Health Consultation

EVALUATION OF AMBIENT AIR SAMPLING

SAUFLEY FIELD LANDFILL

PENSACOLA, ESCAMBIA COUNTY, FLORIDA

JULY 20, 2006

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.

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HEALTH CONSULTATION

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SAUFLEY FIELD LANDFILL

PENSACOLA, ESCAMBIA COUNTY, FLORIDA

Prepared by:

Florida Department of Health
Bureau of Community Environmental Health
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

Contents

Foreword

This document summarizes the Florida Department of Health's evaluation of ambient air monitoring and sampling results from the US EPA's January 2006 effort near the Saufley Field Landfill in Escambia County, Florida. The Florida Department of Health (DOH) evaluates site-related public health issues through the following processes:

- Evaluating exposure: Florida DOH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is on the site, and how human exposures might occur. Usually, the Florida DOH does not collect its own environmental sampling data. The United Stated Environmental Protection Agency (USEPA) provided the information for this Health Consultation.
- Evaluating health effects: If we find evidence that exposures to hazardous substances are occurring or might occur, Florida DOH scientists will determine whether that exposure could be harmful to human health. We focus this report on public health; that is, the health impact on the community as a whole, and base it on existing scientific information.
- Developing recommendations: In this evaluation report, the Florida DOH outlines its conclusions regarding any potential health threat posed by particulates in smoke from the fire, hydrogen sulfide, total volatile organic compounds (VOCs), carbon monoxide, and sulfur dioxide near the Saufley Field Landfill. Recommendations are made for reducing or eliminating human exposure to contaminants. The role of the Florida DOH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions for other agencies, including the USEPA and the Florida DEP. If, however, an immediate health threat exists or is imminent, the Florida DOH will issue a public health advisory warning people of the danger, and will work with other agencies to resolve the problem.
- Soliciting community input: The evaluation process is interactive. The Florida DOH starts by soliciting and evaluating information from various government agencies, individuals or organizations responsible for cleaning up the site, and those living in communities near the site. We share any conclusions about the site with the groups and organizations providing the information. Once we prepare an evaluation report, the Florida DOH seeks feedback from the public.

If you have questions or comments about this report, we encourage you to contact us.

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Summary

The United States Environmental Protection Agency (USEPA) monitored the air and collected air samples in the neighborhoods surrounding Saufley Field Landfill in January 2006. The Florida Department of Health (DOH) determined the air monitoring data were insufficient to evaluate the public health threat. Based on the available data, the FL DOH classifies the Saufley Field Landfill as an indeterminate public health hazard.

Site Information

Saufley Field Landfill is located on the corner of Saufley Field Road and E. Fence Road in Pensacola, Escambia County, Florida. It is a 23-acre construction and demolition debris landfill. The Florida Department of Environmental Protection (FDEP) issued the first permit for operation in 1990. The landfill has operated continuously since 1990, but the size of the landfill has grown from 5 acres to its present size of 23 acres.

Construction and demolition (C&D) debris landfills are a substantial waste stream in the United States; hundreds of millions of C&D waste are generated each year (USEPA 1988). The United States Environmental Protection Agency defines C&D debris as waste material from construction, renovation, or demolition of structures. It consists of concrete, asphalt, wood, metals, gypsum wallboard or drywall, and roofing material. Gypsum wallboard is of special concern as it is a major component of C&D waste and it leads to hydrogen sulfide formation. Drywall is composed of a core of gypsum (calcium sulfate) with a paper facing and backing (Gypsum Assoc. 1992). Sulfate dissolves upon exposure to water. If conditions are such that oxygen is removed, anaerobic bacteria digest the sulfate and generate hydrogen sulfide. Air sampling studies on and near C&D landfills have demonstrated that hydrogen sulfide is emitted and does affect off-site air quality (University of Florida 2000/2002).

Residences border the Saufley Field Landfill to the north, east, and south. Saufley Field Naval Air Base borders the landfill to the west. In 2000, over 2,000 people lived within a 1-mile radius of the landfill. Approximately 91% were white and 3% percent were black. Approximately 6% of the population is other racial/ethnic groups including American Indian, Hispanic or Latino. In a 2-mile radius, the estimated population is about 11,067 people. Approximately 81% were white and 10% percent were black. Approximately 9% of the population is other racial/ethnic groups including American Indian, Hispanic or Latino. (Bureau of the Census, U.S. Department of Commerce 2000). Since the 2000 census, additional residences have been constructed near the LF.

In November 2005, a small fire started in the debris pile and burned until mid-February 2006. Residents living within a 2-mile radius have complained that smoke from the fire at the landfill penetrates their homes. Other odors reported by the public include rotten eggs and natural gas. They have expressed concerns about health affects from inhalation of smoke from the fire and odors from the landfill.

