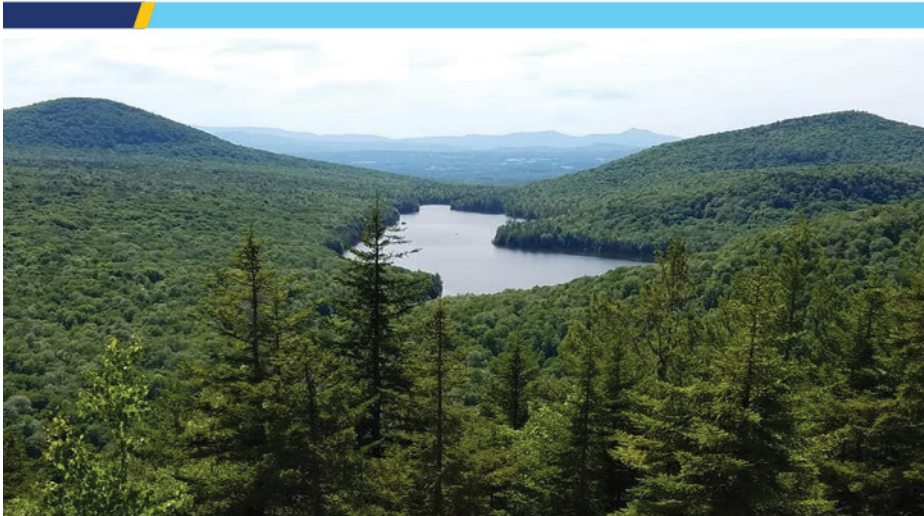


Request for Information

# LIFECYCLE GREENHOUSE GAS (GHG) EMISSIONS FROM ENERGY USE FOR THE STATE OF VERMONT



**Firm:**

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**Single Point of Contact:**

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**Submission Date:**

Submitted: March 4, 2022



Groundwater & Environmental Services, Inc.

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March 4, 2022

Ms. Jane Lazorchak, ANR  
Jane.Lazorchak@vermont.gov  
Global Warming Solutions Act Project Director  
Vermont Agency of Natural Resources

**Re: Response to Request for Information regarding Lifecycle Greenhouse Gas (GHG) Emissions from Energy Use for The State of Vermont**

Dear Ms. Lazorchak:

Groundwater & Environmental Services, Inc. (GES) is pleased to submit the enclosed response to your request for information dated February 1, 2022 regarding obtaining a better understanding of how supplemental analysis of energy related lifecycle emissions can help Vermont fully account for the emissions it is responsible for and its reduction options.

This capabilities statement responds to RFI questions 1-15, providing GES' expertise, capabilities, and insight into GHG emissions from energy use estimating and reporting. We believe that you will find our responses to be concise, direct, and helpful to your objectives of identifying the appropriate software tool, datasets, methodologies, protocols, decision aids, and level of expertise for analyzing Vermont's GHG emissions related to Vermont's multi-sector statewide energy usage.

As your GHG emissions consultant, GES offers the following benefits:

- Team with highly-experienced air quality services professionals
- Experience working for and with regulatory agencies implementing significant new regulations and requirements
- Skilled with GHG emissions inventory and estimating for government entities and commercial clients
- Registered small business

We appreciate the opportunity to provide this capabilities statement. If you have any questions regarding GES' submission, please contact Mr. John Tsun at (970) 713-6061.

Sincerely,

A handwritten signature in blue ink that reads "John M. Tsun".

John Tsun  
Regional Director of Air Quality Services

A handwritten signature in blue ink that reads "Richard K. Evans".

Richard Evans, PE  
Vice President of Engineering Technical Functions



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# 1. Understanding of the Objective

Groundwater & Environmental Services, Inc. (GES) understands that the Vermont Department of Environmental Conservation (DEC) has issued this request for information (RFI) to gain additional information as to how a supplemental analysis of lifecycle and upstream greenhouse gas (GHG) emissions related to energy use can contribute to the state's Climate Action Plan (CAP). GES has strived to provide the DEC with our insight into this endeavor and appreciates the opportunity to introduce our key air quality professionals and provide a summary of our experience.

## 1.1 Why GES?

GES is a full-service environmental consulting firm. Since GES' founding in 1985, our core and principal lines of business have been site investigation and characterization, remediation, regulatory advocacy and consulting, and environmental program and project management. For more than 35 years, GES has provided integrated environmental services that drive value for our clients across North America. GES professionals have a wide range of scientific, ecological, and geological experience that gives us a unique perspective and problem-solving capabilities.

GES operates out of 28 primary offices, including offices in Massachusetts, Connecticut, and New York, and 12 project satellite offices. We employ approximately 350 professional and administrative support staff, including engineers, geologists, environmental scientists, field services technicians and operators, and health and safety professionals.

GES seeks to partner with our clients to successfully achieve the desired outcomes. Our collaborative team approach engages clients, GES staff, and other stakeholders at the beginning of projects to set projects on the "right" path. Our air quality team includes seasoned professionals who have worked for and alongside regulatory agencies that were developing sweeping new initiatives and programs such as Title V permitting in California and New Jersey and climate action and carbon accountability in California. Mr. Doug Wolf and Mr. John Tsun have decades of experience in the air quality industry and would lead this project at GES. They actively provide air quality services to our clients on a daily basis and remain engaged with current regulations and requirements. Our experience in multiple states provides GES with a diverse range of experience and insight into working with multiple local, regional, state, and federal regulatory agencies. Accordingly, our team is well positioned to help the Vermont DEC navigate through an undertaking like GHG emissions inventory and reporting for energy use by the state of Vermont.

## 2. Information Needs and Objectives

The following narrative briefly describes the job role, responsibilities, and authorities for each of our project team members as they relate to this project. Detailed resumes for each project team member are provided in **Appendix A**.

**Question 1.** Please detail your qualifications and experience with conducting lifecycle GHG emissions analyses for national or sub-national jurisdictions.

GES' air quality services team has over 75 years of combined air quality experience, including performance of GHG emissions analyses for government and commercial clients. The resumes for key personnel are provided in **Appendix A**.

**Mr. Doug Wolf, Director Air Quality Services** – Mr. Wolf has over 40 years of multidisciplinary environmental permitting, compliance, and management consulting experience. Doug's expertise includes regulatory negotiation, rule development, risk evaluations, and strategic management leadership. He has conducted over 100 air-quality compliance reviews throughout his career and has completed projects including GHG inventory management, emission verification, co-benefit analysis, and reporting, Title V permits, National Environmental Policy Act (NEPA) support sustainable business-management-practice plans (e.g., carbon accounting, evaluation of alternative and renewable energy resources, and green initiatives). Doug has significant experience in California and drafted early regulations for Title V facilities and carbon trading practices for the Bay Area Air Quality Management District (BAAQMD).

**Mr. John Tsun, Northeast Regional Director Air Quality** – Mr. Tsun has over 30 years of experience managing environmental compliance projects for sites including commercial and government clients and is GES' subject matter expert for Environmental Justice. John has completed projects in Minnesota and New Jersey for commercial clients to comply with cumulative impact assessment requirements. He worked as a subcontractor to the New Jersey Department of Environmental Protection (NJDEP) when the initial Title V permit process was developed by the NJDEP.

**James Ryan, Project Engineer** – Mr. Ryan has over eight years of experience working primarily on air quality and greenhouse gas (GHG) emissions projects for government and commercial clients. James' experience includes California Environmental Quality Act (CEQA) GHG and air-quality environmental impact report (EIR) analysis; GHG inventory development, reporting, verification, and management; Clean Air/Clean Planet emissions management/GHG reduction software; climate action planning; and sustainability practices.

**Question 2.** Please define and explain the term "lifecycle" and "upstream" for purposes of a GHG emissions analysis.

GES applies definitions to "lifecycle" and "upstream" similar to those used by the United States Environmental Protection Agency (US EPA). Since this RFI is focused on energy supply and use in Vermont, we would define the terms as follows.

