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California issues draft guidance for vapor intrusion to indoor air

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California environmental agencies recently issued a draft vapor intrusion guidance document that will significantly impact the investigation and remediation of environmentally impacted properties by owners, operators and potential buyers.

The guidance document will also impact real estate deals and development involving those properties.

The California State Water Resources Control Board, San Francisco Regional Water Quality Control Board and California Department of Toxic Substances Control released their "Draft Supplemental Guidance: Screening and Evaluating Vapor Intrusion" for public comment on Feb. 14.[1]

The draft guidance attempts to standardize and render consistent the approach that various California environmental agencies with overlapping jurisdiction take regarding vapor intrusion.

If promulgated in its current form, this guidance document could make regulatory compliance for these properties significantly more difficult, expensive and time-consuming.

Real estate and environmental lawyers, property owners and developers, and environmental consultants should accordingly familiarize themselves with the draft guidance. They may also wish to advise potentially affected clients of the likely implications and the June 1 public comment deadline.

BACKGROUND REGARDING VAPOR INTRUSION

Vapor intrusion occurs when certain volatile chemicals released to the ground or subsurface contaminate soil or groundwater. Gases formed from the volatilization (i.e., evaporation) of these chemicals can migrate up through soil and into buildings and homes via basements, crawl spaces, cracks in foundations, sewer lines, gaps around utility lines and other pathways.

Chemicals that can cause vapor intrusion include trichloroethylene, also referred to as TCE, and tetrachloroethylene, which is also known as PCE. These solvents are commonly used by dry cleaners and as industrial degreasers in manufacturing and metal degreasing processes.

Various agencies have identified them as carcinogenic or potentially carcinogenic and harmful to human health in other ways. Benzene, which is associated with releases of gasoline and diesel fuel, is also volatile. It has been deemed carcinogenic and can cause vapor intrusion.

Historically, regulators were primarily concerned with subsurface chemical impacts to groundwater that might be used as drinking water or for other purposes. But some of that focus is now shifting to vapor intrusion as health impacts from subsurface chemical vapors, and their migration pathways into overlying buildings, are better understood and testing equipment can measure ever-smaller concentrations.

TCE in particular raises vapor intrusion concerns with regulatory agencies. The U.S. Environmental Protection Agency and the Department of Toxic Substances Control have issued guidance documents indicating that even very low levels of TCE in indoor air — as low as 2 micrograms per cubic meter for residential uses — may present an unacceptable risk to sensitive occupants such as children, pregnant women, sick people and the elderly.

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These guidance documents state that these low levels can also damage developing fetal hearts when pregnant women breathe the impacted air.

For perspective, 1 microgram per cubic meter is roughly equivalent to a drop of liquid in five Olympic-sized swimming pools.

Vapor intrusion problems may also be widespread. Properties contaminated with chemicals that can volatilize into indoor air are located throughout California and across the nation.

Much of that contamination stems from historical business operations as varied as electronics manufacturing, metal barrel refurbishing and dry cleaning.

Some of these operations date back more than a century, when little was known about the potentially harmful health effects of exposure to very low levels of these chemicals.

In those early periods, it was common and often legal to dispose of these chemicals and associated wastes by discharging them into unlined ponds or even simply discharging them onto the ground.

Nevertheless, those companies may remain responsible under environmental laws and sometimes lease provisions to address their historical impacts to human health and the environment. In many cases, the properties that are now posing vapor intrusion risks were thought to be cleaned up.

In fact, some of them have received a clean bill of health from regulators. These historical impacts affect real estate transactions when they are discovered by buyers during the due diligence period.

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Addressing potential vapor intrusion issues at potentially impacted properties can be complicated and expensive. It generally begins with assessment work. This can entail testing soil, soil gas and groundwater under and near buildings, and indoor and ambient outdoor air to assess indoor air chemical concentrations and to compare those concentrations with outdoor air to rule out external sources.

Contaminants in soil and groundwater that exceed regulatory levels may need to be mitigated through measures such as installation of vapor barriers on foundations, optimization of heating, ventilation and air conditioning systems, or construction of subslab depressurization systems to vent vapors to the outdoor air.

