

Letter Health Consultation

CABO ROJO GROUND WATER CONTAMINATION SITE

CABO ROJO, PUERTO RICO

EPA FACILITY ID: PRN000206319

FEBRUARY 24, 2012

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333**

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Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

CABO ROJO GROUND WATER CONTAMINATION SITE

CABO ROJO, PUERTO RICO

Prepared By:

**Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Site and Radiological Assessment Branch**



Agency for Toxic Substances
and Disease Registry
Atlanta, GA 30333

February 24, 2012

Ms. Judith Enck
Administrator, Region 2,
U.S. Environmental Protection Agency (EPA)
290 Broadway
New York, New York 10007-1866

Re: Cabo Rojo Ground Water Contamination site in Cabo Rojo, Puerto Rico

Dear Administrator Enck:

The Agency for Toxic Substances and Disease Registry (ATSDR) reviewed the draft report on the U.S. Environmental Protection Agency's (EPA's) June 2011 soil gas and sub-slab volatile organic compound (VOC) sample results from your investigation of potential source areas for the Cabo Rojo site¹. This letter health consultation documents our phone conversations and recommendations to collect indoor air samples as soon as possible at locations where results show sub-slab VOCs might be migrating indoors at levels of health concern. The indoor VOC estimates are calculated from their sub-slab concentrations using very conservative assumptions. Nevertheless, prudent public health practice dictates taking prompt action. The Puerto Rico Department of Health has been advised of ATSDR's concern.

Since making these recommendations, we understand that EPA is mobilizing to initiate the following activities:

- additional community involvement activities,
- indoor air sampling and installing a vapor intrusion mitigation system in a Head Start facility (precautionary measure), and
- indoor air sampling at other locations near these potential source areas,

We look forward to working with you to evaluate additional sampling results and convey the findings to the affected community.

Summary of Sampling Results

EPA collected soil gas samples at outdoor and indoor locations underneath the building slab ("sub-slab") and analyzed them in the field for tetrachloroethylene (PCE), trichloroethylene (TCE), and dichloroethylene (DCE, not specified whether 1,1-dichloroethylene or cis- or trans-1,2-dichloroethylene).² Laboratory confirmation samples were in agreement with the field sampling

¹ McBurney, J. Memo to J Catanzarita of U.S. Environmental Protection Agency RE: trip report – soil gas investigation, Cabo Rojo site, work assignment no.: SERAS-130, document no. SERAS130-DTR-011312-DRAFT. Edison, NJ: Lockheed Martin SERAS, January 13, 2012.

² ATSDR notes that the detection of certain types of dichloroethylene in groundwater is primarily attributable to biodegradation of PCE and/or TCE. When conditions are favorable for biodegradation to occur, the process

results.

VOCs were detected at 4 out of the 13 potential source locations investigated. Of these detections, 2 potential source locations had detections in sub-slab indoor samples. One of these was in a building which also contains a Head Start facility where young children are regularly present. A sub-slab sample from inside the Head Start facility was also collected. The Table 1 summarizes the results from indoor sub-slab sampling at the potential source locations, with the results from the Head Start facility shown separately.

Table 1. VOC Detections in Building Sub-Slab Gas Samples, Cabo Rojo Ground Water Contamination Site

Contaminant	Concentration in parts per billion by volume (ppbv) and in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)		
	Potential Source #1 (4 Samples)	Potential Source #2 (3 Samples)	Head Start Adjoining Potential Source #2 (1 Sample)
PCE	4,870–64,700 ppbv 33,450–444,000 $\mu\text{g}/\text{m}^3$	103–980 ppbv 707–6,730 $\mu\text{g}/\text{m}^3$	4,970 ppbv 34,133 $\mu\text{g}/\text{m}^3$
TCE	23–113 ppbv 125–615 $\mu\text{g}/\text{m}^3$	ND*–190 ppbv ND*–1,034 $\mu\text{g}/\text{m}^3$	83 ppbv 452 $\mu\text{g}/\text{m}^3$
DCE	Not Detected (ND)* ND*	ND* –1,700 ppbv ND*–6,825 $\mu\text{g}/\text{m}^3$	50 ppbv 201 $\mu\text{g}/\text{m}^3$
*Not Detected (ND) = less than 10 ppbv (less than 54 $\mu\text{g}/\text{m}^3$ for TCE and less than 40 $\mu\text{g}/\text{m}^3$ for DCE)			
NOTE: Results from other indoor sub-slab locations were not detected for PCE, TCE, and DCE.			

These results for sub-slab concentrations of VOCs are not the same concentrations occupants of the building may be exposed to because concentrations are generally attenuated from the sub-slab to the indoor air. An evaluation of EPA's vapor intrusion database indicates that out of over 1,000 paired indoor air and sub-slab concentration measurements in its vapor intrusion database, the 95th percentile attenuation factor (indoor air concentration divided by sub-slab concentration) is 0.1³. ATSDR used this factor to calculate a conservative value for screening purposes and estimate the highest potential indoor air concentrations.

Table 2 shows the potential indoor air concentrations estimated using this conservative screening attenuation factor. Actual indoor air concentrations may be lower. The estimated indoor concentrations are then compared to health-based comparison values (CVs) in Table 2. Comparison values are contaminant concentrations that are not expected to result in any adverse health effects for a given duration of exposure. Exceeding a CV does not mean that adverse health effects are

also typically involves the generation of vinyl chloride, a known human carcinogen. Vinyl chloride was not summarized in the results ATSDR reviewed.

³ U.S. Environmental Protection Agency. U.S. EPA's vapor intrusion database: preliminary evaluation of attenuation factors. Draft. Washington, DC: U.S. Environmental Protection Agency, Office of Solid Waste, March 2008.

probable. Rather, it indicates the need for further evaluation to determine the likelihood for adverse health effects. When sub-slab contaminant calculations predict indoor air levels above CVs, indoor air testing is recommended.

