Department of Toxic Substances Control

Alan C. Lloyd, Ph.D.
Agency Secretary
Cal/EPA

700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721

Arnold Schwarzenegger
Governor

SPECIAL UPDATE

Soil Vapor Study Results for Building 240 at the Zeneca/former Stauffer Chemical Site Richmond, CA

On August 8 and 9, 2005, a soil vapor study was conducted around Building 240 located on Lot 3 of the Zeneca/former Stauffer Chemical Site (Zeneca site), which currently houses the "Making Waves" after-school tutorial program. Because Building 240 is used for the after-school program, there have been some community concerns that students and teachers who use the building may possibly be exposed to chemical vapors from soil on the Zeneca site. In response to these concerns, DTSC requested that the Responsible Parties for the Zeneca site collect soil vapor samples from around Building 240. This sampling was conducted under DTSC oversight and followed a sampling plan approved by DTSC.

Based on DTSC's evaluation of the data collected during the August 2005 sampling activities, DTSC has determined that the levels of soil vapors present around Building 240 do not pose a health risk to the students and staff of the Making Waves after-school program.

Background and Soil Vapor Analysis:

The first step in determining whether soil vapor may be a problem in a building is to collect soil vapor samples from the soils around a building. Then, if chemicals are detected at levels of concern, indoor air samples may be collected. In a soil vapor study, the vapors or gases that are in the air spaces in soil below the surface and above the water table are collected into containers and analyzed by a laboratory. The vapors studied here are the gases that form when chemicals in the soil or groundwater evaporate. Chemical vapors found in soil may be of concern if they can migrate upwards through cracks that may be in the building foundation. The contaminated indoor air could than be inhaled by people inside the building.

Soil vapor samples were collected from 8 locations around Building 240. The samples were collected in 10-cubic centimeter syringes and analyzed by a state certified mobile laboratory. **Benzene and toluene were the only chemicals detected in the samples collected around Building 240 (see Table 1), and were found at safe levels.** Tetrachloroethylene, trichloroethylene and vinyl chloride were not found above the laboratory detection limits, but they were included in the evaluation as they represent the volatile chemicals found in other areas of the Zeneca site that are possible

carcinogens.

Public Health Risk Analysis:

The first step DTSC took in evaluating the public health risk was to obtain specific information about the users of Building 240. The following information was obtained from the after-school program:

- The program has been in operation since 2002 and is expected to be on-site for one additional year, for a total of four years. The evaluation assumed students and staff would be at the site for five years. This assumption was based on the expectation that the after-school program will continue on-site for no more than five years.

- Students and staff are on-site five days per week for 34 weeks per year, or 170 days per year.

- Students are on-site for 5 hours per day and staff is on-site for 8 hours per day.

The concentrations of the chemicals listed above in soil vapor samples taken around Building 240 were used to determine the level of health risk posed to the students and teachers. Site specific information was used to define the potential for chemical exposure to students and staff while in Building 240. These specific values and other standard parameters (see Table 2) were used to calculate health-protective screening levels for the chemicals found in the soil vapor (see Table 3). DTSC based the screening levels for the above mentioned chemicals on a student, as these levels were more conservative than those based on an adult staff person. The screening levels were then compared to the actual concentrations of chemicals found in the soil vapor. By dividing the maximum concentration of each individual soil vapor concentration by its screening level and multiplying by 10^{-6} or 0.000001, the public health risk posed by the chemical can be determined.

A calculated health risk is an estimate of the potential cancer risk to a sensitive population. In this context, if an indoor air concentration calculated from the soil vapor concentration results in a cancer risk of one in one million, this means that, if one million persons were exposed to that concentration of a chemical, there is a potential that one person in that group of one million could get cancer. Potential cancer risks between one in one million ($1x10^{-6}$) and one in ten thousand ($1x\ 10^{-4}$) are within the risk range considered by the U.S. Environmental Protection Agency (USEPA) to be safe and protective of human health.

The total cancer risk posed by benzene, the only cancer-causing chemical found in the soil vapor, was found at a safe level of 0.076×10^{-6} or 7.6 in one hundred million. When tetrachloroethylene, trichloroethene and vinyl chloride were included in the calculation using the laboratory detection limit as the maximum

concentration, the total combined risk was also at a safe level of 0.098 x 10^{-6} or 9.8 in one hundred million.

For the chemical toluene, a hazard quotient is calculated. A hazardous quotient is used to determine whether a non-cancer causing chemical can cause a health effect other than cancer. A hazard quotient of 1 or below is the level of exposure where it is unlikely that a sensitive population will experience adverse non-cancer health risks and therefore is considered by the U.S. EPA to be safe and protective of human health.