From January through mid-May, 2006, the Escambia County Health Department has received 34 individual calls about health effects they attribute to landfill emissions. Some callers also expressed health effects that their family members were experiencing for a total of 78

individuals. Eleven physicians sent letters to the health department about 10 individuals. These physicians expressed concern that their patients' health effects were due to or exacerbated by exposure to landfill emissions. The age range for persons with adverse health symptoms is 3 to 80 years (mean= 40.0). Sinus and allergy problems were reported most frequently (30%). Other health issues reported include "other" (15%), chest tightness (14%), cough (13%), headache (13%), followed by burning eyes (10%), nausea (5%), and pneumonia (1%) [June 22, 2006, Escambia County Health Department].

Sampling History

In January 2006, the United States Environmental Protection Agency monitored the air and collected air samples on two days at 25 locations surrounding the landfill and at two locations inside the landfill fence-line. They conducted real-time air monitoring for carbon monoxide (CO), hydrogen sulfide (H_2S), particulate matter (PM) and volatile organic compounds (VOCs) at each of these locations. The US EPA also monitored sulfur dioxide (SO_2) at 7 of the locations and sampled the air for asbestos at 6 locations.

The US EPA used a programmable multi-gas air monitor (MultiRae, Model PGM-50) to measure real-time concentrations of CO, H_2S and VOC. They measured the PM concentrations using a datalogging real-time aerosol monitor (DataRam4, Model DR-400). The DataRam measured particles ranging from 0.1 to 10 microns in diameter (this size can reach the lower airways in the lungs). It has an accuracy of +/-2% of reading. The EPA recorded 29 15-minute time weighted averages and 17 5-minute time weighted averages for particulates. US EPA used a Draeger, Model CMS to monitor real-time SO_2 concentrations. The Draeger minimum detection limit is 0.4 parts per million (ppm).

Air sampling for asbestos used NIOSH Method 7402. Air sampling pumps were used to draw air through 0.45 micrometer cassettes with an effective collection area of 385 mm^2. The pumps ran for seven hours. Samples were analyzed for asbestos using the EPA AHERA method [EPA 40 CFR Part 763 Final Rule]. The laboratory minimum detection limits for asbestos range from 0.0046 to 0.0052 structures per cubic centimeter (S/cc).

Residents have raised concerns that smoke and odors were not as strong around the landfill on the days that EPA performed sampling. It is possible that EPA sampling results are not representative of either typical or worst-case air quality conditions during landfill operations.

Discussion

Carbon Monoxide

Carbon Monoxide (CO) is a colorless, odorless, poisonous gas. The incomplete burning of solid, liquid, and gaseous fuels produces it. Appliances fueled with natural gas, liquefied petroleum (LP gas), oil, kerosene, coal, or wood may produce CO. Burning charcoal and running cars produces CO (US EPA 2006).

The instrument used by the US EPA to measure CO has a range of 0 – 500 ppm and a resolution of 1 ppm. Below 1 ppm the instrument rounds the reading, if the reading is less than or equal to 0.49 ppm it rounds to 0 ppm and if the reading is 0.5 ppm or greater, it rounds the reading to 1 ppm.

The US EPA has two health protective standards: a one-hour standard of 35 ppm and an eight-hour standard of 9 ppm (US EPA 2006). Most CO measurements were below the instrument minimum detection limit of 1 ppm. One twenty-minute measurement was recorded at 2 ppm. This level is below the EPA levels which are set at levels that are protective of human health and not expected to cause adverse health affects.

Hydrogen Sulfide

Hydrogen sulfide is a colorless, flammable gas under normal conditions. It is also known as hydrosulfuric acid, stink damp, and sewer gas. Hydrogen sulfide smells like rotten eggs. People can smell hydrogen sulfide at concentrations as low as 0.0005 ppm. However, at concentrations over 100 ppm most people can no longer smell hydrogen sulfide, which makes it very dangerous. Hydrogen sulfide is found naturally and is also produced from man-made processes. It is found naturally in crude petroleum, natural gas, volcanic gases, and hot springs and is often the result of bacterial breakdown of organic matter. It is also produced from human and animal waste and can be found in sewage treatment facilities, sediments of fish aquaculture, and in livestock barns or manure areas. Industrial sources of hydrogen sulfide include petroleum refineries, natural gas plants, petrochemical plants, coke oven plants, kraft paper mills, food processing plants, and tanneries. It is a well-known emission from C&D landfills (a breakdown product of anaerobic decomposition of sulfate in gypsum board (wallboard). Hydrogen sulfide is also produced by bacteria found in your mouth and gastrointestinal tract, and by enzymes in your brain and muscle. (ATSDR 2004)

During the US EPA's monitoring, the levels of hydrogen sulfide did not measure above 0 ppm. The range of hydrogen sulfide that the MultiRae can measure is 0-100 ppm with a resolution of 1 ppm. Below 1 ppm the instrument rounds the reading, if the reading is less than or equal to 0.49 ppm it rounds down to 0 ppm and if the reading is 0.5 ppm or greater, it rounds the reading up to 1 ppm.