**Lifecycle** is the full lifecycle GHG emissions for energy production, transmission, and use. This includes the extraction of raw materials (e.g., natural gas, petroleum, coal, biomass), energy source collection (e.g., manufacture of solar panels, hydropower, geothermal infrastructure, and wind turbines), processing or manufacturing, transportation and transmission to energy generation and distribution facilities, transmission to the consumer, and end-user consumption. This definition is also consistent with the definition used by the National Energy Technology Laboratory (NETL) of the US Department of Energy (DOE). A lifecycle analysis includes of an inventory of resources used and wastes and pollutants produced in all of these stages to determine an impact assessment the product's (energy in this case) ultimate effects on human health, ecosystem function, and natural resource depletion.



**Upstream**, in the context of this RFI, for energy use includes everything identified in the lifecycle definition above except for transmission to the consumer and use.

**Question 3.** Based upon your definition of "lifecycle" and "upstream" in (2), do you foresee any issues in focusing on either lifecycle or upstream emissions solely related to Vermont's energy supply (including but not limited to electricity including renewable, hydro, solar, wind and nuclear generation; liquid fuels for transportation and heating including biofuels, gaseous fuels including renewable fuels, and solid fuels including wood) versus a more comprehensive consumption based or lifecycle analysis) versus a more comprehensive consumption based or lifecycle analysis of the energy emissions impact of goods and services?

Vermont has the highest level of greenhouse gas emissions per capita in the Northeast, and has shown continuous emissions increases over the years. Using the "upstream" definition in item #2 above, focusing on upstream emissions is more beneficial in this analysis. Vermont's energy consumption is the smallest among the states, and Vermont has the lowest energy-related carbon dioxide emissions of any state since it consumes over three times as much energy as it produces. Based on 2020 data:

- About 60% of Vermont households heat with petroleum products, and 13% use wood.
- Vermont generated nearly 100% of its electricity from renewable resources, a larger share than any other state.
- About 58% of Vermont's utility-scale in-state generation came from conventional hydroelectric power.
- Vermont's five utility-scale wind farms accounted for about 15% of the state's total electricity net generation, a larger share than in 75% of the states.

Note that non-attributable processes relevant to some products are capital goods and infrastructure. These processes include renewable energy generation (i.e., hydroelectric and wind power), requiring capital infrastructure that may have a sizeable GHG impact relative to the rest of Vermont's inventory.

Vermont's ability to determine upstream GHG emissions will be reliant on the availability and transparency of data from energy providers. The use of emissions factor estimates from reliable sources (e.g., US EPA) may also be required in the analysis.

**Question 4.** Please identify any other states, provinces, or nations that have undertaken a similar jurisdiction-wide energy-related lifecycle or upstream GHG emissions analysis that might serve as a useful guide to Vermont's efforts.

Other states that can serve as a model for Vermont to explore are as close as its neighboring states:

- Massachusetts has an approximately 25% larger economy than Vermont. It achieved a 25% reduction in emissions attributed to more efficient energy systems and passage of a law mandating less greenhouse gas pollution than the baseline year of 1990.
- Connecticut, Maine, and New York all have Global Warming/Climate Acts legislated, with New York's being the most ambitious.
- Rhode Island and New Hampshire have bills under consideration in their legislature related to with GHG emission reductions.

Other larger states like Texas and California may be good resources for Vermont since both states have been considered some of the biggest emitters of GHG over the years. California has implemented numerous GHG emissions related programs such as Low Carbon Fuel Standard, Zero-emission vehicles, and Advanced Clean

Cars Program and has been a model for other states seeking to decrease GHG emissions from various sources, inclusive of their Cap and Trade Program.

GES' experience is that states are not incorporating all upstream sources due to the challenges of obtaining and applying the data. Specifically, raw materials extraction and energy source collection (e.g., solar panel manufacturing) are excluded. Therefore, upstream sources are limited to processing or manufacturing and transportation/transmission to energy generation and distribution facilities.

**Question 5.** Please provide a list of recommended software, datasets, methodologies, protocols, etc. that would be required to perform a lifecycle or upstream GHG emissions analysis for Vermont.

### Software

A comprehensive GHG analysis might require multiple software programs. Depending on the detail of the study, the recommended software would include:

- *Toolkit for Building National GHG Inventory Systems* – this Toolkit is consistent with Intergovernmental Panel on Climate Change (IPCC) “good practice,” the 2006 IPCC Guidelines, and the latest United Nations Framework Convention on Climate Change (UNFCCC) transparency requirements.
- *Agriculture and Land Use (ALU) Software* – developed by US EPA and Colorado State University. Based on the methods used in the 2006 IPCC Guidelines.
- *IPCC Inventory Software* – facilitates the development and reporting of national GHG inventories. Supported by the UNFCCC secretariat and the Technical Support Unit of the IPCC Task Force on National Greenhouse Gas Inventories.

### Datasets

In conjunction with Vermont's DEC air emissions data from its air permitting program, the dataset used in a GHG emissions analysis is available through the US EPA. For example, the Greenhouse Gas Reporting Program (GHGRP) collects GHG data from large emitting facilities, suppliers of fossil fuels and industrial gases that result in GHG emissions when used, and facilities that inject carbon dioxide underground.

States where energy generation facilities provide energy to Vermont may also have or developed emissions databases. For example, New Jersey's recent Environmental Justice Law and the Cumulative Impact Assessment legislation being considered in Massachusetts will require development of state emissions databases to implement the programs effectively.

Note that the quality of such databases is critical, and any data gaps will require additional time to obtain.

### Methodologies

There are various methodologies used to perform GHG emissions analysis. The 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines) is a recommended document to use in terms of methodologies for estimating national inventories of human-caused emissions by sources and sinks of greenhouse gases. In addition, the US EPA Center of Corporate Climate Leadership GHG Inventory Development Process and Guidance is a thorough document, which Vermont can follow in its GHG analysis. The GHG inventory development process consists of four key steps:

1. Review accounting standards and methods, determine organizational and operational boundaries, and choose a base year;
2. Collect data and quantify GHG emissions;
3. Develop a GHG Inventory Management Plan to formalize data collection procedures and
4. Set a GHG emission reduction target and track and report progress in transparent fashion.

**Question 6.** Are there other software, datasets, methodologies, protocols available? If so, please describe the rationale for your recommended selections.

A comprehensive GHG analysis might require multiple software solutions. Depending on the detail of the study, GES has listed additional software that might be necessary to assist in the GHG analysis below.

- *IPCC Emission Factor Database* – provides a library of emission factors, background documentation, and technical references to support the estimation of GHG emissions and removals. Supported by the Technical Support Unit of the IPCC Task Force on National Greenhouse Gas Inventories.
- *FAOSTAT* – GHG emissions database that provides country-level estimates of emissions from individual sources within the Agriculture and Land Use Inventory sectors, based on FAOSTAT activity data and Tier 1 methods from the 2006 IPCC Guidelines.
- *Collect Earth* – used in conjunction with Google Earth, Bing Maps, and Google Earth Engine to provide high-resolution satellite imagery that is customizable for specific data collection needs.

This additional software will be helpful tools to assist in fine-tuning GHG emissions, if needed, for some emission sources.

**Question 7.** Would any of the components you recommend require specialized training of staff, purchase of software licensing or subscriptions, purchase of specialized hardware, an ongoing need for consultant services, etc.? If so, please elaborate.

The software mentioned above is freely available through the US EPA, including periodic updates. As for training, GES's key members can provide training for the Vermont DEC staff in the use of the program(s) on a one-time or ongoing consulting basis. Due to the size of the possible emissions databases, computers with higher memory specifications and processing speeds are likely needed.

**Question 8.** Please describe the tasks and estimate the anticipated number of person hours required to produce a lifecycle or upstream analysis for a single calendar year, and whether a similar level of effort would be required annually in future years to compile a comparable analysis.