The calculated hazard quotient for toluene was found at a safe level of 0.00008.

Conclusion:

As previously discussed above, based on DTSC's analysis of the data collected during the soil vapor sampling activities on August 8 and 9, 2005, **DTSC has concluded that the soil vapor levels around Building 240 do not pose a public health risk to the students and staff of the Making Waves after-school program**. Therefore, DTSC has determined that no further outdoor or indoor soil vapor testing around building 240 is needed at this time.

For More Information

For questions regarding the Building 240 Soil Vapor Study Results, please contact:

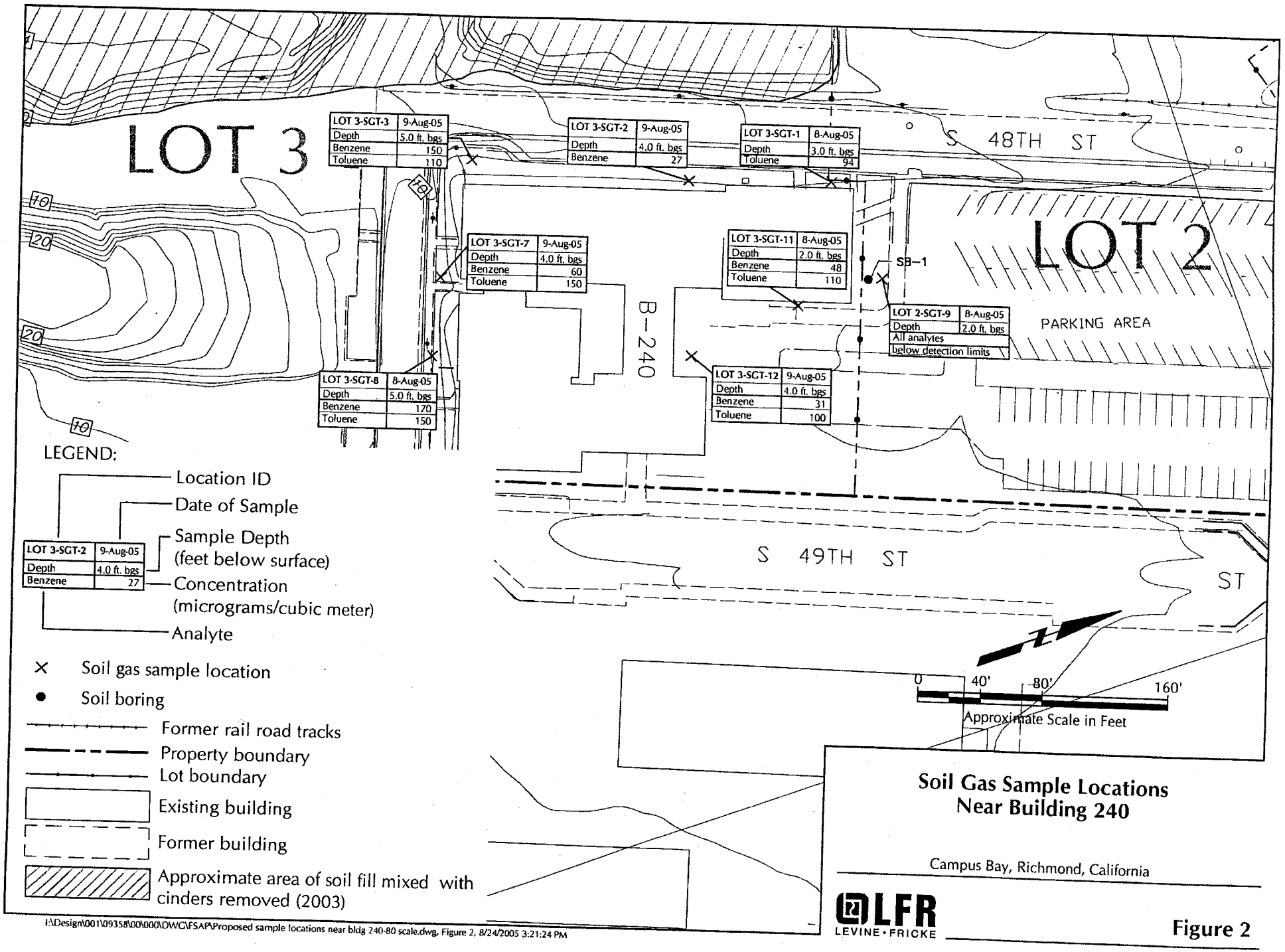
Lynn Nakashima
DTSC Project Scientist
(510) 540-3839
Email Lnakashi@dtsc.ca.gov

Nancy Cook
DTSC Public Participation Specialist
(510) 540-3923
Email Ncook@dtsc.ca.gov

For media questions, please contact:

Angela Blanchette
DTSC Public Information Officer
(510) 540-3732
Email Ablanche@dtsc.ca.gov

For more information about DTSC and the Zeneca Site, visit www.dtsc.ca.gov.