The Agency for Toxic Substances and Disease Registry's (ATSDR) minimum risk level is set at 0.02 ppm for an intermediate duration exposure that lasts 15-364 days and 0.2 ppm for an acute duration exposure less than two weeks. The acute duration inhalation minimum risk level (MRL) is derived from a study of asthmatics exposed to 2 ppm hydrogen sulfide for 30 minutes. The intermediate duration MRL is derived from a study in which rats were exposed to 30 or 80 ppm of hydrogen sulfide 6 hours/day, 7 days/week for 10 weeks. In a study conducted by ATSDR in Dakota City, Nebraska, scientists found a correlation between emergency room visits for respiratory issues and the previous day's hydrogen sulfide level above 0.03 ppm (Campagna et al. 2004).

The American Industrial Hygiene Association Emergency Response Preparedness Guidelines' (ERPG) most conservative (ERPG-1) value for hydrogen sulfide is 0.1 ppm. The ERPG-1 is defined as the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined, objectionable odor. The ERPG-2 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health

effects or symptoms which could impair an individual's ability to take protective action. The ERPG-3 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects. The values derived for ERPGs should not be expected to protect everyone but should be applicable to most individuals in the general population. In all populations there are hypersensitive individuals who will show adverse responses at exposure concentrations far below levels where most individuals normally would respond. Furthermore, since these values have been derived as planning and emergency response guidelines, not exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead, they are estimates, by the committee, of the thresholds above which there would be unacceptable likelihood of observing the defined effects. The estimates are based on the available data that are summarized in the documentation. In some cases where the data are limited, the uncertainty of these estimates is large. Users of the ERPG values are encouraged strongly to review carefully the documentation before applying these values (AIHA 2006).

The instrument used by the US EPA to monitor hydrogen sulfide in the Saufley Field neighborhood could only detect concentrations greater than 1 ppm. Therefore, the FL DOH cannot determine if levels of hydrogen sulfide are present that may cause health affects in residents living near Saufley Landfill.

Volatile Organic Compounds

Volatile Organic Compounds (VOCs) are organic chemicals that easily vaporize at room temperature. They are called organic because they contain both carbon and hydrogen in their molecular structures. VOCs include a very wide range of individual substances, such as hydrocarbons (for example benzene and toluene), halocarbons and oxygenates. Volatile Organic Compounds (VOCs) are found in everything from paints and coatings to underarm deodorant and cleaning fluids.

The US EPA's monitoring recorded levels for total VOCs ranging from approximately 0.1 to 0.3 ppm (these values are approximate as instrument response factors are different for different VOCs). The ATSDR recommends that—depending on further characterization of the contaminants--populations should be protected when readings are more than 1 ppm above background for more than a few days (ATSDR 2001). If readings remain around 1ppm above background on a routine basis, air samples should be analyzed to determine which VOCs are present at what concentration.

Particulates

Perhaps no other pollutant is as complex as particle pollution. Also called particulate matter or PM, particle pollution is a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, pollen, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope. These tiny particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Some particles are emitted directly from a source, while others form in complicated chemical reactions in the atmosphere. In addition, some can change back and forth from gas to

particle form. Particle pollution also varies by time of year and by location and is affected by several aspects of weather, such as temperature, humidity, and wind. (EPA 2004)

ATSDR suggests that protection of a population near a landfill fire should occur when real-time readings of particulates exceeds 3500 micrograms per cubic meter (ug/m^3) above background for a smoke that is black in color or 5000 ug/m^3 above background for a smoke that is a color other than black in a 5 minute time weighted average (TWA) sample (ATSDR 2001). The highest particulate concentration measured near Saufley Field Landfill was 567 ug/m^3 for a 5-minute TWA. However, the data may not be representative of particulate emissions during smoke and fire events due to wind direction possibly having shifted on this day. The levels for particulates near the Saufley Field Landfill fall below action levels created by ATSDR. However, the standards created by ATSDR assume an exposure of only a few days, while the landfill fire at Saufley Field had lasted for months. Therefore, the Florida DOH recommends that quantitative ambient air sampling be performed for a representative time frame near the Saufley Field Landfill and during periods when fires occur. If PM levels remain above short-term exposure levels, the samples should be analyzed for contaminants such as metals, respirable silica, fibrous glass, PAHs, and pH.

