



CENTER FOR PUBLIC ENVIRONMENTAL OVERSIGHT

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To: Alana Lee

From: Lenny Siegel

Subject: CPEO comments on the MEW Study Area Vapor Intrusion Proposed Plan

Date: October 23, 2009

CPEO has developed the following positions with the assistance of Peter Strauss, our technical advisor, in consultation with our Community Advisory Board. We not only agree in general with the amended version of the Proposed Plan, but we believe it can serve as a national model for addressing vapor intrusion at a large, complex site with commercial, residential, and educational buildings. However, as we explain below, we consider it essential to create an enforceable document describing plans for long-term management at this site.

Specifically, we find and recommend:

- 1 CPEO agrees that active substructure—that is, sub-slab and sub-membrane—depressurization systems can provide effective, reliable mitigation for vapor intrusion, in both large and small structures. Nevertheless, **we do support a performance-based approach for non-residential buildings, in which the responsible parties and owners of each building have some flexibility in implementing mitigation as long as they can demonstrate, through periodic or continuing monitoring, that the subsurface is sufficiently depressurized and/or the air inside the building complies with EPA’s action levels.** For example, though we have not been able to find any successful model where a sub-slab system has been drilled in from the perimeter of a building, we believe such an approach may be acceptable if it can be shown to create a suction field under the entire slab.
- 2 The Proposed Plan states, “There is a general decrease of TCE [trichloroethylene] concentrations with increasing air exchange rates. Vapor intrusion resulting in concentrations above interim action levels appear to be more likely to occur in commercial buildings in the Vapor Intrusion Study Area when HVAC systems do not provide sufficient air exchanges with outside air in all or part of a building.” In general, we consider HVAC [heating, ventilation, and air conditioning] to be a

supplement to sub-structure measures, not a stand-alone remedy, for many of the reasons that EPA stated in its August 20, 2009 “Potential Changes to Proposed Vapor Intrusion Remedy.” **But we are willing to accept HVAC systems as mitigation if they are operated and monitored to ensure protection—that is, achievement of EPA’s performance goals—whenever the building is occupied.** We propose that *if* the HVAC system is used as the primary mitigation system, *then* it should be operated for one additional hour before and after the presence of any building occupants, including security or custodial personnel. While in modern buildings with building management systems such an approach is feasible, we believe that building owners should weigh the energy costs and greenhouse gas emissions associated with longer operation of HVAC systems before agreeing to rely on them as remedies. Still, we believe that there may be buildings that normally operate HVAC systems around the clock, for which there would be no additional run time.

- 3 **Achieving indoor air concentrations based upon the long-term health effects of exposure should be the primary Remedial Action Objective or Performance Goal for the vapor intrusion remedy.** These, in turn, should comport with EPA’s latest air action levels, which are the Regional Risk Screening Levels and the modified action level based on California’s findings for TCE. Because industries in this area no longer use TCE, the much weaker occupational standards for the same chemicals are not applicable.

As suggested above, while CPEO believes that engineering controls such as substructure depressurization are the most appropriate remedies for most of the buildings in the study area, we will support other types of remedies—including podium construction—as long as they achieve the performance goals. These goals, including actual or projected target indoor air concentrations for TCE, PCE, benzene, and vinyl chloride, should be documented in the Final Plan or Decision Document. The latter two compounds are mentioned because a study by NASA in March 2005 (“Preliminary Regulatory and Cost Evaluation of Alternative Approaches to Vapor Intrusion Mitigation,” EKI) identified these compounds as potentially exceeding the Bay Area Air Quality Management District’s trigger levels for requirements that a depressurization system needs to be equipped with an air emission control device, such as granular activated carbon.

- 4 Performance goals for residential and commercial uses should be identified in the Proposed Plan. **For those buildings that serve as classrooms, house students, or have day-care centers, residential standards should be used.**
- 5 As implied above, long-term monitoring of the remedy is critical to its success. The Proposed Plan pays little attention to this aspect of the cleanup, but we have found that it is important to lay out a framework for these activities prior to approval of the remedy.

**Wherever mitigation is required, it should be supported by a long-term management plan, or what New York State calls a Site Management Plan (SMP).** This SMP should be developed along with the remediation plan and then updated as information becomes available. Because the university campus at

Moffett Field (which will house students, have classrooms, food service, and day care) falls within the boundaries of the Vapor Intrusion Study Area, the SMP is an even more essential part the long-term protection that should be provided.

The primary purpose of the SMP should be to establish a monitoring and inspection system for each structure that ensures that the performance goals are achieved and are not compromised. The plan should designate how future inspections are to be carried out, with what frequency and with what tools, and it should lay out what training is necessary for the inspectors. The draft SMP should be made available for public comment. Some of the major components are outlined below.

