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**TO:** Tom Cota
Branch Chief
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Department of Toxic Substances Control
Cypress, California

**FROM:** Shukla Roy-Semmen, Ph.D.
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Human and Ecological Risk Office

**DATE:** October 9, 2012

**SUBJECT:** Review of Environmental data collected at Tract 31175, Amaryllis Court, Wildomar, California.

PCA: 11025

Dear Mr. Cota,

At your request, the Human and Ecological Risk Office (HERO) reviewed (a) the cover letter "Notification Pursuant to Health and Safety Code Section 25180.7 (Proposition 65); Reported Soil & Air Contamination, Autumnwood Residential Development, Tract 31175, Amaryllis Court, Wildomar, California", and (b) the report enclosed with the letter, addressed to Senator Boxer. The cover letter was prepared by the City Manager (Mr. Frank Oviedo) of the City of Wildomar, and is addressed to the Board of Supervisors and Department of Public Health of Riverside County. Mr. Oviedo is seeking assistance (from the USEPA and several California State agencies including DTSC, Water Board, SCAQMD and EMA) in evaluating claims by the Swanson Law Firm that high concentrations of volatile organic compounds (VOCs) are emanating from contaminated soils and travelling into indoor air spaces via the vapor intrusion process. The Law Firm alleges that the contaminated soils were used as fill material underneath homes located on Tract 31175, Amaryllis Court, Wildomar, California, and is now the source of high levels of chlorinated and petroleum related VOCs. The report also claims that residents have experienced severe health problems after moving into these homes, as a result of inhaling the VOCs. Below are comments on the report.

1) **Collection of environmental data at the site:** A review of the report indicates that environmental data (subsurface, indoor and outdoor air) at the site may not

have been collected in accordance with California EPA and USEPA guidance for evaluating vapor intrusion. According to DTSC's guidance for vapor intrusion, the first step in the process is to establish that VOCs are present in the subsurface. Since the fill material is thought be the source of high levels of VOCs, the depth of this fill material should have been clearly delineated. The report does not provide any details of the sampling protocol. For example, were the soil gas probes constructed properly? Was a leak check test performed? Were the soil gas probes purged properly? Were soil gas samples collected and analyzed properly? Were the canisters certified clean? All soil gas sampling and analysis plans should follow the California Environmental Protection Agency (Cal/EPA) Advisory, Active Soil Gas Investigations, developed jointly by the DTSC, LARWQCB and SFRWQCB (dated April, 2012).

If the soil gas data indicated that vapor intrusion may me occurring (e.g., using the Johnson & Ettinger screening model), sub-slab and indoor air data should have been collected following methodologies specified in the Cal/EPA guidance documents, along with ambient air data. In addition, there is no evidence that proper indoor air screening was conducted prior to sampling, to ensure that other sources of VOC (such as, household cleaners and solvents, cosmetics, sprays etc.,) were identified and removed.

2) **Evaluation of vapor intrusion at the site:** Even if one were to assume that the soil gas, indoor air and outdoor air data were collected properly, the data presented in the report do not support that vapor intrusion is occurring at the site, for the following reasons.

   a. First, establishing that vapor intrusion is occurring should be based on multiple lines of evidence. Specifically, soil gas data, sub-slab data and indoor/outdoor air data must all support vapor intrusion based on the attenuation factors derived from empirical observations. Given the limited data provided and the lack of correlation between soil gas, sub-slab and indoor air results, suggests that other indoor sources may be contributing to many chemicals detected in indoor air.

   b. Second, a screening level assessment of the soil gas data (using the Johnson & Ettinger model) indicates that the concentrations of VOCs (in the low 10s to 100s of ug/$m^3$ range) reported to be present at 10 feet bgs, are not high enough to result in indoor air concentrations that would present health risks to residents (risks were below one-in-a- million, and non-cancer hazards were far below 1).

   c. Third, a review of the indoor air data provided in the report (single to double digit ug/$m^3$ range) indicates that concentrations of VOCs detected in the homes are very similar to concentrations typically found in ambient outdoor air (see ATSDR toxicology profiles on various VOCs; also see

AQMD website for MATES III data at www.aqmd.gov/), due to common uses of these chemicals in urban settings. In most of the cases, the reported indoor air concentrations were either below or very similar to USEPA's Regional Screening Levels (RSLs) for residential air (http://www.epa.gov/reg3hwmd/risk/human/rbconcentration_table/Generic_Tables/pdf/composite_sl_table_run_MAY2012.pdf) or California EPA's California Human Health Screening Levels (CHHSLs). Such levels are not high enough to cause the types of neurological, respiratory, dermal, and other adverse effects experienced by the residents of these homes (see comment # 3).

d. Finally, most of the indoor air concentrations detected are within the range of concentrations reported by USEPA in background indoor air in homes across the United States where vapor intrusion is not occurring (Background Indoor Air Concentrations of Volatile Organic Compounds in North American Residences (1990 – 2005): A Compilation of Statistics for Assessing Vapor Intrusion, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, EPA 530-R-10-001, June 2011).

