Health Consultation

Exposure Investigation Report

Indoor Air Testing

WEST LASALLE STREET SITE

TAMPA, HILLSBOROUGH COUNTY, FLORIDA

EPA FACILITY ID: FLT060077807

MAY 11, 2007

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

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.

You May Contact ATSDR TOLL FREE at
1-800-CDC-INFO
or
Visit our Home Page at: http://www.atsdr.cdc.gov

HEALTH CONSULTATION

Exposure Investigation Report

Indoor Air Testing

WEST LASALLE STREET SITE

TAMPA, HILLSBOROUGH COUNTY, FLORIDA

EPA FACILITY ID: FLT060077807

Prepared by:

Florida Department of Health
Bureau of Community Environmental Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Table of Contents

Executive Summary

This Exposure Investigation (EI) addresses the public health threat of possible vapor intrusion from contaminated ground water entering indoor air of homes on LaSalle Street in Tampa, Florida.

In the fall of 2006, the Florida Department of Health (DOH) requested funding from the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) for indoor air testing after reviewing ground water data from monitoring wells along LaSalle Street. ATSDR provided the financial and technical support for this testing.

In November/December 2006 and January 2007, the Hillsborough County Health Department (CHD) and the Florida DOH tested for 68 different volatile organic compounds (VOCs) in the indoor air of two homes near the West LaSalle Street (WLS) property. One of the homes was used as a background because it was not on top of any known ground water contamination. No significant vapor intrusion into indoor air from contaminated ground water occurred at the home tested on LaSalle Street. In most cases, the VOCs of interest were higher in the indoor air of house #2 – the background sample.

VOCs from other sources were detected in the indoor air of the two homes. Those VOC levels are not likely to cause illness in children or adults. There is no apparent public health hazard or cancer risk from breathing VOCs in indoor air in the two homes tested. Further, the concentrations of VOCs in indoor air do not warrant further air testing or blood/urine testing.

Objectives and Rationale

This Exposure Investigation (EI) addresses the public health threat of possible vapor intrusion from contaminated ground water entering indoor air of homes on LaSalle Street in Tampa, Florida.

The Florida Department of Health (DOH) requested funding from the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) for indoor air testing after reviewing ground water data from monitoring wells along LaSalle Street. ATSDR provided the financial and technical support for this testing.

In November/December 2006 and January 2007, the Hillsborough County Health Department (CHD) and the Florida DOH tested for 68 different volatile organic compounds (VOCs) in the indoor air of two homes near the West LaSalle Street (WLS) property. One of the homes was used as a background because it was not on top of any known ground water contamination.

Background

The 0.22-acre West LaSalle Street (WLS) property is in a mixed residential and light commercial/industrial area of Tampa in Hillsborough County, two blocks south of Interstate 275 and one mile west of the Hillsborough River (Figure 1).

While various owners have used the WLS property for businesses and manufacturing operations since 1931, the specific sources of the contaminants of concern are not known. According to aerial photos and maps (E&E 2006), onsite operations included an oil warehouse (1931), Florida Orange Wood Corporation (1950) and Tarpon Chemical and Supply Company warehouse and distribution facility (1950s to mid-1980s). The site remained vacant after Tarpon Chemical ceased operations. Other chemical companies may have owned the site between the mid-1980s and 2001. In 2001, a non-profit redevelopment corporation built a concrete-block house on the property but it was never occupied. In 2002, the City of Tampa obtained the property and demolished the house. The Florida Department of Transportation (DOT) is purchasing homes north of the WLS property to expand Interstate 275.

In January 2001, Post, Buckley, Shuh and Jernigan conducted a limited investigation on the WLS property for the Florida DOT. They field-screened 5 soil samples for VOCs and analyzed one ground water sample from a shallow monitoring well (6 to 7 feet below the ground surface). The ground water samples contained volatile organic aromatics (VOAs), semi-volatile organic compounds (SVOCs), metals and petroleum hydrocarbons above the Florida Drinking water standards.

In a 2007 health consultation, Florida DOH evaluated test results of 27 surface and subsurface soil samples collected by Florida Department of Environmental Protection's (DEP) contractor. Florida DEP's contractor analyzed soil for VOCs, semi-volatile organic chemicals (SVOCs), metals, and total recoverable petroleum hydrocarbons (TRPHs). Additionally, the contractor

analyzed one green-colored subsurface soil sample for glycols, hexavalent chromium, and National Institute of Standards Technology VOCs and SVOCs.

In January 2007, the Florida DOH drafted a health consultation evaluating levels of VOCs in the ground water under the WLS site. The report states that the extent of ground water contamination in the neighborhood near the WLS property has not been fully determined—therefore, the public health risk from shallow ground water is indeterminate. In this draft report, the Florida DOH recommended indoor air testing of nearby homes. They also recommended the city of Tampa collect additional shallow ground water data and completely delineate the area of ground water contamination.

Methods

Exposure Investigation Design

Selection of Homes for Indoor Air Testing

The Florida DOH used the Johnson-Ettinger model to predict the potential for vapor intrusion from the available shallow ground water data. The potential for vapor intrusion into buildings is on the WLS site and on an adjacent property. Although the vapor intrusion potential on the WLS site itself is very high, there are currently no buildings on the site.

Ground water along LaSalle Street is 8 feet below the surface and is contaminated with VOCs. No one is drinking the ground water. Using the Johnson-Ettinger model, the Florida DOH calculated vapor intrusion Hazard Indices (HIs) for each of the chemicals measured in shallow ground water, which we added together to get total Hazard Indices (EPA 2002). The chemicals that contributed to the total HIs were, 1-dichloroethene, 1,1-dichloroethane, trichloroethene, vinyl chloride, 1,2-dichlorobenzene, 1,4-dichlorobenzene, hexachloroethane, chlorobenzene, ethylbenzene, toluene, xylenes, naphthalene and methylisobutylketone (E&E 2006).

There are houses on LaSalle Street but no homes directly north of the site (Figure 2) (Appendix A). The Florida Department of Transportation will be constructing a road in this area (Figure 2). So far, the ground water plume is not delineated, but there are VOCs in the shallow ground water. There was only one house that had a monitoring well with a vapor intrusion HI>1. For this EI, this home was the one of most concern.

Target Population

Based on Florida DOH's 2006 review of the ground water data from the WSL property, DOH chose two homes with the possibility of vapor intrusion and one background (Appendix B). The Florida DOH used the Johnson-Ettinger model for determining which houses to select for indoor air testing.

In October 2006, the Florida DOH phoned residents and set up appointments to discuss the possibility of testing indoor air in their homes. The Florida DOH and the Hillsborough CHD went door to door asking for indoor air testing participation. After staff spoke with residents, two out of four households on LaSalle Street declined the testing and one of the households agreed.

Another household resident initially agreed to testing but was disqualified from testing because their house was not on a solid slab foundation. The Florida DOH tried to contact other nearby residents with no success. So, for the first round of indoor air testing, the Florida DOH only tested the indoor air for one household. The residents agreed not to use VOCs in their home 72 hours prior to, and during testing (Appendix C). The Florida DOH and the Hillsborough CHD explained the testing in person and answered questions.

Environmental Sampling

Data Collection/Sampling Procedures

On November 20 and 21, 2006, the Hillsborough CHD and Florida DOH staff collected 24-hour indoor air samples from home #1 on LaSalle Street near the WLS property. On December 11 and 12, 2006 and January 3 and 4, 2007, the Hillsborough CHD collected 24-hour indoor air samples from house #1 and one background home (house #2) on LaSalle Street west of the WLS property. The five indoor air samples were collected in stainless steel Summa© canisters. The owner of the background home signed a consent form and received instructions on VOCs not to be used in the home 72 hours prior to and during testing. The Florida DOH was unable to contact the owner of house #2 for the November 2006 sampling event.

Florida DOH or the Hillsborough CHD staff measured the pressure in each Summa canister before and after each test. During each sampling event, the Summa© canisters were placed at breathing height about 3 feet off the floor (within a toddler/child breathing zone). The canisters were placed in the main bedroom of house #1 and in the den of house #2 away from the main doors and drafts. Residents agreed to keep their windows and doors shut 72 hours before testing and during testing except for entering and exiting. This resident also agreed not to use VOCs as listed in Appendix B in their home 72 hours prior to, and during testing.

The Hillsborough CHD staff shipped the canisters and pressure gauges overnight to Data Chem Laboratories in Utah. They included chain-of-custody forms, laboratory analytical request forms, canister serial numbers, collection times, and pressure readings. Data Chem Laboratories received all five air canisters and pressure gauges in good condition.

Laboratory Analytic Procedures

Data Chem Laboratories analyzed the five air samples for 68 volatile organic compounds using EPA Method Total Organic 15 (http://www.epa.gov/ttn/amtic/files/ambient/airtox/to-15r.pdf). They also tested one method blank and one duplicate for each canister sampled. The quality assurance data were acceptable.

Data Analysis Procedures

The Florida DOH used ATSDR and EPA air screening values to compare with the indoor air concentrations found in house #1 and house #2 (Tables I and II). If the chemical level exceeded a screening value, then a more in-depth evaluation of dose was conducted. If the level was less than the screening value or not detected, than that chemical was considered to pose a no apparent health risk.

Results

Target Population Demographic

In 2000, an estimated 1,397 persons lived within a 1/4-mile radius of the site. Approximately 88% were black, 9% were Latino/Hispanic, and 4% were white. American Indian/Alaska Native, Asian/Pacific Islander, and all other racial/ethnic groups made up less than 1% of the population (US Census Bureau 2000).

Environmental Sampling Results

No significant vapor intrusion into indoor air from contaminated ground water occurred at the home tested on LaSalle Street. The ground water contaminants included acetone, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, 1,1,1-trichloroethane, ethylbenzene, methyl ethyl ketone, methyl isobutyl ketone, naphthalene, trichloroethylene (TCE), toluene, xylenes and vinyl chloride. Of these fifteen chemicals, only acetone, 1,4-dichlorobenzene, ethylbenzene, toluene, and xylenes were detected in indoor air; all were below the air health comparison values. A number of the VOCs found in the ground water near house #1 were higher in the indoor air of house #2 – the background sample (Table I).