Table 2. Highest Estimates of Indoor Air VOC Concentrations Based on the Attenuation of Soil Gas/Sub-Slab Sample Results⁺, Cabo Rojo Ground Water Contamination Site

Contaminant	Highest Indoor Air Estimates in parts per billion by volume (ppbv) and in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)			Health-Based Comparison Value in ppbv ($\mu\text{g}/\text{m}^3$)
	Potential Source #1	Potential Source #2	Head Start Adjoining Potential Source #2	
PCE	6,470 ppbv 44,434 $\mu\text{g}/\text{m}^3$	98 ppbv 673 $\mu\text{g}/\text{m}^3$	497 ppbv 3,413 $\mu\text{g}/\text{m}^3$	40 ppbv (300 $\mu\text{g}/\text{m}^3$) – chronic MRL 200 ppbv (1,000 $\mu\text{g}/\text{m}^3$) – acute MRL 0.02 ppbv (0.2 $\mu\text{g}/\text{m}^3$) – CREG
TCE	11.3 ppbv 62 $\mu\text{g}/\text{m}^3$	19 ppbv 103 $\mu\text{g}/\text{m}^3$	8.3 ppbv 45 $\mu\text{g}/\text{m}^3$	0.37 ppbv (2 $\mu\text{g}/\text{m}^3$) – RfC 0.045 ppbv (0.24 $\mu\text{g}/\text{m}^3$) – CREG
DCE	N/A	170 ppbv 683 $\mu\text{g}/\text{m}^3$	5 ppbv 20 $\mu\text{g}/\text{m}^3$	20 ppbv (80 $\mu\text{g}/\text{m}^3$) – intermediate MRL
<p>⁺ Based on an Attenuation Factor of 0.1 (upper 95th percentile) Chronic MRL = minimal risk level for non-cancer effects with exposure duration 1 year or longer. Intermediate MRL = minimal risk level for non-cancer effects for exposure durations from 2 week to 364 days. Acute MRL = minimal risk level for non-cancer effects for exposure durations up to 14 days. RfC = EPA reference concentration not likely to result in adverse health effects for a lifetime of exposure. CREG = Cancer Risk Evaluation Guide, concentration not likely to increase risk of cancer greater than 1 in a million people exposed over a lifetime.</p>				

As indicated in Table 2, some of the estimated potential indoor air concentrations for these VOCs are an order of magnitude or higher than health-based screening levels:

- Calculated PCE air concentration estimates at the Head Start facility and Potential Source #1 exceed the acute minimal risk levels based on neurological effects, and all three locations exceed the chronic MRL, which is based on neurological effects. The estimated PCE concentrations could increase the risk of cancer for children or adults to

unacceptable levels.

- Calculated TCE air concentration estimates at all 3 locations exceed EPA's reference concentration for cardiac and immunologic effects and may increase the risk of cancer (kidney, non-Hodgkin's lymphoma, and liver).
- Calculated DCE air concentration estimates at Potential Source #2 may exceed the intermediate-duration MRL for 1,1-DCE which is based on liver effects. (Since the exact isomer of DCE detected was not specified, we compared to 1,1-DCE which has the lowest (most conservative) comparison values.)

Actual sampling data is needed. These results suggest that a potential exists for harmful inhalation exposures to VOCs from vapor in the buildings tested. Of particular concern is the Head Start facility where young children are regularly present. Assessing the actual concentrations of VOCs in the indoor air is essential to determine the potential risks and prevent potential future harmful exposures from occurring.

Need for Prompt Action

The current rainy season may result in higher vapor intrusion issues because of rain infiltration flushing vapors up from soil into indoor air. Sampling indoor air as soon as possible may capture VOC concentrations that might be missed at dryer times of the year. Immediate sampling will also allow prompt action to be taken to reduce any harmful exposures that may be occurring.

Vapor intrusion is variable. Several rounds of indoor air sampling (best coupled with additional sub-slab and outdoor sampling) may be needed to know the true extent of the problem. If the first round of sampling does not indicate a health concern, we recommend further sampling for confirmation.

Conclusion

Indoor air contaminant estimates calculated from field sub-slab sampling results indicate the potential for harmful indoor air exposures to VOCs through vapor intrusion. One of the buildings includes a Head Start facility where young children are regularly present.

Recommendations

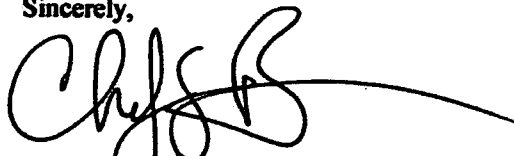
- Conduct indoor air sampling at the affected properties as soon as possible to capture results for the rainy season. Methods should be sensitive enough to detect concentrations at or below the chronic comparison values cited in this letter.
- Conduct indoor air and/or sub-slab sampling at other potentially affected properties, especially if sensitive populations are present.
- ATSDR will evaluate the results of indoor sampling related to this site and assist in conveying the findings to the community.

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- If results of winter 2012 sampling do not indicate a health concern, ATSDR recommends that EPA follow up with confirmatory indoor air sampling during another season of the year.
- If indoor air sampling is delayed, precautionary installation of mitigation systems for vapor intrusion in these buildings could prevent potentially harmful exposures.

Thank you for including ATSDR in your site work. Please do not hesitate to contact me if you have any questions or concerns. I can be reached at (770) 488-0768 or by email at JDyken@cdc.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'Chris Portier', with a long horizontal flourish extending to the right.

Christopher J. Portier, Ph.D.
Director, National Center for
Environmental Health, and
Agency for Toxic Substances and
Disease Registry