Sulfur Dioxide

Sulfur dioxide is a colorless gas with a pungent odor. It is a liquid when under pressure. Sulfur dioxide dissolves in water very easily. It cannot catch fire. Sulfur dioxide in the air results primarily from activities associated with the burning of fossil fuels (coal, oil) such as at power plants or from copper smelting. In nature, sulfur dioxide can be released to the air, for example, from volcanic eruptions. (ATSDR 1998)

The US EPA used an instrument to measure SO_2 that had a minimum detection limit (MDL) of 0.4 ppm. The ATSDR has established an MRL of 0.01 ppm for acute-duration exposure to sulfur dioxide. The MRL is derived from a study in which exercising mild asthmatics were exposed to $\geq$0.1 ppm sulfur dioxide for 10 minutes. Two test subjects showed dose-related increases in airway resistance after exposure to 0.1-0.5 ppm. Significant increases in airway resistance were observed in other asthmatics exposed to $\geq$0.25 ppm sulfur dioxide during moderate exercise. All measurements recorded during monitoring for SO_2 were below the instrument MDL, but this level is above the level shown to cause respiratory affects in asthmatics. Because levels between 0.1 and 0.4 ppm cause increased airway resistance in asthmatics and the instrument was not sensitive enough to measure this range of levels, the Florida DOH can not determine if S02 was present at levels of health concern—especially for asthmatics living near the Saufley Landfill. However, non-asthmatics should not experience any respiratory affects until exposure levels exceed 0.6 ppm. The air monitoring may not provide either typical or worst-case results. With the information provided, FL DOH cannot determine if levels of sulfur dioxide are present that may cause health affects in residents living near Saufley Landfill.

Asbestos

Asbestos is the name given to a group of six different fibrous minerals (amosite, chrysotile, crocidolite, and the fibrous varieties of tremolite, actinolite, and anthophyllite) that occur naturally in the environment. One of these, namely chrysotile, belongs to the serpentine family of minerals, while all of the others belong to the amphibole family. All forms of asbestos are

hazardous, and all can cause cancer if inhaled, but amphibole forms of asbestos are considered to be somewhat more hazardous to health than chrysotile. Asbestos minerals consist of thin, separable fibers that have a parallel arrangement. Nonfibrous forms of tremolite, actinolite, and anthophyllite also are found naturally. However, because they are not fibrous, they are not classified as asbestos minerals. Amphibole asbestos fibers are generally brittle and often have a rod- or needle-like shape, whereas chrysotile asbestos fibers are flexible and curved. Chrysotile, also known as white asbestos, is the predominant commercial form of asbestos; amphiboles are of minor commercial importance. Asbestos fibers do not have any detectable odor or taste. They do not dissolve in water or evaporate and are resistant to heat, fire, chemical and biological degradation. Because of these properties, asbestos has been mined for use in a wide range of manufactured products, mostly in building materials, friction products, and heat-resistant fabrics. Since asbestos fibers may cause harmful health effects in people who are exposed, all new uses of asbestos have been banned in the United States by the EPA. (ATSDR 2001)

The minimum detection limit of the laboratory instrument used to analyze asbestos ranged from 0.0046 to 0.0052 structures per cubic centimeter (S/cc). All ambient air samples collected near the Saufley Field Landfill were below the MDL. If levels of asbestos were present below the MDL, the Florida DOH would not expect those levels to cause adverse health affects.

Child Health Considerations

ATSDR and the Florida DOH recognize that the unique vulnerabilities of infants and children demand special attention. Children may be at greater risk than are adults to certain kinds of exposure to hazardous substances. Because they play outdoors and because they often carry food into contaminated areas, children are more likely to be exposed to contaminants in the environment. Children are shorter than adults, which mean they breathe dust, soil, and heavy vapors closer to the ground. They are also smaller, resulting in higher doses of chemical exposure per body weight. If toxic exposures occur during critical growth stages, the developing body systems of children can sustain permanent damage. Probably most important, however, is that children depend on adults for risk identification and risk management, housing, and access to medical care. Thus, adults should be aware of public health risks in their community, so they can guide their children accordingly.

Conclusions

1. Landfill emissions pose an indeterminate public health hazard. This is largely due to 2 main items:
    - concentrations of the air pollutants represent a two-day monitoring period; this may not be representative of typical or worst case conditions.
    - The lower limit of detection on some of the air monitoring instruments could not detect levels of contaminants that may affect public health.

2. Levels of carbon monoxide and asbestos are not likely to cause illness.

3. Levels of total volatile organic compounds (VOCs) are not likely to cause illness for exposures of one or two days. Additional testing for VOCs and particulate matter is necessary, however, to determine the health risk from longer-term exposures.

4. Levels of particulate matter (PM) were not found near levels that may pose a health hazard; however, the short monitoring time period may not be representative of typical or worst-case conditions around the landfill.

5. The sulfur dioxide or hydrogen sulfide detection limits were not low enough to ensure protection of public health.

Recommendations

1. Monitor air near the Saufley landfill for hydrogen sulfide using equipment with a detection limit low enough to be protective of public health.
2. Monitor the air near the Saufley landfill for a representative time period. Air monitoring should include VOCs, CO, S02, and PM. Analyses should have detection limits below the level(s) of health concern.
3. Analyze PM for metals, silica, and fibrous glass associated with construction and demolition material.
4. If a fire ignites in the landfill, collect either 8- or 24-hour air samples near the Saufley Field Landfill and analyze for VOCs using EPA method TO-15
5. If a fire ignites in the landfill, collect air samples near the Saufley Field Landfill and analyze for sulfur dioxide using a detection limit of 0.1 ppm or less.
6. Conduct PM sampling during fire events.

