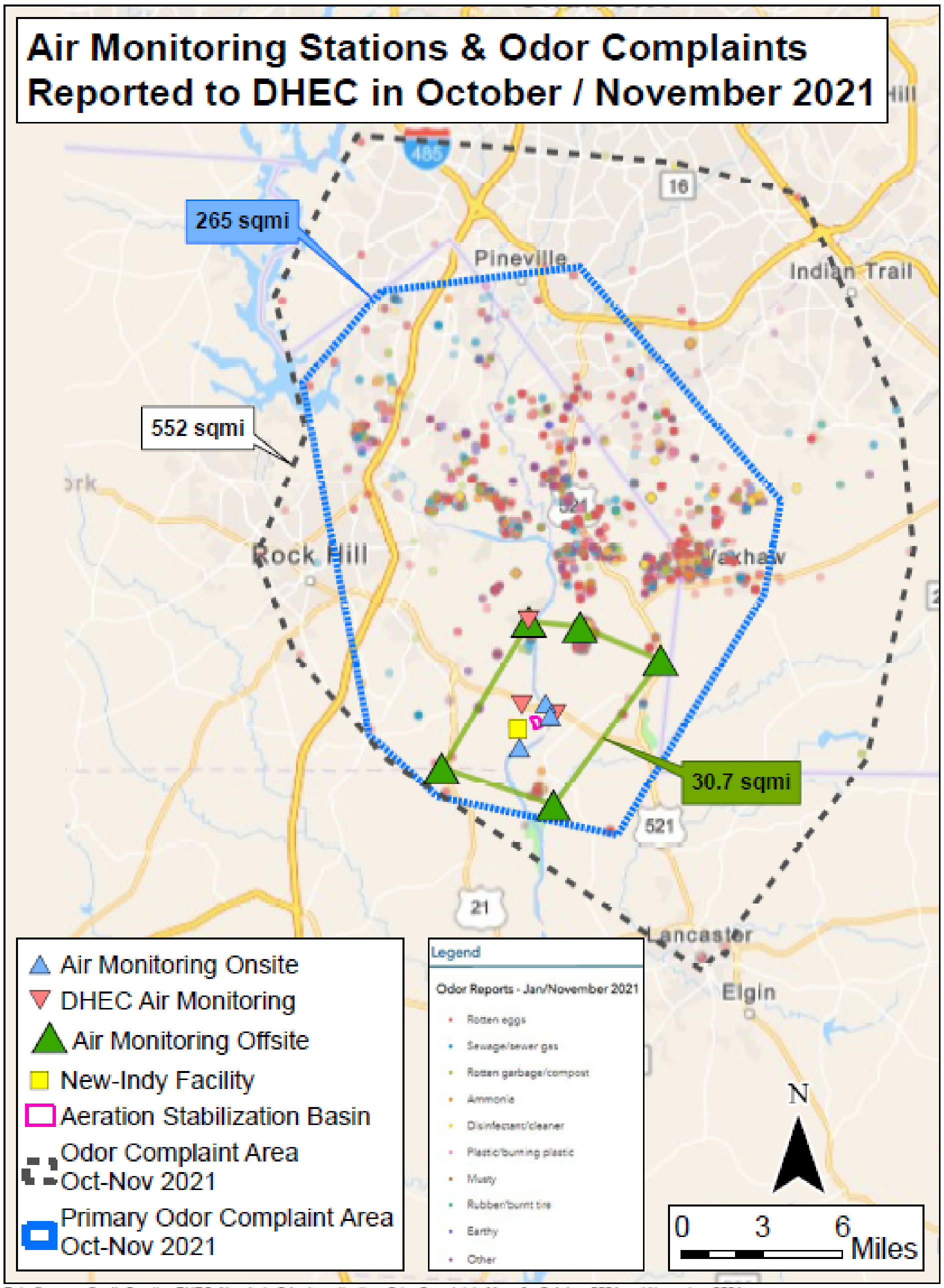
Obviously, selecting the number of sites needed to meet monitoring objectives based on how many monitors the facility already has, is not an adequate technical basis for network design. The size of the ASB is irrelevant to network design since the monitoring objectives are broader than just characterizing the ASB's ambient air quality impact.

b. The network design must also consider the location of community receptors, especially those locations from which air quality complaints have originated. During EPA's January 25, 2022 public meeting, one of the speakers [Alexander Socko (sp?)] noted that he lives within one mile west of the mill, and that there is no fence-line monitor on that side of the facility. Many other persons filing odor complaints with DHEC are located in areas where there is no fence-line monitor between the Mill and their properties. See Figure 2, below.

III. Post Aeration Tank

Where possible, such as the post aeration tank, air emissions should be collected so that they can be properly managed. The proposed Consent Decree requires New-Indy to permanently enclose only the post aeration tank and control emissions by installing and maintaining an activated carbon adsorption system to control emissions from this source. The Consent Decree would also mandate the installation of a post aeration tank VOC monitoring system.

Figure 2. Distribution of Air Quality Complaints, October-November, 2021



Data Sources: South Carolina DHEC. New Indy Odor Investigation, Odor Complaints Maps for October, 2021 and November, 2021.
https://scdhec.gov/environment/environmental-sites-projects-permits-interest/new-indy-odor-investigation
Accessed December 7 and February 4, 2021
https://newindycatawba.com/wp-content/uploads/2021/08/NI-Air-Monitoring-Summary-Results-08-07-21.pdf
https://scdhec.gov/environment/environmental-sites-projects-permits-interest/new-indy-odor-investigation/air-monitoring-hydrogen-sulfide

- Since reduced sulfur compounds are the primary concern associated with wastewater treatment system air emissions and the Mill's air permit imposes emission limits on TRS, New-Indy should be required to continuously monitor TRS emissions from the adsorption system exhaust to protect against breakthrough. It is unreasonable to ignore TRS emissions from the post aeration tank.

- As with the VOC monitoring requirement, EPA should specify a TRS breakthrough concentration that will trigger media change-out.

ADDITIONAL PROVISIONS FOR INCLUSION INTO CONSENT DECREE

Community Ambient Air Monitoring

The New-Indy Mill has significant emissions from elevated release points (i.e. stacks and vents), in addition to near-ground level releases. Therefore, a fence-line monitoring network of only three monitors at an elevation of 4-6 feet above ground level is grossly inadequate to protect the public from excess emissions. Elevated releases likely will be transported over fence-line monitors, only to disperse to ground level and adversely impact air quality at some distance from the Mill. Therefore, it is essential that New-Indy be compelled to establish and maintain a multi-parameter community ambient air quality monitoring network. My September 24, 2021 letter report (Attach. B) and contributions to the December 16, 2021 Zoom presentation to EPA (Attach. C) emphasized these community monitoring inadequacies. Regrettably, the proposed Consent Decree fails to require any community monitoring of any kind.

1. The number and location of monitoring stations should be determined by a formal monitoring network analysis, including an assessment of necessary meteorological parameters. Figure 2, above, illustrates the location of air quality complaints recently registered in the vicinity of the New-Indy Mill. At least 20 monitoring stations will be needed to adequately cover the target area.

2. Monitoring parameters should include at least H_2S, TRS, and sulfur dioxide. Other volatile constituents in the foul condensate, including methanol, ethanol and terpenes that can result in community odors also need to be monitored. Given the Mill's predominance of methyl mercaptan emissions, New-Indy should be required to implement a method for speciating the TRS compounds.

Unlike the fence-line H_2S monitors, New-Indy's current community monitoring program relies on electrochemically-based Acrulog instruments. Electrochemical sensors often suffer from lack of specificity to the target pollutant, subject to drift, and sensitive to changes in humidity. I was unable to find any Acrulog evaluations in the peer-reviewed literature. New-Indy should be required to demonstrate the adequacy to all monitoring instruments is uses to avoid these common problems that will skew the results. I note that New Indy's March 4, 2022 status report states:

> *03/04/22 Update: An Accrulog monitor is collocated at Station 3 site and monitoring continues. Data is being compiled for comparison, and an Addendum is being drafted for the Offsite Monitoring QAPP to address the Collocation Plan on an ongoing basis.*

This will provide a modicum of quality control to the community monitoring program. I believe the correct approach is to set appropriate data quality objectives for the program and then institute a comprehensive suite of quality assurance/quality control measures to achieve those objectives.

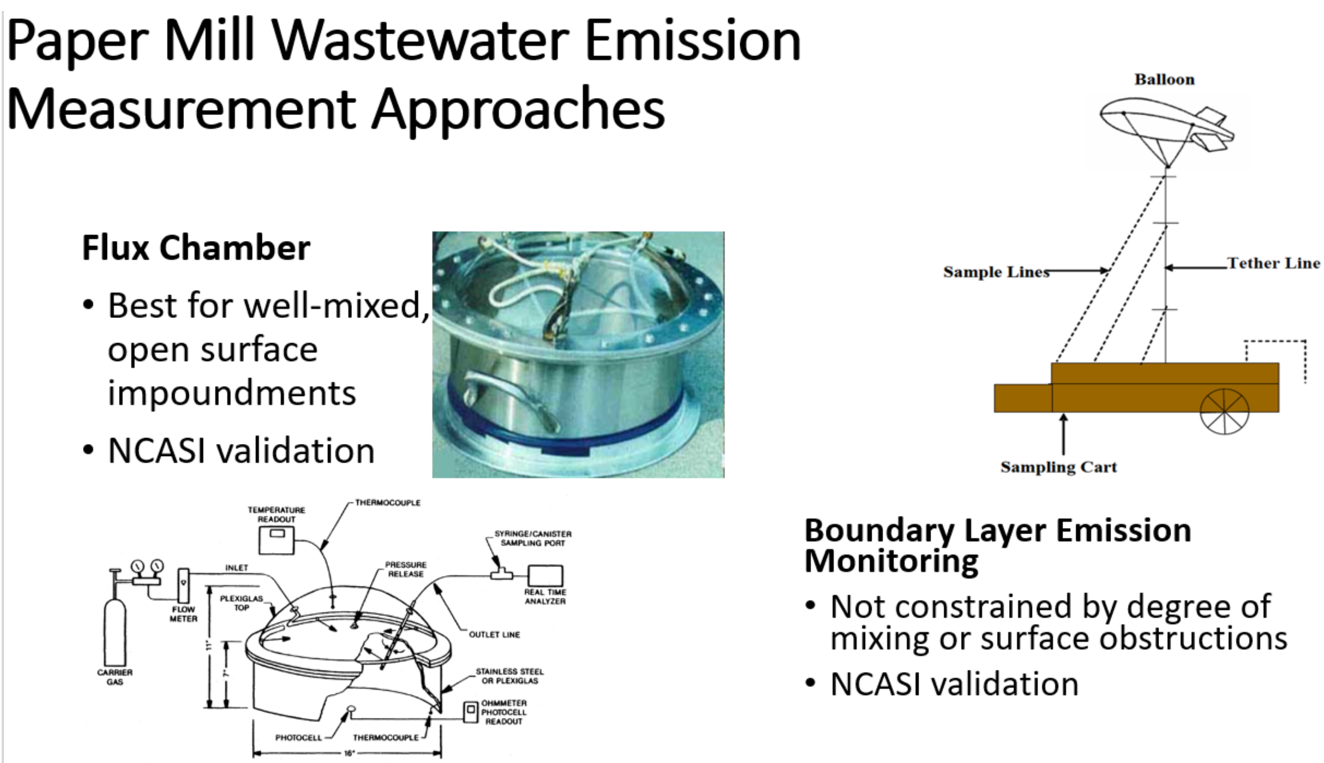
Wastewater Treatment System Emissions Measurement

As communicated during the December 16, 2021 Zoom call with EPA officials (Attachment C) and detailed in my December 23, 2021 letter report (Attachment D), much of the New-Indy air quality mismanagement, resulting in the excessive adverse impacts to the public, resulted from inaccurate information that New-Indy presented in support of its air permit applications and air dispersion modeling. The misrepresented data of most consequence are the fugitive emissions from the wastewater treatment system, including the aeration stabilization basin and other wastewater and sludge storage facilities.

Much of the wastewater treatment system emissions information provided by New-Indy was the result of mathematical modeling rather than direct measurements. The emission models used have only been validated for well-maintained wastewater treatment systems with operating parameters that are within the models' demonstrated validation range. Due to poor operation and maintenance, the New-Indy wastewater treatment system was far outside the models' validated range. This same problem led to inaccurate and unreliable air dispersion modeling performed by New-Indy's consultant as detailed in an October 2021 "Air Dispersion Modeling Analysis" submitted to DHEC. Therefore, modeling to determine the theoretical fugitive emissions from the wastewater treatment plant should not be used to quantify its emissions for use in air models.

Given the inadequacy of the air dispersion modeling to date, New-Indy should be required to directly measure the wastewater treatment system emissions. Several techniques have been used and validated for monitoring paper mill wastewater treatment system fugitive emissions. Figure 3, below, illustrates two accepted methods.

Figure 3. Paper Mill Wastewater Emission Measurement Approaches



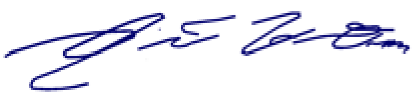
Attachment C, that was previously shared with EPA, provides additional details of how these approaches that can be employed to measure fugitive emissions with a high degree of accuracy.

Bypass Venting

New-Indy's Title V permit requires monitoring, recordkeeping, and reporting of any occasion when an emission control device is bypassed. The position of bypass vents must be monitored and uncontrolled venting of emissions is defined as a permit deviation. In my experience, bypass venting can result in significant pollutant emissions—leading to odor complaints and, in extreme situations, physical compliant and health impacts. Given the overwhelming number of air pollution complaints associated with New-Indy's recent operations, I suggest that the Consent Decree reinforce the need for monitoring recordkeeping and reporting of bypass incidents and, further, incorporate a stipulated penalty for each such deviation.

Let me know if you have any questions on these comments or wish to discuss.

Regards



Richard H. Osa, QEP

Technical Director

Attachments

A. Richard H. Osa CV

B. September 24, 2001 Letter Report

C. Presentation given to EPA on December 16, 2021

D. December 23, 2021 Letter Report

Attachment A

Richard H. Osa, QEP Curriculum Vita

Rick Osa, QEP

Technical Director

Rick has experience in a broad range of air quality management activities, having performed Clean Air Act permitting, legislative and regulatory analyses, as well as compliance planning and implementation. Rick has supported a broad range of industrial operations, with particular concentration in the energy, metals, mining, and food processing sectors. He has performed air permitting in 38 different states, and all EPA regions. These have included PSD and Non-Attainment New Source Review (major) emission sources, in addition to minor and FESOP facilities. Rick leads ERM's ambient air quality monitoring practice, establishing procedures and standards and managing a number of the firm's larger efforts—from the Kenai Peninsula of Alaska to Guyana, South America.

Experience: 40 years' experience in air quality and environmental management

Email: rick.osa@erm.com

LinkedIn: https://www.linkedin.com/in/richard-osa-a21335b

Education

- MS. Engineering Management
  Northwestern University, USA, 1992
- BS. Physics
  Illinois Institute of Technology, 1976

Professional Affiliations, Registrations, Honors

- Qualified Environmental Professional—Institute for Professional Environmental Practice
- Air Quality Fellow, South Korean Embassy, US Department of State
- Air & Waste Management Association

Languages

English, native speaker

Fields of Competence

- Air emission source permitting
- Ambient air quality monitoring
- Fugitive dust quantification, modeling, and control
- Settled dust investigation
- Atmospheric dispersion modeling
- Legislative/regulatory analysis

Key Industry Sectors

- Power
- Oil & Gas Midstream
- Pulp & paper
- Metals

Key Projects

PSD Air Emission Source Construction Permit
Nucor Steel, Blytheville, AR
Managed quick turn-around PSD air permitting effort. Tasks included:

- Definition of permitting strategy;
- Development of project, facility, and near-by emission source inventories;
- Preliminary air quality analysis (dispersion modeling);
- BACT analysis of modified emission units;
- Refined air quality analysis;
- Agency liaison and negotiation.

A Technical Support Document served as the application framework. Total time from project authorization to receipt of the agency's "completeness" notice was less than 12 weeks for this complex facility modification permitting effort.

Air Construction and Operating Permitting
Mondelēz Chicago Bakery, Chicago, IL
Directed multiple facility modification construction permitting projects and related Title V permit revisions for this bakery which is located in a designated "Environmental Justice" community. Several of the permitting actions were processed under Illinois' expedited permit review program, to accommodate the client's schedule.

Air Permit Compliance Assurance
Evonik Goldschmidt Corporation, Mapleton IL
Designed and implemented an emissions and compliance tracking system for a major synthetic organic chemical manufacturing complex. The system imported existing inventory and production data to document and report compliance with complex Title V operating permit requirements.

John Deere Seeding Group
Air Emission Source Construction Permit, Moline, IL
In partnership with client management, developed permitting strategy for new painting line. Project scope necessitated "one source" (i.e., aggregation) and Environmental Justice considerations. Oversaw development air permit application package and its submittal to Illinois EPA.

Air Permit Revision, Clinton Industrial Sand Mine & Processing Plan
Superior Silica Sand, Clinton, WI
Developed an air permitting strategy and application to add drilling and blasting as authorized operations at an existing sand mine, add a new mine, and add a crusher at an existing mine. The permitting authority considered the new processes and operations to serve as a "support facility"—requiring an aggregation approach. To expedite development, a "commence construction waiver" was obtained.

Sulfur Dioxide Attainment Status Monitoring
Multiple Clients, WI, IL, NY
Designed, installed, and operated three independent monitoring networks, conforming to the requirements of the SO_2 "Data Requirements Rule". The projects' objective is to demonstrate the attainment status of their respective areas. Program quality assurance conforms to 40CFR Part 58 Appendix A specifications, in accordance with the DRR. Operation is planned for at least three years in order to assess compliance with the one-hour NAAQS.

Shipborne Air Monitoring Survey
Confidential Client, Guyana, South America
To document pre-exploration, background air quality, instrumented a research vessel to continuously monitor SO_2, NO_2, H_2S, PM_{10}, VOC, wind speed and direction, temperature, relative humidity, and geographical location. Redundant instruments ensured high data recovery over the survey's six weeks, despite unattended operation. Data were screened to filter out measurements biased by the influence of the ship's engines.

Compressor Station Air Monitoring for Impact Assessment
Williams Cos., Multiple Locations
Recent changes to FERC guidance on preparation of environmental impact assessments (RR9) permits the use of local ambient air quality monitoring data to characterize the impact of existing equipment when performing a cumulative impact analysis. Ambient air monitoring tends to be considerably less conservative than the traditional approach—dispersion modeling. This approach can lead to project approvals with fewer restrictions or, in some instance, demonstrate that an otherwise un-licensable facility upgrade can, indeed, be

authorized. These multi-year ambient air monitoring projects formed both the basis for FERC's revised RR9 guidance, but also its implementation to several large-scale gas pipeline development projects. Twelve (12) monitoring sites were established and operated, continuously monitoring $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, wind speed, wind direction, sigma theta, differential temperature, and solar radiation. The data were telemetered to ERM's database server and posted to a secure web site—accessible to the client.