The hours estimated below to perform the GHG Emission analysis are based on the methodologies described in item 5 above.

1. Review accounting standards and methods, determine organizational and operational boundaries, and choose a base year.
  - One person full-time for three months. This estimate does not include the time and staffing from the Vermont DEC, other government agencies, or public involvement that may be involved in this step.
2. Collect data and quantify GHG emissions.
  - One person full-time for three to four months



3. Develop a GHG Inventory Management Plan to formalize data collection procedures.
  - One person full-time for two to three months
4. Set a GHG emission reduction target and track and report progress.
  - One person full-time for three months

For a comparative analysis in the future, Vermont DEC's staff efforts will be reduced dramatically once the initial dataset is compiled unless a significant software or methodology update/change is needed. Routine (e.g., annual) updating of the dataset will be required.

**Question 9.** Do data of sufficient detail exist to describe the diverse and variable nature of Vermont's energy imports with reasonable accuracy for a given year?

It is our experience, due to lack of upkeep, that emissions databases are not well maintained and data gaps exist. The quality of the data is also often in question due to validation issues. However, given the programs implemented by other states in the northeast such as New York, it is reasonable to assume that the data needed can be obtained though there may be a lag of up to several years for some databases.

**Question 10.** Please identify the time lags in the availability of the underlying data for a lifecycle or upstream GHG emissions analysis (e.g., when would sufficient data to conduct an analysis for calendar year 2021 become available and is this later than data availability for the current inventory approach?).

GES estimates a lag of one to five years based on the data source. Focusing on energy generation facilities, Massachusetts' publically available GHG emissions inventory was last completed in 2017 with partial updates in 2018 and 2019 ([https://www.mass.gov/lists/massdep-emissions-inventories#proposed-addendum-to-2021-update-of-statewide-greenhouse-gas-\(ghg\)-emissions-baseline-](https://www.mass.gov/lists/massdep-emissions-inventories#proposed-addendum-to-2021-update-of-statewide-greenhouse-gas-(ghg)-emissions-baseline-)) whereas New York appears to have information as current as 2021 available (<https://www.dec.ny.gov/energy/99223.html#Report>).

Since Vermont is an energy importer, the GHG emissions for Vermont will likely be based on a range of years. With the current importance of GHG emissions, GES expects that the quality of data will be improved and the time lag will be reduced in the next five years, and data from the previous year should be available in the first half of the new year (e.g., 2024 data available by June 2025). Vermont could also implement a requirement for energy providers to report GHG emissions data to Vermont on an annual basis. However, that data may not be specific to the energy generation facilities that specifically provide Vermont's energy but rather the average of the provider energy portfolio.

**Question 11.** Please describe any methodological challenges, limitations, data gaps, etc. that are likely to be encountered during the preparation of a statewide lifecycle GHG analysis related to energy use. In addition, please state your opinion regarding the feasibility and usefulness of conducting a comparable analysis for historical years, including the baseline years 2005 and 1990.

There should be no significant challenges in the methodologies used for the analysis since developed guidelines will be followed. As mentioned above, the dataset will pose a considerable challenge if there is a large data gap or the quality of the data is flawed. Time will be spent filling data gaps, which places a significant resource burden on Vermont DEC and continuously managing and updating the database. GES has experienced these challenges first-hand in California and New Jersey where insufficient agency resources can lead to dated and inaccurate databases.

It will be feasible and valuable to conduct a comparable analysis using historical years, including the base years 2005 and 1990. 1990 is a common base year for GHG emissions reductions goals and analyses. This type of

analysis will show if implemented legislation during these periods helped reduce GHG. It can give policymakers a better understanding of what has happened and develop new regulations that benefit Vermont and all stakeholders.

**Question 12.** Please describe if/ how this analysis might inform or interact with Vermont's existing annual statewide GHG emissions inventory.

Vermont's annual mandatory GHG emission reporting requirement will provide part of the data needed to create the dataset for the analysis, primarily on the use component of the lifecycle. In addition, the existing annual GHG emission reporting can be used as a gauge to conduct future GHG emissions analysis. Importantly, the existing inventory establishes a practice and precedence to be used for the analysis and reporting.

When performing an upstream or full lifecycle GHG emissions analysis for energy use, the out-of-state emissions by energy generation facilities will be critical. It may be necessary to reconcile estimate calculation methods between various data sources, which could result in changes to the methods used in the existing inventory.

**Question 13.** Do you have recommendations that would maximize the usefulness of this analysis to policymakers? Specifically: what aspects or components should be included or excluded in the analysis to facilitate effective prioritization and development of GHG emissions reduction actions. Should this analysis be periodically repeatable, and if so on what periodic basis should the analysis be conducted?

GES recommends including all components during this initial statewide GHG emissions analysis. It will present a more complete baseline. Based on the findings of this initial analysis, Vermont DEC can eliminate insignificant components from future studies. In addition, annual GHG emission reporting is an excellent resource for evaluating trends.

As the overall availability and turn-around-time of data improves, the burden to generate GHG emissions reports is expected to decrease over time. An annual update of in-state data with a triennial update of all sources may be a reasonable goal at this time. Over time, it should be possible to generate GHG emissions on an annual basis at a reduced level of effort.

**Question 14.** Please provide any additional relevant information you believe is key to conducting this analysis.

Establishing GHG emissions reductions and reporting requirements is likely to proliferate in states across the US. Along with US EPA regulations, this will collectively drive GHG emission reductions and improvement in available data from emissions sources across the US. By taking action now, Vermont can further the actions taken by nearby states and realize the collective benefits of emissions reductions.

The following factors are key to successful analyses of GHG emissions:

- Developing a collaborative working relationship between the Vermont DEC and the consultant(s) provides a team effort in achieving the goals set forth for the intent of the GHG analyses and has in our experience yielded significantly better results than a task delegation approach where the next contact point is delivery of a draft deliverable.
- Defining the scope of work to ensure the work meets expectations and scope creep does not occur yielding costs for delivery of unnecessary and/or unsatisfactory work.
- Establishing a clear line of communication and setting expectations including forms of communication, frequency of communication, and content of communication provides a consistent quality control of



the work product being produces and minimize changes during critical stages of the GHG analyses. Identifying stakeholders to include and decision makers and authorities minimizes rework that can result when work is performed without their engagement at the onset of and during the project.

**Question 15.** Please indicate your availability and capacity to provide assistance to the ANR over the time period of XXXX to YYYY.

GES is available to assist the Agency of Natural Resources (ANR) from 2022 until no specific end date.



## Appendix A – Key Personnel Resumes

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## John Tsun

### Regional Director, Air Quality Services/Principal Engineer II

#### LOCATION

Wall Township, NJ

#### EDUCATION

BE, Mechanical Engineering – City College of New York

#### LICENSES/REGISTRATIONS

Certified Smoke Reader (EPA Method 9)

#### AFFILIATIONS

American Society of Mechanical Engineers

Air & Waste Management Association

Society of American Military Engineers

#### EXPERTISE

- Air-quality monitoring and modeling
- Regulatory compliance and permitting
- Odor mitigation
- Industrial design

John Tsun is a regional director of air quality services for the Northeast Region and a principal engineer with over 30 years of experience managing environmental compliance projects for sites including petroleum, pharmaceutical, chemical, and power-generation facilities, as well as governmental agencies. He joined GES in 2021.

John is well-versed in regulatory compliance and preparation of air-permit documents, computer simulation modeling, and Title V compliance reporting. He served as part of a business development team to develop the air market sector and specializes in air-quality-related projects, including ambient air-quality monitoring, air dispersion and consequence modeling, soil vapor dispersion modeling, vapor intrusion barrier installation, vapor intrusion sampling, vibration monitoring, bi-axial tilt monitoring, crack gauge installation and monitoring, and noise monitoring. In addition, he has experience conducting odor mitigation studies for various facilities, and instituting design improvements for sanitary sewer systems at industrial sites.