Contaminants may also need to be remediated through elimination of the chemicals in the subsurface to reduce or eliminate vapor intrusion problems.

DRAFT GUIDANCE PROVISIONS

The draft guidance includes four primary recommendations for assessing possible vapor intrusion into buildings in California.

First, it recommends using attenuation factors the EPA promulgated in 2015.

Attenuation factors are multipliers used to extrapolate chemical concentrations detected in subsurface soil gas or groundwater to indoor air concentrations. A consultant essentially takes the subsurface concentration and multiplies it by the attenuation factor. This calculation yields the predicted indoor air concentration.

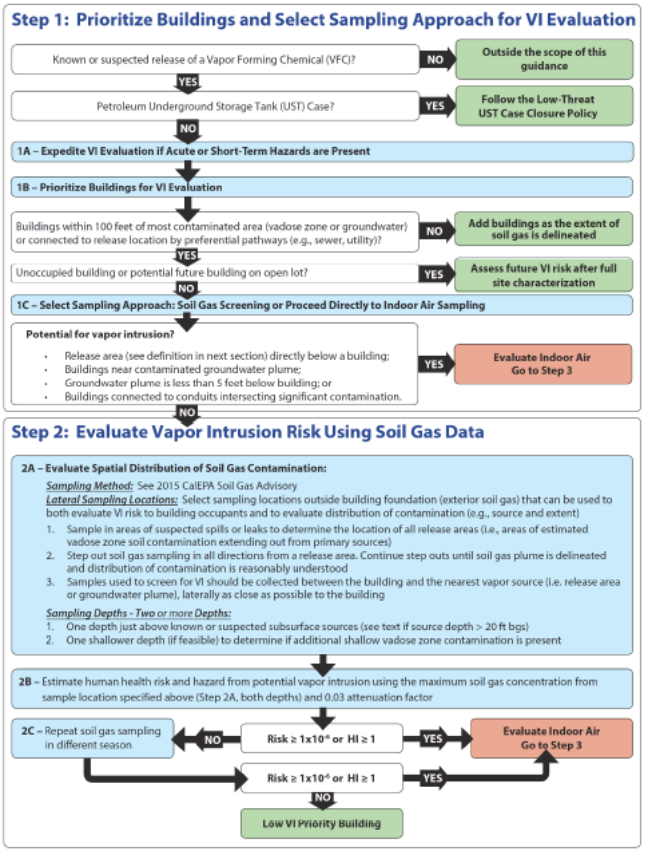
For example, the draft guidance specifies a multiplier of 1 for crawl space chemical concentrations. This means the guidance assumes 100% of the chemicals in the crawl space intrude into indoor air — an assumption that some find unrealistic.

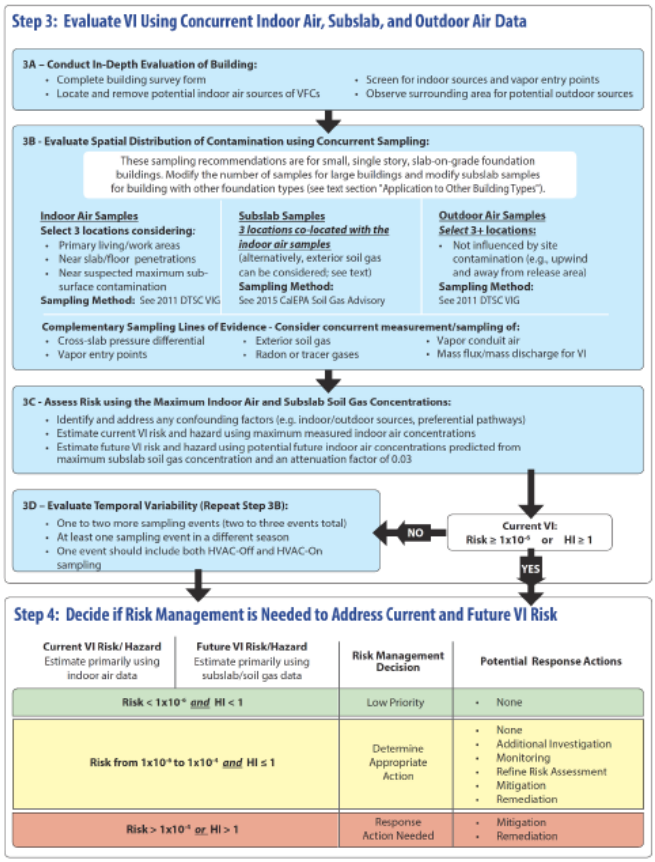
Similarly, the multiplier for groundwater is 0.001, meaning it is assumed that 0.1% of the chemical in groundwater will enter into indoor air.

