2024 ITRC Project Proposal

Proposed Project Title

ITRC Vapor Intrusion Pathway Evaluation and Mitigation Update and Compilation

State Team Leaders

Matthew Williams, Michigan Department of Environment, Great Lakes, and Energy

Kelly Johnson, North Carolina Department of Environmental Quality

Rafat Abbasi, Chief, Discovery and Enforcement Program, Department of Toxic Substances Control, Site Mitigation and Restoration Program

Proposal Contacts

- Matthew Williams, Michigan Department of Environment, Great Lakes, and Energy, williamsm13@michigan.gov
- Rafat Abbasi, Chief, Discovery and Enforcement Program, Department of Toxic Substances Control, Site Mitigation and Restoration Program, rafat.abbasi@dtsc.ca.gov
- Gina Plantz, Haley & Aldrich, gplantz@haleyaldrich.com
- Robbie Ettinger, Geosyntec, rettinger@geosyntec.com
- Matt Lahvis, Shell Projects and Technology (US), matt.lahvis@shell.com

Abstract

The challenges and uncertainty associated with evaluating the vapor intrusion (VI) pathway has led to inconsistencies in decision-making at all levels of assessment and mitigation. Since the first ITRC Team was formed in 2004, ITRC has been on the leading edge of addressing technical challenges and educating stakeholders. Through ITRC's VI guidance documents, it provided the best practices for evaluating and mitigating the pathway so that challenges and uncertainties can be minimized. In this almost 20-year period, many new complex challenges have been identified. In the last 10 years alone, significant advancements in the science surrounding VI have been made to address those uncertainties and challenges.

This project will update with the latest science and bring together in one electronic document ITRC's VI documents and products that include: Vapor Intrusion Pathway: A Practical Guideline (VI-1, 2007); Vapor Intrusion Pathway: Investigative Approaches for Typical Scenarios (VI-1A, 2007); Petroleum Vapor Intrusion: Fundamentals of Screening, Investigation, and Management (PVI-1, 2014); and ITRC's VI Mitigation Team Products (VIM-1, 2020).

Problem Statement & Importance to the States and Broader Environmental Community

In 2004 ITRC began and in 2007 published Vapor Intrusion Pathway: A Practical Guideline (VI-1, 2007) and Vapor Intrusion Pathway: Investigative Approaches for Typical Scenarios (VI-1A, 2007). VI-1 and VI-1A provided a generalized framework for evaluating the pathway and provided a description of the various tools available at the time for investigation, data evaluation, and mitigation. Together, these

documents were considered the gold standard for everything related to VI and served as the foundation of guidance documents throughout the United States as well as several other countries. After 2007, ITRC produced additional information to supplement the original material which resulted in the 2014 Petroleum Vapor Intrusion: Fundamentals of Screening, Investigation, and Management (PVI-1) and the 2020 production of multiple Technical ("Tech") Sheets and Fact Sheets about Vapor Intrusion Mitigation (VIM-1) to further assist in keeping up with the latest information. Though these documents did provide new and additional information, they never fully updated the original foundation on which they were built, making much of the information contained in prior ITRC guidance documents outdated today. ITRC recognition of this issue can be seen when accessing either VI-1 or VI-1A through the library available on its website that states: "*Warning! This document has not been amended since publication. Some content may be out of date and may no longer apply.*"

Currently, there is not a single source of information available that provides the framework and guidance using the latest science about VI that the original ITRC guidance documents did. This has resulted in once again, federal and state regulators, industry, practitioners, redevelopers, and the public being challenged or encumbered by the uncertainties in the VI risk assessment process due to conflicting information based on the latest studies as well as potentially unnecessarily mitigating various structures due to some of the conservancy built into the original VI guidance document which is now known to exist. This has caused many organizations to seek guidance elsewhere.

This proposal seeks to coalesce this science with the information contained in the previous ITRC documents into a new comprehensive updated guidance document in an electronic format. This document will serve as a consensus-based framework and best practice for VI risk assessment and mitigation for both chlorinated and petroleum hydrocarbons. The document will be electronic and include web-tools and videos to facilitate the information transfer. The updated guidance document will support numerous stakeholders challenged or encumbered by the uncertainties in VI risk assessment, including federal and state regulators, industry, practitioners, redevelopers, and the public.