PSD Pre-Construction Air Quality Monitoring
Nucor Steel, Convent, LA
Designed, installed, and managed data collection at this multi-year, three-site PSD pre-construction monitoring network. Continuously measured parameters consisted of $PM_{2.5}$, SO_2, NO_2, CO, wind speed, wind direction, sigma theta, and ambient temperature. Data were digitally recorded onsite and telemetered to ERM office via cellular modem.

Fenceline Air Quality, Meteorological Monitoring
Zeeland Farm Services, Zeeland, MI
Initial contract consisted of designing a two site (upwind-downwind configuration) $PM_{2.5}$ and PM_{10} monitoring program that met the requirements of a consent agreement. ERM then developed a Quality Assurance Project Plan (QAPP) for the program and obtained regulatory agency approval. The last task of the initial contract was to develop a budget-level cost estimate for the program's implementation. ERM was awarded a second contract—to procure monitoring equipment, install it, and operate the program for two years. This included developing and maintaining a secure web site for real-time data access.

Ambient Particulate, Manganese, Mercury, and Meteorological Monitoring
Nucor Steel, Marion, OH
Designed, installed, commissioned, and managing data collection at this multi-year, two site monitoring network. Manual (filter-based) and continuous automated particulate matter samplers are employed to document ambient air concentrations. Filter samples are analyzed to quantify particulate mercury and manganese concentrations. Wind speed and direction are used to identify culpable source(s) in the event of high concentrations.

Refinery Fenceline Monitoring Support
Delek, Krotz Springs, LA
Managed assessment and upgrade of on-site meteorological monitoring system, to conform to requirements of petroleum refinery fenceline monitoring regulations. Monitoring system was enhanced to provide real-time data for operational use. Parameters consisted of wind speed, wind direction, barometric pressure, ambient temperature, relative humidity, and precipitation. Data are fed into refinery's DCS via fiber optic.

Contaminated Soil Remediation Site Dust Monitoring
Proctor & Gamble, Inwood, WV
Network of continuous dust monitors was established and operated to provide real-time operational data to contractors carrying out contaminated soil remediation plan. Measured particulate matter levels and current meteorological conditions were telemetered to ERM and posted to a secure web site. Remediation contractors relied on the monitoring data to plan the day's operations and deploy appropriate dust control measures.

Publications

Osa, RH, Raine, T and Guido, D. 2020. *Environmental Science Deskbook, Chapter 8, Air; Thomson Reuters, Release #18*.

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Attachment B

September 24, 2001 Letter Report

September 24, 2021

Chase T. Brockstedt
Baird Mandalas Brockstedt LLC
1413 Savannah Rd.
Lewes, DE 19958

Reference: New-Indy, Catawba, SC

Subject: Initial Ambient Air Quality and Meteorological Monitoring

Dear Mr. Brockstedt:

Per your request, I have prepared the following analysis of the ambient air quality and meteorological monitoring that has been performed in the vicinity of New-Indy's Catawba, SC paper mill by New-Indy-Catawba (New-Indy), the South Carolina Department of Health and Environmental Control (SC DHEC), and United States Environmental Protection Agency (US EPA).

My *curriculum vita* (Attachment A) summarizes my education and career, and provides examples of my experience in air monitoring and related fields. The opinions expressed in this letter are made with a reasonable degree of environmental and scientific certainty, but I reserve the right to supplement this letter if and when more information becomes available.

1. INTRODUCTION

The community surrounding New-Indy's Catawba paper mill has been concerned about air quality impacts that may be associated with frequent odor events since New-Indy has assumed operation of the mill. SC DHEC has documented thousands of odor complaints from the area, since March 2021. Community and agency concern has led to issuance of two administrative orders—one issued by SC DHEC and one by US EPA.

US EPA has required New-Indy to implement ambient air monitoring programs along the facility's fence-line, as well as at a number of community monitoring locations. Additional ambient monitoring has been performed by US EPA and SC DHEC. This letter report presents my professional assessment of the adequacy of ambient monitoring and what conclusions can be drawn or inferred from the resultant data. Particular emphasis is placed on the monitoring program strategy, network design, and what can be inferred about the emission source(s), based on the data collected to date.

Interpreting the monitoring data is complicated by the fact that New-Indy has both ground level and elevated releases of reduced sulfur compounds that can result in odor issues. Elevated releases may not register at the fence-line since the plume may not reach ground level for some distance, following emission.

2. INFORMATION SOURCES

Much of the information on the ambient air monitoring programs is posted on each organization's web site. ERM has received supplemental information as a result of a Freedom of Information Act (FOIA) request. Not all requested FOIA information has been received or extracted from SC DHEC's large, unindexed electronic files. ERM has reviewed a substantial number of relevant documents, including those listed in Attachment B.

In the case of the New-Indy fence-line monitoring program, ERM was able to review the applicable Quality Assurance Project Plan (QAPP) that includes the site locations, specifies the monitored parameters, and provides monitoring instrument specifications. However, that document was deficient in that it failed to provide the rationale for selecting the number of monitoring sites, how the monitoring site locations were chosen, or the selection of monitored parameter (only hydrogen sulfide, "H_2S"). These are all critical parts of an air monitoring QAPP. The number of monitors (three) is particularly troubling given that the site perimeter is almost six miles in length. ERM has yet to receive the corresponding QAPPs for the New-Indy community monitoring program, or for the US EPA and SC DHEC community air monitoring efforts.

As required by the US EPA and SCDHEC administrative orders, New-Indy has been submitting periodic progress reports. Some of these reports provide additional information on the ambient air monitoring programs. There are apparent discrepancies between some of the information sources. For instance, New-Indy's on-site wind speed and wind direction monitoring is variously described as a single sensor, or multiple sensors, collocated with each fence-line monitor. This may simply be due to changes to the program over time.

In analyzing the monitoring data, care has been taken to ensure synchronization (e.g., making sure the time base is consistently on "standard" rather than "daylight saving time").

The air quality measurement technology utilized by US EPA, SC DHEC, and New-Indy poses an additional challenge. At least three different instruments (each relying on a distinct measurement principle) have been used to measure H_2S concentration. Each instrument presents a different sensitivity and selectivity profile. These differences must be considered when comparing the resultant data. The absence of adequate quality assurance documentation introduces considerable uncertainty into this process.

3. PROGRAM DESIGN

Designing an effective ambient air quality monitoring network depends on clearly identifying the program's objective, obtaining relevant historical climatological data, and the results of atmospheric dispersion modeling, if the program is what US EPA refers to as "source oriented". A pilot program may provide valuable insights that will lead to a more effective monitoring program design.

This information is used to determine the number and location of monitoring sites, what parameters to measure, select instruments of adequate sensitivity and selectivity, and specify measurement frequency and duration.

3.1 Pilot Studies

Both US EPA and New-Indy performed preliminary monitoring programs to gain insights into the nature of the odor issue and potential sources.

3.1.1 US EPA GMAP

In response to SC DHEC's request during the week of April 5, 2021, US EPA became part of a multistate team made up of SC DHEC, the North Carolina Department of Environmental Quality (NC DEQ), and Mecklenburg County Air Quality (MCAQ) to investigate the cause of the odor complaints. The Agency initially performed a pilot monitoring effort using a Geospatial Measurement of Air Pollution (GMAP) mobile laboratory. The GMAP was deployed to the New-Indy facility and surrounding areas on Apr. 24. The GMAP is equipped with analyzers for a variety of compounds such as methane, BTEX - benzene, toluene, ethylbenzene, and xylene, hydrogen sulfide and carbon dioxide. It also has meteorological and global positioning system (GPS) equipment. The GMAP can conduct real-time monitoring and mapping of air pollutants while the vehicle is in motion, while taking meteorological conditions into consideration. The monitoring survey was performed in accordance with a formal QAPP and associated Standard Operating Procedure (SOP).

Results of the GMAP pilot study were presented in a US EPA May 5, 2021 report[1]. That 114-page report included data from measurements taken on the New-Indy site, as well as in the near-by community. Among the parameters measured throughout the survey was H_2S, using a Picarro G2204 cavity ringdown spectroscopy analyzer, a very sensitive and selective instrument. Community instantaneous H_2S concentrations of up to several hundred parts per billion (ppb) were measured. On the New-Indy site, itself, H_2S reached a level of at least 8,546 ppb. The GMAP measurements formed the technical basis on which US EPA's emergency order was issued.

3.1.2 New-Indy Weston Odor Testing

New-Indy engaged the consulting firm Weston Solutions, to characterize various waste water streams, as well as air quality—on-site and in the nearby community. Speciated reduced sulfur compounds were quantified on-site using a gas chromatograph (GC). The type of detector was not specified in the monitoring report[2]. Of particular note is that H_2S comprised just 10 percent of the total reduced sulfur compounds (TRS) measured at high concentration at the on-site locations. In addition, New-Indy's July 12, 2021 Corrective Action Plan indicates, in Table 6-1, that less than 10 percent of the TRS emissions form the Aerated Stabilization Basin (ASB) are related to H_2S. This means that the other TRS compounds (methyl mercaptan, dimethyl sulfide, and dimethyl disulfide) likely play a dominant role in the odors being experienced by the community. Nevertheless, New-Indy is required to test only for H_2S.

3.2 Fence-Line Monitoring

Of the fixed monitoring programs, the fence-line H_2S monitoring being performed by New-Indy in compliance with the US EPA emergency order, is the best-documented. It consists of three monitoring sites continuously monitoring H_2S using Teledyne API Model 101 analyzers. Based on the most recent documentation, each monitoring station is also equipped with a wind speed/wind direction sensor. The program is being operated by TRC, in accordance with a QAPP and supporting SOPs.

As noted above, the fence-line monitoring program was prescribed by the US EPA emergency order. EPA specified that H_2S be monitored and the locations of the monitoring sites. Subsequent to issuing the order, New-Indy petitioned the Agency to move the Site 3 location (initially sited within the mill's operating area) to the northwest fence-line. US EPA agreed with this change.

The available documentation indicates that the fence-line monitoring program is capable of generating high quality data. However there are several notable deficiencies related to US EPA's order that greatly

[1] Marta Fuoco, US EPA, Air Monitoring and Analysis Section, Geospatial Monitoring of Air Pollution Report For New Indy Containerboard—Catawba, SC, May 5, 2021.
[2] Weston Solutions, New-Indy Catawba Mill Odor Testing (letter report), April 13, 2021.

limit the program's ability to meet its primary objective—to accurately quantify the concentration of contaminants entering ambient air from the New-Indy mill. These are:

1. **Monitored Parameters.** New-Indy's Title V air emission source operating permit does not contain any emission limits specific to H_2S. Rather, limits are imposed on TRS. As illustrated by the Weston pilot study and New Indy's Corrective Action Plan described above, by limiting monitoring to H_2S, it is likely that as much as 90 percent or more of the TRS emitted by the mill is not being assessed. In addition, methyl mercaptan is a SC DHEC-designated toxic air pollutant and is not being monitored.

   Continuous TRS monitors are commercially available. In fact, Teledyne API offers a Model T102 TRS analyzer that is very similar to the Model T101 being used by New-Indy in the current fence-line monitoring program. There is not a reliable continuous methyl mercaptan analyzer commercially available, but several methods are available to collect whole air samples, followed by laboratory analysis. In conclusion, the fence-line monitoring program that measures only H_2S and not TRS is fundamentally flawed.

2. **Monitoring Network Design.** The number and location of monitors are fundamental considerations in the design of an air monitoring network. In the case of the New-Indy fence line air monitoring network, both the number of monitors and their locations were dictated by the specifications contained in US EPA's emergency order. However, three monitors are woefully inadequate to characterize a facility as large as New-Indy's which consists of approximately 1,100 acres. US EPA has included fence-line monitoring requirements in its petroleum refinery rules. While not directly applicable to paper mills, it demonstrates the Agency's assessment of the minimum network design needed to adequately protect the public. For sites between 750 and 1,500 acres, the fence-line monitoring requirements specify the minimum number of monitoring sites as 18 (one for every 20 degrees of direction)—evenly spaced about a site's perimeter.

   These requirements are a far cry from the three locations being monitored on the New-Indy fence line. As shown in Figure 1, there are gaps of thousands of feet in the New-Indy fence-line monitoring network. This results in H_2S and TRS compound ground level emissions not being adequately monitored as they escape the mill property and impact the surrounding community.

3.3 Community Monitoring

US EPA and New-Indy have performed limited H_2S monitoring in the community within approximately 14 miles of the New-Indy mill. SC DHEC has operated a three-site community monitoring program since June 29, 2021. Although H_2S measurements are performed on a continuous basis, only graphical results (i.e., not numerical values) are publicly available, limiting their value for risk analysis.

US EPA's community monitoring network originally consisted of nine sites equipped with Honeywell SPM Flex continuous H_2S analyzers. The SPM Flex system uses chemical-specific treated tape cassettes and optical detector to measure various air pollutants. Figure 2 illustrates the monitoring site locations. EPA operated these sites from May 13 through July 2, 2021. At that time, New-Indy assumed monitoring at a five-site subset of the US EPA network, and has been monitoring since, using Acrulog H_2S electrochemical sensors. Figure 3 presents the current, more limited New-Indy community monitoring network.

Figure 1. New-Indy Fence-Line Monitoring Network

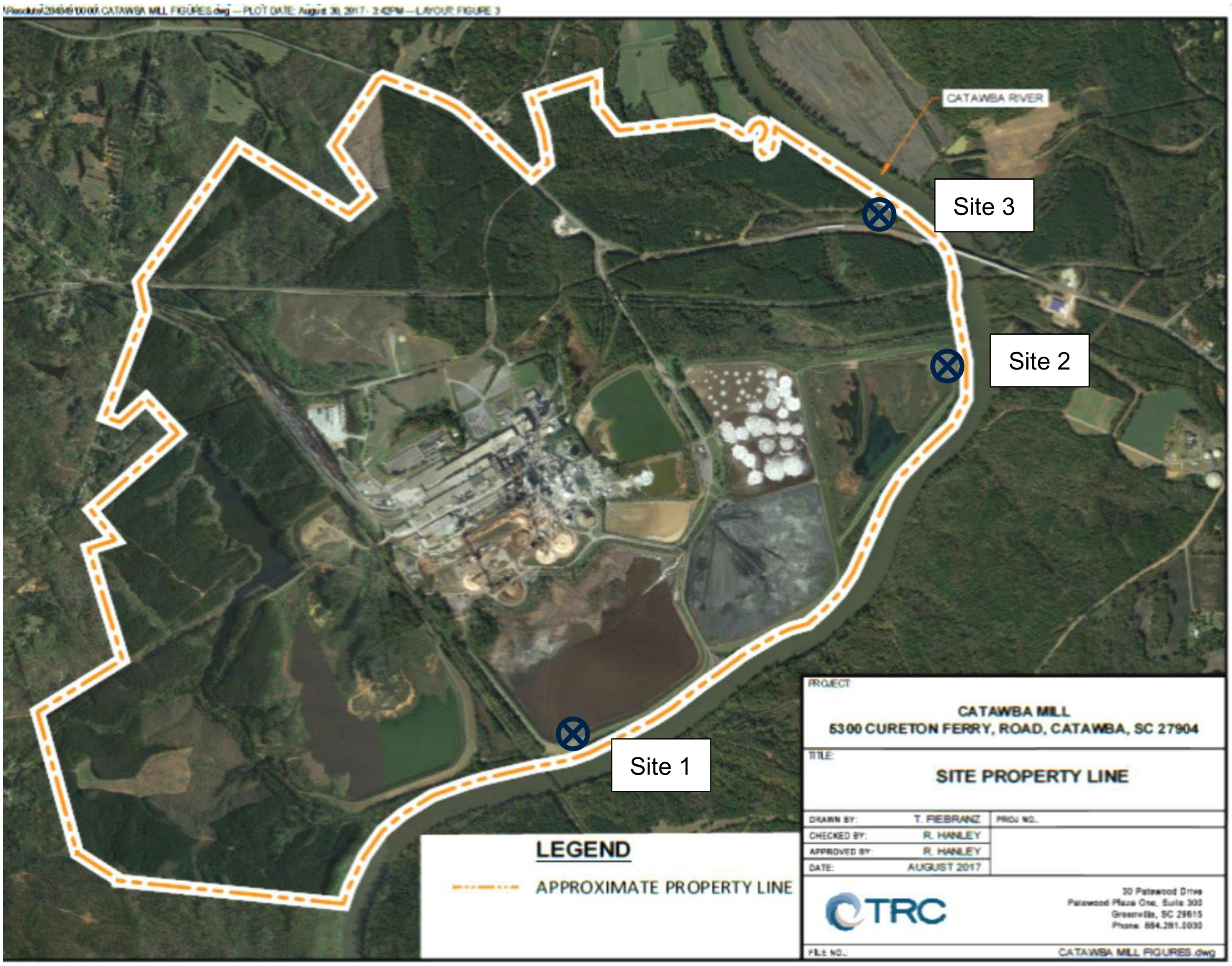

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Figure 2. US EPA Community Monitoring Network

