Potential Air Exposures Pathway (PAEP) Report
DuPont Oakley Site

SUMMARY

E. I. du Pont de Nemours and Company (DuPont) is in the process of redeveloping its site located in Oakley, California, and referred to in this summary as the Oakley Corrective Action Facility (Oakley CA Facility). A portion of the site contains an area that is the focus of future redevelopment, referred to as the Development Focus Area (DFA). Groundwater in the Surficial Aquifer at the DFA contains volatile organic constituents of potential concern (vCOPCs) that could affect redevelopment due to the potential for vapor intrusion into occupied buildings.

The purpose of this report is to:

- Evaluate the potential for vapor intrusion and inhalation of vCOPCs associated with future redevelopment of the Oakley CA Facility
- Present a risk-based decision framework for mitigating potential vapor intrusion in buildings constructed during the future redevelopment of the site

Groundwater is the primary medium of interest and the focus of the decision framework for mitigating potential vapor intrusion. A corrective measures study (CMS) is being performed to identify the preferred remedial alternative(s) for groundwater. It is expected that groundwater restoration to cleanup objectives will require a significant period of time and will likely continue throughout the redevelopment of the site. However, to facilitate redevelopment in the interim, it is proposed to use administrative controls and incorporate engineering controls into the design of the buildings to mitigate potential vapor intrusion for future users of the site. This approach is consistent with positions expressed in the DTSC 2009 draft Vapor Intrusion Mitigation Advisory (VIMA).

The risk-based, step-wise process summarized below was used to ensure that appropriate vapor intrusion mitigation measures will be implemented, where necessary.

- First, commercial/industrial groundwater-to-indoor air risk-based screening criteria (RBSCs) were used to identify potential mitigation areas based on a target cancer risk of 1.0E-06 (one in a million) and noncancer Hazard Index (HI) of 1.
- Second, commercial/industrial cumulative exceedance factors (CEFs) were developed by comparing the concentrations of all vCOPCs in the Surficial Aquifer data to the RBSCs and summing the ratios. These CEFs were then used to identify vapor intrusion mitigation areas at the DFA based on target risks.
- Third, individually identified mitigation areas were combined to produce two broad mitigation zones. In general, a proactive approach to mitigation is proposed. Preemptive mitigation measures are proposed at all building locations where predicted risks associated with vapor intrusion in such buildings would be unacceptable. Moreover, in situations where it is reasonable to expect that potential future risks

associated with vapor intrusion may develop, similar preemptive mitigation measures will be installed. The two zones differ by proposed mitigation techniques as follows:

- **Zone 1: Vapor Intrusion Membrane –** Although mitigation would not be required by DTSC in these areas (i.e., risk is not predicted to be unacceptable), it is proposed that all buildings receive a vapor barrier membrane as a preemptive mitigation measure. These mitigation measures will consist of a vapor intrusion membrane per DuPont Engineering Standard DB22M.
- **Zone 2: Vapor Intrusion Membrane and Vent System –** Vapor intrusion mitigation will include a vapor intrusion membrane plus a passive sub-slab ventilation (SSV) system that will be installed beneath the vapor intrusion membrane. The systems will be designed so that they can be upgraded to active vent systems (SSV or sub-slab de-pressurization [SSD] systems), if necessary.

  Finally, as a further precaution, Zone 2 was expanded to at least 100 feet beyond the boundaries indicated by the risk-based decision framework to address potential future cross-gradient vapor transport and potential upgradient data gaps to ensure that all possible impacted areas will be adequately addressed.

The vapor intrusion mitigation zone configuration is protective of human health for several reasons including, for example, using conservative assumptions in predicting risk levels and using the low end of the predicted risk/hazard range for preemptive mitigation measures. Finally, a Vapor Intrusion Implementation Plan, including a post-construction multimedia sampling program, will ensure that the vapor intrusion mitigation system design is consistent with DTSC guidelines, constructed using construction quality assurance (CQA) inspection and testing standards, and working effectively