- a. Notice. The SMP, including a summary for lay readers, and reports (sampling, inspection, contingency activities, etc.) generated under its requirements should be available to the public, **and each entrance to a non-residential building should contain a sign or plaque reporting that the property is subject to an environmental SMP, with instructions for accessing it.** Such signs should inform current and future occupants without unnecessarily frightening them.
- b. Monitoring of Physical Parameters. **Immediately after installation, the functionality of mitigation systems should be confirmed.** Vapor barriers should be smoke tested for leaks and sealed wherever a penetration is found. Depressurization systems should be pressure-tested at distal locations and modified if the pressure differential does not meet design objectives. **Pressure testing should continue periodically for as long as there is contamination on site and the building is occupied.** Depending upon site conditions, that could be quarterly or annually.
- c. Indoor air sampling. **Indoor air sampling should be conducted immediately after installation.** Occupants of buildings also need direct confirmation that the air is safe. Although this practice may be considered to be redundant with pressure testing (assuming that sub-structure depressurization is the remedy), it is useful to conduct indoor air sampling annually. This is particularly true for buildings that are going to be used as classrooms, residential housing and dormitories, and childcare facilities, and for building that are going to rely on other remedies. **Indoor air monitoring is essential in buildings where the selected remedy is an HVAC system or passive sub-slab ventilation.** Ideally, if there is no centralized HVAC system, each distinct airspace should be sampled. Vapors under an entire slab can become concentrated inside one room if there is a preferential pathway into that room, and that will not be detected if testing is done in another room with no air connection to the first.
- d. Operations and Maintenance. **There should be an operation and maintenance plan that assigns responsibility for keeping operating equipment, such as fans, in working order.** This may include automatic alarms for reporting system failure. If HVAC systems are considered part of the mitigation system, there should be an enforceable schedule to ensure that ventilation is effective whenever the building is in use.
- e. Inspections. **There should be a tiered, regular approach to inspecting engineering controls,** including passive components of the mitigation

system, such as the visible elements of vapor barriers and the integrity of institutional controls (below). Inspections should follow a checklist, and be performed on at least a quarterly basis. The frequency of inspections and monitoring may be adjusted to account for site-specific information.

- f. Institutional Controls. **There should be clear, enforceable prohibitions on activities that would undermine remediation and mitigation systems** (such as drilling holes in the slab), as well as changes in use of the property that might increase the likelihood or severity of exposures.
  - g. Training. **All personnel charged with inspection and operation and maintenance, as well as those charged with reviewing their reports, should be trained in their tasks so they may properly determine when and to whom to report problems.** Training should explain the purpose of each activity, as well as how to conduct it.
  - h. Contingency Planning. **Each SMP should outline actions to be taken if mitigation systems or other engineering controls fail, if indoor air concentrations exceed standards, or if groundwater contamination increases, rather than decreases.** Other contingencies include fires, floods, earthquakes and other natural disasters. A contingency plan should address the most probable events that would trigger a change of approach, and it should be developed and updated by a group of interdisciplinary experts in the fields of toxicology, geology, hydrology, chemistry and the social sciences.
  - i. Continuous management. **SMPs, should, to the extent possible, use continuous monitoring tools.** Continuous management tools are emerging, based upon the widespread and inexpensive availability of Internet connections. Continuous management systems can not only be designed to demonstrate that active systems are operating, but they can report pressure data and even vapor concentration results—if the proper sensors are available. Provision should be made to incorporate new sampling technologies as they emerge.
  - j. Annual Reports. **Annual reports should be prepared for each building or groups of buildings.** Each report should summarize findings from the monitoring and inspection reports, confirm the continuing effectiveness of engineering and institutional controls, and determine whether remedial objectives or performance standards are being met. If not, it should lay out a plan for achieving those standards and for confirming that achievement.
  - k. Certification. An environmental professional or licensed engineer should be responsible for preparing the annual report, and **he or she should certify not only the annual report but also the monitoring and inspection reports for the year covered by the report.**
- 6 **CPEO supports the suggestion that the City of Mountain View promulgate a City Health and Safety Ordinance (HSO).** We believe such an ordinance should do the following: 1) regulate the operation and maintenance of the HVAC systems and other remediation methods in commercial buildings that fall within the Vapor Intrusion Study Area; 2) provide buyers or tenants of residences within the Vapor

Intrusion Study Area within the city with an opportunity to have the indoor air tested and mitigated, if necessary, at the expense of the Responsible Parties, and; 3) obligate sellers or lessors of residential property to inform potential purchasers and tenants of the opportunity to have their residence tested, if it has not been tested within the last 24 months.