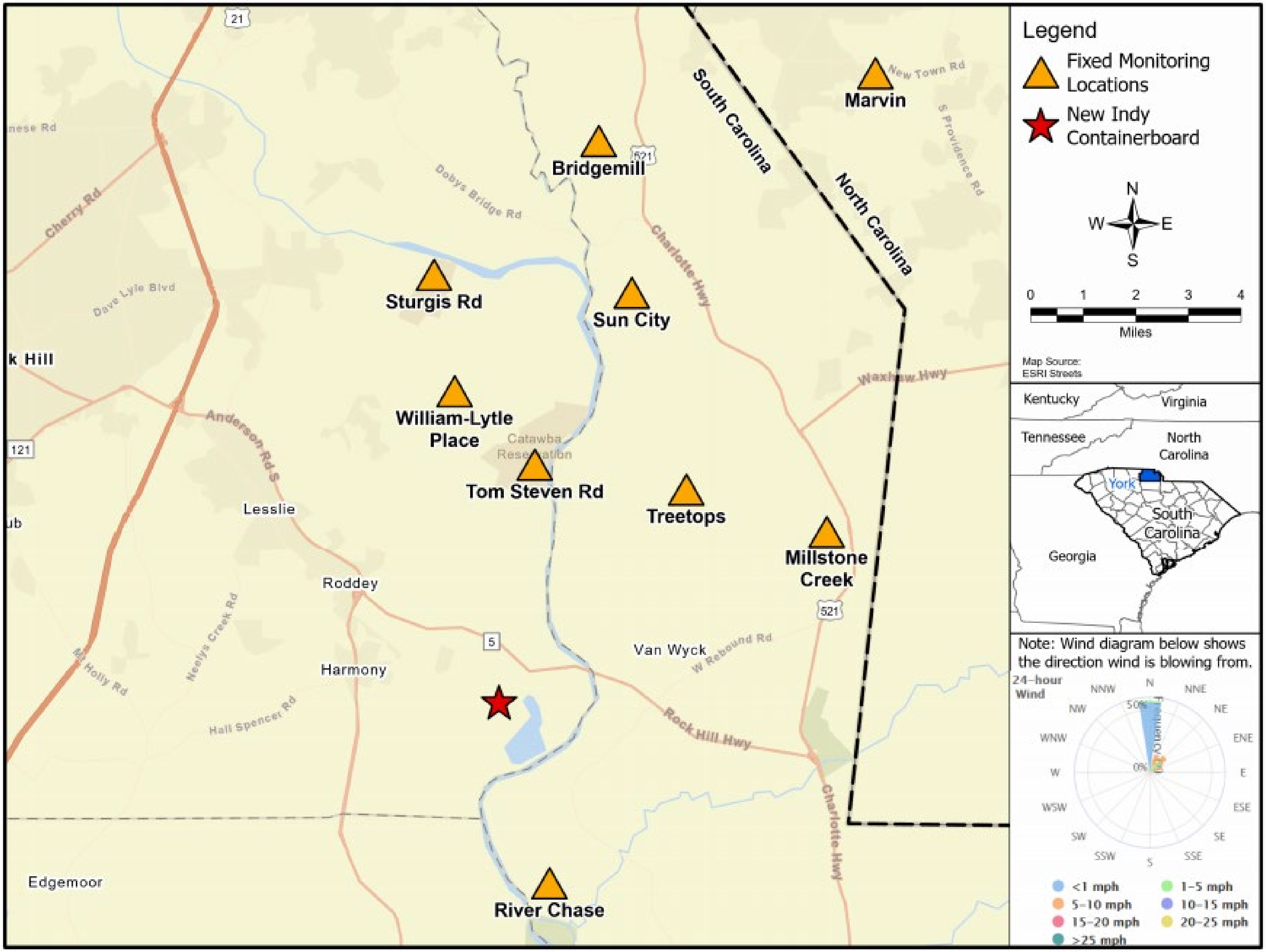
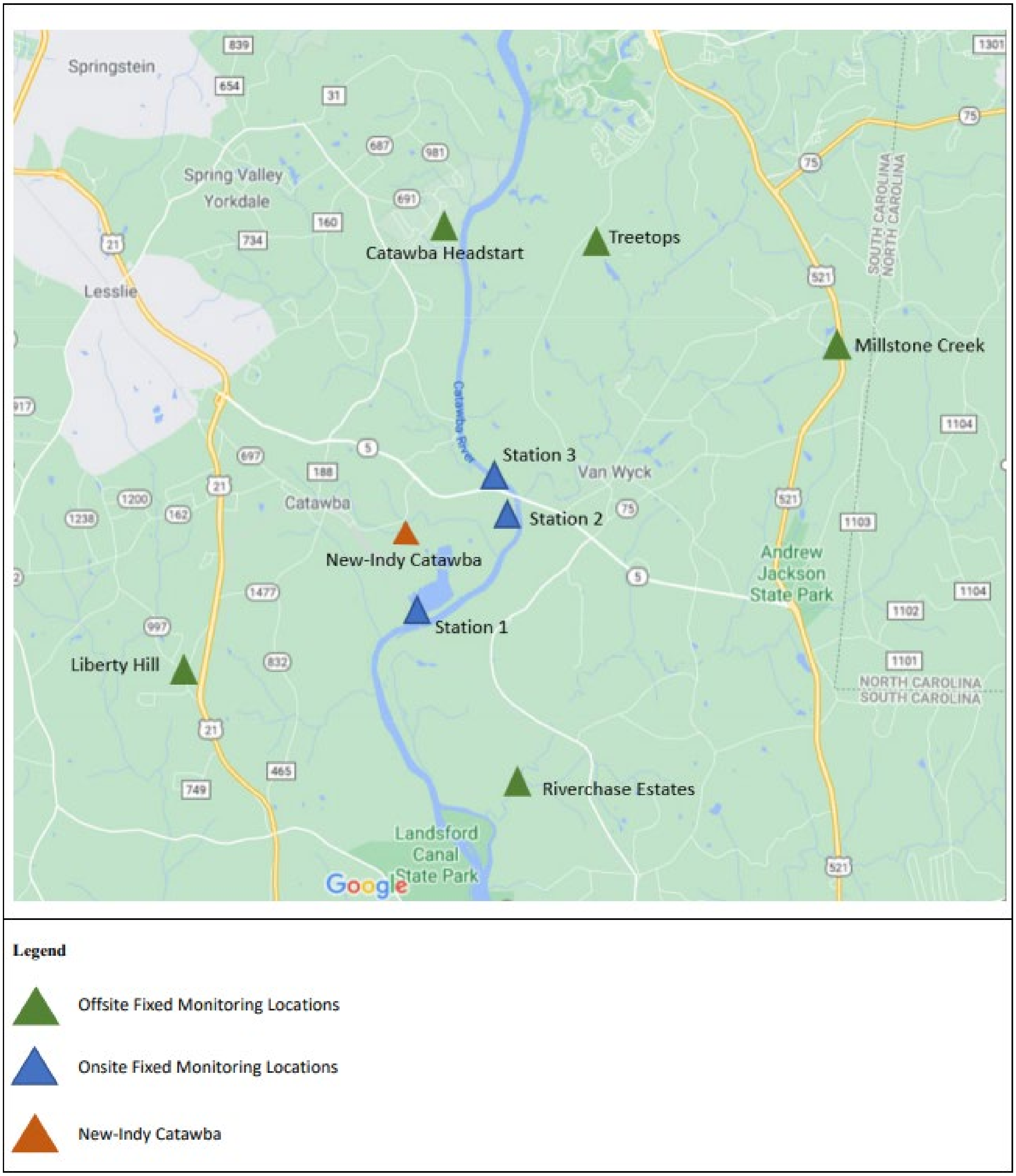


Figure 3. New-Indy Fence Line and Community Monitoring Networks



ERM has not been provided access to critical US EPA siting study documentation, limiting ERM's ability to comprehensively critique the adequacy of the program or effectively interpret it results. Specifically, we are unable to determine whether the community monitoring network advances the program's objectives—or even what the specific objectives of the program are. If the intent of the monitoring effort is to quantify New-Indy's air quality impact, dispersion modeling results would typically play an important role in network design. There is no indication that H_2S or TRS modeling was performed and used to inform the monitoring network design—a necessary prerequisite to effective monitoring network design. This, alone, casts doubt as to whether the community monitoring program's design and implementation can adequately answer the question of what impact New-Indy's emissions are having on the community's air quality.

If the intent of the monitoring program is to characterize sensitive receptors (e.g, schools, day care facilities, assisted living facilities) or the general community's exposures to emissions, then a demographic analysis would be a necessary component of the program's siting study. ERM has not seen such a study.

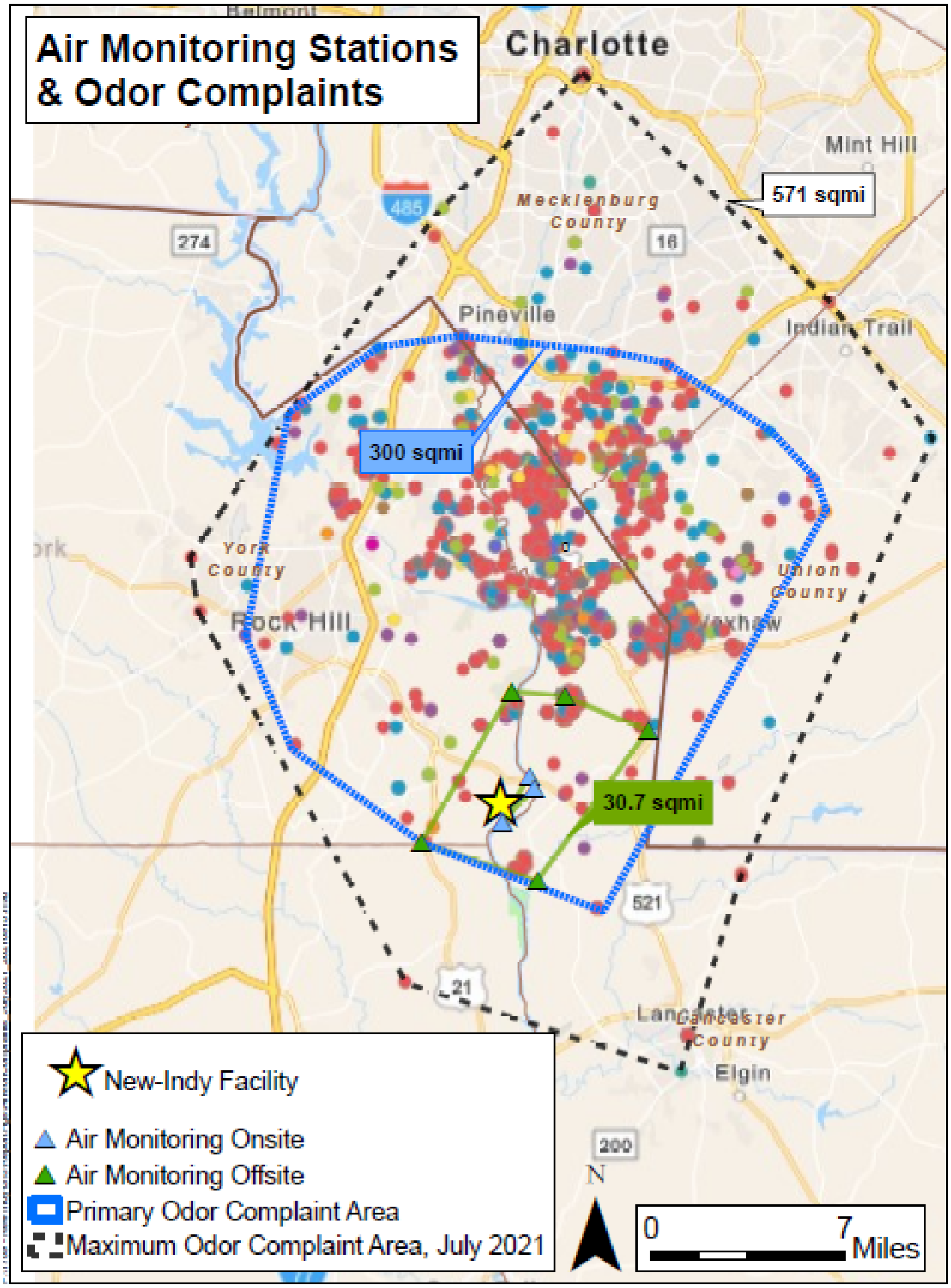
Despite the lack of access to network design supporting information, an examination of the community monitoring networks (SC DHEC program, initial EPA program, as well as the reduced New-Indy network) raises questions about areal coverage. Specifically, there are no sites located due east or due west of the mill. In addition, as shown in Figure 4, the current New-Indy community monitoring network covers an area of only 30.7 square miles while clusters of the hundreds of odor complaints received by SC DHEC in June 2021 alone and posted on SC DHEC's website extend at least 265 square miles and single odor complaints cover an area of 498 square miles.

As with the fence-line monitoring program, exclusively monitoring for H_2S is a significant deficiency. Not only does the New-Indy mill lack any permit limits on H_2S, but the Weston odor survey and July 12, 2021 Corrective Action Plan indicate that H_2S may represent as little as 10 percent of the TRS during high concentration events. Given the relative toxicity of the other TRS components, this deficiency seriously compromises the value of the community monitoring effort which consists solely of H_2S monitoring. Methyl mercaptan's status as a SC DHEC-designated air toxic compound with a property-line limit of 20 ppb compared to the 140 ppb property line limit for H_2S makes the total lack of monitoring for methyl mercaptan and TRS incomprehensible.

Finally, New-Indy's Acrulog instruments appear to be less robust than the US EPA SPM Flex instruments they replaced in the community monitoring program. The SPM Flex analyzers are, in turn, less sophisticated than the T101 analyzers being used in the fence-line program, which are expected to produce somewhat lesser quality data than the Picarro G2204 instrument used in US EPA's pilot study. While each of these instruments may be adequate for their assigned task, ERM is unable to confirm the adequacy of the equipment used for community monitoring because documentation is lacking—notably, the QAPP that directs quality-related aspects of the program.

Even if the equipment is adequate for its intended use, the changes in instrumentation raise the possibility that the resultant data record may be confounded by changes in analyzer sensitivity or selectivity, or both.

Figure 4. Comparison of Monitoring Sites and Community Complaint Locations



Data Sources: South Carolina DHEC. New Indy Odor Investigation, Odor Complaints Map for July, 2021.
https://scdhec.gov/environment/environmental-sites-projects-permits-interest/new-indy-odor-investigation
Accessed September 15, 2021
https://newindycatawba.com/wp-content/uploads/2021/08/NI-Air-Monitoring-Summary-Results-08-07-21.pdf

4. MONITORING RESULTS

While the monitoring program deficiencies described above limit the ability to identify the full frequency and intensity of air quality impacts from the New-Indy mill, recent monitoring events demonstrate that emissions from the mill are continuing to significantly impact ambient air quality in the surrounding communities.

For example, during the late night (11:00 pm, EST) of September 1 through the evening (6:00 p.m, EST) of September 2, 2021, New-Indy's fence-line monitor #1 registered 30-minute average H_2S concentrations of from 335 to 780 parts per billion (ppb). During this time period, the wind direction was primarily from the east-northeast, putting both fence-line monitor #1 and the Riverchase Estates community monitor generally downwind of the mill. Starting at about midnight, the Riverchase Estates monitor H_2S measurements started increasing, reaching a 30-minute maximum of about 30 ppb at 00:30, the morning of 9/2/2021. This lag between the start of high values at the Riverchase Estates and fence-line #1 monitors corresponds closely with the travel time between the two monitoring sites, given the average wind speed of 5 to 8 mph during this time interval. It can be inferred from the wind conditions and lack of significant H_2S emission sources between the monitors that New-Indy was the source of the H_2S impact at the Riverchase Estates monitor.

During this single example, the limited monitoring network demonstrated that New-Indy was responsible for an exceedance of the 600 ppb 30-minute US EPA Acute Exposure Guideline Level (AEGL) for H_2S at the mill's fence-line. Given the sparse fence-line coverage, it is almost certain that the actual maximum fence-line concentration during this period exceeded the 780 ppb 30-minute average registered at fence-line monitor #1.

The maximum H_2S concentration measured at the Riverchase Estates community monitoring site undoubtedly was not the maximum air quality impact from the New-Indy emissions. The sparseness of the monitoring network practically ensures that the maximum impact cannot be recorded or reasonably approximated.

As noted above, H_2S may represent as little as ten percent of the mill's TRS emissions. Therefore, it is likely that the maximum community TRS concentration was much greater than the levels recorded for H_2S and may have been as much as or more than ten times the measured H_2S concentration—possibly 300 ppb or more. Absent an adequate spatial network of TRS monitors, it is not possible to fully evaluate the community impacts, including the non-H_2S TRS components that may be considerably more toxic than H_2S.

5. CONCLUSIONS

Considerable effort has gone into H_2S monitoring in the vicinity of New-Indy's Catawba paper mill. While it appears than some high quality data have been collected, not all necessary parameters have been measured, spatial coverage is lacking, program documentation and high temporal resolution data are currently unavailable, and changes in measurement methods may confound efforts to make sense of the available data.

Of greatest need is to supplement the H_2S monitoring effort with TRS measurements—since TRS is the basis for the mill's permitted emissions. Both the fence-line and community monitoring networks require augmentation to provide adequate monitoring site density. Additionally, the technical siting studies that support the current, seemingly porous, networks should be made available for independent review.

Finally, despite an inadequate monitoring network, recent measurements confirm that substantial impacts to ambient air quality from paper mill emissions are continuing in the communities surrounding New-Indy.

Please let me know if you have any questions or wish to discuss ERM's findings.

Yours sincerely,

Richard H. Osa, QEP
Technical Director

Attachment A

Richard H. Osa, QEP Curriculum Vita

Rick Osa, QEP

Technical Director

Rick has experience in a broad range of air quality management activities, having performed Clean Air Act permitting, legislative and regulatory analyses, as well as compliance planning and implementation. Rick has supported a broad range of industrial operations, with particular concentration in the energy, metals, mining, and food processing sectors. He has performed air permitting in 38 different states, and all EPA regions. These have included PSD and Non-Attainment New Source Review (major) emission sources, in addition to minor and FESOP facilities. Rick leads ERM's ambient air quality monitoring practice, establishing procedures and standards and managing a number of the firm's larger efforts—from the Kenai Peninsula of Alaska to Guyana, South America.

Experience: 40 years' experience in air quality and environmental management

Email: rick.osa@erm.com

LinkedIn: https://www.linkedin.com/in/richard-osa-a21335b

Education

- MS. Engineering Management
  Northwestern University, USA, 1992
- Graduate studies. Environmental Engineering,
  Illinois Institute of Technology, 1976 -1978
- BS. Physics
  Illinois Institute of Technology, 1976

Professional Affiliations, Registrations, Honors

- Qualified Environmental Professional—Institute for Professional Environmental Practice
- Air Quality Fellow, South Korean Embassy, US Department of State
- Air & Waste Management Association

Languages

English, native speaker

Fields of Competence

- Air emission source permitting
- Ambient air quality monitoring
- Fugitive dust quantification, modeling, and control
- Settled dust investigation
- Atmospheric dispersion modeling
- Legislative/regulatory analysis

Key Industry Sectors

- Power
- Oil & Gas Midstream
- Pulp & paper
- Metals

Key Projects

PSD Air Emission Source Construction Permit
Nucor Steel, Blytheville, AR
Managed quick turn-around PSD air permitting effort. Tasks included:

- Definition of permitting strategy;
- Development of project, facility, and near-by emission source inventories;
- Preliminary air quality analysis (dispersion modeling);
- BACT analysis of modified emission units;
- Refined air quality analysis;
- Agency liaison and negotiation.

A Technical Support Document served as the application framework. Total time from project authorization to receipt of the agency's "completeness" notice was less than 12 weeks for this complex facility modification permitting effort.

Air Construction and Operating Permitting
Mondelēz Chicago Bakery, Chicago, IL
Directed multiple facility modification construction permitting projects and related Title V permit revisions for this bakery which is located in a designated "Environmental Justice" community. Several of the permitting actions were processed under Illinois' expedited permit review program, to accommodate the client's schedule.

Air Permit Compliance Assurance
Evonik Goldschmidt Corporation, Mapleton IL
Designed and implemented an emissions and compliance tracking system for a major synthetic organic chemical manufacturing complex. The system imported existing inventory and production data to document and report compliance with complex Title V operating permit requirements.

John Deere Seeding Group
Air Emission Source Construction Permit, Moline, IL
In partnership with client management, developed permitting strategy for new painting line. Project scope necessitated "one source" (i.e., aggregation) and Environmental Justice considerations. Oversaw development air permit application package and its submittal to Illinois EPA.