## Project Experience

### **New Jersey Department of Environmental Protection (NJDEP) Title V Programs Supervision, Trenton, NJ**

Developed and implemented Operating Permit Program in the state. Duties included coordinating work assignments with prime contractor(s) and NJDEP; manpower loading projections and budgeting; development of model operating permits for different Standard Industrial Classification (SIC) codes; pre-application meetings with affected facilities; technical evaluations of operation permit applications; review of permits from surrounding states; public hearing support; development and execution of work plans; training of NJDEP/vendor personnel regarding operating permit elements as promulgated under 40 CFR Part 70; and meetings with different industry advisory groups.

### **Air-Monitoring Oversight at Superfund Site, Borough of Edgewater, NJ**

As part of construction oversight, represented Borough of Edgewater to oversee the air-monitoring program, which addresses odors and dust prevention, and incorporates best practices to meet air-quality health standards. Air-monitoring network includes both on-site and perimeter monitoring, and air monitors at residential properties adjacent to the site. A portable weather station is located on site to monitor wind speed and direction. Represented the Borough with regard to air monitoring questions during town hall meetings.

### **Facility-wide Air Permitting and Compliance at Shipyards, NJ**

Prepared facility-wide air permit for two shipyards and Spill Prevention, Control, and Countermeasure/Storm Water Pollution Prevention Plans (SPCC/SWPPP) for the main NJ shipyard. Work included emission inventory,



negotiations with regulatory agencies, and preparation of air permits. In addition, NO<sub>x</sub> (nitrogen oxides) emission calculations were verified and certified.

### **Air Emissions Limits Evaluation at Industrial Coatings Facility, Ocean Township, NJ**

Based on the projected production volume of coating of metal finish to plastic bottle caps, calculations were used to determine if this process would exceed the volatile organic compound (VOC) emissions limits under the existing approved NJDEP air permit. If permitted VOC limits were exceeded, provided a strategy to avoid any exceedance of the permitted VOC limits and presented long-term options that would allow the increase of production volume to meet future market demands.

### **Model Simulation for Operating Permit Renewal, Ewing Township, NJ**

As part of the facility's operating permit renewal process, NJDEP requested a facility-wide risk assessment for air toxics emission limits above reporting thresholds. This included submittal of an air dispersion model protocol, in conformance with the Department's Technical Manual 1002 "Guidance on Preparing an Air Quality Modeling Protocol" and Technical Manual 1003 "Guidance on Risk Assessment for Air Contaminant Emissions", to NJDEP for review and approval. Executed model simulation in accordance with the approved protocol and prepared final report.

### **Landfill Gas Monitoring, Sampling, and Reporting, Borough of Westwood, NJ**

Responsible for yearly activities at the landfill, which included quarterly methane gas monitoring; quarterly groundwater gauging; annual groundwater sampling; semi-annual Title V deviation reporting; and annual Title V compliance reporting. In addition, worked with NJDEP in obtaining approval for installation of a redesigned passive methane extraction system.

### **Project Coordination for Metro-North Railroad, NY**

Served as office engineer responsible for project coordination. Attended project progress meetings and maintained project files.

### **Site Settlement Monitoring Program Oversight, NJ**

Provided input on the overall instrumentation, sensors, and methodology selections for the site settlement monitoring program. This included on-site supervision during installation of instrumentation, and monitoring of the entire project site once the system was operational.

### **Chlorinated Compounds Vapor Intrusion Pathway Study, Township of Sparta, NJ**

As a result of elevated concentrations of chlorinated compounds in groundwater above the NJDEP's Vapor Intrusion Groundwater Screening Levels, conducted an evaluation of the vapor intrusion pathway to determine if chlorinated vapors were migrating into the building. Based on Vapor Intrusion Technical Guidance, January 2018, Version 4.1, performed sub-slab soil gas/indoor air sampling to evaluate if any of the samples exceeded the applicable NJDEP vapor intrusion screening levels. Vapor intrusion sampling determined that there were no vapor intrusion issues.

### **Regulatory Compliance Support for University, Lawrenceville, NJ**

Provided regulatory compliance support, which included permitting, Title V, and negotiation with regulatory agencies, for a university campus.

### **Gasoline Vapor Intrusion Pathway Study at Dry Cleaners, Borough of Midland Park, NJ**

As a result of elevated concentrations of petroleum hydrocarbons in groundwater above the NJDEP's Vapor Intrusion Groundwater Screening Levels, conducted an evaluation of the vapor intrusion pathway to determine if gasoline vapors were migrating into the building. Based on Vapor Intrusion Technical Guidance, January 2018, Version 4.1, performed sub-slab soil gas/indoor-air sampling to evaluate if any of the samples exceeded the applicable NJDEP vapor intrusion screening levels. Vapor intrusion sampling determined that there were no vapor intrusion issues.

### **Gasoline Vapor Intrusion Pathway Study at Municipal Building, Borough of Elmwood Park, NJ**

As a result of elevated concentrations of petroleum hydrocarbons in groundwater above the NJDEP's Vapor Intrusion Groundwater Screening Levels, conducted an evaluation of the vapor intrusion pathway to determine if gasoline vapors were migrating into the building. Based on Vapor Intrusion Technical Guidance, August 2016, Version 4, performed sub-slab soil gas/indoor air sampling to evaluate if any of the samples exceeded the applicable NJDEP vapor intrusion screening levels. Vapor intrusion sampling determined that there were no vapor intrusion issues.

### **Vapor Intrusion Barrier Installation and Preparation of Bid Specifications, Elizabeth, NJ**

Assisted in preparing vapor intrusion barrier bid specifications for submittal to the New Jersey Schools Development Authority (NJSDA). Bid specifications were for Geo-Seal installations at various new school construction sites in NJ. As a certified Land Science Technologies Geo-Seal Inspector, was on site to certify application of the Geo-Seal product and to witness the smoke testing of Geo-Seal installation. With completion of the smoke test, an official certification letter was issued to obtain the 15-year warranty issued by manufacturer of Geo-Seal.

### **Air-Permit Assistance for Quarry Operation, Lafayette Township, NJ**

Provided air-permit assistance for a quarry operation. Assisted in resolving a field notice of violation/notice of potential violations. This included obtaining a 30-day extension to submit a RADIUS permit application and obtaining an approved air permit within 180 days. The RADIUS permit application included three feeder conveyors and one two-bin hopper for crushed stones.

### **Air-Monitoring Plan and Dust Control Mitigation/Monitoring Plan for Sewerage Authority, Hoboken, NJ**

Developed air-monitoring plan and a dust control mitigation and monitoring plan to identify fugitive dust sources at a construction site. Described dust-control measures to be implemented before, during, and after any dust-generating activity for duration of the project. This plan was specifically prepared for the construction activities that were performed during installation of the wet-weather pump station.

### **Recycling Permit Application at Terminal, Elizabeth, NJ**

Completed Class "D" recycling permit application for used antifreeze and oil. Project included conducting a file review and regulatory review; regulatory consulting for Class D Permit; NJDEP solid-waste permitting; obtaining City of Elizabeth zoning approvals; and preparing application for the Union County Solid Waste Plan.

### **Regulatory Compliance at Cogeneration Facilities, Hackettstown and Rockaway, NJ; and Elizabethtown, PA**

Provided regulatory compliance support, which included Title V permitting and negotiation with regulatory agencies. Projects included replacement of the existing cogeneration facility with a Cogen natural gas/No. 2

fuel-oil fired duct burner system. Prior to the Title V Operating Permit renewal, a thorough review of the facility operating procedures was suggested to increase plant operation flexibility for the Hackettstown facility. A specific strategy was developed and negotiated with NJDEP, which allowed the client to obtain a renewed Title V permit with increased plant operation flexibility and minimum disruption to plant operations.