Advancements in vapor intrusion and peer reviewed science that are proposed for inclusion in the new guidance document includes numerous items, such as:

- Significance of factors that may influence vapor intrusion (i.e., where and when to sample; seasonality, lag times and offset distances between indoor air and subsurface vapor sampling; HVAC operation; building and soil types, sample depth);
- Investigation approaches including rapid diagnostic tools for site assessments including building pressure cycling and radon.
- Use of attenuation factors for site screening based on recently published empirical studies and use of ongoing updates of 2017 USEPA Johnson and Ettinger (J&E) spreadsheet/model.
- Application of a multiple lines of evidence approach for site-specific decision-making.
- Methods and tools to support design and assessment of VI mitigation systems (e.g., long-term operation, maintenance, and monitoring of sub-slab depressurization systems; subsurface vapor mitigation systems, and use of radon as a performance standard for mitigation systems).
- VI implications related to environmental justice, brownfield redevelopment, sustainability (reducing CO2 footprint).

Additional information that will be considered for inclusion will be based on a proposed state-wide survey to identify other issues that need to be considered as part of the guidance document update process. It is anticipated that most of updating would involve the content VI-1 and PVI-1, the older two guidance documents.

The intended audience of this project proposal is staff from state and federal government, consultants, practitioners, and academia. The guidance would also be useful to risk managers, engineers, geologists, hydrologists, and other scientist practitioners working investigation and mitigation of risks to contaminants associated with the VI pathway.

Project Deliverables

The project deliverable includes a single updated ITRC Technical Regulatory Guidance Document that is accessible through ITRC's website. This Technical Regulatory Guidance Document will consist of an overview of VI as well as the preliminary screening of sites, site investigation, and mitigation strategies for both petroleum and chlorinated vapor intrusion. It will also incorporate web-based tools to aid in implementing the various processes associated with vapor intrusion including the use of multiple lines of evidence.

This project is expected to take 24 months to complete. Internet-Based Training (IBT), training videos, and in-person classroom training will be recommended separately in an ITRC proposal as the completion of this project nears.

Additional Information

Strong support and interest for this project already exists within the regulatory community as is evidenced by the combined effort of professionals from state and federal regulatory agencies, consultants, industry, and stakeholders that have participated on previous ITRC VI Guidance Documents, which each team typically exceeded over 200 individuals. In addition, current internet-based trainings on VI mitigation consistently have over 500 registrants and draws interest from across the US, as well as internationally.

The opportunity to participate on ITRC's VI guidance documents has consistently brought in new members to ITRC and broaden its outreach. Currently over 20 regulatory agencies have already indicated their interest in participating from states or regions that include: Alabama, California (including local DTSC and local and regional WCBs), District of Columbia, Indiana, Kentucky, Maine, Michigan, Minnesota, New Jersey, North Carolina, Ohio, Oregon, South Carolina, Virginia, Washington, and Wisconsin in addition EPA and several other federal agencies. Multiple consultants and national subject matter experts are also expected to participate in addition to Robbie Ettinger, Matt Lahvis, and Gina Plantz who are part of this proposal.

Ensuring that this proposal will be successful and completed within the identified timeframe will require collaborative problem solving and decision making. The team will be led by three team leaders to ensure the success of the project.

The teams historical experience with experts in VI supports the adage "*...if you bring the appropriate people together in constructive ways with good information, they will create authentic visions and strategies for addressing the shared concerns of the organization or community*." Using a format that has been effectively applied in the past, this team will be formed using a multidivisional-based organization structure that forms topic specific sub-groups to assist in the project's success. Each sub-group will be led by co-leaders that include a member of the regulated community as well as a regulator to ensure both perspectives are considered. This will allow an organizational structure that segregates the team into close-knit groups that address particular goals and topics that align with a member's experience, interest, and background.

It is estimated that there will be 5 groups that are centered around the following:

1) Site Screening and Risk Assessment
2) Sampling approaches and tools for Site Characterization
3) Sociopolitical Factors
4) Emerging Chemicals Substances
5) Mitigation/Remediation

Though the scope of this proposal may seem broad and aggressive, the use of these groups will make the over objective of upgrading each of these documents into one obtainable. Also, by addressing all three documents at once, ITRC will actually reduce the overall workload if they were to be individually upgraded as there is a lot of similar information that is shared between chlorinated VI and PVI. Furthermore, the use of ITRC's web-based electronic format will allow users to access the information that is necessary to be successful on a project regardless of the site conditions or contaminants present and when necessary, allow future upgrades easier.