Air Permit Revision, Clinton Industrial Sand Mine & Processing Plan
Superior Silica Sand, Clinton, WI
Developed an air permitting strategy and application to add drilling and blasting as authorized operations at an existing sand mine, add a new mine, and add a crusher at an existing mine. The permitting authority considered the new processes and operations to serve as a "support facility"—requiring an aggregation approach. To expedite development, a "commence construction waiver" was obtained.

Sulfur Dioxide Attainment Status Monitoring
Multiple Clients, WI, IL, NY
Designed, installed, and operated three independent monitoring networks, conforming to the requirements of the SO_2 "Data Requirements Rule". The projects' objective is to demonstrate the attainment status of their respective areas. Program quality assurance conforms to 40CFR Part 58 Appendix A specifications, in accordance with the DRR. Operation is planned for at least three years in order to assess compliance with the one-hour NAAQS.

Shipborne Air Monitoring Survey
Confidential Client, Guyana, South America
To document pre-exploration, background air quality, instrumented a research vessel to continuously monitor SO_2, NO_2, H_2S, PM_{10}, VOC, wind speed and direction, temperature, relative humidity, and geographical location. Redundant instruments ensured high data recovery over the survey's six weeks, despite unattended operation. Data were screened to filter out measurements biased by the influence of the ship's engines.

Compressor Station Air Monitoring for Impact Assessment
Williams Cos., Multiple Locations
Recent changes to FERC guidance on preparation of environmental impact assessments (RR9) permits the use of local ambient air quality monitoring data to characterize the impact of existing equipment when performing a cumulative impact analysis. Ambient air monitoring tends to be considerably less conservative than the traditional approach—dispersion modeling. This approach can lead to project approvals with fewer restrictions or, in some instance, demonstrate that an otherwise un-licensable facility upgrade can, indeed, be

authorized. These multi-year ambient air monitoring projects formed both the basis for FERC's revised RR9 guidance, but also its implementation to several large-scale gas pipeline development projects. Twelve (12) monitoring sites were established and operated, continuously monitoring $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, wind speed, wind direction, sigma theta, differential temperature, and solar radiation. The data were telemetered to ERM's database server and posted to a secure web site—accessible to the client.

PSD Pre-Construction Air Quality Monitoring
Nucor Steel, Convent, LA
Designed, installed, and managed data collection at this multi-year, three-site PSD pre-construction monitoring network. Continuously measured parameters consisted of $PM_{2.5}$, SO_2, NO_2, CO, wind speed, wind direction, sigma theta, and ambient temperature. Data were digitally recorded onsite and telemetered to ERM office via cellular modem.

Fenceline Air Quality, Meteorological Monitoring
Zeeland Farm Services, Zeeland, MI
Initial contract consisted of designing a two site (upwind-downwind configuration) $PM_{2.5}$ and PM_{10} monitoring program that met the requirements of a consent agreement. ERM then developed a Quality Assurance Project Plan (QAPP) for the program and obtained regulatory agency approval. The last task of the initial contract was to develop a budget-level cost estimate for the program's implementation. ERM was awarded a second contract—to procure monitoring equipment, install it, and operate the program for two years. This included developing and maintaining a secure web site for real-time data access.

Ambient Particulate, Manganese, Mercury, and Meteorological Monitoring
Nucor Steel, Marion, OH
Designed, installed, commissioned, and managing data collection at this multi-year, two site monitoring network. Manual (filter-based) and continuous automated particulate matter samplers are employed to document ambient air concentrations. Filter samples are analyzed to quantify particulate mercury and manganese concentrations. Wind speed and direction are used to identify culpable source(s) in the event of high concentrations.

Refinery Fenceline Monitoring Support
Delek, Krotz Springs, LA
Managed assessment and upgrade of on-site meteorological monitoring system, to conform to requirements of petroleum refinery fenceline monitoring regulations. Monitoring system was enhanced to provide real-time data for operational use. Parameters consisted of wind speed, wind direction, barometric pressure, ambient temperature, relative humidity, and precipitation. Data are fed into refinery's DCS via fiber optic.

Contaminated Soil Remediation Site Dust Monitoring
Proctor & Gamble, Inwood, WV
Network of continuous dust monitors was established and operated to provide real-time operational data to contractors carrying out contaminated soil remediation plan. Measured particulate matter levels and current meteorological conditions were telemetered to ERM and posted to a secure web site. Remediation contractors relied on the monitoring data to plan the day's operations and deploy appropriate dust control measures.

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Attachment B

Index of Information Source Material

1. Marta Fuoco, US EPA, Air Monitoring and Analysis Section, Geospatial Monitoring of Air Pollution Report For New Indy Containerboard—Catawba, SC, May 5, 2021.

2. Weston Solutions, New-Indy Catawba Mill Odor Testing (letter report), April 13, 2021.

3. New-Indy Title V Operating Permit, #TV-2440-0005, issued May 7, 2021 by 4. South Carolina Department of Health and Environmental Control, effective July 1, 2019.

4. New-Indy Catawba Mill, Corrective Action Plan, Revision 2, July 12, 2021.

5. US EPA, Region 4, Clean Air Act Emergency Order, May 13, 2021.

6. New-Indy Catawba Mill, Initial Performance Test Report, Condensate Collection and Treatment, August 2021.

7. New-Indy Catawba Mill, DHEC Order Weekly Status Update Reports, May 14 through September 17, 2021, https://scdhec.gov/environment/environmental-sites-projects-permits-interest/new-indy-odor-investigation/new-indy-weekly-update-reports.

8. New-Indy Catawba Mill, Air Dispersion Modeling Analysis, August 2021.

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10. New-Indy Catawba Mill, Construction Permit Application, Updated July 2O, 2021.

11. State of South Carolina Administrative Code, Chapter 61-62.5, Standard No. 8, Toxic Air Pollutants

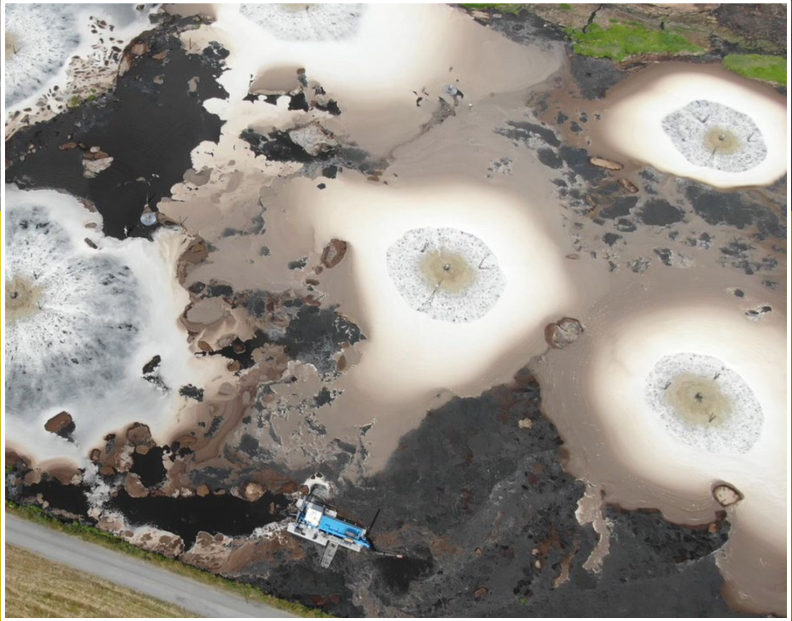
12. New-Indy Catawba, QAPP Plan Summary, (undated).

Attachment C

Presentation Given to EPA on December 16, 2021

New-Indy Containerboard

- Air Pollution
- Wastewater Contamination
- Corrective Action/Remediation



Introductions

David Hoyle

Residents' Co-Lead Counsel, Motley Rice

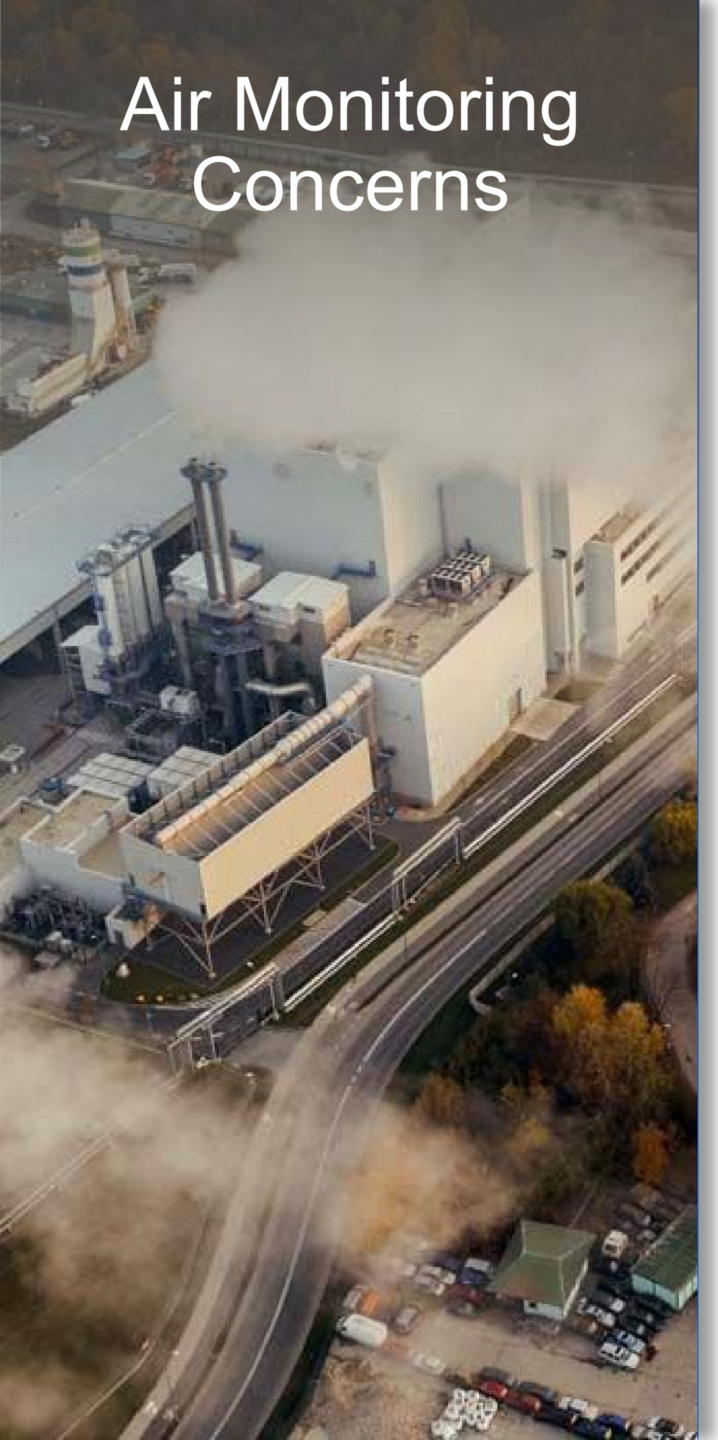
Purpose of Meeting

- To create a collaborative relationship with EPA similar to our relationship to DHEC to help solve New-Indy's environmental problems.
- To share with EPA results of our 8-month investigation and the opinions of our nationally recognized air and wastewater experts.
- To correct misconceptions created by New-Indy regarding monitoring, modeling and reporting.
- To offer effective solutions, both immediate and longer term, to rectify the ongoing air, odor, wastewater, and health issues attributable to the New-Indy mill.

Fixing New-Indy's Problems

Meeting Agenda

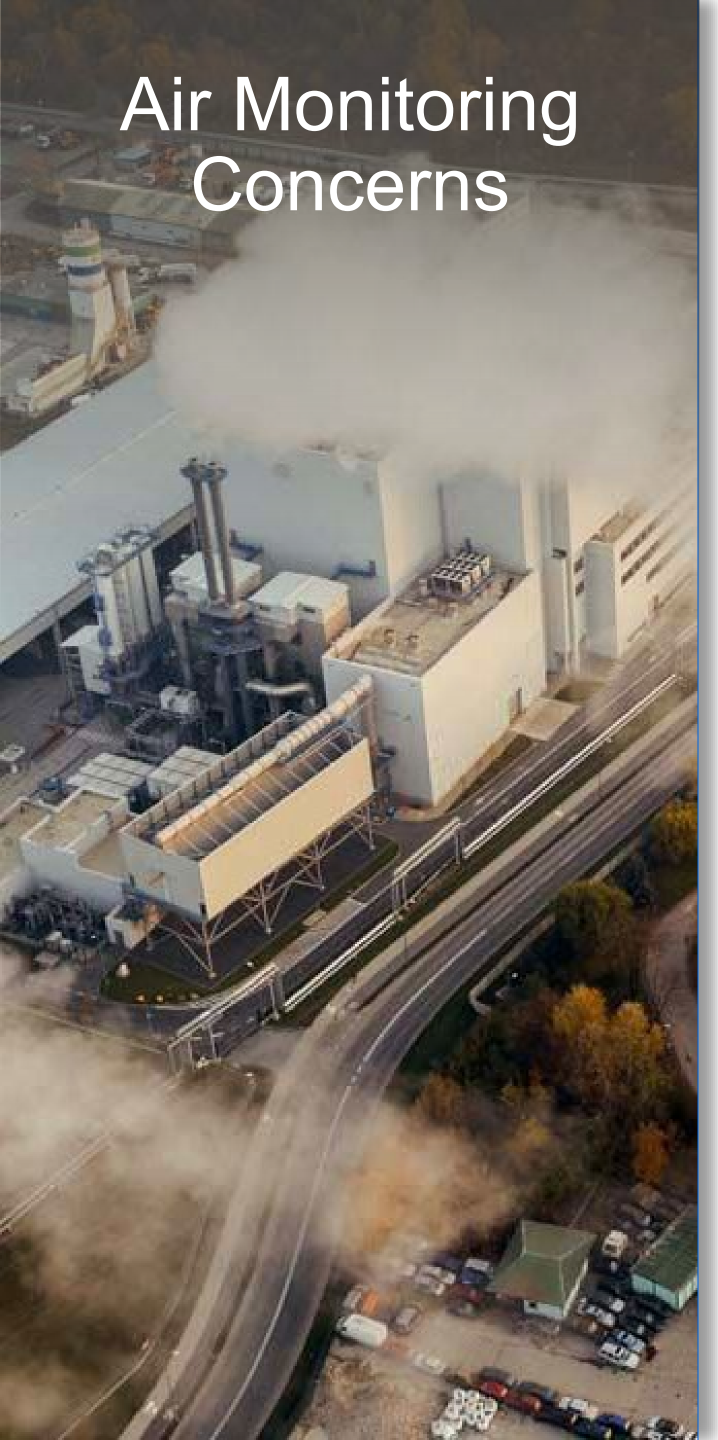
- Inadequate and Insufficient Air Monitoring.
  - Rick Osa, QEP
- Actual April 2021 Emissions Orders of Magnitude Higher than New-Indy Predicted.
  - Steven Hanna, Ph.D
- Critical WWTP Emission Estimates Used by New-Indy in Its October 2021 Modeling Are Wrong.
  - Ken Norcross
- Corrective Action/Remediation
  - Roger Truitt
- Next Steps



Rick Osa QEP

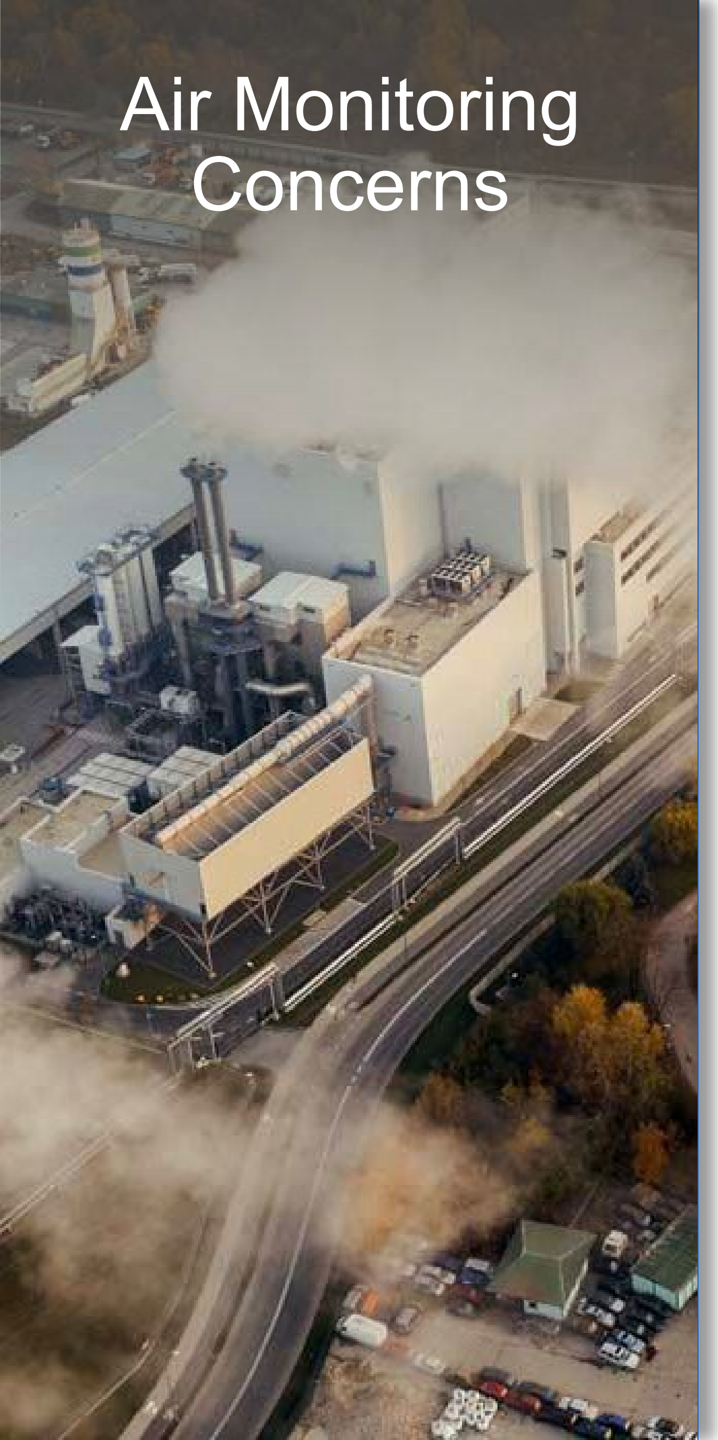
- Ambient Air Quality Expert

- Leads ERM’s ambient air quality monitoring practice, with competence in air emission source permitting and atmospheric dispersion modeling.
- 40 years of experience in air quality issues, including pulp and paper industry consulting.
- MS, Engineering Management from Northwestern University; Graduate studies, Environmental Engineering, and BS, Physics from Illinois Institute of Technology.