### **Regulatory Compliance Support for Paint Company Sites, US and Canada**

Responsible for regulatory compliance support for US and Canadian facilities, including stack testing, SPCC/Discharge Prevention, Containment, and Countermeasure (DPCC), RADIUS permit applications, Title V, and negotiation with regulatory agencies.

### **Model Simulations for Sewer Study at Petroleum Sites, NJ**

Conducted facility study to determine the cause of periodic sewer-system backups and to define short-term/long-term strategies to prevent sewer overflows from recurring. Based on the model simulations, provided a cost-saving solution to the client, which required less extensive construction than originally planned.

### **Refinery VOC-Emissions Control, NJ**

Developed conceptual designs and operating cost estimates to control VOC emissions from the refinery wastewater treatment system. Design alternatives included fixed and floating covers, thermal oxidizers, and carbon absorption.

### **Regulatory Compliance Support for Biopharmaceutical Company, Somerset, NJ**

Responsible for regulatory compliance support, including right-to-know, Title V permitting, facility audits, and negotiation with regulatory agencies.

### **Regulatory Compliance Support for Pharmaceutical Company**

Responsible for worldwide regulatory compliance support, including development of corporate-wide air standards, permitting, process engineering, consequences modeling, and dispersion modeling.

### **Ambient Air Monitoring at Former Manufactured Gas Plant (MGP) Site, New York City, NY**

Prepared, implemented, and maintained ambient air-monitoring network for an MGP site to comply with community air monitoring requirements. In addition, developed and implemented a pilot test program to test real-time ambient air monitoring technology in conjunction with existing monitoring program.

### **Vibration-Monitoring Program for Historic Structures, NYC**

Developed and implemented a vibration-monitoring program, including vibration monitoring for structures classified as historical landmarks and commercial buildings. Projects were located Brooklyn, midtown Manhattan, and the Historical Landmark District in lower Manhattan.

### **Feasibility Study for Construction of Biofuel Processing Facility, NY**

Worked with local legislators to identify feasible locations to construct a biofuel processing facility. Project involved a feasibility study. Provided engineering support and coordination with the biofuel equipment manufacturer during construction and startup.

### **Heating-Plant Permitting and Multi-Source Modeling at University Campus, MN**

Responsible for obtaining permits for new heating plants, which included cogeneration, according to the Title V program. Tasks included emissions inventory development; multi-source modeling (complex and simple

terrain) for point, area, and volume source, which included SO<sub>2</sub> State Implementation Plan (SIP); netting/offset analysis for SO<sub>2</sub>, NO<sub>x</sub> and total suspended particles (TSP) with a kinetic diameter less than or equal to 10 microns (PM<sub>10</sub>); ambient air-quality analysis; and technical support for environmental impact statement (EIS).

#### **Air Permitting and Computer Model Development at Pharmaceutical Facility, Indianapolis, IN**

Responsible for obtaining air permits for organic synthesis processes. Tasks included developing a computer model to calculate point-source and fugitive emissions. Process included charging, transfers, (gravity, pumped and pressure), depressurizing/evacuation, tank bleed, centrifuge nitrogen sweep, reactor nitrogen sweep, heating/atmospheric distillation, gas evaluation, vacuum distillation, and vacuum drying and blowing lines. Performed stack height analysis, air dispersion modeling, and air-quality analysis.

#### **Consequence Analysis at Resins Plant, Greenville, OH**

Performed off-site consequence analysis for a resins plant. The Process Hazard Analysis Software Tools (PHA<sub>ST</sub>) model was used to verify and compare results from scenarios using Fauske. After model verification, additional studies included determining the wind speed which will result in plume touchdown at the LEL for different chemicals; droplet size; final liquid fraction; liquid and vapor mass; effects of low flow on vapor cloud dispersion; effects of different release durations; and determining ignitable vapor mass at a known ignition point.

#### **Risk Assessment Screening and Air Permitting at Naval Station, Woodridge, NJ**

Performed risk assessment screening, developed emission factors, and prepared air-permit applications for a soil vapor extraction system and groundwater treatment system.

#### **Risk Analysis due to Ruptured Fuel Line at Bulk Storage Facility, Sacramento County, CA**

Determined potential health risks to an adjacent school due to a ruptured gasoline line. Analysis included determination of different fence line concentrations for various wind speeds and stability classes; effects due to winter and summer meteorological conditions; impact from various spill sizes; evaporation and vapor-flow rates for various spill sizes; and ignitable vapor mass at a known ignition point.

#### **Air-Dispersion Modeling, Sugar Creek, MO**

Conducted extensive air-dispersion modeling by utilizing on-site meteorological data for bioremediation operations.

#### **Sustainable Energy Partnership, CA**

Served in a partnership to develop sustainable energy projects utilizing microturbines for universities and other private industries.

## **Training**

Loss Prevention System (LPS)

OSHA HAZWOPER – initial and refresher

10-hr Construction Safety and Health – OSHA

Confined Space Training – OSHA

Secret Security Clearance – Department of Homeland Security

CALPUFF (an air-quality dispersion model)



Air Permit Seminar	American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD)
Air Pollution Meteorology	Plume Rise Model Enhancements (ISC-Prime)
Hazardous Materials Chemistry	SESOIL and AT122D Model
Air Pollution Dispersion Modeling Courses	Liquid Boot Certified Inspector
Noise Seminar	Geo-Seal Certified Inspector
Metro-North Railroad Contractor Safety Training	Safe Driver Training
NYC Transit Track Safety Certification – MTA	First Aid and CPR/AED – American Red Cross



# Douglas Wolf

## Director, Air Quality Services

### LOCATION

Stafford, TX

### EDUCATION

BS, Environmental Engineering  
– California Polytechnic State  
University

### LICENSES/REGISTRATIONS

Lead Verifier of Greenhouse  
Gases – State of California Air  
Resources Board

### AFFILIATIONS

Air and Waste Management  
Association – Central Texas  
Chapter

### EXPERTISE

- Air permitting support
- Regulatory compliance
- Sustainable development/resource management
- Risk assessment
- Environmental due diligence
- Climate change and adaptation
- Odor evaluation

Douglas Wolf is a Director of Air Quality Services with over 40 years of multidisciplinary environmental permitting, compliance, and management consulting experience. He joined GES in 2019. Doug's permitting and compliance expertise includes regulatory negotiation, rule development, risk evaluations, and strategic management leadership, leading to successful acquisition of environmental permits and licensing for many industrial and commercial operations. His management expertise includes direct technical oversight and responsibility for project and program support, including front-end planning, conceptual review, and implementation.

Doug provides due diligence support to clients in the petroleum, chemical manufacturing, cement/aggregate, landfill, transportation, pharmaceutical, government, and energy sectors, having conducted over 100 air-quality compliance reviews throughout his career. His air-quality support services have included preparing technical memoranda and basis-of-design specification, including cost benefit analysis. He also provides National Environmental Policy Act (NEPA) support and evaluation in the areas of air quality, greenhouse gases (GHG), and noise. He has prepared Title V permits for major sources throughout his career, has supported multiple permit renewals, and successfully negotiated permit condition changes and elimination of redundant conditions, leading to more flexible operation, recordkeeping, and reporting.

Doug has developed sustainable business-management-practice plans, including carbon accounting, evaluation of alternative and renewable energy resources, and green initiatives. His greenhouse gas experience has included verification of greenhouse emission inventories, sulfur hexafluoride training to operators of power for the Federal Commission of Electricity in Mexico City, carbon trading and allowance allocation, and strategic oversight. Over a 40-year career span, Doug has managed the permitting effort for over \$1-billion dollars of new- and modified-source facility projects.