VOCs from other sources were also detected in the indoor air of the two homes. Most of the 68 different VOCs analyzed were below detection limits. For those VOCs with ATSDR guidance concentrations, all levels detected were below air health comparison values except for benzene and chloroform (Table I and II). Benzene and chloroform were not found in the ground water under the homes on LaSalle Street.

Benzene's highest 24-hour average concentration for house #1 (from the three indoor air sampling events) was 2.7 micrograms per cubic meter ($\mu g/m^3$) in January 2007. The highest 24-hour average of chloroform detected from the three indoor air sampling events was 1.6 $\mu g/m^3$ in January 2007 (Table I). For house #2, the highest 24-hour average of benzene detected from the two indoor air sampling events was 12.0 $\mu g/m^3$ in December 2006. The highest 24-hour average of chloroform detected from the two indoor air sampling events was 2.5 $\mu g/m^3$ in January 2007. Even though these 24-hour average levels of benzene and chloroform from house #1 and #2 are above ATSDR's cancer risk screening guidelines (CREGs), Florida DOH's calculations for long-term inhalation (>1 year) show a no apparent increased cancer risk from breathing those levels of benzene and chloroform.

Several other compounds were found in indoor air that were not detected in the ground water. Those include 4-methyl-2-pentanone, dichlorodifluoromethane, ethyl acetate, 4-ethyltoluene, freon 11, heptane, propene, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene (house #1 and #2) and bromodichloromethane in house #1. Those chemicals are commonly found in indoor air (Appendix D).

Consideration of Biological Testing

The VOC levels found in the indoor air of the two homes tested do not warrant blood or urine testing.

Discussion

Ground Water Contaminants and Indoor Air

Given that the ground water under the homes on LaSalle Street is so shallow and the compounds in the ground water are volatile, we anticipated that at least some of the contaminants would have volatized into the indoor air in house #1; this does not appear to be case. In fact, most of the VOCs found in the ground water near house #1 were higher in the indoor air of house #2 – the background sample (Table I).

Benzene and Chloroform in Indoor Air

Benzene and chloroform – which were not found in the ground water under the homes on LaSalle Street – were detected and therefore came from another source. There are many sources of benzene and chloroform. Benzene is in gasoline and is commonly found in indoor and outdoor air at low levels. EPA reports that the typical level found in indoor air is 5 $\mu g/m^3$ (EPA 1998).

Major sources of benzene are tobacco smoke, vehicle exhaust and industrial emissions. Glues, paints, furniture wax and detergents can also be a source of exposure. Since the two houses are so close to the interstate (100 feet), benzene found in these homes is most likely from vehicle exhaust.

Chloroform enters the environment from chemical companies, paper mills and other sources. Chloroform can enter the air directly from factories that make or use it and by evaporating from water and soil that contain it. Chloroform evaporates easily into the air. Indoors, chloroform is a gas that comes from hot showers and other vaporization of chlorinated water. Chloroform lasts for a long time in the air. EPA reports typical indoor levels of 1 $\mu g/m^3$ (EPA 1998).

Although the detected levels of benzene and chloroform are within the range of typical indoor air values, Florida DOH calculated the cancer risk for long-term inhalation (>1 year). Both benzene and chloroform show no apparent increased cancer risk from this exposure.

Other Compounds Detected in Indoor Air

Several other chemicals were detected in indoor that were not present in the ground water. No

ATSDR comparison screening values were available for these chemicals: 4-methyl-2-pentanone, dichlorodifluoromethane, ethyl acetate, 4-ethyltoluene, freon 11, heptane, propene, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene (found in house #1 and #2) and bromodichloromethane (only found in house #1). These chemicals are commonly found in indoor air. Appendix D describes the common sources for many of these compounds.

In March 2007, the Florida DOH mailed letters to the homeowners explaining their indoor air results.

Limitations

There were several limitations for this investigation. The Florida DOH and the Hillsborough CHD collected three, 24 hour samples from house #1 and two samples from house #2. These air samples were collected at three week intervals rather than daily or weekly. Seasonally, the samples were collected during the winter months rather than in the hotter months of spring, summer or fall. Also, indoor air samples were collected from only two homes on LaSalle Street.

Child Health Considerations

Children may be more sensitive to the effects of VOCs than are adults. Little information exists on how VOCs differ in their effects between children and adults (ATSDR 1997). Children drink more fluids, eat more food, and breathe more air per kilogram of body weight than do adults. Children have a larger skin surface in proportion to their body volume.

Florida DOH reviewed the air test results in terms of sensitive populations such as pregnant women, nursing mothers and children, and found that VOCs in the indoor air of the two homes are not likely to cause illness for these populations.

Conclusions

1. No significant vapor intrusion into indoor air from contaminated ground water occurred at the home tested on LaSalle Street in Tampa, Florida. Most of the volatile organic compounds (VOCs) found in the ground water near house #1 were higher in the indoor air of house #2 – the background sample.

2. VOCs from other sources were detected in the indoor air of the two homes. Those VOC levels are not likely to cause illness in children or adults. There is no apparent public health hazard or cancer risk from breathing VOCs in indoor air in the two homes tested.

3. The concentrations of VOCs in indoor air do not warrant further air testing or blood/urine testing.

Recommendations

The Florida DOH does not have any recommendations regarding indoor air at this site.

Public Health Action Plan

Past:

In January 2007, the Florida DOH drafted a health consultation report evaluating levels of VOCs in the ground water under the WLS site. The report states that the extent of ground water contamination in the neighborhood near the WLS property has not been fully determined, therefore, the public health risk from shallow ground water is indeterminate. In this report, the Florida DOH recommended indoor air testing of nearby homes. They also recommended the city of Tampa should collect additional shallow ground water data and completely delineate the area of ground water contamination.

In March 2007, the Florida DOH mailed letters to the homeowners explaining their indoor air results.

Future:

ATSDR and the Florida DOH are currently finalizing a soil health consultation report and a ground water health consultation report. ATSDR expects both reports to be finalized by fall 2007.

In the future, if additional chemicals are found in the ground water or ground water levels increase significantly, the Florida DOH will consider additional indoor air monitoring.

Authors, Technical Advisors

Susan Skye

Biological Scientist IV
Florida Department of Health
Bureau of Community Environmental Health

Florida DOH Designated Reviewer

Randy Merchant

Program Administrator
Florida Department of Health
Bureau of Community Environmental Health

ATSDR Technical Project Officer

Jeffrey Kellam

Technical Project Officer
Division of Health Assessment and Consultation
Superfund Program and Assessment Branch
Agency for Toxic Substances and Disease Registry

References

[ATSDR] Agency for Toxic Substances and Disease Registry. 2005. Draft Toxicological profile for benzene. Atlanta: US Department of Health and Human Services.

[ATSDR] Agency for Toxic Substances and Disease Registry. 1997. Toxicological profile for chloroform. Atlanta: US Department of Health and Human Services.

[E&E] Environment and Ecology, Inc. 2006. Phase II Targeted Brownfields Assessment Supplemental Contamination Assessment Report, 1529 West LaSalle Street Site, Tampa Hillsborough County, Florida. Conducted for the City of Tampa under the FDEP/EPA State Response Program Cooperative Agreement. Grant Number RP97484603

[EPA] Environmental Protection Agency.1998. Inside IAQ EPA's Indoor Air Quality Research Update. Office of Research and Development, Research Triangle Park, NC 27711. Found online at http://www.epa.gov/appcdwww/iemb/insideiaq/ss98.pdf#search=%22inside%20iaq%20epa%201998%22

[EPA] Environmental Protection Agency. 2002. Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings. http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm Last visited March 6, 2007.

[US Census Bureau] Bureau of the Census. 2000. LandView 5 Software on DVD, A Viewer for EPA, Census and USGS Data and Maps. U.S. Department of Commerce.

Figure 1: Site Location Map and Hillsborough County

Figure 2: Aerial Photograph of La Salle Street and Surrounding Area

Table I: 2006/2007 Indoor Air Concentrations from Two Homes on LaSalle Street (micrograms per cubic meter)

	House #1			House #2		
	Nov 2006 Air Sampling Results	Dec 2006 Air Sampling Results	Jan 2007 Air Sampling Results	Nov 2006 Air Sampling Results	Dec 2006 Air Sampling Results	Jan 2007 Air Sampling Results
Air Canister Number	105676	107007	108802	N/A	107010	108976
1,4-Dichlorobenzene	1.5	2.6J	3.9	N/A	3.2	5.6
2-Butanone	3.6	5.5	27.0	N/A	2.7	6.7
4-Methyl-2-Pentanone	ND	ND	0.63	N/A	ND	4.5
Acetone	42.0	110E	130.0	N/A	13.0	49.0
Benzene	2.0	2.6	2.7	N/A	12.0	8.5
Bromodichloromethane	0.99	0.97J	1.4	N/A	ND	ND
Carbon Disulfide	ND	0.87J	1.3	N/A	0.84J	1.1
Chloroform	1.5	1.5J	1.6	N/A	ND	2.5
Chloromethane	2.0	5.3	3.1	N/A	1.8	1.4
Cyclohexane	ND	ND	1.2	N/A	ND	ND
Dichlorodifluoromethane	1.9J	2.1J	3.9	N/A	2.1J	3.1
Ethyl Acetate	9.7	18.0	11.0	N/A	ND	4.0
Ethylbenzene	1.5	2.8	6.8	N/A	9.6	8.1
4-Ethyltoluene	0.56	0.53J	1.1	N/A	4.4	3.3
Freon 11	1.2J	1.3J	1.7	N/A	1.8J	3.4
Heptane	ND	0.96J	5.7	N/A	5.6	3.7
Hexane	1.4	3.3	3.7	N/A	14.0	9.1
Methyl t-Butyl Ether	ND	ND	ND	N/A	3.1	3.1
Methylene Chloride	0.88	ND	0.79	N/A	ND	0.66
Propene	4.3	12.0	4.0	N/A	4.0	1.8
Styrene	0.96	1.8	1.7	N/A	0.86J	1.2
Tetrachloroethene	2.8	4.1	2.6	N/A	12.0	19.0
Toluene	11.0	17.0	60.0	N/A	140.0E	59.0
1,3,5-Trimethylbenzene	0.67	0.62J	1.2	N/A	3.4	3.4
1,2,4-Trimethylbenzene	2.9	2.7	5.1	N/A	14.0	14.0
m,p-Xylene	5.4	8.8	25.0	N/A	34.0	29.0
o-Xylene	1.1	1.7	7.5	N/A	10.0	8.6

House #2=background

J= the value is between the Maximum Detection Limit(MDL) and Practical Quantitation Limit (PQL). It is also used for indicating an estimated value for tentatively identified compounds in mass Spectrometry where a 1:1 response is assumed.