Inadequate Air Monitoring

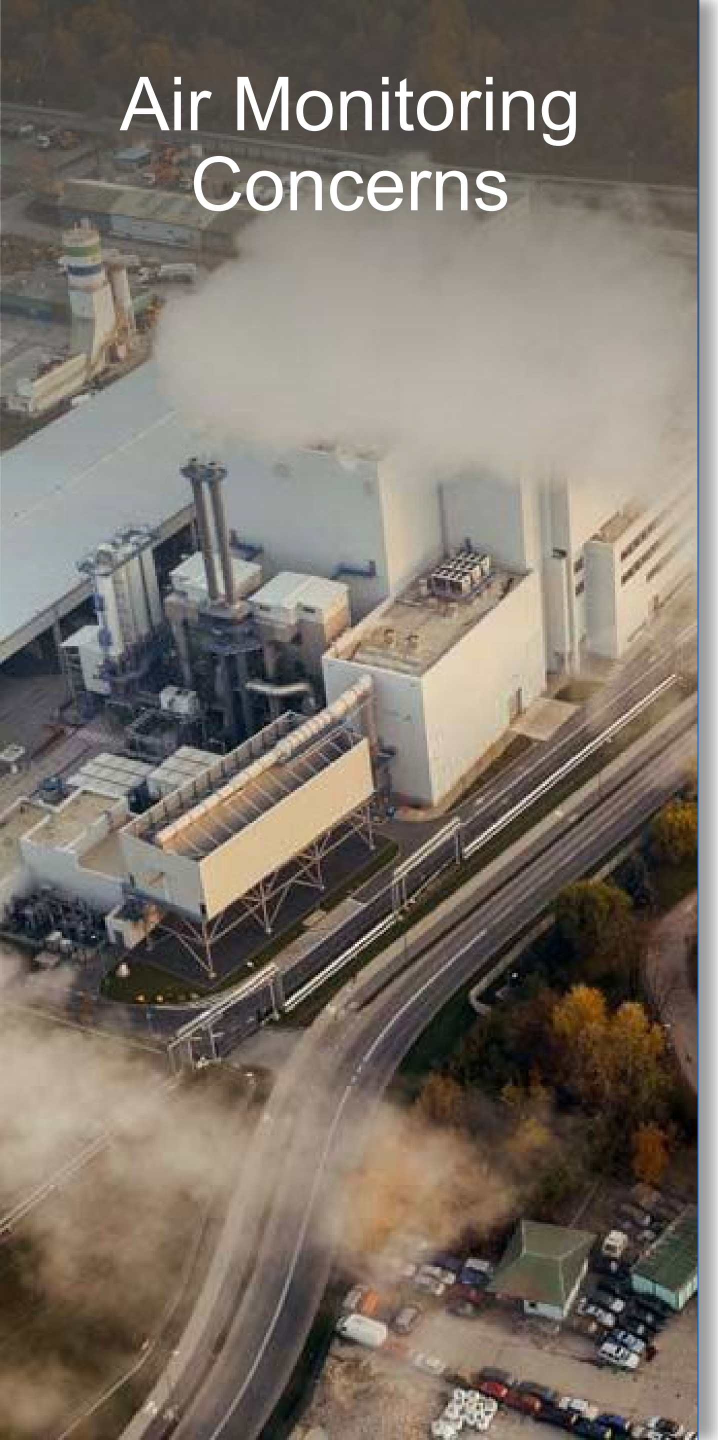
- New-Indy is monitoring only for hydrogen sulfide.
- New-Indy's fence-line monitoring leaves big gaps.
- New-Indy's community monitoring stations do not cover large areas of citizen complaints.
- As a consequence, unaccounted emissions are causing odors and health effects to continue unabated.

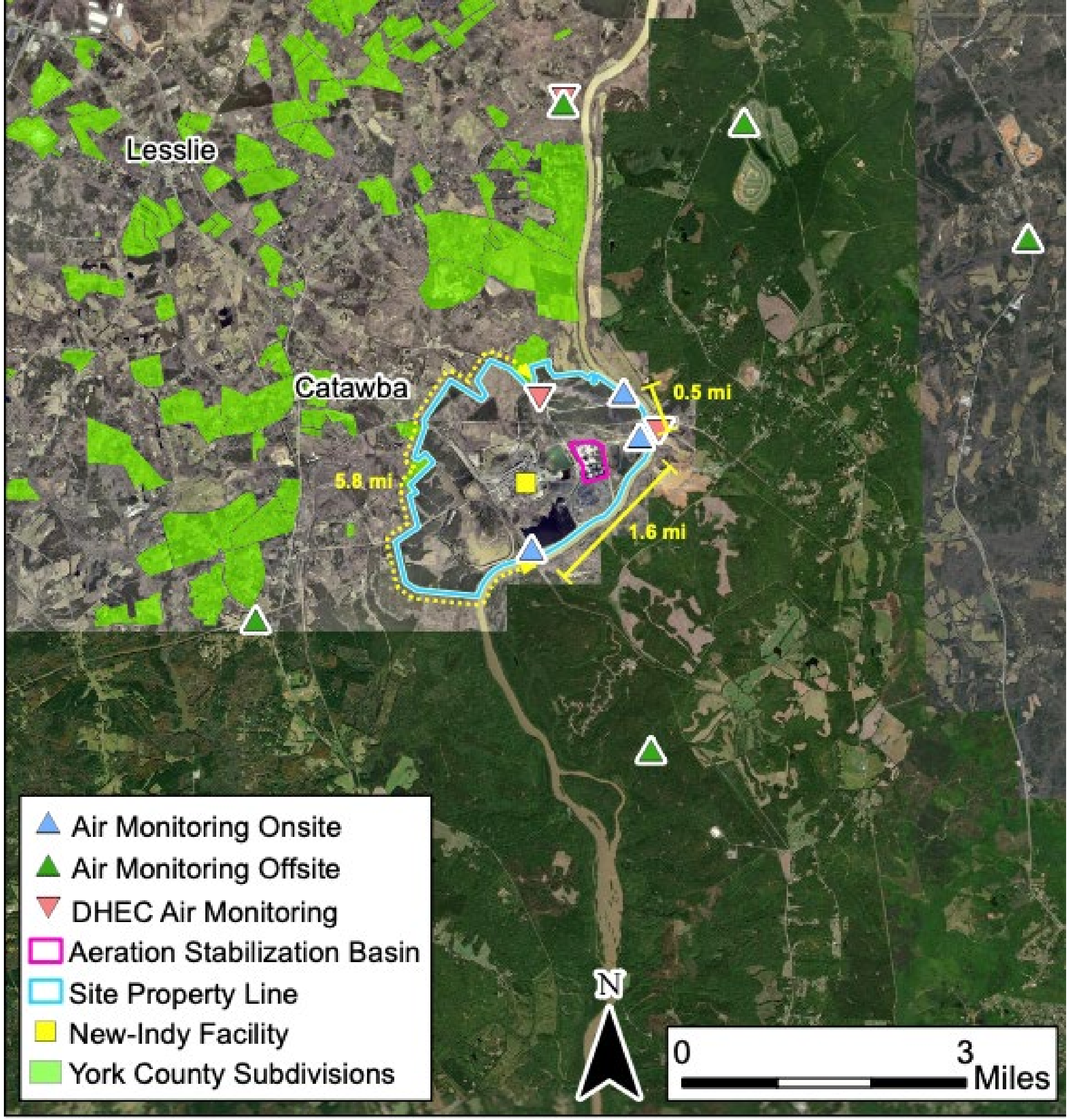


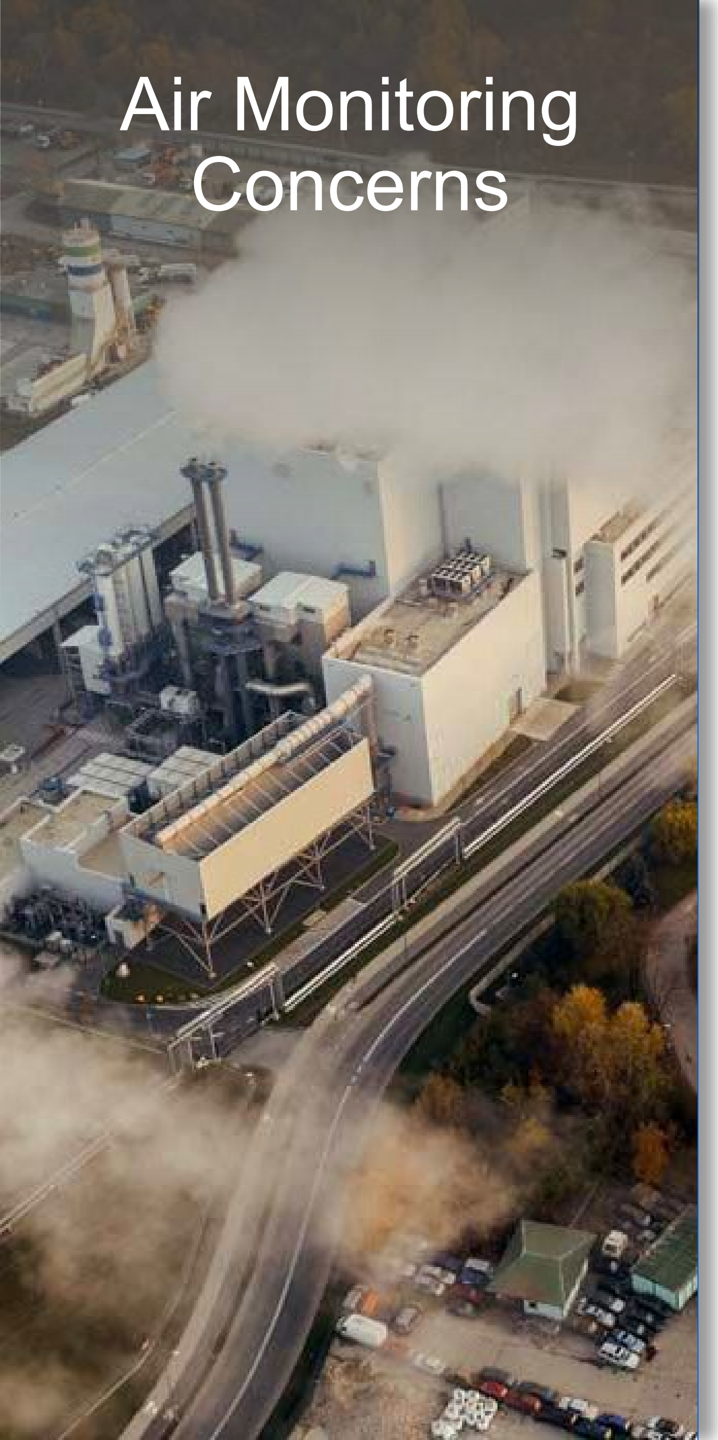
New-Indy Is Monitoring Only for H_2S

- In addition to H_2S, New Indy's foul condensate and other sources of air emissions include other malodorous and potentially toxic TRS compounds including **methyl mercaptan, dimethyl sulfide, and dimethyl disulfide**.
- Methyl mercaptan has been designated as a toxic air pollutant by DHEC, with much more stringent property line limits (10 ug/m3) than H_2S (140 ug/m3).
- New-Indy's Corrective Action Plan estimates that up to 90% of the TRS emitted from WWTP components is non-H_2S constituents.
- **Therefore, New-Indy is not monitoring for 90% of its TRS emissions.**

Air Monitoring Concerns

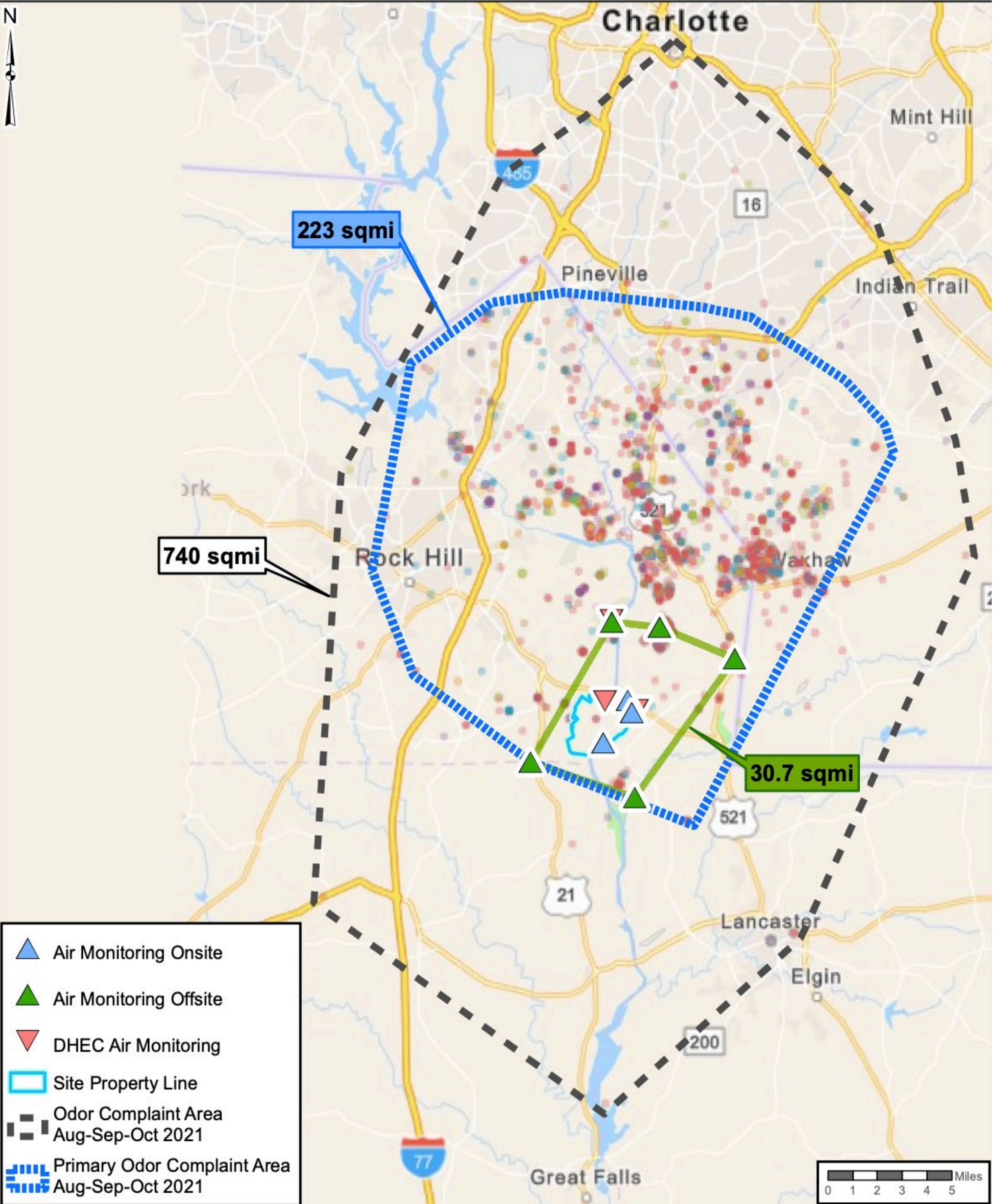






New-Indy's Fence-Line Monitoring Leaves Big Gaps

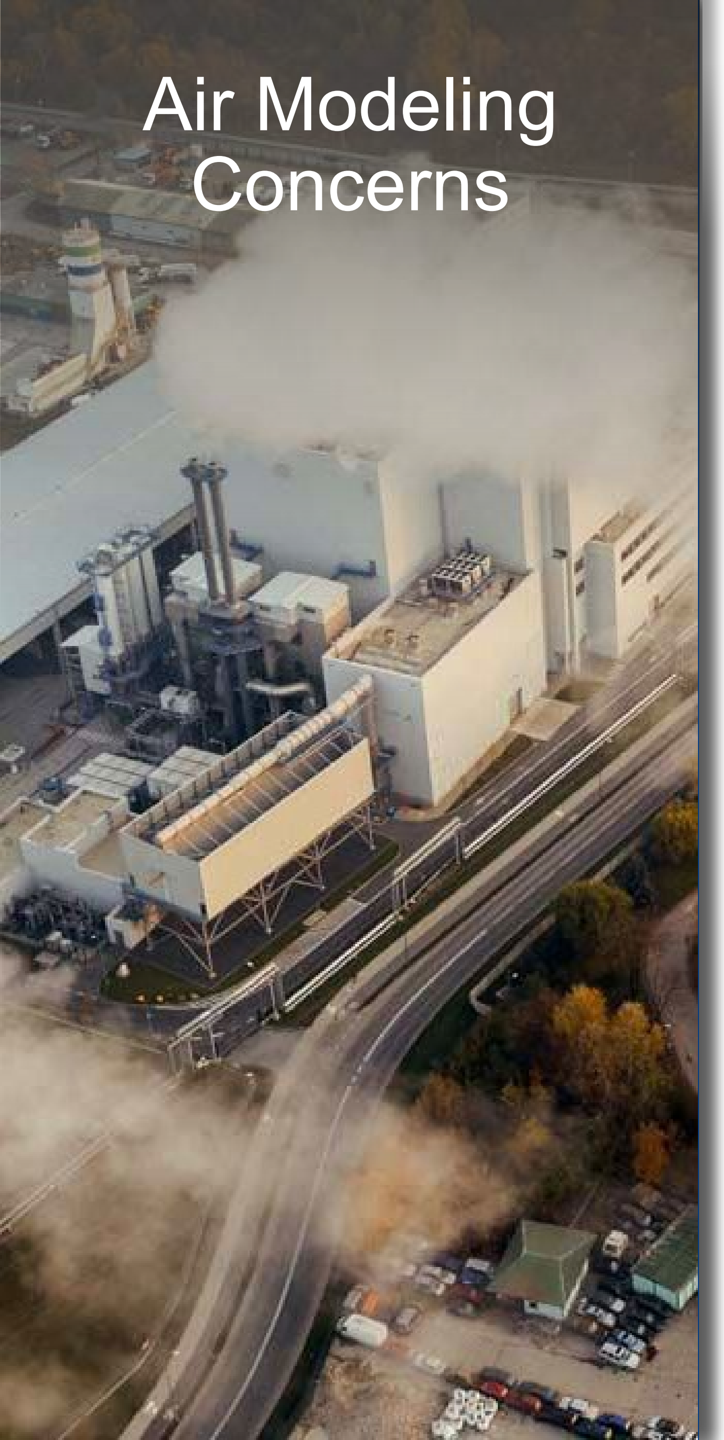
- New-Indy's fence-line around the approximate 1,100-acre mill site is six miles long.
- New-Indy has installed only three monitors to cover six miles of fence-line (see Figure).
- There are no fence-line monitors to measure H_2S levels released to residential areas W, NW, and SW of New-Indy's mill (see Figure).
- There are huge gaps of up to 5.8 miles between some of the existing three H_2S monitors required under EPA's Order.
- EPA's regulations of petroleum refinery fence-line monitoring would require at least 18 monitoring locations for a facility this large.



