

Memorandum

To: Cleanup Program Management Team

From: Engineering Work Group, Sarah Greenfield, P.E., Heidi Nelson, P.E., Erin McDonnell, P.E.

Date: July 24, 2019

Subject: Engineering Review of Vapor Intrusion Mitigation Systems

Purpose

This memorandum is intended to assist Oregon Department Environmental Quality (DEQ) project managers in the evaluation and approval of engineering controls at cleanup sites with unacceptable vapor intrusion risk. This memorandum also serves to clarify what constitutes an engineering control and when to engage a professional engineer.

Applicability

This memorandum applies to cleanup sites where engineering controls are used to mitigate an unacceptable vapor intrusion risk. A cleanup project may be regulated under one or more programs, collectively referred to as Cleanup Program: Cleanup, Emergency Response, Leaking Underground Storage Tank (LUST) and Heating Oil Tank (HOT).

Background

Soil and groundwater contaminated with volatile organic compounds may produce an unacceptable vapor intrusion risk to building occupants. Engineering controls are often used to mitigate these risks, typically in conjunction with institutional controls. Engineering controls may include sub-slab or sub-membrane depressurization systems, sub-slab venting (passive or active), soil vapor extraction, a vapor barrier or enhanced building ventilation. Institutional controls may consist of maintaining engineering controls, site use restrictions, contaminated media management plans, periodic monitoring or notification requirements.

DEQ project managers should engage a Cleanup Program engineer when evaluating vapor mitigation systems, including:

- Sizing system components such as piping and fan/blowers
- Specifying engineered materials such as underlayment geotextiles and vapor barrier membranes
- Installation of an engineering control including subgrade preparation, seam and penetration sealing, system testing and /or startup testing
- Conducting system performance evaluations
- Preparing long-term operation and maintenance plans

In terms of engineered materials, a growing catalogue of vapor barriers (or membranes) are available and marketed as effective options to mitigate vapor intrusion. Several factors including composition (chemical resistance, permeability, durability, strength) and thickness is a short list of considerations in selecting an appropriate vapor barrier for a site.



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Keep in mind, products not previously considered by a Cleanup Program engineer will require a more detailed evaluation of the material's physical and chemical properties to determine suitability as a vapor barrier, especially when used as a sole engineering control.

Stamping of Documents Submitted to the Cleanup Program

Final documents containing original engineering work that are submitted to the Cleanup Program must be stamped by the Oregon professional engineer (P.E.) in responsible charge of that work, as specified in Oregon Revised Statute (ORS) Chapter 672 and Oregon Administrative Rule (OAR) 820.¹

Key Points

- Environmental consultants employed by property owners, developers or potential responsible parties should engage an Oregon registered P.E. in evaluating vapor mitigation systems.
- DEQ project managers should engage a Cleanup Program engineer in evaluating proposals for vapor mitigation systems and reviewing pertinent documents (workplans, corrective action plans, feasibility studies, remedial action plans, construction completion reports, monitoring and maintenance plans and similar documents).
- Site-specific conditions will determine the nature of the engineering control or combination of controls to achieve protectiveness.
- Verification of the performance and effectiveness of a selected mitigation system is necessary for long-term risk management.
- DEQ will not issue Agency decision documents, such as records of decision, certificates of completion and no further action letters, unless the supporting documents have been stamped by an Oregon registered P.E., in accordance with ORS 672 and OAR 820.

Additional Resources

The relevant guidance document for vapor intrusion in buildings is DEQ's [2010 Guidance for Assessing and Remediating Vapor Intrusion in Buildings](#). While DEQ intends to update this guidance to incorporate the latest understanding of how to evaluate and address risks related to vapor intrusion, it remains the most comprehensive reference for DEQ cleanup project managers. Additional vapor intrusion guidelines are available, including publications by the U.S. Environmental Protection Agency (EPA) and the Interstate Technology & Regulatory Council (ITRC).

DEQ has recently prepared an Internal Management Directive (IMD) concerning [Professional Stamping of Cleanup Program Documents](#). Oregon Revised Statute 672 requires certain geologic and engineering documents to be "stamped" with the seal of the registrant with responsible charge for the work. The IMD addresses documents prepared by external parties, agency staff and agency contractors. The IMD formalizes the approach



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¹ Oregon State Board of Examiners for Engineering and Land Surveying (OSBEELS) regulates the practice of engineering, land surveying, photogrammetric mapping, and water right examination in the State as they relate to the welfare of the public in safeguarding life, health and property. Practice of engineering is identified in ORS 672 and OAR 820.

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for identifying work that may require stamping by a registered geologist or professional engineer, assigning the work to appropriate staff and determining whether the work product will be stamped. The IMD emphasizes the need for supporting documents, such as those prepared by environmental consultants, to be stamped before DEQ issues decisions such as Records of Decision and No Further Action determinations.

Disclaimer

This memorandum and any referenced IMDs are intended solely as guidance for DEQ employees. It does not constitute rulemaking by the Environmental Quality Commission and may not be relied upon to create an enforceable right or benefit, substantive or procedural, enforceable at law or in equity, by any person. With written managerial approval, DEQ employees may deviate from these directives. DEQ anticipates revising IMDs from time to time as conditions warrant.



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