Soil Gas Sample Locations Near Building 240

Campus Bay, Richmond, California

LFR LEVINE • FRICKE

Figure 2

I:\Design\001\09358\00\000\DWG\FSAP\Proposed sample locations near bldg 240-80 scale.dwg, Figure 2, 8/24/2005 3:21:24 PM

TABLE 1								
Chemical	**Sample Results (µg/m^3) from Mobile Laboratory**							
	Sample Location							
	Lot -3-SGT-1	**Lot-3-SGT-2**	**Lot-3-SGT-3**	**Lot-3-SGT-7**	**Lot-3-SGT-8**	**Lot-2-SGT-9**	**Lot-3-SGT-11**	**Lot-3-SGT-12**
Benzene	<25	27	<25	60	170	<25	48	31
Carbon Tetrachloride	<25	<25	<25	<25	<25	<25	<25	<25
1,2-Dichloroethane	<25	<25	<25	<25	<25	<25	<25	<25
cis-1,2-Dichloroethene	<80	<80	<80	<80	<80	<80	<80	<80
trans-1,2-Dichloroethene	<25	<25	<25	<25	<25	<25	<25	<25
Napthalene	<80	<80	<80	<80	<80	<80	<80	<80
Tetrachloroethene	<80	<80	<80	<80	<80	<80	<80	<80
Toluene	94	<80	110	150	150	<80	110	100
1,1,1-Trichloroethane	<80	<80	<80	<80	<80	<80	<80	<80
Trichloroethene	<80	<80	<80	<80	<80	<80	<80	<80
Vinyl Chloride	<10	<10	<10	<10	<10	<10	<10	<10
m-Xylene	<80	<80	<80	<80	<80	<80	<80	<80
o-Xylene	<80	<80	<80	<80	<80	<80	<80	<80
p-Xylene	<80	<80	<80	<80	<80	<80	<80	<80
m,p,Xylenes	NA	NA	NA	NA	NA	NA	NA	NA
Ehtyl Benzene	<80	<80	<80	<80	<80	<80	<80	<80
1,1-Difluroethane (Leak Detection Compound)*	<10,000	<10,000	<10,000	<10,000	<10,000	<10,000	<10,000	<10,000
Sample Depth (feet)	3	4	5	4	5	2	2	4

*Leak Detection Compound: A tracer compound was used to determine if there was any leakage in the sample collection system.
A detection limit of 10,000 ug/m^3 is the standard requirement

NA - Not Analyzed
Method Used: EPA Method 8260 B

Table 2
Exposure Input Parameters

Input Parameter	Value	Units	Source
Exposure Duration	5	years	Survey of After-School Program
Averaging Time			
Cancer	70	years	Default Value US EPA Guidance
non-cancer	5	years	Equal to Exposure Duration
Exposure Frequency	170	days/year	Survey of After-School Program
Inhalation Rate			
Adult Staff	8	m^3/day	Survey of After-School Program that adult is on-site for 8 hours/day
Student	5	m^3/day	Survey of After-School Program that student is on-site for 5 hours/day
Body Weight			
Adult Staff	70	kilograms	Default Value US EPA Guidance
Student	43.5	kilograms	Default Value DTSC Guidance
Attentuation Factors			Office of Environmental Health Hazard Assessment - assumes existing
Benzene	0.00116	unitless	commercial building scenario
Tetrachloroethylene	0.00115	unitless	
Trichloroethylene	0.00115	unitless	
Vinyl Chloride	0.00117	unitless	
Toluene	0.00116	unitless	

m^3/day - cubic meters per day

Table 3

Screening Level Risk from Potential Exposure to Soil Vapors Intruding into Indoor Air at Building 240

Chemical	Soil Gas Screening Level, µg/m^3	Maximum Soil Gas Concentration found, µg/m^3	Screening Level Risk[a]
Benzene	2,250	170	0.076×10^{-6}
Tetrachloroethylene	10,320	<80	0.008×10^{-6}
Trichloroethylene	32,470	<80	0.002×10^{-6}
Vinyl Chloride	830	<10	0.012×10^{-6}
Toluene	1,772,000	150	NA[b]
Cummulative Risk			0.098×10^{-6}

[a] - Risk calculated by dividing the maximum soil gas concentration by the soil gas screening level and multiplying by 10^{-6}

NA[b] - Toluene is not a cancer causing chemical