3) **Indoor air screening levels:** It is unclear how the soil test results of chloromethane, chloroform and chlorobenzene at 19,903%, 13,545% and 3,700% higher than "safe levels" were derived using the data provided in the letter. If VOCs were detected above the screening levels, it was concluded that exposure to those VOCs was causing various neurological, respiratory and dermal effects in the residents. It should be noted that the screening levels derived by California EPA and USEPA are typically very conservative (health protective) since they are based on the most sensitive toxic endpoint, in the most sensitive species of laboratory animals, and also incorporated several safety factors (typically 100 to 1000) for noncancer endpoints. Exceeding these values does not mean that adverse health effects will be observed in humans. In fact, adverse effects are typically observed in humans in occupational settings where they are exposed to concentrations that are 3 to 4 orders of magnitude higher than the USEPA or CalEPAs screening levels. In such cases, workers are using these solvents as part of manufacturing processes, and regulatory levels (typically in the $mg/m^3$) range are exceeded. For examples, see American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) for occupational exposures for the various VOCs. The idea behind developing the screening levels is to identify sites that may require further investigation.

4) **Other sources of contamination within the homes:** A review of the narrative provided in the report indicates that there may be other sources of contamination in the homes. For example, the report states that some residents (Muniz, Villanueva, and Covos families) found moisture and mold within the homes and

in the furniture. The respiratory, lung and gastrointestinal problems, as well as severe headaches may be associated with exposure to mold contamination (http://www.mayoclinic.com/health/mold-allergy/DS00773/DSECTION=causes). Also, the "chemical smells" that the residents complained of, may be generated by mold.

5) **Soils:** The report states that "Homeowners on Amaryllis Court found that when they began gardening and digging into the soil to place their plants, they uncovered large quantities of waste, including oil rags, blue industrial paper towels, carpet pieces, pieces of rubber and large construction debris. Also, the soil as they dug it up had a strong smell of gasoline". The report should include evidence of contamination in the fill material. Soils should also be tested for all classes of chemicals, thought to be present in the fill. The major classes of chemicals typically analyzed in environmental media fall into the following classes: VOCs (including methane), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPHs), metals, and dioxins/furans.

6) **Incidences of cancer and other health problems among community members:** DTSC is not qualified to diagnose the cause of illnesses experienced by the residents (as described in the report) because we are not medical professionals. The agency can only determine whether contaminants at a site may be posing a threat to human health and whether cleanup actions are warranted. A health care professional should be consulted for questions regarding the cause of existing health problems, since these symptoms may be caused by any number of factors.

7) **VOCs in trees:** The report states that "toxins were found in the residents; unacceptably high levels of toxic organic substances were found in the air within the homes; and even higher concentrations were found in trees outside the homes" (page 2 of report). A review of the scientific literature indicates that VOCs are not taken up into plants/trees in any significant concentration (see ATSDR website, for details), if at all, due to the low solubility of these substances in water. They also do not bioaccumulate in plant tissue. Details on the methodology of sampling the trees for VOCs were not provided. It should be noted that acetaldehyde occurs in nature as an intermediate product in the respiration of higher plants and can be found in ripening fruit.

**Recommendations and Conclusions**

A review of the environmental data provided in the report does not support the conclusions that (a) vapor intrusion is occurring underneath the houses where samples were collected, and (b) concentrations of VOCs inside these homes are high enough to cause the types of neurological, respiratory or dermal effects in human, animals or

plants (as described in the report). We recommend that any future environmental investigations at the site and data evaluation follow California EPA's and DTSC's guidelines, since the validity of the data and related evaluation could not be determined.

HERO notes that the decisions made in this document are site specific and should not be construed as a policy decision applicable to other sites. If you have additional questions please feel free to contact me at (714) 484-5448 or SRoysemm@dtsc.ca.gov.

**Reviewed by:**

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