Public Health Action Plan

Past

- EPA collected ambient air monitoring samples in residential neighborhoods surrounding Saufley Field Landfill.
- Florida DOH evaluated ambient air data and provided technical assistance to Escambia County Health Department.

Current

- Escambia County Health Department collects information using an epidemiological survey.

Future

- Escambia County Health Department will look for resources to collect addition air samples.

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Appendix A. – US EPA Summary and Tables

United States Environmental Protection Agency Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

SITE: Saufley Field Landfill
Pensacola, Florida

EPA monitored ambient air concentrations of carbon monoxide (CO), hydrogen sulfide (H_2S), particulate matter (PM), and volatile organic compounds (VOCs) at 25 locations in the area directly surrounding the landfill and at two locations inside the landfill fence-line. EPA monitored sulfur dioxide (SO_2) at 7 of these locations. EPA sampled ambient air for asbestos in six locations. These locations are presented as GPS locations on Tables 1 and 2 and graphically as squares on Figures 1 and 2.

The CO, H_2S and VOC concentrations were measured using a programmable multi-gas monitor (MiniRae, Model PG-5014). The PM concentrations were measured using a datalogging real-time aerosol monitor 4 (DataRam4, Model DR-400). The DataRam4 has an accuracy of ±2% of reading. A Draeger (Model CMS) was used at monitoring locations 1-4, 24 and 25 to measure SO_2 concentrations. All SO_2 measurements were below the Draeger CMS detection limit of 0.4 parts per million (ppm). Calibration was conducted on monitoring equipment following manufacturer procedures. The ambient air monitoring results, except SO_2 are presented in Table 1, and SO_2 monitoring is presented in Table 2.

The asbestos ambient air sampling followed the procedures outlined in the NIOSH Method 7402. The ambient air sampling utilized SKC Pumps (Model No 224-PCXR4) to draw air through 0.45 micrometer cassettes with an effective collection area of 385 mm^2. The lab will follow TEM-AHERA analysis method to measure the amount of asbestos fibers in the sampling media. The filter media was sent to the laboratory for analysis. All samples were below the detection limit.