E= indicates a reported value above the analytical linear range
Note: 41 other VOCs were tested and were ND (not detected). Some of these VOCs include those found in the ground water under La Salle Street homes: 1,2-dichlorobenzene, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, 1,1,1-trichloroethane, methyl ethyl ketone, methyl isobutyl ketone, naphthalene and vinyl chloride

TABLE II. Air Comparison Values

Reference: ATSDR Comparison Values last visited 2/13/07
µg/m^3=micrograms per cubic meter
RFC=reference concentration

	ATSDR Comparison Values				EPA Comparison Values	
Volatile Organic Compounds	acute (ug/m^3)	interm (ug/m^3)	chronic (ug/m^3)	cancer (ug/m^3)	EPA RFC (ug/m3)	EPA Inhalation Unit Risk ($ug/m^3)^{-1}$
1,4-Dichlorobenzene	10,000	1000	60	none	800	none
2-Butanone	none	none	none	none	5000	none
4-Methyl-2-Pentanone	none	none	none	none	none	none
Acetone	60000	30000	30000	none	none	none
Benzene	30	20	10	0.1	30	7.8 E-06
Bromodichloromethane	none	none	none	none	none	none
Carbon Disulfide	none	none	900	none	700	none
Chloroform	500	200	100	0.04	none	2.3E-05
Chloromethane	1000	400	100	none	none	none
Cyclohexane	none	none	none	none	6000	none
Dichlorodifluoromethane	none	none	none	none	none	none
Ethyl Acetate	none	none	none	none	none	none
Ethylbenzene	none	4000	none	none	1000	none
4-Ethyl Toluene	none	none	none	none	none	none
Freon 11	none	none	none	none	none	none
Heptane	none	none	none	none	none	none
Hexane	none	none	2000	none	700	none
Methyl t-Butyl Ether	7000	2000	2000	none	3000	none
Methylene Chloride	2000	1000	1000	none	none	4.7 E-07
propene	none	none	none	none	none	none
Styrene	none	none	300	none	1000	none
Tetrachloroethene	1000	none	300	none	none	none
Toluene	4000	none	300	None	5000	none
1,3,5-Trimethylbenzene	none	none	none	none	none	none
1,2,4-Trimethylbenzene	none	none	none	none	none	none
Xylenes (total)	9000	3000	200	none	100	none

Interm=intermediate

Appendix A

Photos of LaSalle Street

Photo of the WLS site on LaSalle Street

LaSalle Street Facing East

LaSalle Street Facing West

Buildings at the intersection of LaSalle and Rome Streets

Appendix B

Exposure Investigation Protocol

Exposure Investigation Protocol for
LaSalle Street, Tampa, Florida

October 2006

Prepared by

Susan Skye
Florida Department of Health

TABLE OF CONTENTS

Table of Contents

I. PROJECT OVERVIEW

i. Summary

The Florida Department of Health (DOH) proposes to conduct an exposure investigation (EI) to determine if selected volatile organic compounds (VOCs) via indoor air vapor intrusion pose a health risk to residents living near the LaSalle site in Tampa, Florida.

ii. Investigators and collaborators

The Florida DOH and the Agency for Toxic Substances and Disease Registry (ATSDR) will be the lead agency for this EI. The Hillsborough County Health Department (CHD) will assist. The Florida Department of Environmental Protection (DEP) is the lead agency for the determination of the extent of the contamination and site cleanup.

Agency for Toxic Substances and Disease Registry

Diane Jackson, Exposure Investigation Team will serve as the technical consultant for the exposure investigation.

Florida DOH

Susan Skye, the Exposure Investigation Coordinator with FDOH, will coordinate indoor air testing of three locations near the site with the Hillsborough CHD (Gregg Rottler). Ms. Skye will coordinate the lab analyses with Data Chem. Once results are received from the laboratory, FDOH will interpret the results and prepare an Indoor Air Exposure Investigation report for ATSDR's review. The results of the exposure investigation and report will be shared with the households that participate in the air testing.

Randy Merchant, FDOH Environmental Administrator, will review documents and assist as needed.

Lu Grimm, the FDOH Physician Health Education Coordinator/Community Relations Coordinator, will be available to provide assistance as necessary.

Hillsborough County Health Department

Gregg Rottler and other staff, Hillsborough CHD, will assist with indoor air testing at the homes near the site.

II. INTRODUCTION

i. Background

Florida DEP recently began their investigation of a chemical formulating facility on La Salle Street and they have little information about the site's background. The LaSalle Street site is a former chemicals formulation plant (center of Figure 1 and 2) with various owners and likely various products that were manufactured. The site is at 1529 LaSalle Street in Tampa north of LaSalle Street and south of Laurel Street. It is in a residential neighborhood off I-275 just north of Old Tampa Bay (Figure 1). In addition to the site, another source of chemical storage was just identified south of the site west of monitoring well (MW)-10 (bottom of Figure 2). That area was used for trichloroethylene (TCE) storage, drum storage and acid tanks.

Most of the houses in the immediate area of 1529 LaSalle Street are all on slabs, so vapor intrusion is more likely for these homes. The houses south of the site are all off grade with crawl spaces, so vapor intrusion is unlikely (Figure 1).

The houses in this neighborhood were built between 1956 and 1985. The three homes/locations we plan to sample were built in 1960, 1965 and 1956 (X, Y, and A on Figure 1).

During March 2006, the Florida DEP's contractor conducted an investigation of the LaSalle Street site (1529 LaSalle Street) and collected ground water and soil samples. Currently, the Florida DEP is taking an additional soil sample for pesticides and metals on the apartment complex (Y LaSalle Street on Figure 1). The ground water concentrations are of the main concern for this EI and are shown in Figure 3. Xylenes were as high as 20,000 parts per billion (ppb), methyl ethyl ketone 12,000 ppb, and toluene 12,000 ppb on the site.

ii. JUSTIFICATION FOR THE EXPOSURE INVESTIGATION

VOCs are present in the ground water underneath the residents' homes (Figure 3). Ground water is traveling in the direction of the residents' homes selected for this EI. Based on DOH's evaluation of the ground water levels, DOH recommended this investigation to determine if vapors from the contaminated ground water are entering residents' homes. We do not know if vapors from contaminated ground water under the resident's home located at X LaSalle Street and the nearby apartment complex are entering the buildings and if so, if they are at a level of health concern. VOCs from contaminated soil and groundwater can infiltrate a building through the foundation or other openings. These vapors can then be distributed throughout the structure via natural forces of ventilation that determine the course of indoor air, such as stack effect, passive and active ventilation, and wind. The Hillsborough CHD will collect indoor air samples to determine if vapors are entering near the site and if the levels are of health concern.

Groundwater depth on property X LaSalle Street is 8 feet below the surface and is

contaminated with VOCs (Figure 1). No one is drinking the groundwater. We used the Johnson-Ettinger model to calculate vapor intrusion Hazard Indices (HIs) for each of the chemicals measured in shallow groundwater, which we added together to get total Hazard Indices (EPA 2002). The chemicals that contributed to the total HIs were 1,1-dichloroethene, 1,1-dichloroethane, trichloroethene, vinyl chloride, 1,2-dichlorobenzene, 1,4-dichlorobenzene, hexachloroethane, chlorobenzene, ethylbenzene, toluene, xylenes, naphthalene and methylisobutylketone (E&E 2006).

Currently, there are no homes north of the alley (Figure 2). The Florida Department of Transportation will be constructing a road in this area (Figure 1). So far, the groundwater plume is not delineated but there are volatiles on the site in the shallow groundwater. The only house that has a monitoring well with a vapor intrusion HI>1 is the house directly east of the site (X on Figure 1). For this EI, this home is the one of most concern.

The hazard index (HI) for monitoring well (MW) 9 on the property X LaSalle Street is 1.2 and 0.9 for MW-4 which is just west of property X on the corner of the site (Figure 2) (E&E 2006). Hazard indices on the site were 26.4 for the 25' well and 5.5 for the 35' well. The HI for MW-2 is 90, it is a shallow well approximately 8' deep. The VOC concentrations found in MW-2, MW-4 and MW-9 are shown in Figure 3. All of the screens in the monitoring wells capture the water table, which occurs at about 8', except 13D which is 35' at the Top of Casing (TOC) and DW-6 which is 25' at TOC (Figure 3).

This EI would impact public health decision making by knowing whether to notify the Department of Environmental Protection and/or the U.S. Environmental Protection Agency (EPA) if further sampling is warranted or if ventilation is needed in the homes. Depending upon air levels found, if any, other nearby homes/buildings may need to be tested.

iii. Objectives

The objective of the exposure investigation is to determine if indoor air of two residences have VOCs at levels of health concern. DOH will also collect a background sample from a location outside of the VOC ground water plume.

III. METHODS

i. Exposure investigation design

The Hillsborough CHD will collect indoor air samples from two households near the site and one background location. They will collect them on three occasions over a three to six week period.

The Hillsborough CHD will collect three, 24-hour indoor air samples (1 from the home X on LaSalle Street, 1 from the nearby apartment complex (basement) and 1 background samples from a house west of the site) using SUMMA canisters. The canisters will be analyzed for Total Organic (TO) -15 compounds (63 volatile organic compounds).

