County of Santa Cruz

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Vapor Intrusion Mitigation Systems Guidance Document

The County of Santa Cruz Environmental Health Division's (CSCEHD) Environmental Cleanup Program (ECP) is responsible for reviewing technical reports, providing regulatory oversight, and approving mitigation measures associated with contaminated sites. Some sites exhibit unacceptable indoor air risks during site characterization and/or remedial actions. In these instances, indoor air mitigation response actions can be implemented for buildings to interrupt or monitor the vapor intrusion pathway and to ensure public safety until the source of chemical concentrations causing the vapor intrusion risk has been restored to concentrations at or below levels considered safe for human exposure. Sometimes the appropriate indoor air mitigation response action requires the design and installation of a Vapor Intrusion Mitigation System (VIMS). Because of the specialized nature of a VIMS, a qualified professional may be retained by the CSCEHD to assist the Health Officer in determining the adequacy of the engineering and/or institutional controls proposed in the VIMS to protect human health and/or the environment. The cost of the services provided by the CSCEHD and CSCEHD's qualified professional will be at the sole expense of the Responsible Party (SCCC, Chapter 7.100.340).

The CSCEHD ECP's technical review of VIMS general considerations and installation shall be done in accordance with California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) and California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SFBR) guidance (see References Cited). The review components of VIMS submittals may include, but may not be limited to the following:

1. **Professional licensure requirements.** All VIMS should be designed, built, installed, operated, and maintained in conformance with standard geologic, engineering, and construction principles and practices using appropriately licensed and registered professionals.

2. **Stronger preference for cleanup**. ECP typically requires cleanup (i.e., remediation) of the source of contamination, instead of mitigation (e.g., VIMS). VIMS are considered short-term solutions to provide protection while active cleanup is ongoing. ECP may consider exceptions if contamination is from an off-site source or regional contaminant plume. For more information on development/construction over chemically impacted areas, please see the CSCEHD ECP Standards.

3. **Redundant VIMS designs**. ECP typically requires vapor barriers (liners) coupled with a subslab venting (passive) or depressurization (active) system to remove vapors that accumulate below a building. Subslab Depressurization Systems (SSDS) that rely on active electromechanical means to divert subslab vapors and generate a constant negative pressure beneath the building's slab foundation to prevent contaminated vapors from migrating up into the building. SSDSs are generally more preferred for slab on grade design because they provide greater protection and allow for simpler monitoring (CRWQCB-SFBR, 2019).

4. **Pre-occupancy verification**. Municipal building departments often rely on our input when granting occupancy for new buildings. Verification of VIMS installations by testing vapor below and above the slab is required before ECP can conclude that a VIMS is working as designed.

5. **Ongoing monitoring**. If ECP determines that vapor concentrations beneath the VIMS represent a potential risk to human health, monitoring will be required. SSDSs can be monitored with pressure sensors that can send real time notifications if the system fails. Subslab vapor and/or soil vapor are required to be sampled periodically to evaluate the need for and the effectiveness of the VIMS. Indoor air samples may also be required to verify VIMS effectiveness or if potential vapor intrusion is suspected.

6. **OM&M and contingency planning**. An operation, maintenance, and monitoring (OM&M) plan is required for all VIMS and must occur through an enforceable mechanism, such as a land use covenant (LUC), and costs associated with OM&M should be the responsibility of the responsible party/site owner and identified in the enforceable mechanism. This plan should also include a contingency plan if monitoring shows that the VIMS is not working as designed. The contingency plan must include specific measures to correct the problem in a timely manner.

7. **Financial assurance**. VIMS may be needed for years to decades following installation. A mechanism to fund ongoing OM&M should be established before a VIMS is installed, especially at redevelopment projects. The responsible party/site owner should establish and maintain a sufficient and enforceable financial assurance mechanism for costs associated with implementation of the VIMS response action, OM&M activities, LUC compliance, regulatory oversight, and any other applicable costs associated with the implementation and use of the VIMS.

8. **Long-term ECP oversight**. Monitoring and case oversight will continue if soil gas measurements show that there is a vapor intrusion risk. Site closure will be driven by actual risk reduction at the Site. Active cleanup of source contamination can help reduce the project lifecycle.

The CSCEHD staff and/or qualified professional will perform site visits and make additional inquiries as needed for an appropriate understanding of the specific site conditions.

If CSCEHD retains a qualified professional, the qualified professional will prepare and submit a technical memorandum to CSCEHD summarizing the components of the review and providing technical comments regarding the VIMS. Comments will be presented as explicitly as possible (e.g., suggestions or examples may be provided) to ensure that all comments are successfully addressed by the VIMS designers. The CSCEHD's qualified professional will be available to discuss memorandum and/or attend meetings as needed with the CSCEHD, Responsible Party, Responsible Party's consultant, the public, and/or others regarding the VIMS and technical review.

REFERENCES CITED

California Environmental Protection Agency / Department of Toxic Substances Control (CalEPA/DTSC). 2011. *Vapor Intrusion Mitigation Advisory, Final, Revision 1*. October 2011, 71 p.
https://dtsc.ca.gov/vapor-intrusion/

California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SFBR). 2019. *Fact Sheet: Development on Properties with a Vapor Intrusion Threat – July 2019*. July 2019, 4 p.
https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html

Santa Cruz County Code (SCCC). *Chapter 7.100, Hazardous Materials/Hazardous Waste/Underground Storage Tanks*. 7.100.340. 21 p.
http://scceh.com/Portals/6/Env_Health/hazardous_materials/Chapter7-100.pdf