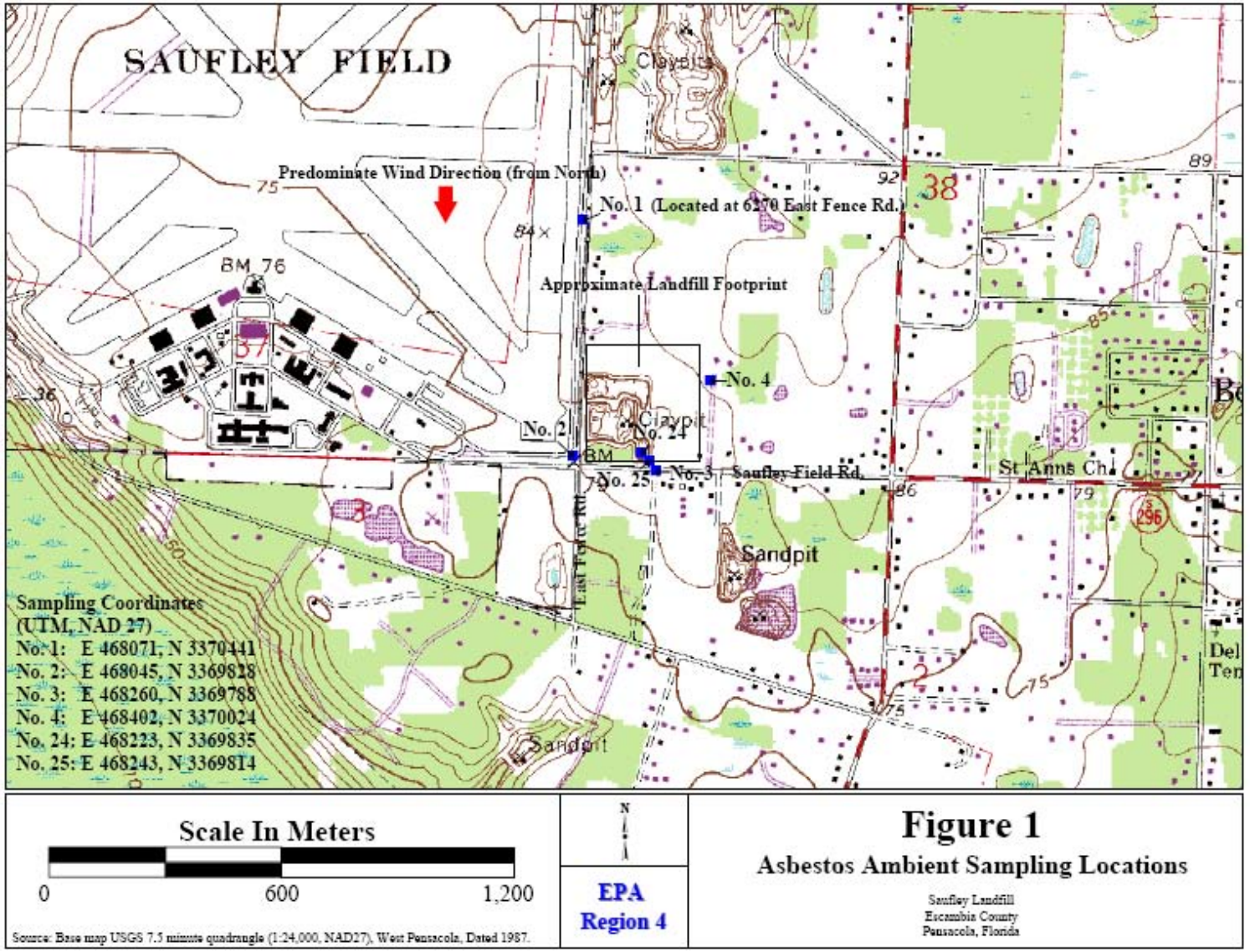

Figure 1

Asbestos Ambient Sampling Locations

Saufley Landfill
Escambia County
Pensacola, Florida

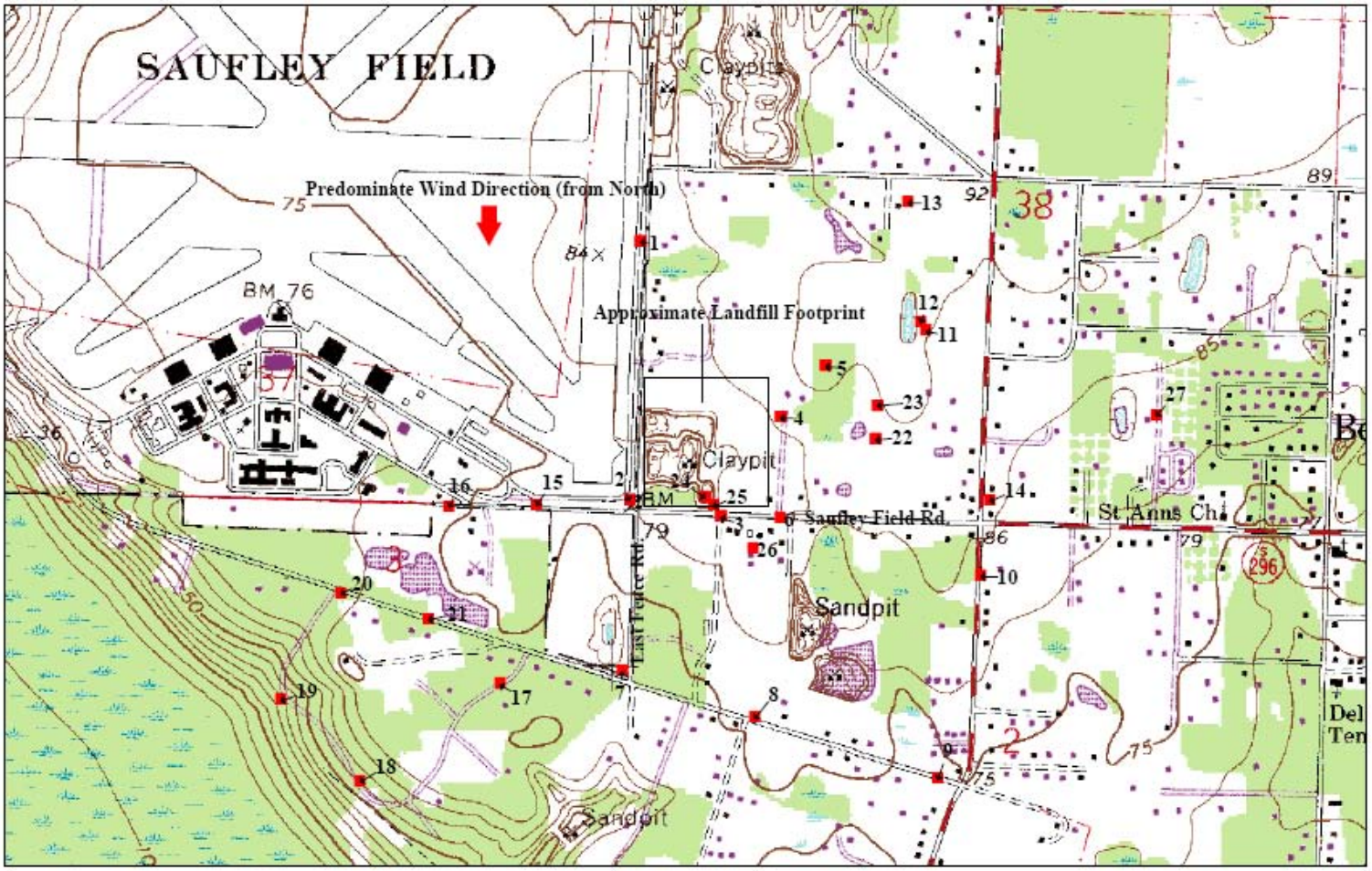

Figure 2
Ambient Air Monitoring Locations

Saufley Landfill
Escambia County
Pensacola, Florida

Table 1
Ambient Air Monitoring Results
EPA Region 4
Saufley Landfill
Pensacola, Florida