## Project Experience

### Regulatory Permitting and Compliance Assessment for Global Building Materials Company, Katy, TX

Prepared Emission Credit Reduction Banking Application for a cement facility in Victorville, CA and reported results to the Regional Director of Environment, in Katy, TX. Work include emission estimation of shut-down sources and compliance with local regulatory rules and regulations. Project was completed on schedule and within budget and provided to client within 10 days of project authorization.

### **Title V Permit Applications for Multiple Power-Generating Facilities, Tracy, Antioch, Pittsburg, Fresno, Hanford, and Lemoore, CA**

Provided technical assistance and support on multiple power projects and prepared Title V permit applications and supported renewal permits for multiple power-generating facilities. Facilities included five 25-MWe pet coke, a 30-MWe biomass, and a 50-MWe coal-fired and 300-MWe natural-gas-fired combined cycle base load and multiple 90-MWe peaking operating units. Work has included Spill Prevention Control and Countermeasure (SPCC) Plans, Stormwater Pollution Prevention Plans (SWPPP), risk management plans (RMP), and other specialized technical studies.

### **Pipeline, Railroad, Water Tank, Airport, and Freeway Air and Risk Evaluations, CA**

Evaluated consequences of accidental releases from multiple pipelines near expanding or new proposed school sites. Evaluated imminent health and safety concerns to students, faculty, and staff within the boundary of the site. Recommended risk-control measures via specific prevention and mitigation procedures including emergency evacuation, identification of set-back distances, and architectural and design considerations. Provided risk evaluation of railroad derailment, airport line of flight patterns, water-tank rupture, and air-quality analysis resulting from congested transportation corridors.

### **Permit and Risk-Reduction Support at Aerospace Component Manufacturing Sites, Berkeley, CA, and Washoe and Clark Counties, NV**

Provided permit support of legacy operations, and risk reduction abatement control design support. Identified and coordinated afterburner installation requirements and oversaw installation activities. Identified carbon adsorption control options and coordinated installation and compliance sampling. Attended Reno-Sparks Nevada Environmental Protection – Air Bureau agency review negotiation meetings leading to flexible operating permits. Supported a third project site location with agency permitting and attended meetings at Clark County Department of Air Quality Management office.

### **Permitting and Environmental Compliance Support for 135,000 bbl/day Refinery, Benicia, CA**

Provided on-site consulting support for permitting to certify environmental compliance with CEQA and CAA requirements. Responsibilities also included SARA Title III reporting, oil movement tracking and compliance evaluation, Title V permit preparation, RMP support, evaluation of site-specific projects, and advising department supervisors of permitting feasibility and preparation of applications for reformulated clean fuel projects. Work also included evaluation of hydrogen sulfide releases into the atmosphere from process vents and emergency safety valves, and performing a complete sulfur balance at refinery. Prepared the refinery's first sulfur balance inventory, requiring knowledge of the refinery's computer PI system and understanding of 13 discrete processes throughout the refinery.

### **Evaluation of Potential Risks of Proposed Natural-Gas Transmission Pipeline on Planned Development, AZ**

Prepared qualitative evaluation of potential hazards posed by a proposed natural-gas pipeline and operations to future residents for adjacent development. Report provided mitigation measures that would be necessary to reduce risk. A similar risk analysis was performed using pipeline-specific data, statistics, and procedures that had been developed by government agencies to determine safe set-back distances from a given pipeline failure event, including leak-explosion and leak-jet fire along the same transmission corridor. Consideration was given for both overpressure risk impacts and thermal-radiation risk impacts.

### **Air-Permit Application for Biodiesel Plant and CEQA Support, Port of Stockton, CA**

Prepared air permit application for a 5-million-gallon-per-year biodiesel plant and provided CEQA support. Project was designed to import non-petroleum fats and oils to meet the objective of minimizing environmental impacts. Biodiesel production process reacts with non-petroleum oil with methanol using the catalyst, sodium methoxide. Following reaction, the resulting material is separated into biodiesel product and glycerol byproduct. Following separation, the biodiesel stream flows through a flash unit to remove residual methanol and water. Methanol is recycled back into the system, whereas the water is recycled on site and reused. Process includes feed-stock import and drying, reactor, settling, flashing, washing, glycerol neutralization, methanol purification, and recovery and storage.

### **Feasibility Study of Biodiesel Production Plant, Santa Rosa, CA**

Prepared feasibility study and pro-forma for potential installation of a biodiesel production plant for the Sonoma County Water Agency. Proposed plant would produce up to 500,000 gallons of biodiesel per year for consumption by the agency and surrounding partners. Biodiesel is registered with EPA and DOE as one of the nation's fastest growing alternative fuels and provides a broad range of environmental, economic, and energy security benefits.

### **Air Permitting and Compliance Support for Expansion Projects, Cupertino, Oakland, Berkeley, San Francisco, and Sunol, CA**

Consulted with and advised client of permit strategies to secure permits for various expansion projects. Work included Title V permitting, evaluation of Cal Accidental Release Program, CERCLA, Toxics Release Inventory (TRI) reporting, Hazardous Materials Business Plan (HMBPs), SPCCs, tank closures, due diligence evaluations, and banking certification.

### **Hazardous Materials Study, City of Fremont, CA**

Led team to study toxic endpoint for various hazardous material release scenarios from facility operations within a half-mile radius of specific study areas. Work included review of existing hazardous material business plans and risk management plans and assessment of most-probable and worst-case release scenarios.

### **Air Emission Inventory, Title V Permit Support, Waste Minimization, and Regulatory Compliance Support at Air Force Base, Edwards, CA**

Provided program support for various task activities. Worked on development of air-emission inventories for Title V reporting, and commuter options to reduce transportation emission footprint on the base. Work included site visits, emission inventory development, oversight of source testing of paint booths and ovens, and risk evaluations.

### **Environmental Permitting and Construction Oversight at Scrap-Recycling Center, Pittsburg, CA**

Obtained site environmental approvals and construction permits for a new recycled scrap-metal loading operation. A use permit and design review permit, grading and building permit, and air permits were obtained from the City of Pittsburg. Provided construction oversight.

### **Personnel Air Monitoring and Health Risk Assessment at Landfill, Alameda County, CA**

Established personnel air-monitoring program and implemented site-specific air monitoring for operators at the landfill. Air-monitoring results were compared with Cal OSHA criteria and reported back to environmental



management at the landfill. Representative samples were taken of selected contaminants of concern. Appropriate personal protective equipment (PPE) was employed at all times.

**Feasibility Study for Solar Energy Farm, Pittsburg, CA**

Prepared feasibility study identifying the economic benefits of installation of a solar energy farm at an industrial landfill site. Evaluation included economic benefit analysis, inclusive of tax and rebate incentives and bonus depreciation. Analysis also included discussion of carbon neutral renewable energy resource and CO<sub>2</sub> credits that would be realized from such installation. Worked with integrators and solar energy companies to cost out solar modules, inverters, and balance of system. Provided cost estimates and assessed net present value and payback periods for system installation and commissioning.

**Air Permitting and CEQA Compliance for Energy Company, CA**

Performed evaluation of emission characteristics and toxicity for combustion of railroad ties and utility poles in combination with biomass fuel. Project support included toxic risk evaluation, amendment suggestions to permit conditions for inclusion of rail ties and utility poles, and an assessment of maximum allowable amount of fuel types that can be used as biomass fuel. Fuel types included sawmill residue, forest residue, urban wood, agriculture residue, and clean construction debris. Analysis included a best available control technology (BACT) evaluation, a maximum achievable control technology (MACT) determination, a health risk assessment, BACT for toxics determination, air-quality modeling for National Ambient Air-Quality Standards (NAAQS), and enhanced amendment to the Title V permit.

**Particulate Fallout Study for Pharmaceutical Company, Berkeley, CA**

Evaluated nuisance and potential health claims associated with particulate fallout of nuisance dust from neighboring foundry. Provided sampling analysis for laboratory evaluation and recommended best management practices.