Some practitioners criticize this attenuation factor approach as overly simplistic. Existing modeling can, in some cases, use factors such as properties of the chemical at issue, soil type and porosity, building age and size, and other factors to develop a more nuanced, site-specific assessment of indoor air. The draft guidance effectively rules out this kind of modeling analysis.

Second, the draft guidance recommends a four-step evaluation process to determine whether a building located near a known or suspected source of vapor-forming chemicals may be affected by vapor intrusion.

These steps are described on the following flowchart and summarized below.





(1) Prioritize buildings in proximity to the source contamination. First, determine whether there has been a known or suspected release of vapor-forming chemicals. If so, determine whether the release is associated with one or more underground storage tanks, in which case the property falls within the State Board's Underground Storage Tank Low-Threat Closure Policy and not under the draft guidance.[2] If not, the responsible party should evaluate whether acute or short-term hazards are present based on the type or concentrations of hazardous substances at issue. Such hazards may require immediate mitigation or remediation measures.

According to the draft guidance, buildings within 100 feet of the most contaminated areas or connected to a contaminated area by a preferential pathway such as sewer lines, which are discussed below, should be evaluated for vapor intrusion.

The draft guidance also recommends skipping subsurface sampling and proceeding directly to indoor air testing for buildings that meet those criteria plus one of the following: the release area is directly below the building; a contaminated groundwater plume is near or less than 5 feet below the building; or the building is connected to conduits (such as sewer lines) that intersect significant subsurface contamination.

If the latter criteria are not met, then the guidance recommends evaluating vapor intrusion using soil gas sampling instead of indoor air testing, which is more consistent with the current regulatory approach and is described in Step 2 below.

(1) Collect exterior subsurface soil gas samples to determine whether a building may experience vapor intrusion. If, based on Step 1 above, it is appropriate under the draft guidance to evaluate possible indoor vapor intrusion using soil gas data instead of indoor air testing, the next step is to test subsurface soil vapor chemical concentrations. The guidance indicates the responsible party should conduct this testing both near the building in question and laterally from the suspected source area to determine the nature and extent of the contaminant impact. The responsible party should also sample at two or more depths, one depth above the known or suspected source area and one or more shallower depths to determine whether additional contamination exists.

Next, the responsible party should calculate human health risk using the 0.03 attenuation factor discussed above applied to the maximum subsurface soil gas concentration.

If the calculated cancer risk is greater than one in a million or the hazard index, which is a measure of non-cancer health effects, is greater than 1.0, then the responsible party should conduct indoor air testing.

If the calculated risk does not exceed either number, then the draft guidance recommends repeating the soil gas testing in a different season to account for seasonal variations in subsurface chemical vapor concentrations.

If the calculated risk remains below these numbers in a different season, then the responsible party can consider it a low vapor-intrusion priority building and regulatory closure may be available.

(1) Collect indoor air, subslab gas and outdoor air samples if a building has vapor intrusion risk. If indoor air testing is recommended based on Steps 1 or 2, then the responsible party should survey the building. This includes locating and removing indoor air sources of vapor-forming chemicals, which can be more common than one may think, screening for vapor entry points into the building, and observing the surrounding area for possible outdoor sources of vapor-forming chemicals.

Under the draft guidance, the responsible party should select at least three indoor air sampling locations and three co-located subslab sampling points, which will require drilling through the floor and building foundation.

These locations should be in primary live/work spaces, near slab or floor penetrations from which vapors may enter the building and near the suspected maximum subsurface contamination.

In addition, the draft guidance recommends selecting three outdoor locations upwind of the building to determine if any indoor vapor concentrations may emanate from outdoor sources rather than vapor intrusion.