Date	Time	Monitoring Location Number	Wind Direction	UTM Coordinates (NAD27)		Ambient Air Concentration			
				Easting	Northing	CO (ppm)	H_2S (ppm)	VOC (ppm)	PM[a] ($\mu g/m^3$)
1/24/2006	1545	1	NNW	468071	3370441	0	0	b	11.5
1/24/2006	1610	2	NNW	468045	3369828	0	0	b	10.0
1/24/2006	1630	3	NNW	468260	3369788	2	0	b	24.8
1/24/2006	1645	4	NNW	468402	3370024	0	0	b	21.3
1/24/2006	1705	5	NNW	468508	3370145	0	0	b	8.7
1/25/2006	0820	1	N	468071	3370441	0	0	0	10.2
1/25/2006	0930	5	N	468508	3370145	0	0	0	7.9
1/25/2006	0955	4	N	468402	3370024	0	0	0	7.4
1/25/2006	1122	1	N	468071	3370441	0	0	0	14.4
1/25/2006	1200	2	N	468045	3369828	0	0	0	7.2
1/25/2006	1249	3	N	468260	3369788	0	0	0	85.0
1/25/2006	1325	4	N	468402	3370024	0	0	0	7.0
1/25/2006	1425	6[f]	N	468400	3369786	0	0	0	567
1/25/2006	1527	2	N	468045	3369828	0	0	0	9.1
1/25/2006	1534[c]	7	N	468028	3369423	0	0	0	7.0
1/25/2006	1544[c]	8	N	468340	3369312	0	0	0	13.1
1/25/2006	1600[c]	9	N	468772	3369168	0	0	0	6.8
1/25/2006	1610[c]	10	N	468874	3369649	0	0	0	16.4
1/25/2006	1620[c]	11	N	468745	3370229	0	0	0	10.6
1/25/2006	1630[c]	12	N	468732	3370250	0	0	0	5.3
1/25/2006	1641[c]	13	N	468702	3370534	0	0	0	7.3
1/25/2006	1720[c]	14	N	468895	3369827	0	0	0	7.1
1/25/2006	1731[c]	15	N	467825	3369817	0	0	0	6.8
1/25/2006	1740[c]	16	N	467619	3369813	0	0	0	5.9
1/25/2006	1749[c]	17	N	467739	3369392	0	0	0	13.1
1/25/2006	1800[c]	18	N	467409	3369162	0	0	0	6.4
1/25/2006	1810[c]	19	N	467222	3369354	0	0	0	7.1
1/25/2006	1820[c]	20	N	467364	3369607	0	0	0	5.4
1/25/2006	1837[c]	21	N	467570	3369546	0	0	0	6.3
1/25/2006	1843[c]	22	N	468626	3369972	0	0	0.1	7.1
1/25/2006	1850	23	N	468630	3370053	0	0	0.1	6.1
1/26/2006	0710	22	N	468626	3369972	0	0	0.3[d]	11.3
1/26/2006	0810[c]	23	N	468630	3370053	0	0	0	9.4
1/26/2006	0816	5	N	468508	3370145	0	0	0	7.0
1/26/2006	0900	24	N	468223	3369835	0	0	0	17.1
1/26/2006	0925	25	N	468243	3369814	0	0	0	8.4
1/26/2006	0955	1	N	468071	3370441	0	0	0	10.9
1/26/2006	1025	2	N	468045	3369828	0	0	0	15.3
1/26/2006	1042	26	N	468337	3369712	0	0	0.1[d]	16.2
1/26/2006	1058	4	N	468402	3370024	0	0	0	14.9
1/26/2006	1200	3	N	468260	3369788	0	0	0	57.0
1/26/2006	1220	27[e]	N	469288	3370029	0	0	0	5.8

1/25/2006	1245	22	N	468626	3369972	0	0	0	5.7
1/26/2006	1305	24	N	468223	3369835	0	0	0	34.8
1/26/2006	1330	25	N	468243	3369814	0	0	0	25.2
1/26/2006	1400	2	N	468045	3369828	0	0	0	8.7

Notes:

a Concentration results are 15-minute TWA.

b No VOC monitoring was conducted.

c Particulate matter (PM) concentration 5-minute TWA .
d Calibration performed after point was measured. Instrument measured zero after calibration. Reading may have been drift.
e Montoring location behind Family Life Center in large open field. Measured ambient air concentrations for use as representative background level.
f Monitoring location directly across the street from the landfill exit. The road had accumulated significant amount of dirt. Traffic would cause the dirt

particles to become airborne, this dust directly influenced concentration results at this location.