The movement of VOCs from the soil or ground water into an enclosed structure can vary by season. Factors that can influence such VOC migration include temperature, barometric pressure, and precipitation. Because of these and other variables, VOC concentrations in samples collected on a single day or two may not accurately represent year-round conditions.

Hillsborough CHD staff will be present the day of the indoor air testing and explain the process to the residents. Florida DOH will order nine air canisters with restrictive orifices for 24-hour time weighted average samples. DOH will coordinate ordering the SUMMA canisters in advance and have them shipped to the CHD. Ms. Skye of DOH and Gregg Rottler of CHD will review and discuss the directions from the laboratory on collecting these samples. CHD will collect air samples from the room where the families spend the most amount of time such as the bedroom or family room, but away from the outside entrances. The samplers will be placed at breathing zone height or around three feet (the sleeping or sitting height).

The samples will be taken with the air conditioning running and windows shut as the residents typically live in their home in the fall. Hillsborough CHD confirmed that house X on LaSalle Street has central air conditioning. We are unsure about the apartment complex and background location at this time but will find out once the EI is approved.

They will give each family a list of household products that contain VOCs and ask them to not use these products at least 72 hours prior to indoor air testing (Attachment A). Hillsborough CHD staff will assist collecting the samples.

ii. Exposure investigation population

For this investigation, the residents living closest to the site and with the highest monitoring well concentrations are the main focus.

iii. Data collection/sampling procedures

Hillsborough CHD (Mr. Rottler and other Hillsborough CHD staff) will conduct air sampling at three locations (two households near the site and one background location). They will place the SUMMA canisters in each home for 24 hours at the level of the breathing zone (3 feet from the floor). Ideally, for indoor air testing, the temperature inside the house should be less than the temperature outside.

The canister will have a restrictive orifice so that the correct pressure is maintained throughout the 24-hour period. CHD staff will arrive before the end of the sampling period to ensure that the pressure has not dropped below what is necessary. (Note: If for some reason the pressure has not been maintained, that sample will not be analyzed and another sample will be taken.) CHD staff may also call the homeowner once or twice and have them read the pressure gauge to make sure it is functioning properly and has not drastically dropped.

Sampling will be repeated twice over a two to six week period.

iv. Data analysis and evaluation of data

Data Chem Laboratories will analyze nine 24-hour air samples using EPA's Method TO 15 for VOC analysis.

All of the indoor air samples will be analyzed utilizing the EPA method TO 15. Currently, there are Minimal Risk Levels (MRLs) available for 37 of the 63 chemicals to use for evaluation of the air results.

The Florida DOH will compare the VOC air test results with ATSDR's air comparison values, EPA's latest soil vapor intrusion guidance numbers, and NIOSH TWAs (Table 1). DOH realizes that the guidance levels (Table 1) are for comparison purposes only and are calculated with built in safety factors. DOH will keep in mind that theoretical calculated risk is not exact and tends to overestimate the actual risk associated with exposures that may have occurred. Also the MRLs for VOCs are based mainly on animal studies and represent a 14 day to a lifetime exposure. The NIOSH TWA are based on an 8-hour exposure, but also represent all the exposure a person should be allowed to receive in one day. Assuming that residents spend less than 24 hours per day in their homes, the overall theoretical calculated risks would further decrease. DOH plans to take three samples spaced over a several week period in an attempt to characterize the exposure. This characterization represents a "snapshot" in time and may not be representative of a daily, weekly, or lifetime of exposure. DOH realizes the limitations of the comparisons (i.e., theoretical risk, exposure frequency and time frame) and believes the comparisons are protective of public health.

DOH will also compare the levels found in home X on LaSalle Street and the apartment complex to those found at the background location. If the VOC levels found inside the homes are at levels higher than the guidance levels and determined to potentially pose a health risk, DOH will question residents on their VOC uses, decide if additional sampling is warranted, and make recommendations for venting if necessary.

v. Reporting of Results

The Florida DOH will review the results as quickly as possible and prepare a letter in Spanish to all households who had indoor air testing. The letter will include an explanation of the EI results. A copy of this letter in English will be sent to the Florida DEP and the Hillsborough CHD. DOH will also prepare and distribute an Indoor Air Exposure Investigation report to the residents.

vi. Fieldwork coordination

Susan Skye of DOH will coordinate the fieldwork for this investigation. Using a Spanish interpreter, the Hillsborough CHD will visit the three locations and explain the air testing to each resident. If they agree to the testing, each resident will sign a consent form. After the consent forms are signed, DOH will order the air canisters and have them delivered to the Hillsborough CHD. Hillsborough CHD will conduct the air testing in November

2006.

vii. Quality assurance

Sample collection, storage, and analysis description will be documented on the chain-of-custody forms. The originals of these forms will be sent to the laboratory with the samples. Copies of the chain-of-custody will be made prior to shipment. The chain-of-custody forms are generated once a contract-laboratory has been contacted and the site-specific sampling media is identified (some laboratory-specific information needs to be entered prior to site work).The sampling will take place within the acceptable holding time.

IV. COMMUNITY INVOLVEMENT

Since the indoor air testing will be done inside three individual homes, a public meeting will not be necessary after the results are reviewed. Each individual household will receive a letter explaining their results. The Florida DOH and the Hillsborough CHD will be available to answer questions from the residents.

V. RISK/BENEFIT INFORMATION

Although it is inconvenient for the homeowners to cease using certain products for three days prior to and during each sampling event, they will benefit by either knowing that indoor air levels are currently at acceptable levels or by agencies developing a solution to reduce levels so they do not pose a health hazard.

If indoor air concentrations in homes are at levels of health concern, the Florida DOH will work with the Florida DEP to develop a solution.

The Florida DOH will share information collected during the EI with homeowners, other agencies, and if requested by the media, we must share it with them.

After this investigation, the Florida DOH will review additional environmental data as necessary.

VI. INFORMED CONSENT PROCEDURES

See attached consent form.

VII. ASSURANCES OF CONFIDENTIALITY

N/A – The Florida Department of Health considers medical records only confidential. If a citizen requests copies of the air testing results or other records for this investigation, the Florida DOH must release the results according to the Florida Sunshine Law.

VIII. PROCEDURES FOR NOTIFYING PARTICIPANTS OF INDIVIDUAL AND OVERALL RESULTS

Within two weeks of receiving the lab results, Florida DOH will evaluate the indoor air

results and notify the Spanish interpreter of the results. The Spanish interpreter will verbally notify the three households of their results. With the Spanish interpreter's assistance, Ms. Skye and DOH will be available to answer the residents' questions about the testing results. In addition, each resident will receive a letter in Spanish with a copy of their results.

IX. ESTIMATED TIME FRAME

The Florida DOH and the Hillsborough CHD plan to collect indoor air samples in mid-November. FDOH will contact Data Chem Labs to reserve sampling equipment for mid-November.

X. PROJECTED BUDGET AND SOURCE OF FUNDING

In June 2006, Susan Skye contacted the Hillsborough County Health Department. They spoke with the City of Tampa Solid Waste Department about paying for indoor air testing; the staff member asked said they wouldn't be able to fund the testing.

Approximately $2,250 is required to conduct the EI. This amount is based on a recent verbal quote Florida DOH received from Data Chem on October 2, 2006 (VOCs (EPA TO 15 analysis): $250 x 9 canisters=$2,250). This quote included sampling equipment (canisters and 8 hour regulators (restrictive orifices) and a 5-day working day turnaround time. If ATSDR requests that Florida DOH use another lab, this amount may increase or decrease. The Florida DOH is requesting funds from the Exposure Investigation and Consultation Branch with ATSDR to pay for these analyses.

XI. REFERENCES

[E&E] Ecology and Environment, Incorporated. Phase II Targeted Brownsfields Assessment: Supplemental Contamination Assessment Report for the LaSalle Street Site, Tampa, Florida. July 2006.

[EPA] Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings. 2002.

http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm
Last visited August 30, 2006.

[NJDEP] New Jersey Department of Environmental Protection. February 2003.
http://www.epa.gov/ttbnrmrl/625R03004/session4/Boyer-%20Indoor%20Air_files/frame.htm
Last viewed September 18, 2006.

XII. APPENDICES

APPENDICES

APPENDIX A - Consent Form
APPENDIX B - Figure 1 - Site Map (Age and Addresses of Homes)
Figure 2 -Site Map (Monitoring Wells and Hazard Indices)
Figure 3 – Monitoring Well Groundwater VOC Concentrations
Attachment A. List of VOCs to cease using during sampling
Table 1. Comparison Values for Chemicals found in Groundwater

Consent to Access to Property
(Environmental Sample Collection)

LaSalle Street – Tampa, Florida
3 LaSalle Street Residents
Indoor Air Sampling
Exposure Investigation

The Agency for Toxic Substances and Disease Registry (ATSDR) of the U.S. Department of Health and Human Services, together with the Florida Department of Health (FDOH) and the Hillsborough County Health Department (CHD), is conducting an exposure investigation. People in your neighborhood are concerned about chemical vapors from the under ground water coming into their homes. We have chosen one home, one apartment and one other place to test indoor air. Your home is one of the three places we chose because your home is close to the where the underground water is thought to be most polluted.

Before you decide if you want this testing done, please read the rest of this form and ask us any questions you have.

If you choose to participate, we will test your indoor air for the chemicals on the attached sheet. Your participation is voluntary. The authority for collecting information in this investigation is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (42 U.S.C. 9604 (i)).

What we will do

If you choose to be in this study, Hillsborough CHD staff will:

- meet with you and show you the metal air canisters used to collect an air sample
- explain to you what the results will tell you after the laboratory gives us the results
- put a metal air canister in your home and pick it up 24 hours later
- ship the metal air canister overnight to the laboratory to test the air
- repeat the sampling every 2 to 3 weeks for a total of 3 sampling rounds

We will only test your indoor air for the 63 chemicals on the attached sheet. Some of those (i.e., 1,1-dichloroethene, 1,1-dichloroethane, trichloroethene, vinyl chloride, 1,2-dichlorobenzene, 1,4-dichlorobenzene, hexachloroethane, chlorobenzene, ethylbenzene, toluene, xylenes, naphthalene and methylisobutylketone) were found in the groundwater near your home. We will also test for other chemicals on this sheet because they are part of the standard laboratory test and can be found in indoor air.