**Environmental/Health and Safety Audits, Air Permitting, HMBP, SPCC, and Green Pilot Program for Telecommunications Sites, northern CA**

Provided project leadership during site audits of existing call centers, head ends, maintenance facilities, and hubs. Reported directly back to client on findings and recommendations. Where site audits revealed deficiencies, provided project management and oversight for permitting support of internal combustion engines, HMBP support for battery racks, and SPCC support for diesel tanks. Worked closely with industrial hygiene specialists in areas where vapor intrusion issues were evident, including indoor air assessments, and lead and asbestos abatement. Assisted with identifying a green pilot program for Sacramento site locations and assisted in assembling their greenhouse gas inventory and green resource and initiative report.

**Training**

Loss Prevention System (LPS)	Safe Driver Training
OSHA HAZWOPER – initial, refresher, and supervisor	First Aid and CPR/AED – American Red Cross

## James Ryan

### Project Engineer

#### LOCATION

Westford, MA

#### EDUCATION

BS, Environmental Engineering/Industrial Processes – University of New Hampshire

#### EXPERTISE

- Air-quality projects
- GHG emissions projects
- Permitting and compliance
- Sustainability practices

James Ryan is a project engineer with over eight years of experience working primarily on air quality and greenhouse gas (GHG) emissions projects for a variety of clients. He joined GES in 2021. James has technical experience in the following general areas: California Environmental Quality Act (CEQA) GHG and air-quality environmental impact report (EIR) analysis; Title V permitting; GHG inventory development, reporting, verification, and management; California Air Resources Board (CARB) mobile source compliance programs; continuous emission monitoring systems (CEMS) operation for the measurement of NO<sub>x</sub>, CO, SO<sub>2</sub>, and non-methane total hydrocarbons (NMTHC); operating air permits and compliance consultation; source emissions testing in accordance with US EPA stationary source methods; ambient air sampling; Clean Air/Clean Planet emissions management/GHG reduction software; climate action planning; environmental permitting and compliance; hazardous materials and pipeline risk assessments; energy efficiency audits; and sustainability practices.

James has experience with alternative energy projects, which included installing solar hot-water heaters, harnessing methane fuel from decomposition of organic waste, biofuel manufacturing, conversion of a diesel automobile to run on vegetable oil, and sustainable farming practices.

## Project Experience

### GHG Inventory Preparation, Portsmouth, NH

Completed a GHG inventory as part of the city's commitment to the Cities for Climate Protection (CCP) campaign organized by the International Council for Local Environmental Initiatives (ICLEI). This inventory effort accounted for both municipal and community sources of GHG. Data were researched, collected, and used to calculate the city's GHG emissions using the Clean Air and Climate Protection (CACAP) software that was provided by ICLEI to its members. The emissions calculations were assembled into a comprehensive report that outlined the baseline municipal and community emission estimates and proposed GHG reduction measures.

### Title V Renewal and Toxic Emissions Reporting for Cement-Manufacturing Facility, Victorville, CA

Served as project engineer responsible for preparing a Title V Part 70 renewal application for a large cement-manufacturing facility under the jurisdiction of the Mojave Desert Air Quality Control Management District (MDAQMD). The renewal application included updated facility-wide Potential to Emit calculations, completion on all required MDAQMD forms, updates to the compliance assurance monitoring plan, and updating permit language. The facility consisted of a wide range of sources including kilns, crushers, silos, storage piles, mills, backup generators, and mining equipment. The 2020 Toxic Emissions Inventory (TRI) Reporting was also provided for the facility. Toxic emissions calculations were performed and compared to TRI reporting thresholds. Emissions of toxic chemicals in exceedance of the EPA thresholds were reported to the EPA using EPA Central Data Exchange reporting system.



### **Air-Quality Technical Report Preparation, San Francisco, CA**

Served as principal engineer responsible for preparing an air-quality technical report assessing the impacts from a mixed-use development. Prepared the report in accordance with the City of San Francisco Planning Division's Environmental Review Guidelines and the Bay Area Air Quality Management CEQA guidelines. The report served as technical appendix to a mitigated negative declaration for the project.

### **CARB GHG Reporting, Stockton, CA**

Served as principal engineer responsible for reporting GHG emissions to CARB from a power-generation facility.

### **CARB Verification at Glass-Manufacturing Facilities, Tracy, Vernon, and Oakland, CA**

Served as a key member of the verification team responsible for the verification of three glass-manufacturing facilities in California.

### **Stormwater Drainage Study, Riverside, CA**

Authored air quality and GHG sections of a CEQA initial study for a stormwater drainage upgrade project. Analysis was prepared in accordance with South Coast Air Quality Management District guidelines. As part of the initial study, provided air-modeling estimates for the project construction using the California Emissions Estimator Model (CalEEMOD) as well as mitigation strategies for reducing localized particulate matter (PM<sub>10</sub>) impacts.

### **Air-Quality and GHG Impact Analysis at Marine Oil Terminal, Martinez, CA**

Authored air-quality and GHG analyses for the EIR prepared for the marine oil terminal lease consideration. Used US EPA, CARB, and local air district-approved methods to estimate emissions from the construction and operation of the facility, which included emissions from heavy construction equipment and marine vessels. Conducted an impact analysis, per CEQA guidelines, and suggested mitigation for any significant impacts.

### **Mitigated Negative Declaration for Pipeline Upgrade Project, Hillsborough, CA**

Served as project engineer responsible for the air-quality and GHG sections of a mitigated negative declaration for a pipeline upgrade project located along an interstate corridor. Used Bay Area Air-Quality Management District CEQA guidelines in conjunction with CalEEMOD to evaluate the project's air-quality and GHG impacts. During the public comment and review period, served as key engineer responsible for addressing comments from the Bay Area Air Quality Management District (BAAQMD) and San Francisco Public Utilities Commission (SFPUC). As part of the air-quality impact analysis, prepared a health risk screening assessment to evaluate potential risks to surrounding sensitive receptors from diesel particulate matter.

### **Mitigated Negative Declaration for Pipeline Upgrade and Regulator Station Rebuild Project, San Francisco, CA**

Was responsible for the air-quality and GHG sections of a mitigated negative declaration. Used BAAQMD CEQA guidelines in conjunction with the CalEEMOD to evaluate the project's air-quality and GHG impacts. During the public comment and review period, served as key engineer responsible for addressing comments from BAAQMD and SFPUC.

### **CEQA Air-Quality Impact Assessment for Proposed Fuel-Storage and Terminal Facility, Port of Stockton, CA**

Assisted in preparing an air-quality impact assessment, per CEQA guidelines. Used US EPA, CARB, and local air district-approved methods to estimate emissions from the construction and operation of the facility, which included emissions from rail, truck, and marine vessels. Conducted an impact analysis, per CEQA guidelines, and suggested mitigation for any significant impacts.

### **Environmental Impact Report Review for Energy Infrastructure Project, Pittsburg, CA**

Provided technical review of the air-quality and GHG resource sections of an EIR for an oil terminal. The review focused on air emissions from construction, ocean-going vessels, and storage tanks.

### **Environmental Impact Report Review for Marine Oil Terminal, Martinez, CA**

Provided technical review of the air-quality and GHG resource sections of an EIR for a marine oil terminal used to transfer crude oil from tanker vessels to a tank farm immediately upland. The review focused on air emissions from increased throughput at the facility, and included performing air-emission estimations from ocean-going vessels and locomotives. Also provided responses to the BAAQMD's public comments.

### **Title V Permit Application and Regulatory Compliance at Fiberglass Manufacturing Facility, Willows, CA**

Prepared Title V Part 70 operating permit renewal application. Responsibilities included preparing potential-to-emit emissions inventory for both criteria and hazardous air pollutants, an applicability analysis for federal (NSPS and NESHAPS), state, and district regulations, and the development of a compliance assurance monitoring plan. Authored a source test protocol for the facility's annual compliance source test.