New-Indy's community monitoring stations do not cover large areas of citizen complaints.

- New-Indy and DHEC is monitoring H_2S at only 8 off-site locations covering approximately 30 square miles extending only 5.8 miles from the mill.
- Thousands of citizen odor complaints have consistently been lodged with DHEC from between 6-10 miles distant from the NI mill with some as far away as 25 miles covering approximately 300 square miles (10 times the area being monitored).
- *This problem is ongoing*. By way of example, the figure on the left shows complaints lodged from August-October 2021.
- NI should install, calibrate, and operate continuous real-time H_2S and TRS monitors and report daily readings on 15 minute intervals for at least 25 locations in the broader community.

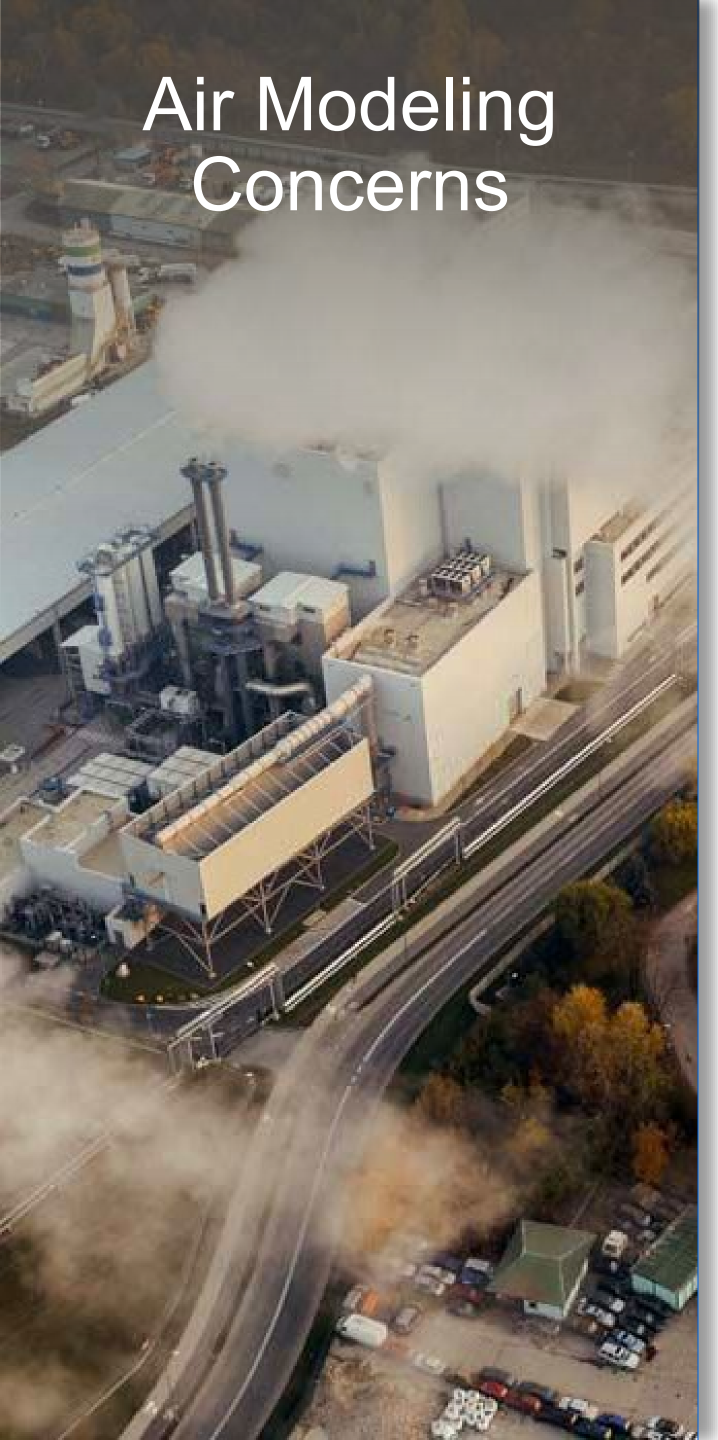
Air Modeling Concerns

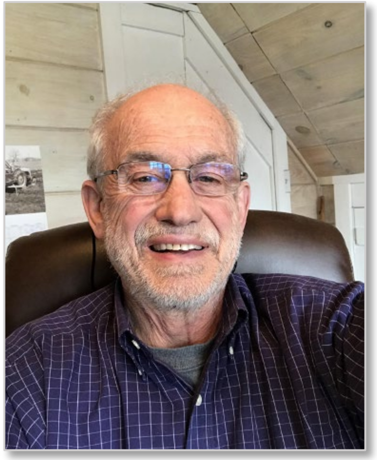


Catastrophic Failure and Implications

- New-Indy (NI) sought and obtained permission to disconnect stripper and change process
  - New-Indy represented that no PSD was required because H2S was projected to increase from 9.7 to 11.9 tpy, with a net increase being 2.2 tpy compared to significant increase threshold of 10 tpy.
  - New-Indy estimated TRS emissions would increase 6.9 tpy compared to significant increase threshold of 10 tpy.
  - Prediction was based on NCASI Model for WWTP emissions.
  - New-Indy's WWTP operating conditions failed to meet the requirements of the NCASI Model, and thus gave inaccurate emissions estimates.
  - Community blanketed with emissions
  - Back-calculation and reverse modeling to show actual emissions.

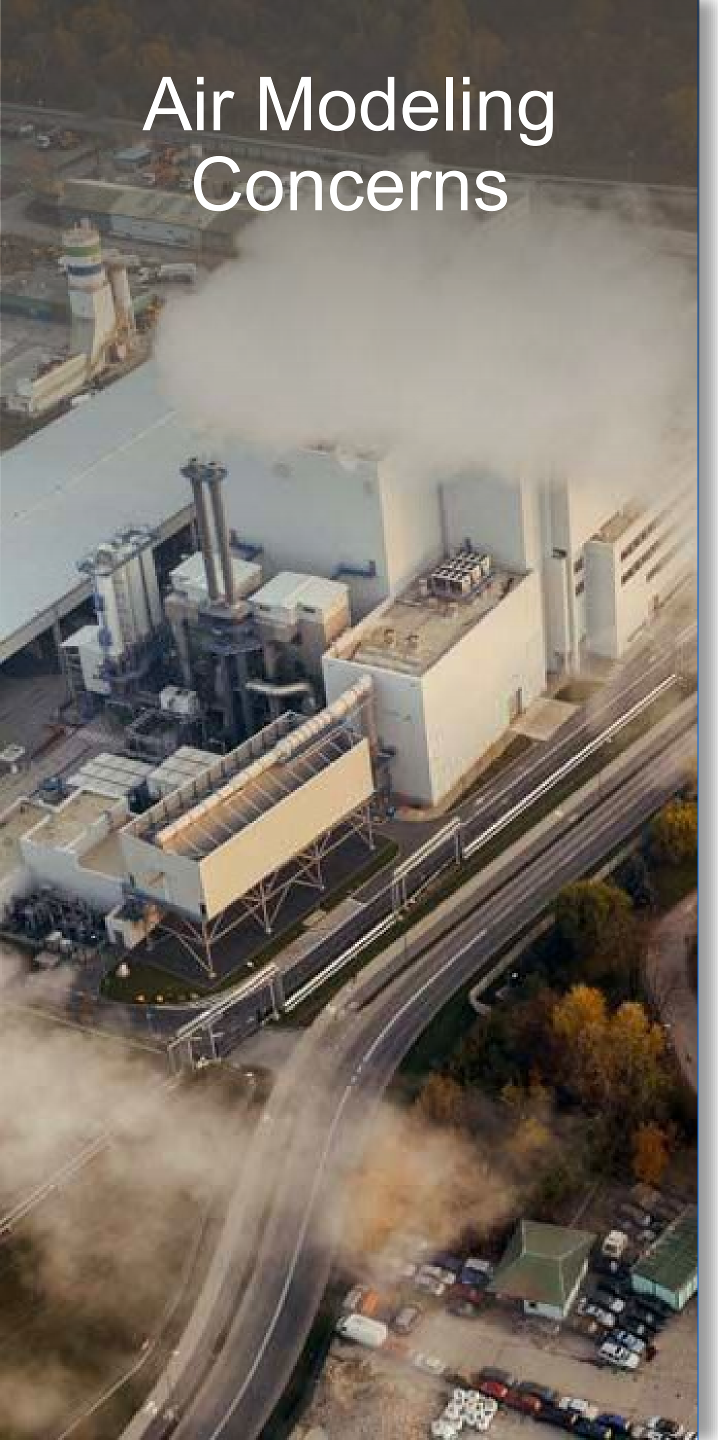
Air Modeling Concerns



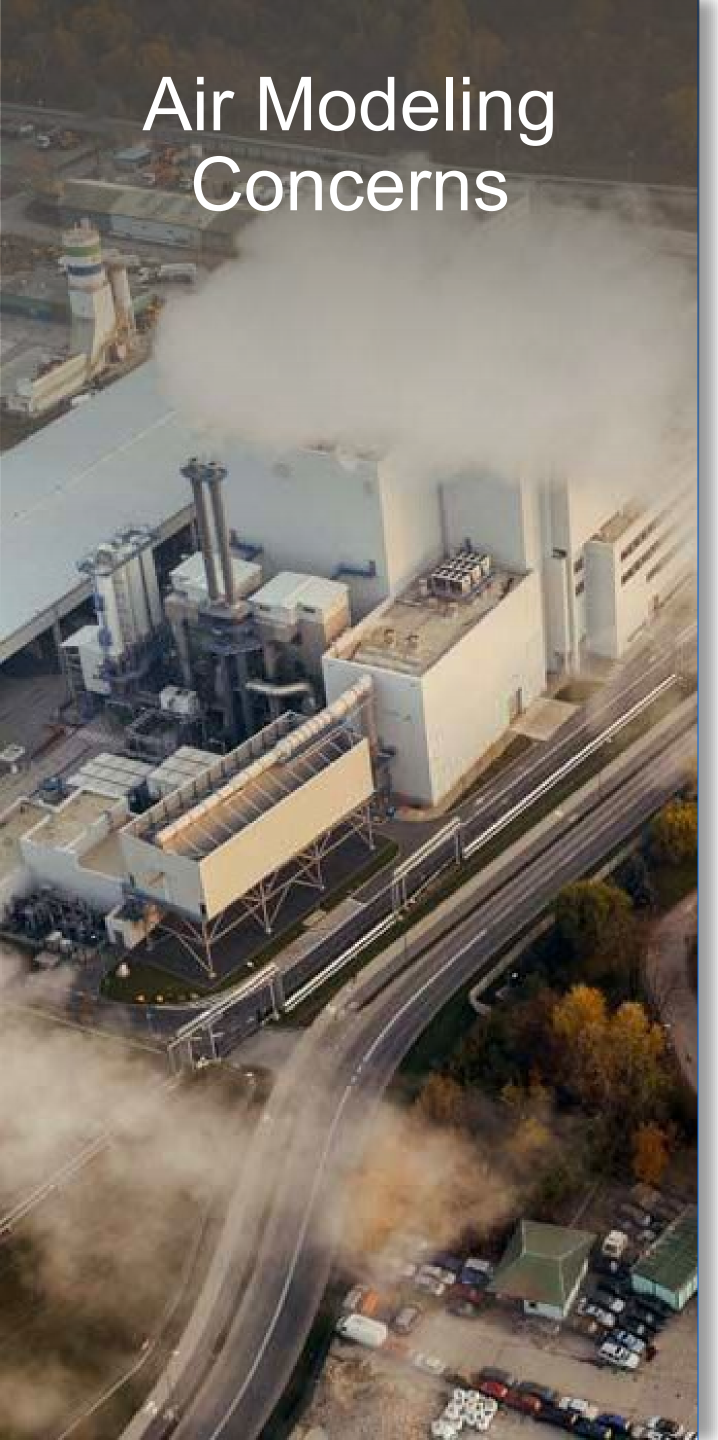


Steven R. Hanna, Ph.D.

- Adjunct Associate Professor; Exposure Epidemiology, and Risk Program; Harvard University, School of Public Health
- Specialist in atmospheric turbulence and dispersion, and in the development, evaluation, and application of air quality models.
- Fellow of the American Meteorological Society.
- Currently chief scientist of a DOD and DHS research study, regarding emissions estimates and downwind effects of toxic industrial chemical releases.
- He published a review of source term estimation (STE) models and evaluated the performance of several operational STE models using observations from field experiments.



EPA GMAP van H2S concentration observations on 4/27/21 while driving on road about 500 to 1000 m N of edge of pond. Begins at 0530 EDT, Max C of 408 ppb.



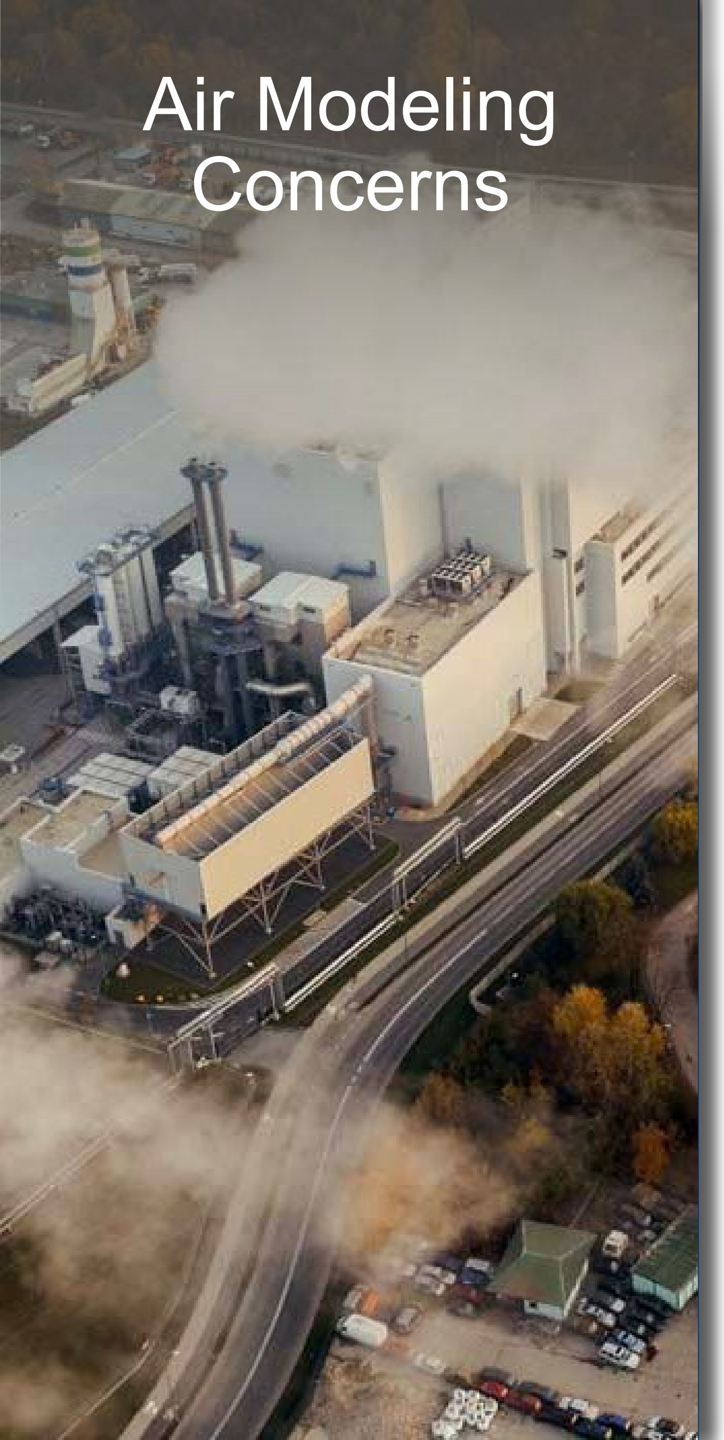
Methodology and Conclusions

- Using observations of concentrations from EPA's GMAP van sampling system on 4/27 (winds moderate out of SSW), and wind observations from Rock Hill weather station, a basic science integral dispersion model was used to back calculate the emissions rate that would produce the observations.

- The results were checked using concentration observations at 1, 6, and 9 km.

- Observations were compared for the four days of field testing to see if there are major differences.

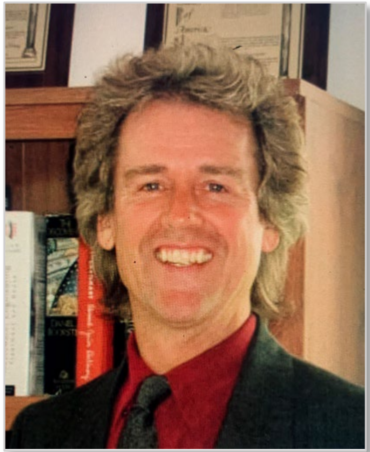
- This resulted in a total emission rate over the aeration pond (of dimension 430 x 630 m) of 106 g/s, equivalent to 3650 tons per year.



Comparison of Actual Emission Rate to New-Indy Representations

- Recall New-Indy predicted a TRS increase of 2.2 tons per year as compared to the 10 tpy significance threshold.
- Actual emission rate closer to 3650 tons per year.
- Demonstrates that NI misrepresented on the front end.
- Demonstrates that PSD requirements were violated.
- With the help of AERMOD, will demonstrate the magnitude of community exposure.