Do I need to do anything different while the metal air canister is in my home?

Yes. Please do not use cleaning products, hairsprays or other aerosol/pump products in

your home 72 hours before we collect the air samples (Attachment A). Also, **please do not open your windows any time during the air testing! Please open and close your doors quickly when entering and leaving your home while the canisters are in your home**.

You can bathe and shower as normal. Please do not touch the canisters or cover them because this can ruin or affect the air results and the laboratory may not be able to check for all the chemicals.

When will I receive the results of this indoor air testing?

You will receive a letter explaining your indoor air testing results within eight weeks.

What will your agencies do with the results?

Susan Skye, FDOH will write a report that sums up what we find from the indoor air testing of your home and the one other neighbor selected for indoor air testing. It will take us about six months to finalize the report. We will send you a copy of the report once it is finalized. We will also give the report to the Hillsborough CHD, and the Florida Department of Environmental Protection (DEP).

What about my privacy?

In Florida, indoor testing results are not confidential (private) information because they are not medical. You may choose to withhold your address or names to avoid affecting your property value.

Are there any costs?

No. You do not have to pay to have your indoor air tested. The ATSDR is paying for this air testing.

What if I don't want to do this?

Testing your indoor air is voluntary. If you decide not to have your indoor air tested, we will ask the next nearest homeowner. At this time, we are only able to test three locations near the city of Tampa property on LaSalle Street. After review of those results, if we believe it is important to sample your home, we will contact you again for your consent.

How can I find out more?

You may have questions about this project. If so, you can ask anyone here right now. If you have questions later about the indoor air testing, please call Susan Skye with the Florida DOH in Tallahassee at 1-877-798-2772 during regular business hours or Gregg Rottler with the Hillsborough CHD in Tampa at (813) 307-8015 ext. 5940.

Consent Statement

I have read this form or it has been read to me. I have had a chance to ask questions about indoor air testing in my home and my questions have been answered. I agree to have my air tested in my home.

Yes Let the County Health Department collect three air samples from my home (one in November 2006, one in December 2006 and one in January 2007).

_____ _____

Participant's Signature Date

_____

Participant's Printed Name

APPENDIX B of Exposure Investigation Protocol

Figure 1
Site Map Showing Addresses/Ages of Homes

Source: ATSDR GIS 2006

Figure 2

Site Map Showing Monitoring Wells and Hazard Indices

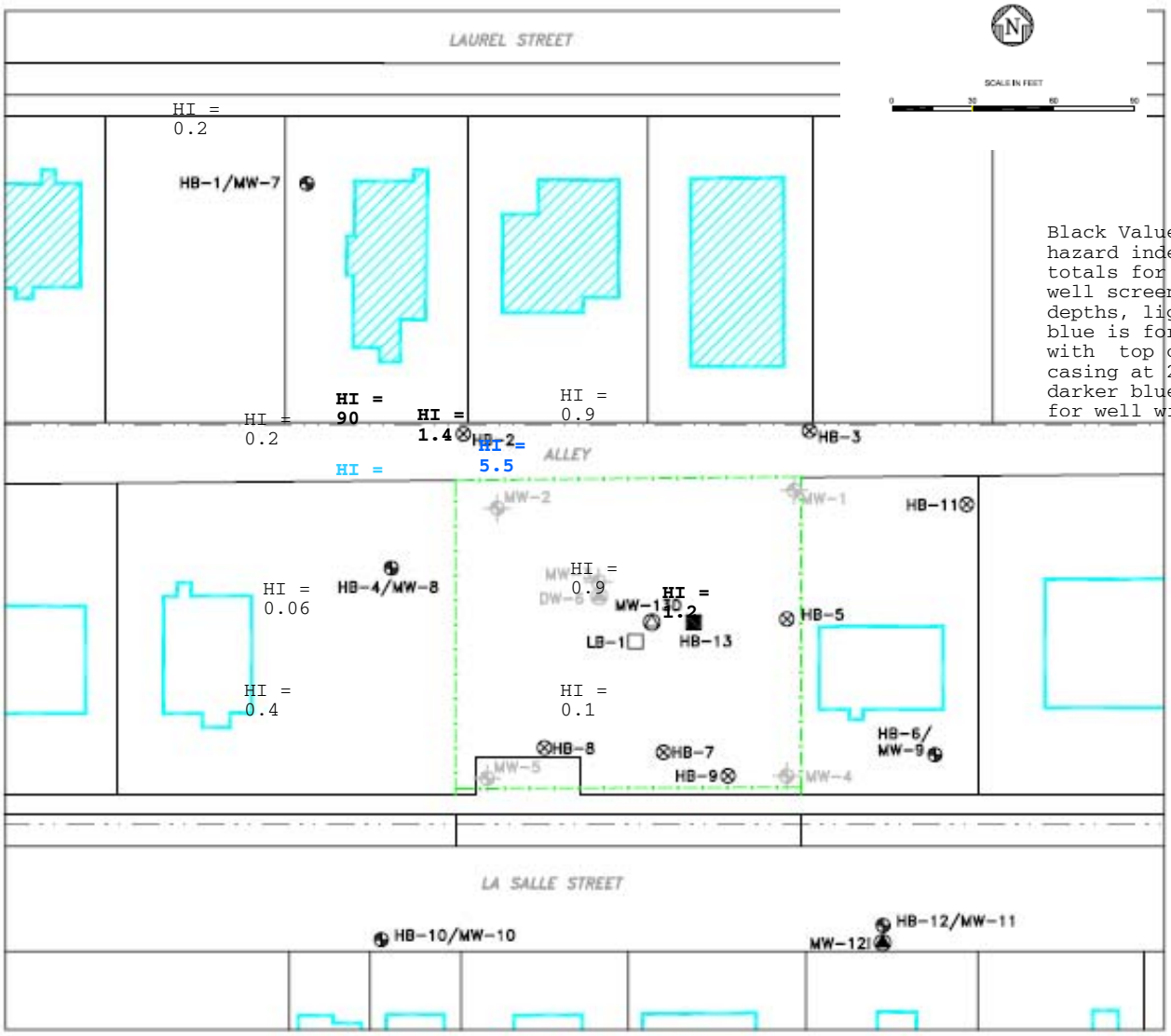
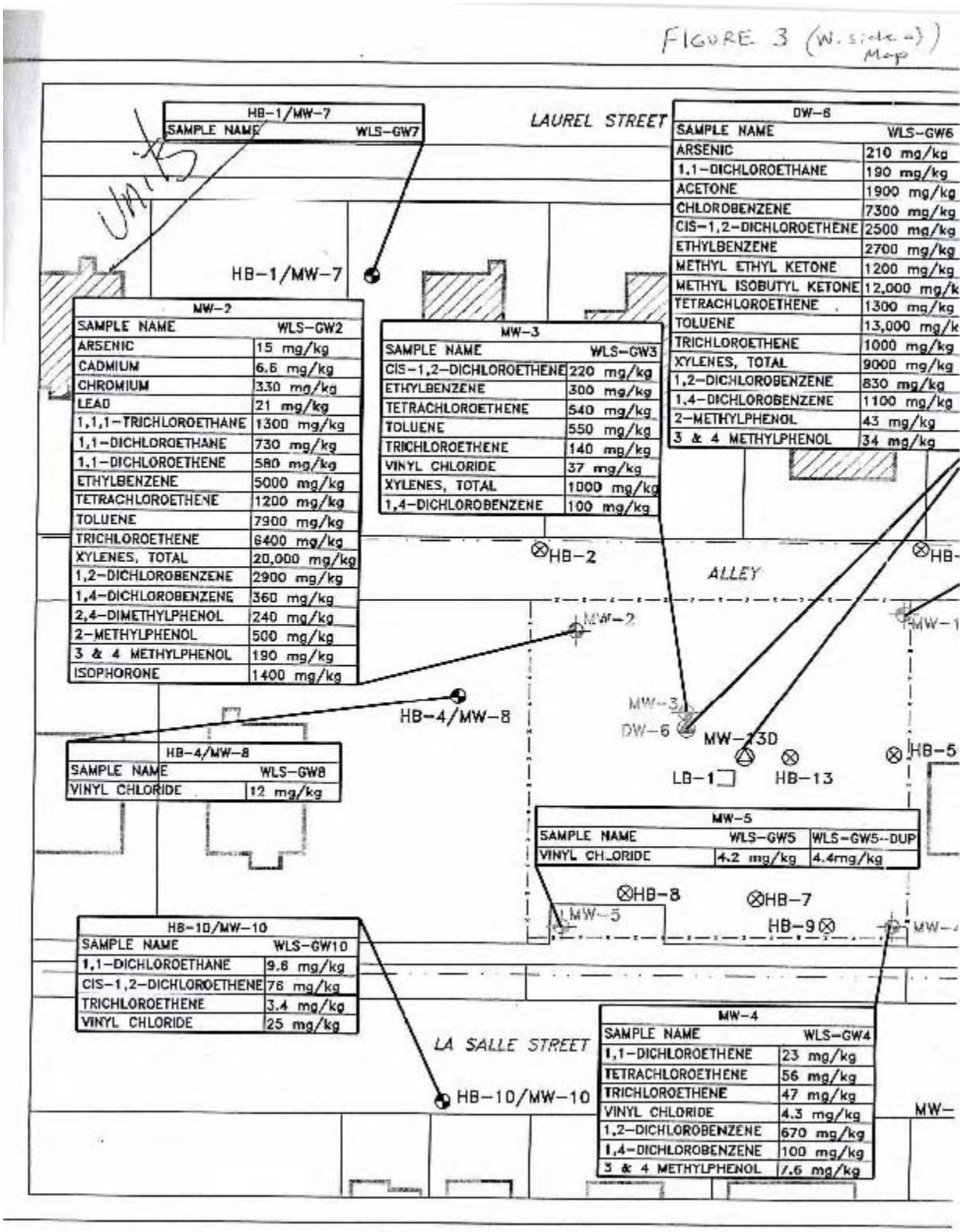