The responsible parties should bear all the costs of implementing the ordinance, and we suggest that the City enter into an agreement with one or more qualified third parties to implement the ordinance as well as monitor any associated institutional controls.

To address the contingency that Mountain View does not agree to adopt a Health and Safety Ordinance, EPA should articulate in its Proposed Plan an alternative approach to ensuring that performance goals are being met. It should consider proprietary controls with third party management as well as oversight by state agencies—at the expense of the Responsible Parties.

As recommended above, owners of residential structures falling within the bright line of the Vapor Intrusion Study Area should have an opportunity to have their homes tested for vapor intrusion and an obligation when selling or leasing the residence to disclose either the results of the test, or the opportunity to have the home tested. Because California requires disclosure of proximity to Superfund Sites, this should be no extra burden on the homeowner, and it will provide them with the opportunity to have their homes tested.

If a residence does not have a vapor intrusion problem (through indoor air tests within the past 24 months, and that groundwater remediation is continuing to capture the western plume), property owners should be able to state, “To the best of our knowledge, we do not have a vapor intrusion concern.” If a mitigation system is in place, then the owner must disclose this.

- 7 We believe that the boundaries of the residential portion of the Vapor Intrusion Study Area lines on the map are not well enough delineated because relatively few monitoring wells are used to extrapolate the precise location of the 5-part-per-billion TCE-concentration contour line. **We suggest that EPA and the PRPs at least double the number of boundary monitoring wells and update this map annually.** Indoor air testing results, indicative of the extent of the groundwater plume, should be incorporated in updated maps.
- 8 **There should be an enforceable mechanism for regulating mitigation systems on federal property, similar to the local ordinance.** In particular, occupants of residential units on federal property should have the same opportunity to request testing and additional mitigation as residents in Mountain View.
- 9 **For new construction, we favor *active* sub-structure depressurization (with a vapor barrier) as the presumptive remedy.** Passive systems are unpredictable, as they rely on changing outdoor air pressure to provide a negative pressure. In warmer months and climates, ambient pressure at the roofline may be greater than the subsurface, and passive systems may provide little help. In most cases, they do not create the same pressure differential between the sub-surface and the indoor air

as an active system; they may merely vent and dilute harmful vapors intermittingly. EPA reported in 1993 that passive sub-slab systems were 30 to 90 percent as efficient as active systems.

Therefore, if a passive system is to be used, a greater burden of proof is needed to demonstrate that it will prevent vapor intrusion over the long-term, including more frequent indoor air testing and other activities that would be set forth in the aforementioned SMP. Testing should be conducted in the warmest months.

Because cost estimates indicate that an active system has a very marginal operation and maintenance cost differential of \$500 per year for a single unit, less than the cost of additional sampling, we favor the more protective *active* approach.

- 10 There is an assumption in the proposed plan that the groundwater contours are the best indicator of the potential for vapor intrusion. While in general buildings overlying the higher groundwater concentrations have a higher likelihood of indoor air samples exceeding the TCE action level, **we believe that soil gas data, if available, provides a better indication of vapor intrusion potential.** Where practical, the Responsible Parties should be encouraged to conduct more soil gas samples. The Proposed Plan should include known soil gas contours and determine the levels for each of the contaminants that would be necessary to install active systems.
- 11 It appears that background—the concentration of TCE in outdoor air—has been decreasing over time. **The proposed plan should discuss what happens to remediation goals when background goes down,** as EPA uses current background as a baseline. This discussion should be included in the SMP contingency plan.
- 12 In Figures 3 and 4 of the final Proposed Plan, EPA should define “confirmation sampling” (indoor air?) and “Level of concern.”
- 13 The Proposed Plan should define exactly what “multiple lines of evidence” means, and it should establish the burden of proof for existing buildings to opt out of the remedial requirements.
- 14 Only a portion of the buildings was sampled, and the remedial design may not fit all buildings. We question how EPA is going to assure that all buildings in the study area are equipped with the appropriate mitigation systems, given that some buildings have not been tested at all.
- 15 **CPEO wants to reiterate the necessity of speeding up the groundwater remedy so that eventually vapor intrusion remedies are no longer necessary.** We expect such innovative strategies to be discussed in the “Supplemental Site-wide Groundwater Feasibility Study” for the site. It is imperative—to promote the cooperation of residents, other property owners, commercial and education tenants, and local officials in the complex web of necessary site management discussed above—that EPA affirm its commitment to this principle now.