Air Modeling – Current Emissions

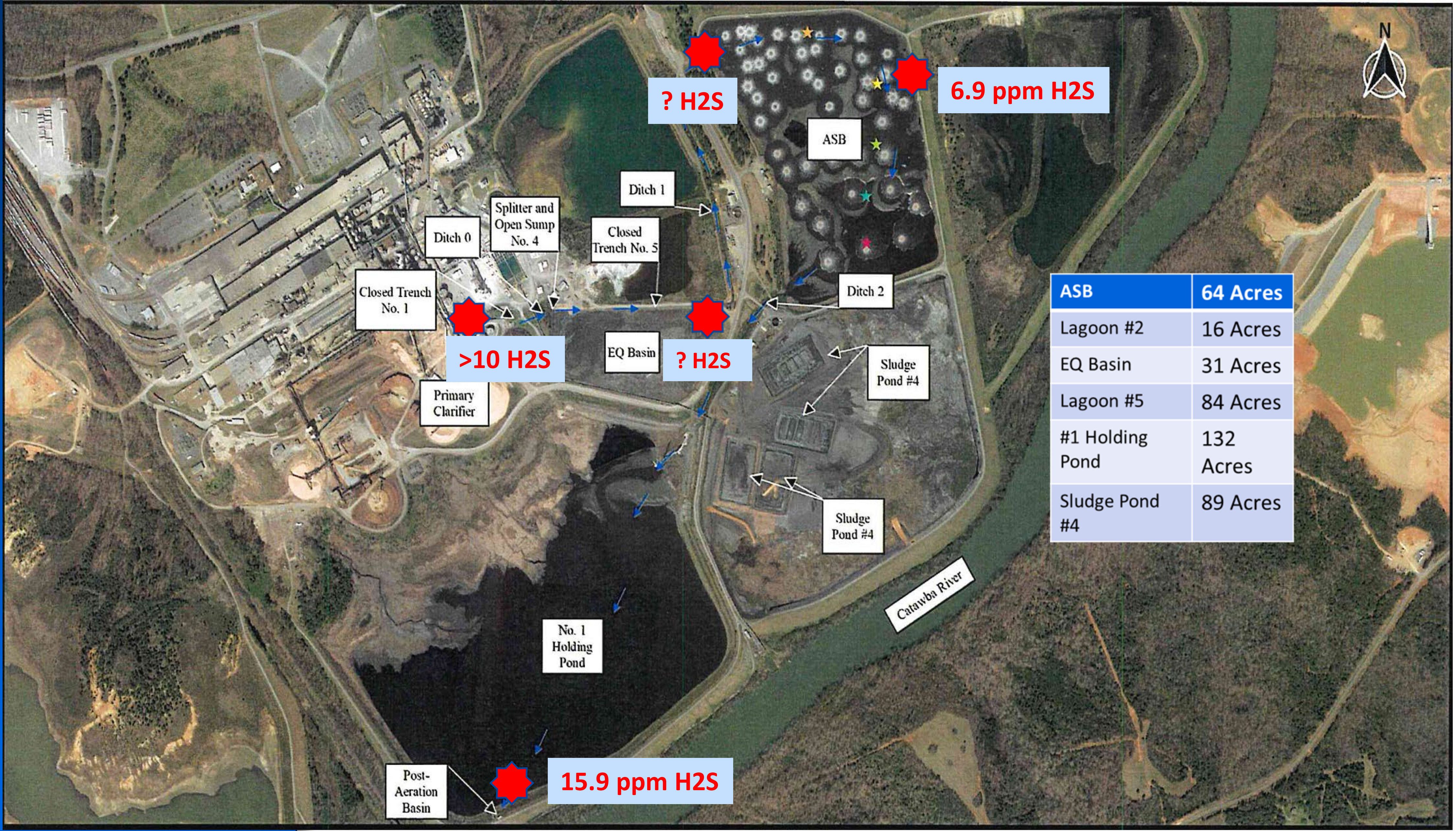


Ken Norcross

- Wastewater Engineer

- Wastewater Engineering Consultant/Expert.
- 42 years of experience designing and troubleshooting industrial wastewater plants.
- Consulted on nine (9) pulp and paper wastewater plants.
- 19 patents in wastewater and water treatment.
- Bachelor of Environmental and Water Resources Engineering and Masters of Science in Water Quality Engineering from Vanderbilt University.

Locations of H_2S Detected by EPA – 4-15-2021



ASB	64 Acres
Lagoon #2	16 Acres
EQ Basin	31 Acres
Lagoon #5	84 Acres
#1 Holding Pond	132 Acres
Sludge Pond #4	89 Acres

NCASI Modeling of Wastewater is Not a Substitute for Measuring Air Emissions from Kraft Mill WWTPs

NCASI Tech Bulletin 956 describes the methods for measuring emissions from Kraft Mill WWTPs:

- NCASI model is based on actually measured emissions from well-aerated basins operated using state of the art management.
- “Aerated stabilization basins where foul condensates were directly introduced via a submerged enclosed pipe were found to be the most significant source of emissions of the three organic reduced sulfur compounds. Emission rates for the same unit often varied considerably over time, and similar units at different plants generally did not have equivalent emission rates.”

New-Indy's Oct. 2021 Air Dispersion Modeling Analysis is Misleading based on Incorrect Emissions Estimates

Model Parameter	Value Applied	Actual Value	Comment
Influent Sulfide	0.02 mg/l	0.07 - >22 mg/l	Sulfide formation ignored; Underestimate emissions
Dissolved Oxygen	0.3 – 2.0	Zero in the 20-Acre Sludge zone	Sludge-filled Lagoon ignored; Underestimate emissions
Active Biomass	300 mg/l	150 mg/l	Underestimate Emissions

TRS Emissions Should be Measured Not Modeled

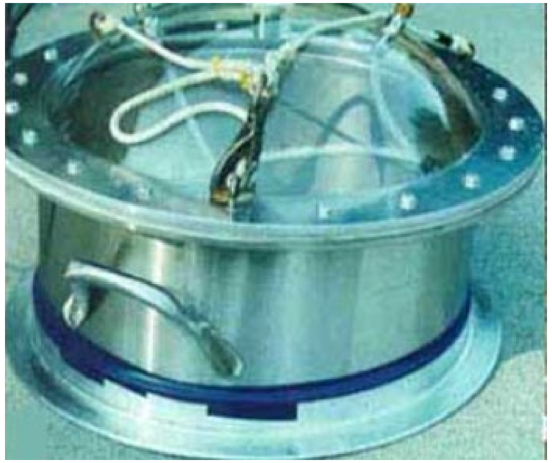
- There are three methods for quantifying fugitive emissions from New Indy's WWTP:

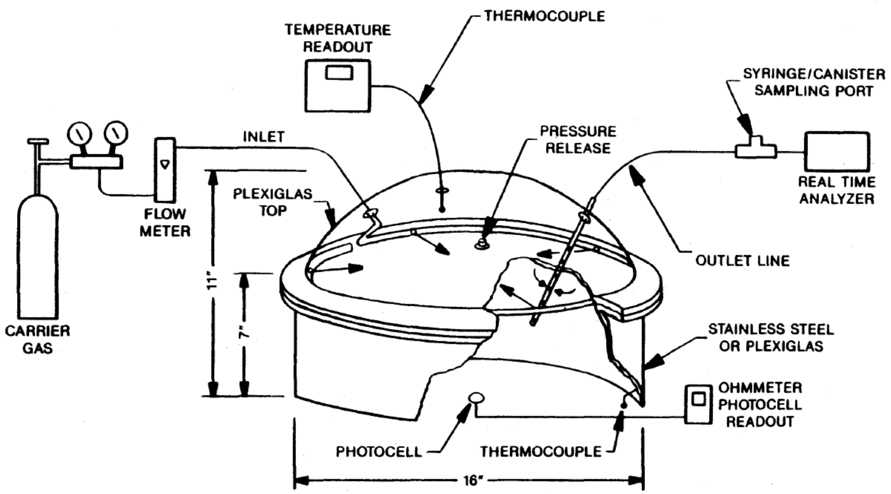
  1. Install temporary total enclosure and use traditional source testing methods - As was done for the Post Aeration Basin.
  2. Measure emissions using flux chamber or boundary layer methods.
  3. Use a suitable emissions model; requires ***all*** the following:
     - Accurate input data
     - Validation for the type and size of emission source
     - Must be used within the parameter limits of the validation demonstration
     - New-Indy's application of H2SSIM is deficient on all three of the above requirements

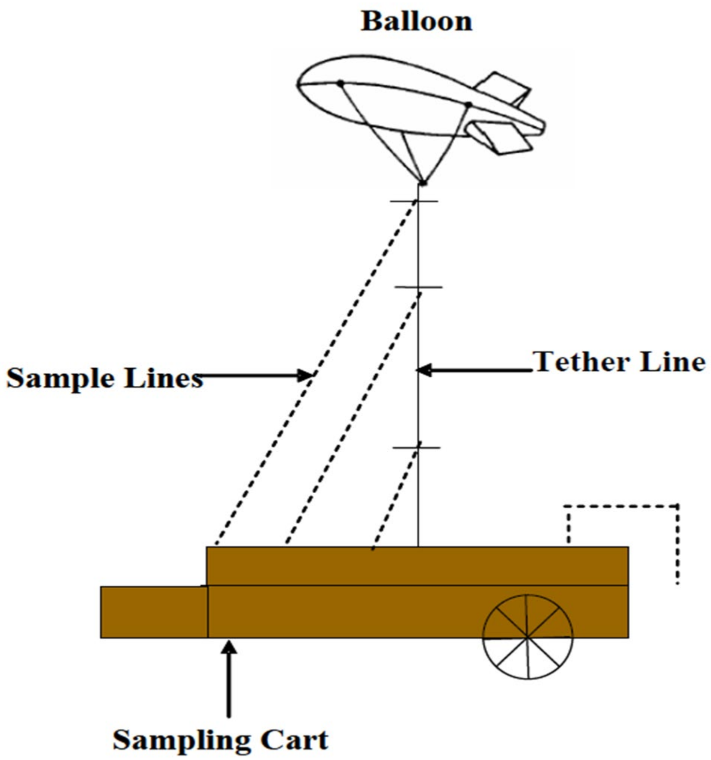
- New-Indy should be required to use Methods 1 or 2 above to measure actual emissions from the WWTP.

Flux Chamber

- Best for well-mixed, open surface impoundments
- NCASI validation







Boundary Layer Emission Monitoring

- Not constrained by degree of mixing or surface obstructions
- NCASI validation
- Can provide ***speciated*** TRS emission rates (i.e. H_2S, methyl mercaptan, etc.).

Remediation Plan

Immediate Action Items (within 30-60 days)

- Reduce generation of foul condensate to a flowrate and loading that can be fully processed by the existing steam stripper (approx. 500k to 700k gpd).
- Install, calibrate, and operate continuous real-time H_2S and TRS monitors approved by Residents' experts and report daily readings to Residents on 15-minute intervals for both H_2S and TRS for at least 18 evenly-spaced H_2S and TRS monitors located along New-Indy's fence-line or perimeter.
- Install, calibrate, and operate continuous real-time H_2S and TRS community monitoring stations approved by Residents' experts.
- Require New-Indy to measure actual H_2S, methyl mercaptan, and TRS emissions from the ASB and other WWTP units under typical operating conditions to use as fugitive inputs to air dispersion model.

Remediation Plan

Short-Term Action Items (within 12 months)

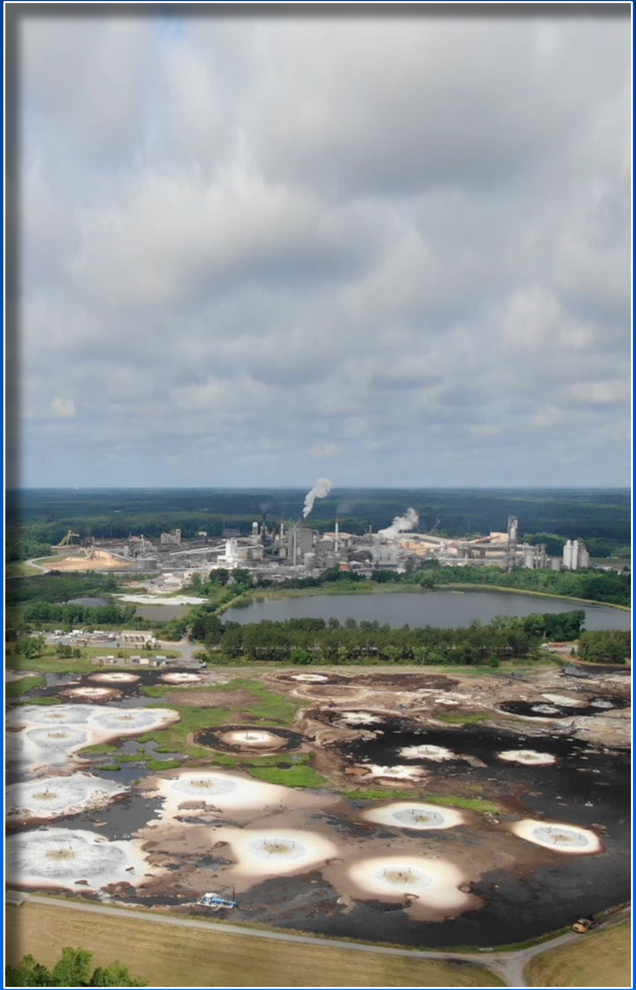
- Install new steam stripper with sufficient capacity to treat all foul condensate generated in the mill.
- Convert Temporary Wastewater Holding Lagoon (Lagoon # 5) to an additional aerobic stabilization basin by lining and installing baffles and aerators to increase treatment capacity and efficiency and add standby capacity for future unexpected high load or upset events.
- Remove sludge from Holding Pond # 1 to prevent generation of odors and properly dispose of sludge as approved by Residents' experts.

Remediation Plan

Longer-Term Action Items (1-3 years)

- Add a second Primary Clarifier of at least 275-ft diameter to provide more reliable operation and capacity to handle future spills, failures, and mill upsets.
- Reconfigure the Equalization Basin to separate the influent wastewater flow from the thickening of clarifier sludge.
- Reconfigure Holding Lagoon # 1 to separate the ASB effluent solids-settling function from the effluent flow equalization function. Alternatively, install two new secondary clarifiers between the ASB and Holding Lagoon # 1 to provide vastly improved process control ability and to ensure that ASB effluent solids are not settled into Holding Lagoon # 1 and cause release of H_2S and TRS to the air.
- Add a second Post-Aeration Basin and equip each basin with a sulfide monitoring system that controls both the aerators and chemical feed pumps to add oxygen and sulfide-destroying oxidant as necessary.
- Construct a replacement facility for Sludge Lagoon # 4 (which is nearing the end of its service life) that meets current standards and provides capacity to properly stabilize, dewater, and dispose of all sludge generated at the site for the next 30 years.

Call to Action



Conclusion

- **New-Indy continues to dump up to 500k gallons of toxic and malodorous foul condensate every day** into a poorly functioning wastewater treatment plant resulting in more than hundreds of odor and health-related complaints still being made by residents to DHEC every month.
- New-Indy's **outdated and undersized WWTP** discharges 20 million gallons of wastewater per day to the Catawba river. **The plant needs major upgrades.**
- **Monitoring stations** at New-Indy's fence-line and in the community are **inadequate in number, location, and air pollutants** being monitored.
- **New-Indy's current Air Dispersion Model Analysis is inaccurate and misleading**. The **Corrective Action Plan is woefully inadequate** and needs to be reassessed and expanded.
- New-Indy's response to EPA's and DHEC's orders has been too slow and too meager, such that the **ongoing air pollution continues to cause odors and health problems.**
- If EPA elects to work with our team of nationally recognized environmental experts and consultants, together we can bring New-Indy into compliance and achieve a long-term solution to **protect the residents from the toxic air and water pollution emanating from the New-Indy mill.**

Attachment D

December 23, 2021 Letter Report

CONFIDENTIAL Prepared at Request of Counsel in Anticipation of Litigation

December 23, 2021

Chase T. Brockstedt
Baird Mandalas Brockstedt LLC
1413 Savannah Rd.
Lewes, DE 19958

Reference: New-Indy, Catawba, SC

Subject: Quantification of New-Indy Wastewater Treatment System Emissions

Dear Mr. Brockstedt:

Per your request, I have prepared the following analysis of available methods for quantifying air emissions from impoundments, as applicable to New-Indy's Catawba, SC paper mill wastewater treatment system.

My *curriculum vita* (Attachment A) summarizes my education and career, and provides examples of my experience in air monitoring and related fields. The opinions expressed in this letter are made with a reasonable degree of environmental and scientific certainty, but I reserve the right to supplement this letter if and when more information becomes available.

INTRODUCTION

Computerized atmospheric dispersion modeling is often used to quantify the impact of air pollution emissions on ambient air quality. Such models require meteorological and emission source data to drive the algorithms they use to simulate how pollutants are distributed about an emission source. The reliability of dispersion modeling results is limited by the quality of its input data.

The best and most accurate way to obtain the requisite dispersion model input data is by direct measurement. Where direct emissions measurement is not feasible, there exist mathematical models that can be used to estimate emissions in a form that can be input to air dispersion models. Using one model's results to drive another model can obviously compound errors, reducing confidence in the final results. Where possible, it is best to actually measure the parameters upon which analyses and decisions will be based.

Throughout this report, I will discuss these two types of models:

- Emission models—computerized calculations that estimate actual emissions, based on known facility conditions, such as wastewater chemical characteristics
- Atmospheric dispersion (or "air") models—computerized formulations that combined information on emissions with meteorological conditions to project ambient air pollutant concentrations.

The New-Indy wastewater treatment system's total reduced sulfur compound emissions (TRS) are released to the atmosphere predominantly as "fugitive emissions"—emission that are not released via a smokestack or vent. TRS is comprised of up to four compounds: hydrogen sulfide (H_2S), methyl mercaptan, dimethyl sulfide, and dimethyl disulfide. Much of these emissions come from very large wastewater treatment and storage impoundments that are part of the mill's wastewater treatment plant (WWTP). Since fugitive emissions are not released through a stack or vent, they cannot be measured using standard US EPA source testing methods.

There are several fugitive emissions quantification methods available for developing the data needed for modeling air quality impacts from WWTP facilities. This report presents each of the available methods, assesses their suitability for the New-Indy WWTP emission sources, and recommends the most accurate and reliable approach for developing emission estimates from the WWTP for use in New-Indy's air dispersion modeling.

1. TEMPORARY/PERMANENT TOTAL ENCLOSURE

One method for quantifying a fugitive source's emissions to enclose it in a temporary or permanent total enclosure. US EPA has developed Standard Method 204[1] to describe the process for implementing this process.

This method was used by New-Indy to measure emissions from the post-aeration basin. It is likely that numerous other pulp and paper mill wastewater facilities' impoundments have employed Method 204 but, as an EPA standard method, there is no need to receive case-by-case approval to do so—so there is not a record of its application to such emission sources.

In the case of a permanent enclosure, if there are no natural draft openings, concentrations and exhaust gas flow may be measured directly. For an impoundment temporary total enclosure, the method may to be modified by the addition of a "sweep" flow in order to accurately simulate free low mass transfer.

Total enclosure can pose a technical and financial challenge—especially for large impoundments such as New-Indy's Aerobic Stabilization Basin (ASB). However, total enclosure methods (both temporary and permanent) have been successfully employed with large impoundments by publicly owned treatment works. This method is considered the "gold standard" from the standpoint of accurately characterizing emissions from such emission sources. It can be instrumented with continuous monitoring instruments, providing temporal resolution of emissions—something not practicable using most other techniques.