Figure 3

Monitoring Well Groundwater VOC Concentrations



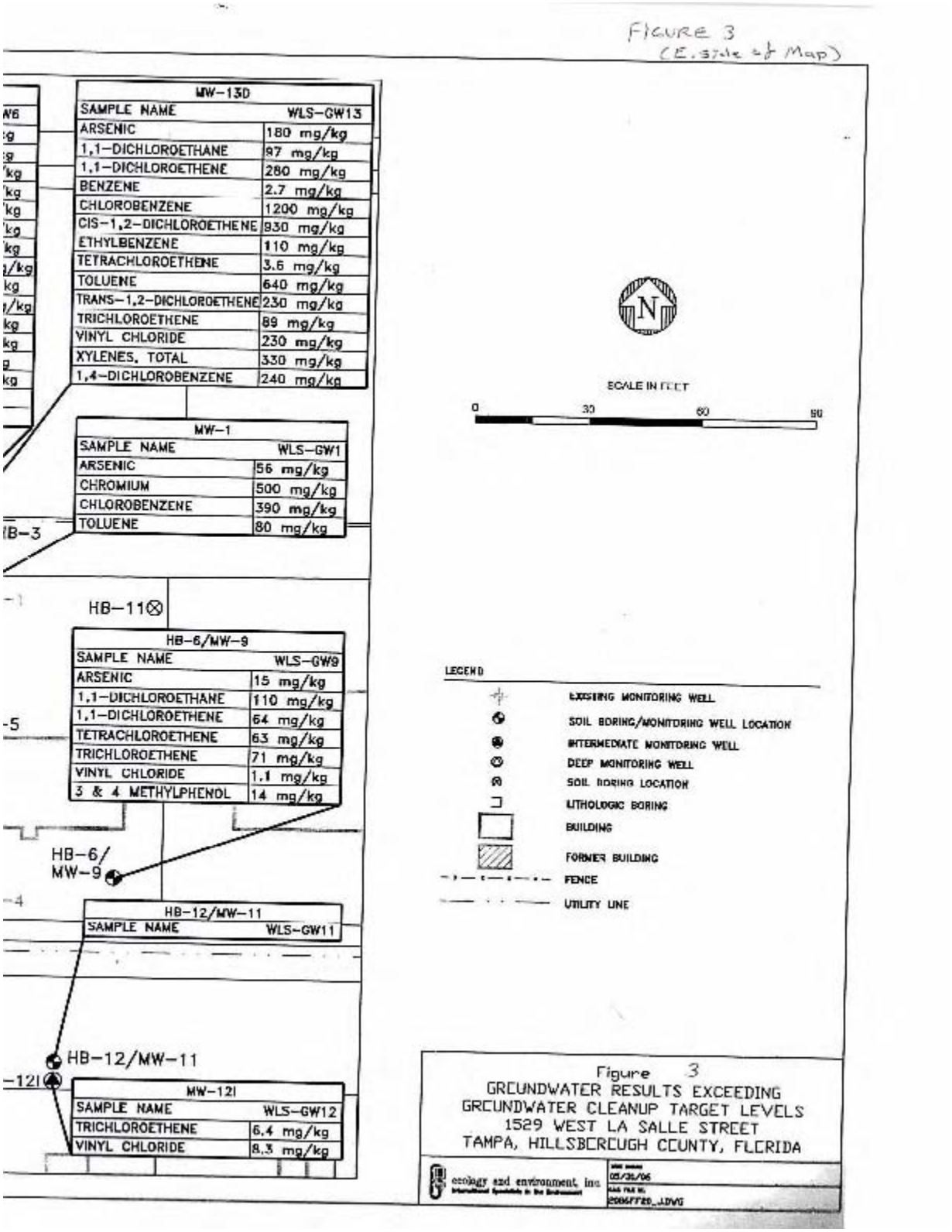


FIGURE 3
(E. Side of Map)
MW-13D
SAMPLE NAME WLS-GW13
ARSENIC 180 mg/kg
1,1-DICHLOROETHANE 97 mg/kg
1,1-DICHLOROETHENE 280 mg/kg
BENZENE 2.7 mg/kg
CHLOROBENZENE 1200 mg/kg
CIS-1,2-DICHLOROETHENE 930 mg/kg
ETHYLBENZENE 110 mg/kg
TETRACHLOROETHENE 3.6 mg/kg
TOLUENE 640 mg/kg
TRANS-1,2-DICHLOROETHENE 230 mg/kg
TRICHLOROETHENE 89 mg/kg
VINYL CHLORIDE 230 mg/kg
XYLENES, TOTAL 330 mg/kg
1,4-DICHLOROBENZENE 240 mg/kg
MW-1
SAMPLE NAME WLS-GW1
ARSENIC 56 mg/kg
CHROMIUM 500 mg/kg
CHLOROBENZENE 390 mg/kg
TOLUENE 80 mg/kg
HB-11
HB-6/MW-9
SAMPLE NAME WLS-GW9
ARSENIC 15 mg/kg
1,1-DICHLOROETHANE 110 mg/kg
1,1-DICHLOROETHENE 64 mg/kg
TETRACHLOROETHENE 63 mg/kg
TRICHLOROETHENE 71 mg/kg
VINYL CHLORIDE 1.1 mg/kg
3 & 4 METHYLPHENOL 14 mg/kg
HB-6/
MW-9
HB-12/MW-11
SAMPLE NAME WLS-GW11
HB-12/MW-11
MW-12I
SAMPLE NAME WLS-GW12
TRICHLOROETHENE 6.4 mg/kg
VINYL CHLORIDE 8.3 mg/kg
N
SCALE IN FEET
0 30 60 90
LEGEND
EXISTING MONITORING WELL
SOIL BORING/MONITORING WELL LOCATION
INTERMEDIATE MONITORING WELL
DEEP MONITORING WELL
SOIL BORING LOCATION
LITHOLOGIC BORING
BUILDING
FORMER BUILDING
FENCE
UTILITY LINE
Figure 3
GROUNDWATER RESULTS EXCEEDING
GROUNDWATER CLEANUP TARGET LEVELS
1529 WEST LA SALLE STREET
TAMPA, HILLSBOROUGH COUNTY, FLORIDA
ecology and environment, inc.
05/30/06

ATTACHMENT A

Please do not use any of the following products in your home from November 18, 19 and November 20 and December 9, 10 and 11th , 2006 and January 1, 2 and 3, 2007 as they can contain Volatile Organic Compounds (VOCs). These are chemicals that will affect the air testing in your home. We will collect air samples from your home on November 20, December 11 and January 3.

paint
paint strippers
solvents
varnishes
hardwood floor and other waxes
glue
hairsprays
perfumes
all household cleaners
nail polish
magic markers
deodorants or other personal hygiene items (in a spray or aerosol can)
wood preservatives
aerosol sprays cleansers and disinfectants
moth repellents
air fresheners
stored fuels and automotive products
hobby supplies
dry-cleaned clothing
cigarette smoke

TABLE 1
Comparison Values (CVs) for Chemicals Found in Groundwater at the LaSalle Site in Tampa, Florida

	MRL ppb Chronic	Int	Acute	NIOSH TWA	EPA Typ Level Indoor[1] ppb	RBC Region 3 Ambient Air[3]	MW	EPA Vapor Intrusion Guidance[2] 10^{-4} pbbv
lorobenzene				10 ppm 10,000 ppb		51 ug/m3 11 ppb	112	13
1,2-dichlorobenzene	none	none	none	25 ppm (25,000 ppb)		150 ug/m3 25 ppb	147	33
1,4-dichlorobenzene	17	100	1664	10 ppm (10,000 ppb)		150 ug/m3 25 ppb	147	33
1,1-dichloroethene	none	20	none			54 ppb	98	50
1,1-dichloroethane	600	none	none	100 ppm (100,000 ppb)				120
Ethylbenzene		1000		100 ppm (100,000 ppb)	1.5	1100 ug/m3 200 ppb	106	51
Hexachloroethane		6000	6000	1 ppm (1000 ppb)				6.3
Methyl isobutyl ketone		700		50 ppm (50,000 ppb)		3100 ug/m3 756 ppb	100	340
Naphthalene	0.7			10 ppm (10,000 ppb)	0.2		128	0.57
Toluene	80		1000	50 ppm?	5.3	5000 ug/m3 1000 ppb	92	110
Trichloroethene –	none	100	2000	50 ppm	0.9	0.016 ppb	131	0.41
Vinyl chloride	none	30	500	1 ppm (1000 ppb)		40 ppb	62	11
Xylenes	50	600	2000	100 ppm (100,000 ppb)	4	100 ug/m3 20 ppb		1300

[1] Ref doc for Typ levels @ http://www.epa.gov/appcdwww/iemb/insideiaq/ss98.pdf#search=%22inside%20iaq%20epa%201998%22
[2]Ref doc vapor intrusion @ http://www.epa.gov/correctiveaction/eis/vapor/tables.pdf
[3] RBC ref @ http://www.epa.gov/reg3hwmd/risk/human/rbc/rbc0406.XLS
[3] Ref @ http://hpd.nlm.nih.gov/

APPENDIX C

VOC CHEMICAL LIST for Residents not to use (English Version)

Please do not use any of the following products in your home on November 18, 19 and November 20 and December 9, 10 and 11th , 2006 and January 1, 2 and 3, 2007 as they can contain Volatile Organic Compounds (VOCs). These are chemicals that will affect the air testing in your home. We will collect air samples from your home on November 20, December 11 and January 3.

paint
paint strippers
solvents
varnishes
hardwood floor and other waxes
glue
hairsprays
perfumes
all household cleaners
nail polish
magic markers
deodorants or other personal hygiene items (in a spray or aerosol can)
wood preservatives
aerosol sprays cleansers and disinfectants
moth repellents
air fresheners
stored fuels and automotive products
hobby supplies
dry-cleaned clothing
cigarette smoke

VOC CHEMICAL LIST for Residents not to use (Spanish Version)

Departamento de Salud de Florida
Oficina de Pruebas de Aire Interior
1523 Calle La Salle

SUPLEMENTO A

Favor de no usar ninguno de los siguientes productos en su casa durante las siguientes fechas - 18, 19, y 20 de Noviembre, 2006; 9, 10, y 11 de Diciembre, 2006; y el 1, 2, y 3 de Enero, 2007, ya que estos pueden contener Compuestos Orgánicos Volátiles. Estas substancias quimicas afectan las pruebas de aire que estaremos haciendo en su casa los días 20 de Noviembre, 11 de Diciembre, y 3 de Enero.

