
San Francisco Bay Regional Water Quality Control Board

Fact Sheet: Development on Properties with a Vapor Intrusion Threat – July 2019

The San Francisco Bay Regional Water Board (Regional Water Board) oversees an increasing number of cleanups at properties where volatile organic compounds (VOCs) are present in soil vapor and development is occurring. These VOCs can pose a health threat to building occupants if they migrate into buildings through vapor intrusion (VI). We will continue to require site cleanup where threats to human health or the environment exist. However, we recognize that achieving cleanup standards may take years given currently available remedial technologies, and therefore interim protective measures may be needed. Typically, VI mitigation systems (VIMS) are installed in the interim to mitigate VI threats. VIMS are not a substitute for cleanup. Operation, maintenance, and monitoring (OM&M) and agency oversight are typically warranted to ensure effectiveness. The Regional Water Board's approach to regulating VIMS has evolved since the 2014 release of our *Framework for Assessment of Vapor Intrusion at TCE-Contaminated Sites in the San Francisco Bay Region* (VI Framework). This fact sheet is intended to provide developers, cities, homeowners associations, and the public a summary of expectations for development at sites where VI may pose a threat.

Types of VIMS

Traditional VIMS for the soil vapor intrusion pathway can be divided into two main categories: Subslab Depressurization Systems (SSDS) and Vented VIMS. SSDS rely on active electromechanical means to divert subslab vapors and generate a constant negative pressure beneath a building's slab foundation to prevent contaminated vapors from migrating up into the building. Vented VIMS rely on passive or active mechanisms (e.g., thermal gradients, wind driven ventilation, or powered fans) to dilute vapors beneath the building and vent them into the outdoor air.

Updated Approach to VIMS

In the 2014 VI Framework, the Regional Water Board expressed a preference for passive venting systems, which have fewer moving parts and potentially require less maintenance, and we typically did not require monitoring after occupancy. Since 2014, our concerns about long-term effectiveness of VIMS have increased due to awareness of failures and limited monitoring at buildings with VIMS. We now prefer SSDS for slab on grade design because they provide greater protection and allow for simpler monitoring.

In 2019, the Regional Water Board also updated our approach to VI assessment by providing more stringent soil gas and groundwater VI Environmental Screening Levels (ESLs) based on empirical attenuation factors rather than those determined using the Johnson and Ettinger VI model. We also updated the ESL guidance to recommend verification of VI model predictions and evaluation of the sewer/utility conduit air pathway. See the [ESL Webpage](#) for more information.

Evaluating Effectiveness

For vented VIMS, ongoing monitoring of contaminant concentrations (subslab and/or indoor air) is needed to demonstrate effectiveness. Long-term monitoring of indoor air can be problematic because it requires access permission, is intrusive to occupants, and data interpretation can be challenging due to confounding factors from indoor and outdoor sources of VOCs. For SSDS, the measurement of cross-slab vapor pressure differential can be used to monitor if subsurface vapors are migrating into the building. Pressure differential monitoring can provide real-time, continuous readings more cost effectively than indoor air monitoring. This reduces the need for long-term indoor air monitoring except as a contingency measure.

Evaluating Operational Lifetime

The Regional Water Board encourages active cleanup to reduce or eliminate the ongoing need for VIMS. Therefore, the operational lifetime of the VIMS is related to the cleanup timeframe and may be years to decades until the VI threat is abated. OM&M and Regional Water Board oversight are needed for the entire duration to ensure

protectiveness. The operational lifetime of the VIMS will depend on site-specific data on the VI threat. An estimate of the operational lifetime should be included in the VIMS plans. The operational lifetime of the VIMS should be reevaluated as part of long-term monitoring reports and 5-year reviews conducted under our oversight. Soil vapor monitoring near the source of pollution where the VIMS is installed provides the best evidence to evaluate the VI threat and evaluate when VIMS are no longer needed. VIMS operation can be discontinued when we determine that the VI threat has ceased.

Regional Water Board Oversight

For cases under Regional Water Board oversight, we should be informed early in the development planning process of VI issues and the need for VIMS. When we concur that VIMS are necessary, we will typically need to review the documents summarized in Table 1, below. All documents should be prepared under the direction of an appropriately licensed professional. In addition, some documents will also require approval by local agencies including, but not limited to; the local building department, local environmental health agency, air quality agency, and local water agency. Local building departments routinely rely on regulatory oversight agency concurrence with milestone documents before granting building permits or approving occupancy.

Table 1. Documents Needed for a VIMS

Document Title	Milestone
VIMS Plan(s) – Including VIMS design, OM&M, contingency plans, and financial assurance.	Pre-construction
VIMS Construction Completion Report – Including as-built drawings	Post-construction and pre-occupancy
Long-Term Monitoring Reports	Ongoing post-construction
Five-Year Review Reports	Every five years post-construction

Financial Assurance

Financial assurance is typically required to ensure sufficient funds are available to operate, maintain, and monitor the VIMS, and pay regulatory oversight cost recovery for the anticipated operational lifetime of the VIMS. Prior to construction, a financial assurance mechanism should be created to fund costs associated with the VIMS (e.g., OM&M, reporting, potential contingency measures, Regional Water Board oversight). Financial assurance may be in the form of a trust fund, surety bond, letter of credit, insurance, corporate guarantee, qualification as a self-insurer by a financial means test, or other acceptable mechanism. A detailed cost estimate should be provided to quantify the amount of the financial assurance needed and should be based on the length of time that residual contamination may pose a vapor intrusion risk, up to 30 years.

Expectations for Regulatory Review Timeframes

For planning purposes, assume the Regional Water Board will need 60 days per submittal for review. Actual review times may vary depending on workload and project complexity (e.g., alternative designs, site complexity). Expectations for our oversight and review timeframes should be explicitly discussed with the site's case manager.

Questions or Comments

For general questions about our VIMS guidance, contact ESLs.ESLs@waterboards.ca.gov. For questions regarding a specific site, contact the Regional Water Board case manager. Contact information for the case manager can be accessed on the [GeoTracker](https://geotracker.waterboards.ca.gov/) database (<https://geotracker.waterboards.ca.gov/>). To request oversight on a project, refer to the "Requesting Oversight" information and complete the new case application on our [Site Cleanup Webpage](https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/sitecleanupprogram.html#RequestingOversight) (https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/sitecleanupprogram.html#RequestingOversight).