The guidance indicates the responsible party should then estimate vapor intrusion risk using the maximum measured indoor air concentration and estimate future vapor intrusion risk using the maximum subslab gas concentration and an attenuation factor of 0.03, as discussed above.

The draft guidance also recommends conducting this testing two to three times to account for seasonal variability, similar to the repeated soil gas testing described in Step 2 above, and once with the HVAC system on and once off.

The draft guidance lays the groundwork for development of a California-specific vapor-intrusion database of information such as vapor intrusion sampling and building data.

(1) Evaluate the need to manage current and future vapor intrusion risk based on indoor air concentrations and subsurface soil gas concentrations. If, based on Step 3, cancer risk is greater than one in a million but less than one in 10,000, and the calculated hazard index is less than 1.0, then additional investigation, monitoring, risk assessment, mitigation and remediation should be considered. If the cancer risk is greater than one in 10,000 or the hazard index is higher than 1.0, then mitigation and remediation should be implemented.

The third core element of the draft guidance is a recommendation for increased consideration of sewers as a potential vapor intrusion migration and exposure pathway.

The agencies indicate subsurface vapors can enter sewer lines that intersect contaminated soil vapor or groundwater and be transported beneath or directly into buildings.

Given this risk, the agencies recommend sampling indoor air in a building that meets these criteria even if soil gas and subslab sampling indicate no significant vapor intrusion risk because they may ignore the sewer pathway risk.

This could result in more complicated and expensive vapor intrusion assessments because many buildings have sewer lines beneath or connected to them that may intersect contaminated soil or groundwater.

All such buildings may be compelled under the draft guidance to conduct indoor air sampling that would not be required under existing guidance.

Finally, the draft guidance lays the groundwork for development of a California-specific vapor-intrusion database of information such as vapor intrusion sampling and building data. The purpose of this database is to understand how human-caused and natural factors influence vapor intrusion.

The information will be collected via the State Board's existing GeoTracker database. A working group within the California EPA will eventually use the database to determine whether California-specific attenuation factors are appropriate in place of, or in addition to, those discussed above.

IMPLICATIONS OF THE DRAFT GUIDANCE

The increased vapor intrusion sampling, mitigation and remediation requirements set forth in the draft guidance could increase the cost of vapor intrusion assessments by as much as 30% to 60%, according to one environmental consultant.[3]

One reason is the increased emphasis on multiple lines of evidence, such as soil gas, subslab, groundwater, and indoor and outdoor air sampling. In addition, multiple sampling events over a long period of time to evaluate seasonal variations will increase the time and cost of assessment and regulatory closure.

These time frames will be completely unrealistic in many real estate due diligence contexts, which may result in creative approaches like environmental escrows, expanded environmental indemnities and increased use of prophylactic mitigation measures that may not ultimately be necessary.

Collecting samples from multiple subsurface depths during each sampling event will also increase complexity and costs.

Finally, the required use of specified attenuation factors in place of site-specific vapor-intrusion modeling will increase the number of properties that exceed calculate cancer and non-cancer risk thresholds.

Due to the coronavirus pandemic, on March 25, the agencies extended the public comment period until June 1 at noon.

Comments can be submitted to DWQ-vaporintrusion@waterboards.ca.gov. The agencies have indefinitely postponed the public meetings previously scheduled for April regarding the draft guidance.

Property owners and developers, environmental and real estate lawyers, environmental consultants and other stakeholders in California should carefully evaluate the draft guidance and submit public comments if they desire.

Notes

[1] DTSC and California Water Resources Control Boards, Public Draft, Supplemental Guidance: Screening and Evaluating Vapor Intrusion (February 2020), available at https://bit.ly/34U6DLi (last visited May 4, 2020).

[2] State Board, Underground Storage Tank Program, Low-Threat Underground Storage Tank Closure Policy (last updated Sept. 3, 2019), available at https://bit.ly/2Kpq3OW (last visited May 4, 2020).

[3] Roux Associates, Inc., CA Vapor Intrusion Supplemental Guidance: Notable Changes and Implications for Developers, Property Owners, and Responsible Parties (Mar. 5, 2020), available at https://bit.ly/2Vojmml (last visited May 4, 2020).

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