Pintura
Productos para quitar o limpiar pintura
Solventes
Barniz o laca
Cera de cualquier tipo (para pisos u otras superficies)
Pega o goma
Laca para el pelo
Perfumen
Productos de limpieza de casa
Pintura de uñas
Marcadores
Desodorantes u otros productos de higiene personal en latas a presión
Preservativos de madera
Cualquier producto de limpieza o de aseo en latas a presión
Repelentes de insectos (naftalena)
Limpiadores o perfumen de aire
Gasolina, parafina, y productos para automóviles
Artefactos usados en pasatiempos
Ropa recientemente mandada a la lavandería
Humo de cigarrillo o tabaco

APPENDIX D

4-Methyl-2-Pentanone[a] – used in antifreeze and brake fluids; also used as a solvent to make nitrocellulose, cellulose acetate, celluloid, pigments, waxes, and oils

Bromodichloromethane[b] **- T**he small quantities that are produced are used in laboratories or to make other chemicals. However, most bromodichloromethane is formed as a by-product when chlorine is added to drinking water to kill bacteria.

Dichlorodifluoromethane[c] - The manufacture of products containing CFC-12 propellants was banned by the EPA in 1978; also known as Freon 12; formerly used as aerosol propellants for cosmetics, pharmaceuticals, insecticides, paints, adhesives, and cleaners (almost all fluorochloro-carbon-propelled aerosol uses were banned by EPA in 1978); used as a refrigerant in home and commercial air conditioners; used as a low-temperature solvent or diluent in fumigants for food sterilization, and as a solvent or degreaser in paints and varnish removers and in polymerization processes; used in water purification; copper and aluminum purification;used in regulating devices for leak detection; used as insulators and generator windings in manufacture of materials for electrical applications; used in organic synthesis of freons and resins; used as a working fluid for heat pumps and in hydraulic fluids

Ethyl Acetate[c*] **-** used as a solvent in dry cleaning and for varnishes and stains; Liberated during manufacture of smokeless powder; during manufacture of artificial silk and leather; and during preparation of photographic films and plates; Liberated and used as a solvent during application of coatings and lacquers containing nitrocellulose, cellulose acetate, and cellulose nitrate, shellac, synthetic rubber, vinyl resins, and inks; used for contact lens mold release; Liberated during manufacture of linoleum and plastic wood, dyes, pharmaceuticals, drug intermediates, ethyl acetoacetate, acetic acid, n-nitrosodiethanolamine, artificial fruit flavorings and essences, and perfumes and fragrances; and during use of duplicator fluid

Freon 11[c]* - formerly used as a propellant in aerosols for insecticides, pharmaceuticals (such as medicated propellant sprays for bronchial asthma), floor waxes, paint, and perfumes; use as a refrigerant, as a blowing agent for polymeric foams, as a solvent for cleaning and degreasing, in the production of polymeric resins, and as a dielectric fluid in bubble chambers and in wind tunnels; use as a fire-extinguishing liquid

Heptane[c] **–** used as a carrier and penetrant solvent for adhesives; in azeotropic distillations, and in rubber tire manufacture; ussed as a reference fuel for testing gasoline engine knock and in pollution and combustion studies; used in organic chemical synthesis of toluene, alkylbenzenes, gasoline, rubber solvent naphtha, and petroleum solvents

Propene[d]* **–** virtually all propene or propylene is made from propane, which is obtained from natural gas stripper plants or from refinery gases. Some 80% of the propene produced in North America is a refinery byproduct, the rest is a byproduct of cracking to ethene. Propane is converted to propene; uses of propene include gasoline (80%), polypropylene, isopropanol, trimers and tetramers for detergents, propylene oxide,

cumene, and glycerine

1,3,5-Trimethylbenzene[a] – used in the synthesis of organic chemicals; also used in plastics as an ultraviolet stabilizer and in solvents

1,2,4-Trimethylbenzene[a] - used in the synthesis of organic chemicals; also used in plastics as an ultraviolet stabilizer and in solvents

Reference a - ACGIH - American Conference of Governmental Industrial Hygiene from http://hazmap.nlm.nih.gov/cgi-bin/hazmap_generic?tbl=TblAgents&id=140

Reference b– ATSDR ToxFAQs - http://www.atsdr.cdc.gov/tfacts129.html

Reference c – http://www.osha.gov/SLTC/healthguidelines

Reference d – http://www.cartage.org.lb/en/themes/Sciences/Chemistry/Organicchemistry/Organicindustriel/Petrochemicals/Petrochemicals.htm

APPENDIX E : ATSDR Glossary of Environmental Health Terms

This glossary defines words used by the Agency for Toxic Substances and Disease Registry (ATSDR) in communications with the public. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number,
1-888-422-8737.

Absorption
The process of taking in. For a person or an animal, absorption is the process of a substance getting into the body through the eyes, skin, stomach, intestines, or lungs.

Acute
Occurring over a short time [compare with chronic].

Acute exposure
Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with intermediate duration exposure and chronic exposure].

Additive effect
A biologic response to exposure to multiple substances that equals the sum of responses of all the individual substances added together [compare with antagonistic effect and synergistic effect].

Adverse health effect
A change in body function or cell structure that might lead to disease or health problems

Aerobic
Requiring oxygen [compare with anaerobic].

The Agency for Toxic Substances and Disease Registry (ATSDR)

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency with headquarters in Atlanta, Georgia, and 10 regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances.

Ambient
Surrounding (for example, *ambient* air).

Anaerobic
Requiring the absence of oxygen [compare with aerobic].

Analyte
A substance measured in the laboratory. A chemical for which a sample (such as water, air, or blood) is tested in a laboratory. For example, if the analyte is mercury, the laboratory test will determine the amount of mercury in the sample.

Analytic epidemiologic study
A study that evaluates the association between exposure to hazardous substances and disease by testing scientific hypotheses.

Antagonistic effect
A biologic response to exposure to multiple substances that is **less** than would be expected if the known effects of the individual substances were added together [compare with additive effect and synergistic effect].

Background level
An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

Biodegradation
Decomposition or breakdown of a substance through the action of microorganisms (such as bacteria or fungi) or other natural physical processes (such as sunlight).

Biologic indicators of exposure study
A study that uses (a) biomedical testing or (b) the measurement of a substance [an analyte], its metabolite, or another marker of exposure in human body fluids or tissues to confirm human exposure to a hazardous substance [also see exposure investigation].

Biologic monitoring
Measuring hazardous substances in biologic materials (such as blood, hair, urine, or breath) to determine whether exposure has occurred. A blood test for lead is an example of biologic monitoring.

Biologic uptake
The transfer of substances from the environment to plants, animals, and humans.

Biota
Plants and animals in an environment. Some of these plants and animals might be sources of food, clothing, or medicines for people.

CAP [see Community Assistance Panel.]

Cancer
Any one of a group of diseases that occur when cells in the body become abnormal and grow or multiply out of control.

Cancer risk
A theoretical risk for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.

Carcinogen
A substance that causes cancer.

Case study
A medical or epidemiologic evaluation of one person or a small group of people to gather information about specific health conditions and past exposures.

Case-control study
A study that compares exposures of people who have a disease or condition (cases) with people who do not have the disease or condition (controls). Exposures that are more common among the cases may be considered as possible risk factors for the disease.

Central nervous system
The part of the nervous system that consists of the brain and the spinal cord.

CERCLA [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980]

Chronic
Occurring over a long time [compare with acute].

Chronic exposure
Contact with a substance that occurs over a long time (more than 1 year) [compare with acute exposure and intermediate duration exposure]

Cluster investigation
A review of an unusual number, real or perceived, of health events (for example, reports of cancer) grouped together in time and location. Cluster investigations are designed to confirm case reports; determine whether they represent an unusual disease occurrence; and, if possible, explore possible causes and contributing environmental factors.

Community Assistance Panel (CAP)
A group of people from a community and from health and environmental agencies who work with ATSDR to resolve issues and problems related to hazardous substances in the community. CAP members work with ATSDR to gather and review community health concerns, provide information on how people might have been or might now be exposed to hazardous substances, and inform ATSDR on ways to involve the community in its activities.

Comparison value (CV)
Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

Completed exposure pathway [see exposure pathway].

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 CERCLA)

CERCLA, also known as Superfund, is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by CERCLA, is responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances. This law was later amended by the Superfund Amendments and Reauthorization Act (SARA).

Concentration

The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

Contaminant

A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.

Delayed health effect

A disease or an injury that happens as a result of exposures that might have occurred in the past.

Dermal

Referring to the skin. For example, dermal absorption means passing through the skin.

Dermal contact

Contact with (touching) the skin [see route of exposure].

Descriptive epidemiology

The study of the amount and distribution of a disease in a specified population by person, place, and time.

Detection limit

The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

Dose (for chemicals that are not radioactive)

The amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. In general, the greater the dose, the greater the likelihood of an effect. An “exposure dose” is how much of a substance is encountered in the environment. An “absorbed dose” is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs.

Dose (for radioactive chemicals)

The radiation dose is the amount of energy from radiation that is actually absorbed by the body. This is not the same as measurements of the amount of radiation in the environment.

Dose-response relationship
The relationship between the amount of exposure [dose] to a substance and the resulting changes in body function or health (response).