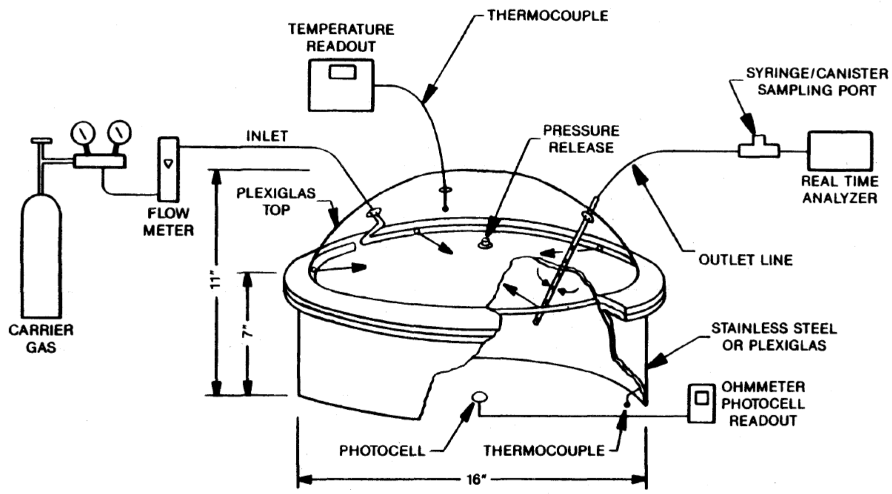
In addition to enabling direct emission measurement, permanent enclosure can be a prerequisite to effective add-on emissions/odor control measures. The lead time for a total enclosure can be a matter of months, due to the need for engineering and construction.

[1] METHOD 204 - CRITERIA FOR AND VERIFICATION OF A PERMANENT OR TEMPORARY TOTAL ENCLOSURE, US Environmental protection Agency, January 2019, https://www.epa.gov/sites/default/files/2019-06/documents/method_204_0.pdf, accessed December 20, 2021.

2. FLUX CHAMBER

Rather than confining all of an impoundment's emissions and sampling at a defined point, a flux chamber measures emission rate over one or more limited sample areas of an impoundment (e.g., 1 square meter) and extrapolating those measurements to the entire surface area. This is obviously more applicable to impoundments that have consistent emission rates, across the surface area. If spatial variability is expected, multiple test areas are indicated—the greater the expected variability, the more sampling locations are required to adequately characterize the emission rate. Figure 2 illustrates the general techniques.

Figure 2. Flux Chamber Technique for Emission Rate Measurement



US EPA's Office of Research and Development, as well as academic researchers, have developed flux chamber methods and applied them broadly to surface water bodies to quantify a broad range of air pollutants[2]. The National Council for Air and Stream Improvement (NCASI)—a pulp and paper industry research consortium—has supported flux chamber measurements of paper mill impoundment emissions and found it to be an effective tool for many applications[3]. NCASI used measurements from flux chambers and other techniques as the foundation for development of their wastewater processing air emissions model, H2SSIM. This computerized model uses information on influent wastewater chemical and physical data to estimate emissions from typical well-operated wastewater treatment facilities.

The flux chamber method is useful and adaptable for characterizing emissions from most of New-Indy's wastewater and sludge holding basins and treatment systems. It may be of only limited usefulness for an emission source such as the Aeration Stabilization Basin (ASB), due to its expected spatial variability of emissions, and the aerators constituting physical obstructions to implementing flux chamber monitoring.

[2] Bart Eklund (1992) Practical Guidance for Flux Chamber Measurements of Fugitive Volatile Organic Emission Rates, Journal of the Air & Waste Management Association, 42:12, 1583-1591, DOI: 10.1080/10473289.1992.10467102.

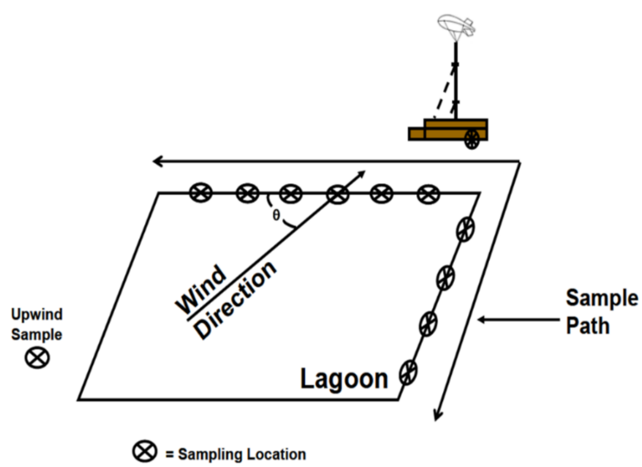
[3] EMISSIONS OF REDUCED SULFURCOMPOUNDS AND METHANE FROM KRAFT MILL WASTEWATERTREATMENT PLANTS, TECHNICAL BULLETIN NO. 956, NCASI, SEPTEMBER 2008.

The flux chamber technique is suitable for emissions monitoring of fairly homogenous impoundments lacking physical obstructions such as New-Indy's primary clarifier, effluent holding ponds, and sludge lagoons—all of which may be emitting significant amounts of H_2S and other TRS compounds, including methyl mercaptan. It can provide high quality, cost effective measurements and can be implemented relatively quickly—over a matter of several weeks.

3. BOUNDARY LAYER EMISSIONS MONITORING

Instead of measuring emissions from a defined sample area of an impoundment, the boundary layer emissions monitoring technique seeks to quantify the mass flow of a pollutant across a vertical downwind surface by integrating across a two-dimensional sampling array. Figure 3 illustrates the basic set-up.

Figure 3. Boundary Layer Emissions Monitoring Set-Up



NCASI TB 956 describes how the boundary layer emission monitoring technique was applied at several paper mill wastewater impoundments during the Council's model development program. Recently, US EPA has been using a similar approach (Remote Emissions Quantification, Other Test Method OTM 33A) and measurements from their Geospatial Measurement of Air Pollution (GMAP) system to directly measure methane (a strong greenhouse gas) emissions from oil and gas drill pads[4].

Provided there is a clear path about an impoundment, a boundary layer emissions measurement program can be executed in a matter of several weeks. NCASI's conclusion is that this method is particularly useful for assessing paper mill emission sources and provides a high level of accuracy[5].

[4] Halley L. Brantley, et al., Assessment of Methane Emissions from Oil and Gas Production Pads, using Mobile Measurements, Environ. Sci. Technol. 2014, 48, 14508−14515.

[5] EMISSIONS OF REDUCED SULFURCOMPOUNDS AND METHANE FROM KRAFT MILL WASTEWATERTREATMENT PLANTS, TECHNICAL BULLETIN NO. 956, NCASI, SEPTEMBER 2008.

4. EMISSIONS MODELING

Regardless of whether an emissions model is derived from theoretical first principle or is an empirical (experimental) construct, it must be validated against actual measurements and is only considered reliable across the range of conditions that defined the evaluation database. ***Modeling*** wastewater treatment and impoundment emissions, as opposed to directly ***monitoring*** them, requires knowledge of the chemical and physical characteristics of the wastewater influent, as well as those of the receiving wastewater treatment of storage impoundment. Depending on the specific wastewater emissions model employed, additional input data will be required. Wastewater emission models assume steady-state conditions and are inadequate for quantifying temporally-varying influent conditions.

New-Indy employed US EPA's WATER9 model to characterize some of its impoundment emissions, and the H2SSIM model, developed by NCASI to estimate emissions from other sources, including the ASB—New-Indy's largest source of reduced sulfur compound emissions that include H_2S, methyl mercaptan, and other TRS compounds. H2SSIM was specifically developed to estimate H_2S and TRS emissions from properly designed and well-operated paper mill wastewater treatment systems. New-Indy's submittals to US EPA and SC DHEC have identified a number of issues with its wastewater treatment system and wastewater expert Ken Norcross has described the current operating conditions that are not consistent with the assumptions used in the NCASI H@SSIM model. This raises concern as to whether it is, indeed, a properly designed and well-operated system. If not, the emissions models are of dubious value in estimating actual emissions. Given these conditions, it is not even possible to quantify the error limits associated with such a modeling exercise.

5. QUANTIFYING NEW-INDY WASTEWATER EMISSIONS BY MONITORING AND MODELING

Emissions modeling offers several advantages over actual direct measurement:

- Quicker results
- Lower execution cost
- Ability to explore how influent process/chemical/physical changes will affect air emissions.

These advantages can only be reliably achieved by using a validated model for its intended type of facility, and operating within its evaluation parameter ranges. In the case of New-Indy, the facility's regulatory filings and the findings of wastewater expert Ken Norcross cast great doubt as to whether its wastewater treatment system meets the models' assumptions of being properly designed for its current use, and well operated. If it does not fit within the models' framework, it is not even possible to quantify the degree of error that could occur. In contrast, emissions monitoring provides high accuracy and reliability—regardless of the condition of the treatment system or how well it is being operated. Direct monitoring also permits identification and speciation of the various TRS compounds (including H_2S and methyl mercaptan) and other odoriferous and toxic emissions (e.g., methanol).

There are several direct monitoring techniques that could be used for generating highly reliable, accurate emission rate measurements from New-Indy's WWTP impoundments, including the ASB. With respect to the ASB, the permanent/temporary total enclosure and boundary layer emission measurement techniques are both feasible. I recommend that one of these methods be used to provide reliable emission rate inputs to the air dispersion model.

6. NEW-INDY'S DISPERSION MODEL ANALYSIS REPORT

Despite the availability of methods to directly measure emissions from the Catawba mill's wastewater treatment system components, New-Indy used theoretical wastewater emission models with unproven and likely flawed technical adequacy, to quantify its TRS and H_2S releases. When those values, which are likely quite understated given the reported operation condition of New-Indy's WWTP, were used as input to New-Indy's air dispersion model, the projected maximum 24-hour average H_2S and TRS concentrations were 14.3 and 52.2 μg/m^3, respectively[6].

New-Indy then compared is unreliable air dispersion modeling results for H_2S to South Carolina's Standard No. 8 Toxic Air Pollutant Maximum Acceptable Ambient Concentration (MAAC) of 140 μg/m^3, South Carolina does not have a MAAC for TRS, the principal components of which are H_2S, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide. South Carolina has assigned methyl mercaptan a MAAC of 10 μg/m^3 but New-Indy's Air Dispersion Modeling Analysis Report does not address predicted methyl mercaptan emissions at all. Subtracting the modeled H_2S impact from the TRS projection yields a non-H_2S concentration of 37.9 μg/m^3, If even one-third of this remaining TRS is methyl mercaptan, New-Indy's own dispersion modeling, that relied on unreliable and likely understated wastewater modeled emission inputs, would exceed the applicable MAAC by 25%.

In conclusion, the New-Indy's October 2021 Air Dispersion Modeling Analysis does not demonstrate compliance with Standard No. 8. As discussed above, the likely issues associated with the theoretical wastewater emissions model used to provide input to the air dispersion model raises considerable doubt as to whether even the H_2S modeling results are sufficient to demonstrate compliance with Standard No. 8. Actual air emission ***monitoring*** of all TRS-emitting WWTP facilities is necessary to determine whether Standard No. 8 compliance has been achieved. . Actual air emission *monitoring* of all TRS-emitting WWTP facilities is necessary to determine whether Standard No. 8 compliance has been achieved.

Please let me know if you have any questions or wish to discuss ERM's findings.

Yours sincerely,

Richard H. Osa, QEP
Technical Director

[6] AIR DISPERSION MODELING ANALYSIS, NEW-INDY CATAWBA, LLC – CATAWBA, SC MILL, OCTOBER 2021.

Attachment A

Richard H. Osa, QEP Curriculum Vita

Rick Osa, QEP

Technical Director

ERM

December 23, 2021
Reference: New-Indy, Catawba, SC

Rick has experience in a broad range of air quality management activities, having performed Clean Air Act permitting, legislative and regulatory analyses, as well as compliance planning and implementation. Rick has supported a broad range of industrial operations, with particular concentration in the energy, metals, mining, and food processing sectors. He has performed air permitting in 38 different states, and all EPA regions. These have included PSD and Non-Attainment New Source Review (major) emission sources, in addition to minor and FESOP facilities. Rick leads ERM's ambient air quality monitoring practice, establishing procedures and standards and managing a number of the firm's larger efforts—from the Kenai Peninsula of Alaska to Guyana, South America.

Experience: 40 years' experience in air quality and environmental management

Email: rick.osa@erm.com

LinkedIn: https://www.linkedin.com/in/richard-osa-a21335b

Education

- MS. Engineering Management
  Northwestern University, USA, 1992
- Graduate studies. Environmental Engineering,
  Illinois Institute of Technology, 1976 -1978
- BS. Physics
  Illinois Institute of Technology, 1976

Professional Affiliations, Registrations, Honors

- Qualified Environmental Professional—Institute for Professional Environmental Practice
- Air Quality Fellow, South Korean Embassy, US Department of State
- Air & Waste Management Association

Languages

English, native speaker

Fields of Competence

- Air emission source permitting
- Ambient air quality monitoring
- Fugitive dust quantification, modeling, and control
- Settled dust investigation
- Atmospheric dispersion modeling
- Legislative/regulatory analysis

Key Industry Sectors

- Power
- Oil & Gas Midstream
- Pulp & paper
- Metals

Key Projects

PSD Air Emission Source Construction Permit
Nucor Steel, Blytheville, AR
Managed quick turn-around PSD air permitting effort. Tasks included:

- Definition of permitting strategy;
- Development of project, facility, and near-by emission source inventories;
- Preliminary air quality analysis (dispersion modeling);
- BACT analysis of modified emission units;
- Refined air quality analysis;
- Agency liaison and negotiation.

A Technical Support Document served as the application framework. Total time from project authorization to receipt of the agency's "completeness" notice was less than 12 weeks for this complex facility modification permitting effort.

Air Construction and Operating Permitting
Mondelēz Chicago Bakery, Chicago, IL
Directed multiple facility modification construction permitting projects and related Title V permit revisions for this bakery which is located in a designated "Environmental Justice" community. Several of the permitting actions were processed under Illinois' expedited permit review program, to accommodate the client's schedule.

Air Permit Compliance Assurance
Evonik Goldschmidt Corporation, Mapleton IL
Designed and implemented an emissions and compliance tracking system for a major synthetic organic chemical manufacturing complex. The system imported existing inventory and production data to document and report compliance with complex Title V operating permit requirements.

John Deere Seeding Group
Air Emission Source Construction Permit, Moline, IL
In partnership with client management, developed permitting strategy for new painting line. Project scope necessitated "one source" (i.e., aggregation) and Environmental Justice considerations. Oversaw development air permit application package and its submittal to Illinois EPA.

Air Permit Revision, Clinton Industrial Sand Mine & Processing Plan
Superior Silica Sand, Clinton, WI
Developed an air permitting strategy and application to add drilling and blasting as authorized operations at an existing sand mine, add a new mine, and add a crusher at an existing mine. The permitting authority considered the new processes and operations to serve as a "support facility"—requiring an aggregation approach. To expedite development, a "commence construction waiver" was obtained.

Sulfur Dioxide Attainment Status Monitoring
Multiple Clients, WI, IL, NY
Designed, installed, and operated three independent monitoring networks, conforming to the requirements of the SO_2 "Data Requirements Rule". The projects' objective is to demonstrate the attainment status of their respective areas. Program quality assurance conforms to 40CFR Part 58 Appendix A specifications, in accordance with the DRR. Operation is planned for at least three years in order to assess compliance with the one-hour NAAQS.

Shipborne Air Monitoring Survey
Confidential Client, Guyana, South America
To document pre-exploration, background air quality, instrumented a research vessel to continuously monitor SO_2, NO_2, H_2S, PM_{10}, VOC, wind speed and direction, temperature, relative humidity, and geographical location. Redundant instruments ensured high data recovery over the survey's six weeks, despite unattended operation. Data were screened to filter out measurements biased by the influence of the ship's engines.

Compressor Station Air Monitoring for Impact Assessment
Williams Cos., Multiple Locations
Recent changes to FERC guidance on preparation of environmental impact assessments (RR9) permits the use of local ambient air quality monitoring data to characterize the impact of existing equipment when performing a cumulative impact analysis. Ambient air monitoring tends to be considerably less conservative than the traditional approach—dispersion modeling. This approach can lead to project approvals with fewer restrictions or, in some instance, demonstrate that an otherwise un-licensable facility upgrade can, indeed, be

authorized. These multi-year ambient air monitoring projects formed both the basis for FERC's revised RR9 guidance, but also its implementation to several large-scale gas pipeline development projects. Twelve (12) monitoring sites were established and operated, continuously monitoring $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, wind speed, wind direction, sigma theta, differential temperature, and solar radiation. The data were telemetered to ERM's database server and posted to a secure web site—accessible to the client.

PSD Pre-Construction Air Quality Monitoring
Nucor Steel, Convent, LA
Designed, installed, and managed data collection at this multi-year, three-site PSD pre-construction monitoring network. Continuously measured parameters consisted of $PM_{2.5}$, SO_2, NO_2, CO, wind speed, wind direction, sigma theta, and ambient temperature. Data were digitally recorded onsite and telemetered to ERM office via cellular modem.

Fenceline Air Quality, Meteorological Monitoring
Zeeland Farm Services, Zeeland, MI
Initial contract consisted of designing a two site (upwind-downwind configuration) $PM_{2.5}$ and PM_{10} monitoring program that met the requirements of a consent agreement. ERM then developed a Quality Assurance Project Plan (QAPP) for the program and obtained regulatory agency approval. The last task of the initial contract was to develop a budget-level cost estimate for the program's implementation. ERM was awarded a second contract—to procure monitoring equipment, install it, and operate the program for two years. This included developing and maintaining a secure web site for real-time data access.

Ambient Particulate, Manganese, Mercury, and Meteorological Monitoring
Nucor Steel, Marion, OH
Designed, installed, commissioned, and managing data collection at this multi-year, two site monitoring network. Manual (filter-based) and continuous automated particulate matter samplers are employed to document ambient air concentrations. Filter samples are analyzed to quantify particulate mercury and manganese concentrations. Wind speed and direction are used to identify culpable source(s) in the event of high concentrations.

Refinery Fenceline Monitoring Support
Delek, Krotz Springs, LA
Managed assessment and upgrade of on-site meteorological monitoring system, to conform to requirements of petroleum refinery fenceline monitoring regulations. Monitoring system was enhanced to provide real-time data for operational use. Parameters consisted of wind speed, wind direction, barometric pressure, ambient temperature, relative humidity, and precipitation. Data are fed into refinery's DCS via fiber optic.

Contaminated Soil Remediation Site Dust Monitoring
Proctor & Gamble, Inwood, WV
Network of continuous dust monitors was established and operated to provide real-time operational data to contractors carrying out contaminated soil remediation plan. Measured particulate matter levels and current meteorological conditions were telemetered to ERM and posted to a secure web site. Remediation contractors relied on the monitoring data to plan the day's operations and deploy appropriate dust control measures.

Publications

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Osa, RH. 2019. *Case Studies in Ambient Air Monitoring*, Presented at the Industrial Emissions Control Technology XVII Conference, sponsored by Council of Industrial Boiler Operators, August 5 - 8, 2019.

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Attachment B

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3. Halley L. Brantley, et al., Assessment of Methane Emissions from Oil and Gas Production Pads, using Mobile Measurements, Environ. Sci. Technol. 2014, 48, 14508−14515.

4. Bart Eklund (1992) Practical Guidance for Flux Chamber Measurements of Fugitive Volatile Organic Emission Rates, Journal of the Air & Waste Management Association, 42:12, 1583-1591, DOI: 10.1080/10473289.1992.10467102.