### **GHG Emissions Verification Inventory Management Plan at Casino, Las Vegas, NV**

Served as a key member of the verification team responsible for verifying carbon disclosure project (CDP) GHG inventory submittal. Verification was performed in accordance with the California-mandatory GHG reporting regulation. Developed updated GHG inventory quality management plan in accordance with the World Resources Institute's GHG protocol. Authored a "Scope 3" emissions analysis, which evaluated the relative benefits of reporting each of the Scope 3 emissions categories, as defined by the CDP.

### **Federal and State GHG Reporting for Power-Generating Facilities, CA**

Completed both federal and state GHG reporting for eight power-generation facilities throughout the state of California using the e-GGRT and Cal e-GGRT reporting tools.

### **Audit of CARB Mandatory Greenhouse Gas Reporting at Cement Facilities, CA**

Performed audit activities, including site visits and interviews with facility personnel, to evaluate the procedures used to report GHG emissions from three cement facilities. The GHG emissions reported to CARB required third-party verification and were ultimately used to determine direct allocation of allowances under California's greenhouse gas emissions cap-and-trade program. Evaluated the existing reporting system due to concerns over the validity and conformance of current procedures.

### **Federal GHG Reporting at Landfill, Pittsburg, CA**

Completed US EPA GHG reporting for the landfill using the e-GGRT reporting tool.

### **Federal/State GHG, AB 2588 Air Toxics, and Toxics Release Inventory (TRI) Reporting, Roseville, CA**

Completed both US EPA and CARB GHG reporting, AB 2588 air toxics reporting, and TRI reporting for a semiconductor manufacturing facility.

### **Verification of Reported GHG Emissions to the Carbon Disclosure Project, Las Vegas, NV**

Served as a primary verifier for the GHG emissions verification of over 40 facilities operated by a large entertainment/hotel company. The GHG emissions were reported to the Carbon Disclosure Project and verified using CARB verification methodology.

### **Spill Prevention, Control, and Countermeasure (SPCC) Plan Update and CARB Compliance Support/Consultation at Steel-Manufacturing Facility, Oakland, CA**

Updated facility's SPCC plan to reflect the facility's operational changes as well as changes in the regulation. Provided support and consultation with regard to CARB's portable equipment regulation, off-road rule, drayage truck regulation, and mobile cargo-handling rule, which included meeting with CARB to negotiate compliance action, providing engineering justification for exemption applicability to heavy machinery operation at their facility, as well as ongoing compliance support while the regulation continued to be phased in.

### **Climate Change Element Conformance Analysis, Livermore, CA**

Served as primary engineer responsible for evaluating a large residential development project's conformance with the climate change element of the City's general plan. This project was primarily a verification of the project's adherence to the CalGreen Building Code Tier 1 Standards.

### **CEQA Climate Change Analysis for Proposed Biomass Power-Generation Facility, Encinitas, CA**

Provided a climate change analysis of the potential GHG emissions resulting from a proposed biomass energy project compared to a "business as usual" alternative. Methodologies employed included a comprehensive inventory of potential emissions from the proposed facility, analysis of mobile source emissions due to biomass transport mileage reductions under the proposed project, and modeling of landfill GHG emissions.

### **Energy and Co-Benefits Analysis for Biomass Power-Generation Facilities, Delano and Anderson, CA**

Served as primary engineer responsible for performing an energy and co-benefits analysis for a biomass power-generation facility. The analysis was performed per CARB's regulation for energy efficiency and co-benefits assessment of large industrial facilities. The analysis provided the client potential energy saving measures and a cost-benefits analysis to aid in the assessment of implementation feasibility.

### **Air-Permitting Support, Cupertino, Oakland, Berkeley, Port of San Francisco, and Sunol, CA**

Provided third-party review of the air-quality section of the State Land Commission (SLC) draft EIR for a sand-mining lease renewal, as well as continued permitting support for several "authority to construct/permit to operate" applications.

### **Air Permitting and Risk Assessments, Pittsburg, CA**

Assisted with consultation and project support in compliance activities, permitting, and major facility review permitting. Support included on-site preparation of hazardous material business plans, monthly CEMS reports, biannual hazardous waste reports, Title V renewal application, and other permit applications. Provided a cost-benefit analysis outlining how specific modifications to the facility's air-pollution abatement system would increase production while also maintaining compliance with the Title V permit.

### **Environmental Exposure Assessment for Research and Development (R&D) Laboratory for Leading Solar-Panel Developer/Manufacturer, San Jose, CA**

Served as lead staff engineer to provide an environmental exposure assessment for a future R&D laboratory. The assessment included completion of all environmental applications and/or notifications as required by applicable local, state, and federal environmental regulations /ordinances /statutes/rules; determination of acute and/or chronic risk to adjacent sensitive receptors located near the proposed R&D site using dispersion and toxic release modeling; identification of acceptable risk base and exposure levels of concern; support with mitigation and/or modified abatement design considerations to achieve acceptable risk, if applicable; and determination of permitting requirements under BAAQMD Regulation 2 Rule 1 or Regulation 2 Rule 2.

### **Air-Permit Modification for Concrete Aggregates Company, Contra Costa Valley, CA**

Assisted in adjusting the permitted throughput limits such that they remained a minor source designation for NOx and volatile organic constituents (VOCs), according to local air district regulations, and avoided costly fees. Conducted calculations and proposed a permitted throughput adjustment for each facility, which were approved by the local air district.

### **Stage 2 Natural Gas and Water Pipeline Risk Analysis for a Proposed School Site, Los Angeles, CA**

Conducted a Stage 2 pipeline risk analysis to develop a quantitative estimate of risks posed by both a natural gas and water pipeline in the vicinity of a proposed school site. The analysis was performed in accordance with the California Department of Education Pipeline Risk Guidance Protocol.

### **Stage 2 Water Pipeline Risk Analysis for a Proposed School Site, Santa Ynez, CA**

Conducted a Stage 2 pipeline risk analysis to develop a quantitative estimate of risks posed by two water pipelines in the vicinity of a proposed school site. The analysis was performed in accordance with the California Department of Education Pipeline Risk Guidance Protocol.

### **Stage 2 Natural Gas Pipeline Risk Analysis for a Proposed School Site Renovation, Anaheim, CA**

Conducted two Stage 2 pipeline risk analyses for two school sites to develop a quantitative estimate of risks posed by natural gas and water pipelines in the vicinity of the school sites. The analyses were performed in accordance with the California Department of Education Pipeline Risk Guidance Protocol.

### **Exhaust Emission Impacts Study at University Campus, Chico, CA**

Monitored, assessed, and reported exhaust emission impacts upon students and employees from three recently-installed on-campus natural-gas fired boilers.

### **Air Permitting Constraints Analysis, Richmond, CA**

Performed an air permitting constraints analysis for a potential crude-oil transloading project, which identified all construction-related and operational-related air impacts, and permitting and regulatory compliance tasks that would need to be addressed as the project was completed.

### **Regenerative Thermal Oxidizer Permitting and Title V Delist Analysis, Merced, CA**

Prepared the permit application for the installation of a regenerative thermal oxidizer unit as well as a study to determine the variability of Title V applicability upon varying degrees of source unit control.



## Training

Loss Prevention System (LPS)

OSHA HAZWOPER – initial and refresher

## Presentations/Seminars

Ryan, J. "CEQA Climate Change Analysis for Proposed Biomass Power-Generation Facility, Encinitas, CA,"  
Greenhouse Gas Strategies in a Changing Climate Convention, San Francisco, CA, November 2011.

Ryan, J. "Cities for Climate Protection Campaign Summary Report, Portsmouth, NH," City of Portsmouth  
Planning Department Eco-Municipality Meeting, Portsmouth, NH, September 2007.

## Professional History

Senior Staff Environmental Engineer/Environmental Scientist at TRC Environmental

Greenhouse Gas Reporting Intern at City of Portsmouth, NH