Environmental media
Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.

Environmental media and transport mechanism
Environmental media include water, air, soil, and biota (plants and animals). Transport mechanisms move contaminants from the source to points where human exposure can occur. The environmental media and transport mechanism is the second part of an exposure pathway.

EPA
United States Environmental Protection Agency.

Epidemiologic surveillance [see Public health surveillance].

Epidemiology
The study of the distribution and determinants of disease or health status in a population; the study of the occurrence and causes of health effects in humans.

Exposure
Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [acute exposure], of intermediate duration, or long-term [chronic exposure].

Exposure assessment
The process of finding out how people come into contact with a hazardous substance, how often and for how long they are in contact with the substance, and how much of the substance they are in contact with.

Exposure-dose reconstruction
A method of estimating the amount of people's past exposure to hazardous substances. Computer and approximation methods are used when past information is limited, not available, or missing.

Exposure investigation
The collection and analysis of site-specific information and biologic tests (when appropriate) to determine whether people have been exposed to hazardous substances.

Exposure pathway
The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people

potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

Exposure registry
A system of ongoing follow up of people who have had documented environmental exposures.

Feasibility study
A study by EPA to determine the best way to clean up environmental contamination. A number of factors are considered, including health risk, costs, and what methods will work well.

Groundwater
Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with surface water].

Hazard
A source of potential harm from past, current, or future exposures.

Hazardous Substance Release and Health Effects Database (HazDat)
The scientific and administrative database system developed by ATSDR to manage data collection, retrieval, and analysis of site-specific information on hazardous substances, community health concerns, and public health activities.

Hazardous waste
Potentially harmful substances that have been released or discarded into the environment.

Health investigation
The collection and evaluation of information about the health of community residents. This information is used to describe or count the occurrence of a disease, symptom, or clinical measure and to evaluate the possible association between the occurrence and exposure to hazardous substances.

Indeterminate public health hazard
The category used in ATSDR's public health assessment documents when a professional judgment about the level of health hazard cannot be made because information critical to such a decision is lacking.

Incidence
The number of new cases of disease in a defined population over a specific time period [contrast with prevalence].

Ingestion
The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see route of exposure].

Inhalation
The act of breathing. A hazardous substance can enter the body this way [see route of exposure].

Intermediate duration exposure
Contact with a substance that occurs for more than 14 days and less than a year [compare with acute exposure and chronic exposure].

In vitro
In an artificial environment outside a living organism or body. For example, some toxicity testing is done on cell cultures or slices of tissue grown in the laboratory, rather than on a living animal [compare with in vivo].

In vivo
Within a living organism or body. For example, some toxicity testing is done on whole animals, such as rats or mice [compare with in vitro].

Lowest-observed-adverse-effect level (LOAEL)
The lowest tested dose of a substance that has been reported to cause harmful (adverse) health effects in people or animals.

Medical monitoring
A set of medical tests and physical exams specifically designed to evaluate whether an individual's exposure could negatively affect that person's health.

Metabolism
The conversion or breakdown of a substance from one form to another by a living organism.

Metabolite
Any product of metabolism.

mg/kg
Milligram per kilogram.

mg/cm^2
Milligram per square centimeter (of a surface).

mg/m^3
Milligram per cubic meter; a measure of the concentration of a chemical in a known volume (a cubic meter) of air, soil, or water.

Migration
Moving from one location to another.

Minimal risk level (MRL)
An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects. MRLs are calculated for a route of exposure (inhalation or oral)

over a specified time period (acute, intermediate, or chronic). MRLs should not be used as predictors of harmful (adverse) health effects [see reference dose].

National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or **NPL)**
EPA's list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The NPL is updated on a regular basis.

National Toxicology Program (NTP)
Part of the Department of Health and Human Services. NTP develops and carries out tests to predict whether a chemical will cause harm to humans.

No apparent public health hazard
A category used in ATSDR's public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but where the exposure is not expected to cause any harmful health effects.

No-observed-adverse-effect level (NOAEL)
The highest tested dose of a substance that has been reported to have no harmful (adverse) health effects on people or animals.

No public health hazard
A category used in ATSDR's public health assessment documents for sites where people have never and will never come into contact with harmful amounts of site-related substances.

NPL [see National Priorities List for Uncontrolled Hazardous Waste Sites]

Plume
A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.

Point of exposure
The place where someone can come into contact with a substance present in the environment [see exposure pathway].

Population
A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

Potentially responsible party (PRP)
A company, government, or person legally responsible for cleaning up the pollution at a hazardous waste site under Superfund. There may be more than one PRP for a particular site.

ppb
Parts per billion.

ppm
Parts per million.

Public availability session
An informal, drop-by meeting at which community members can meet one-on-one with ATSDR staff members to discuss health and site-related concerns.

Public comment period
An opportunity for the public to comment on agency findings or proposed activities contained in draft reports or documents. The public comment period is a limited time period during which comments will be accepted.

Public health action
A list of steps to protect public health.

Public health advisory
A statement made by ATSDR to EPA or a state regulatory agency that a release of hazardous substances poses an immediate threat to human health. The advisory includes recommended measures to reduce exposure and reduce the threat to human health.

Public health assessment (PHA)
An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health.

Public health hazard

A category used in ATSDR's public health assessments for sites that pose a public health hazard because of long-term exposures (greater than 1 year) to sufficiently high levels of hazardous substances or radionuclides that could result in harmful health effects.

Public health hazard categories
Public health hazard categories are statements about whether people could be harmed by conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five public health hazard categories are no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard.

Public health statement
The first chapter of an ATSDR toxicological profile. The public health statement is a summary written in words that are easy to understand. The public health statement explains how people might be exposed to a specific substance and describes the known health effects of that substance.

Public health surveillance
The ongoing, systematic collection, analysis, and interpretation of health data. This activity also involves timely dissemination of the data and use for public health programs.

Receptor population
People who could come into contact with hazardous substances [see exposure pathway].

Reference dose (RfD)
An EPA estimate, with uncertainty or safety factors built in, of the daily lifetime dose of a substance that is unlikely to cause harm in humans.

Remedial investigation
The CERCLA process of determining the type and extent of hazardous material contamination at a site.

RfD [see reference dose]

Risk
The probability that something will cause injury or harm.

Risk reduction
Actions that can decrease the likelihood that individuals, groups, or communities will experience disease or other health conditions.

Risk communication
The exchange of information to increase understanding of health risks.

Route of exposure
The way people come into contact with a hazardous substance. Three routes of exposure are breathing [inhalation], eating or drinking [ingestion], or contact with the skin [dermal contact].

Safety factor [see uncertainty factor]

SARA [see Superfund Amendments and Reauthorization Act]

Sample
A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see population]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

Sample size
The number of units chosen from a population or an environment.

Source of contamination
The place where a hazardous substance comes from, such as a landfill, waste pond,

incinerator, storage tank, or drum. A source of contamination is the first part of an exposure pathway.

Special populations
People who might be more sensitive or susceptible to exposure to hazardous substances because of factors such as age, occupation, sex, or behaviors (for example, cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Statistics
A branch of mathematics that deals with collecting, reviewing, summarizing, and interpreting data or information. Statistics are used to determine whether differences between study groups are meaningful.

Substance
A chemical.

Superfund [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Superfund Amendments and Reauthorization Act (SARA)

Superfund Amendments and Reauthorization Act (SARA)
In 1986, SARA amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from substance exposures at hazardous waste sites and to perform activities including health education, health studies, surveillance, health consultations, and toxicological profiles.

Surface water
Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with groundwater].

Surveillance [see public health surveillance]

Survey
A systematic collection of information or data. A survey can be conducted to collect information from a group of people or from the environment. Surveys of a group of people can be conducted by telephone, by mail, or in person. Some surveys are done by interviewing a group of people [see prevalence survey].

Synergistic effect
A biologic response to multiple substances where one substance worsens the effect of another substance. The combined effect of the substances acting together is greater than the sum of the effects of the substances acting by themselves [see additive effect and antagonistic effect].

Teratogen
A substance that causes defects in development between conception and birth. A teratogen is a substance that causes a structural or functional birth defect.

Toxic agent
Chemical or physical (for example, radiation, heat, cold, microwaves) agents that, under certain circumstances of exposure, can cause harmful effects to living organisms.

Toxicological profile
An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine harmful levels of exposure and associated health effects. A toxicological profile also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.

Toxicology
The study of the harmful effects of substances on humans or animals.

Tumor
An abnormal mass of tissue that results from excessive cell division that is uncontrolled and progressive. Tumors perform no useful body function. Tumors can be either benign (not cancer) or malignant (cancer).

Uncertainty factor

Mathematical adjustments for reasons of safety when knowledge is incomplete. For example, factors used in the calculation of doses that are not harmful (adverse) to people. These factors are applied to the lowest-observed-adverse-effect-level (LOAEL) or the no-observed-adverse-effect-level (NOAEL) to derive a minimal risk level (MRL). Uncertainty factors are used to account for variations in people's sensitivity, for differences between animals and humans, and for differences between a LOAEL and a NOAEL. Scientists use uncertainty factors when they have some, but not all, the information from animal or human studies to decide whether an exposure will cause harm to people [also sometimes called a safety factor].

Urgent public health hazard
A category used in ATSDR's public health assessments for sites where short-term exposures (less than 1 year) to hazardous substances or conditions could result in harmful health effects that require rapid intervention.

Volatile organic compounds (VOCs)
Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, and methylene chloride.

Certification

The Florida DOH, Bureau of Community Environmental Health, under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) prepared the Indoor Air Evaluation for the LaSalle Street Site Exposure Investigation. This Exposure Investigation was prepared in accordance with approved methodology and procedures existing at the time. Editorial review was completed by the Cooperative Agreement Partner.

Jeffrey Kellam
Technical Project Officer, CAT, SPAB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation, and concurs with its findings.

Alan Yarbrough
Team Lead, CAT, SPAB, DHAC, ATSDR

Susan W. Metcalf

Susan Metcalf

Team Lead, EISAB, DHAC, ATSDR