

Building above the “COE” Plume in Palo Alto, California

Lenny Siegel
Center for Public Environmental Oversight
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Nine months ago I wrote about how people in Phoenix, Arizona had not been getting the same protection from vapor intrusion as my neighbors in Mountain View, California. I identified it as a “serious instance” of environmental injustice. Now it turns out that vapor intrusion in Palo Alto, California, a much whiter, “greener,” and wealthier community than Lindon Park, Phoenix, is escaping investigation. In Palo Alto, adjacent to Mountain View, the focus is new construction, as a developer has just won approval for a small mixed-use development above the California-Olive-Emerson (named for streets) or “COE” chlorinated volatile organic compound (CVOC) shallow groundwater plume.

In the 1950s, Stanford University pioneered the “research park” concept by leasing a large section of its land to manufacturers, laboratories, and offices. Hewlett-Packard (H-P) and Varian Associates, two locally based firms with close ties to the university, were the first two companies on board. Several of their plants released toxic chemicals into local groundwater, creating the COE plume. One of the release sites, H-P’s former optoelectronic factory at 640 Page Mill Road, is on the “Superfund” National Priorities List, but since the 1980s the lead environmental regulatory agency has been the San Francisco Bay Area Regional Water Quality Control Board.



Birch Plaza Site

The old factories have been replaced by expansive legal offices, and H-P and Varian, under Water Board oversight, have been using innovative technologies to remediate the source properties. But the Water Board, which is generally uncomfortable addressing air issues, has never launched a vapor intrusion investigation.

The plume has migrated northward at least 1,000 feet to Birch Street, where developer Harold Hohbach proposed the “Birch Plaza” Pedestrian and Transit Oriented Development on five parcels totaling about 20,000 square feet. The three-story project will replace three single-family homes and vacant lots currently used for parking, with ground-floor office space, eight townhome-style residential units, and underground parking. Neighbors, including residents of a senior citizen housing project, are concerned about traffic and parking.

Some community activists have questioned the project because it does not adequately address potential vapor intrusion exposures. At their request, on November 22, 2010 I testified to that effect before the Palo Alto City Council, asking the Council to use the California Environmental Quality Act to require measures that would protect future project occupants. Nevertheless, with strong support from city staff, the Council unanimously approved the project. Its only concessions to the toxic evidence were to require the developer to hold the city harmless and to require that new tenants or owners be told that the site is above a toxic plume.



Building site from other direction

Concentrations of trichlorethylene (TCE) in the groundwater beneath the site range from less than 1 part per billion to 110 parts per billion. Three of eight soil gas samples showed detections of TCE, at 320 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), 410 $\mu\text{g}/\text{m}^3$, and 6,400 $\mu\text{g}/\text{m}^3$, with the highest reading beyond the proposed building's footprint. The Water Board uses

Environmental Screening Levels, for TCE in soil gas, of 1,200 $\mu\text{g}/\text{m}^3$ for residential uses and 4,100 $\mu\text{g}/\text{m}^3$ for commercial uses.

The developer's consultants, with Water Board concurrence, concluded that the incremental lifetime cancer risk was .38 per million, below the commonly applied one-in-a-million threshold, and thus the project as designed would pose no unacceptable risk. City staff backed those findings, adding, "The potential for vapor intrusion exposure is further mitigated because one level of the underground parking garage and office space will separate the soil from the residential units on the second and third floors."

In my written submission to the Council, rejected by city staff, I challenged those findings:

Environmental regulatory agencies use likely attenuation to establish soil gas screening levels. If soil gas under a structure or proposed structure exceeds the screening level, additional action is required. In my analysis for community groups, I usually use 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), based upon California's residential indoor air exposure target of 1.2 $\mu\text{g}/\text{m}^3$. However, some states (Connecticut and New Jersey, for example) use more protective levels. The 1,200 $\mu\text{g}/\text{m}^3$ cited in the staff report is significantly unprotective. *The measured soil gas concentration of 6,400 $\mu\text{g}/\text{m}^3$ by itself establishes the need for mitigation.* To allow construction without adequate mitigation may permit exposures that will be difficult and expensive to reverse.

Furthermore, unless there is evidence that concentrations of TCE throughout the groundwater plume are falling, the potential for higher soil gas levels in the future adds to the argument for action. Finally, U.S. EPA is considering establishing an exposure standard for TCE in indoor air that would be significantly lower. If that happens, my recommended soil gas screening level for residential exposures may fall to 10 $\mu\text{g}/\text{m}^3$ and my recommended soil gas screening level for workplace exposures may fall to 50 $\mu\text{g}/\text{m}^3$.

And there's a simpler way to make decisions. Because of the variability inherent in predicting exposures in yet-to-be built structures, it makes health sense and economic sense to build mitigation into those structures from the ground up, without quibbling over the numbers.

Furthermore, I questioned reliance on the underground garage as mitigation.

According to the staff report, the developer in this instance has proposed an unusual but sometimes acceptable alternative, an underground parking garage. The office space mentioned in the staff report should not be considered safe, however, because workers there will also be subject to vapor exposure. Furthermore, upper floors are unlikely to be protected, because elevators tend to act as pumps, transporting subsurface toxic vapors to the upper floors.

I pointed out that California's Department of Toxic Substances Control, in its Vapor Intrusion Mitigation Advisory, requires that "podium-style construction," to qualify as vapor intrusion mitigation, include the sealing of elevator shafts and other openings as well as the robust ventilation of the parking areas. There appears to be no such requirement at Birch Plaza.



Law Offices in Source Area

Finally, I urged the Council to require a long-term management plan:

Here, as at any site requiring vapor mitigation, *long-term management, including operation and maintenance, monitoring, contingency planning, and public notice is essential.* No matter what mitigation strategy is adopted, it must be supported by a long-term management plan that is defined in detail, demonstrates that the developer has the capability to carry out management activities for the life of the project and/or the contamination, and establishes enforceable oversight by the appropriate government agency.

Despite the fact that sub-slab depressurization systems, the standard form of vapor mitigation, cost very little when installed during construction, the Palo Alto Council approved the project without any additional mitigation requirements. Its only concession was “To require notification when there is a change in rental or ownership regarding toxicity or other environmental issues.” At this point, no further details of that notice obligation are available.

Reliable vapor mitigation should be a standard, required building practice whenever constructing occupied space above shallow plumes of TCE or other CVOCs. Because the COE plume is a Superfund site, U.S. EPA is in a position to require it— before it’s too late.