Table 2
Ambient Air SO_2 Monitoring Results
EPA Region 4
Saufley Landfill
Pensacola, Florida

Date	Time	Monitoring Location Number	Wind Direction	UTM Coordinates (NAD27) Easting	UTM Coordinates (NAD27) Northing	Conc. SO_2 (ppm)
1/25/2006	845	1	N	468071	3370441	<0.400
1/25/2006	936	5	N	468508	3370145	<0.400
1/25/2006	956	4	N	468402	3370024	<0.400
1/25/2006	1213	2	N	468045	3369828	<0.400
1/25/2006	1250	3	N	468260	3369788	<0.400
1/26/2006	905	24	N	468223	3369835	<0.400
1/26/2006	920	25	N	468243	3369814	<0.400

EMSL Analytical, Inc
1770 The Exchange, Suite 135, Atlanta, GA 30339
Phone: (770) 956-9150 Fax: (770) 956-9181 Email: atlantalab@emsl.com

Attn: **Brant McCanless**
Weston Solutions
5430 Metric Place Ste. 100
Norcross, GA 30092
Fax: (770) 325-7950 Phone: (770) 325-7906
Project: **12587.001.009.0346.00/Saufley Road Landfille/FL**

Customer ID: +00WEST
Customer PO:
Received: 01/27/06 9:30 AM
EMSL Order: 070600322
EMSL Proj:
Analysis Date: 1/27/2006
Report Date: 1/27/2006

Asbestos Fiber Analysis by Transmission Electron Microscopy (TEM) Performed by EPA 40 CFR Part 763 Final Rule (AHERA)

Sample	Volume (Liters)	Area Analyzed (mm^2)	Non Ash	Asbestos Type(s)	# Structures ≥ 0.5µ < 5	# Structures ≥ 5µ	Analytical Sensitivity (S/cc)	Asbestos Concentration (S/mm^2)	Asbestos Concentration (S/cc)	Notes
012506-ASB-LANDFILL01 *070600322-0001*	601.00	0.1300	0	None Detected			0.0049	<7.70	<0.0049	
012506-ASB-LANDFILL02 *070600322-0002*	563.00	0.1430	0	None Detected			0.0048	<7.00	<0.0048	
012506-ASB-LANDFILL03 *070600322-0003*	591.00	0.1430	0	None Detected			0.0046	<7.00	<0.0046	
012506-ASB-LANDFILL04 *070600322-0004*	514.00	0.1430	0	None Detected			0.0052	<7.00	<0.0052	
012506-ASB-LANDFILL05 *070600322-0005*	637.00	0.1300	0	None Detected			0.0046	<7.70	<0.0046	
012506-ASB-LANDFILL06 *070600322-0006*	601.00	0.1300	0	None Detected			0.0049	<7.70	<0.0049	
012506-ASB-FIELDBLANK01 *070600322-0007*	0.00			Not Analyzed						
012506-ASB-FIELDBLANK02 *070600322-0008*	0.00			Not Analyzed						

Analyst(s)
Woodley Benoit (8)

or other approved signatory

Disclaimers: The laboratory is not responsible for data reported in structures/cc, which is dependent on volume collected by non-laboratory personnel. This lab is only responsible for data reported in structures/mm^2. This report may not be reproduced, except in full, without written approval by EMSL. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. This report relates only to the samples reported above. Quality control data (including 95% confidence limits and laboratory and analysis' accuracy and precision) is available upon request. As per 40 CFR 763, the initial screening test may not be applied to samples with collected volumes of <1200 liters.
Accredited for NVLAP PLM/TEM #101048-1

TEMAHERA-1

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1

Glossary of Environmental Health Terms

Absorption: How a chemical enters a person's blood after the chemical has been swallowed, has come into contact with the skin, or has been breathed in.

Acute Exposure: Contact with a chemical that happens once or only for a limited period of time. ATSDR defines acute exposures as those that might last up to 14 days.

Adverse Health Effect: A change in body function or the structures of cells that can lead to disease or health problems.

ATSDR: The **A**gency for **T**oxic **S**ubstances and **D**isease **R**egistry. ATSDR is a federal health agency in Atlanta, Georgia, that deals with hazardous substance and waste site issues. ATSDR gives people information about harmful chemicals in their environment and tells people how to protect themselves from coming into contact with chemicals.

Background Level: An average or expected amount of a chemical in a specific environment. Or, amounts of chemicals that occur naturally in a specific environment.

Biota: Used in public health, things that humans would eat B including animals, fish and plants.

Cancer: A group of diseases that occur when cells in the body become abnormal and grow, or multiply, out of control.

Carcinogen: Any substance shown to cause tumors or cancer in experimental studies.

CERCLA: See **C**omprehensive **E**nvironmental **R**esponse, **C**ompensation, and **L**iability **A**ct.

Chronic Exposure: A contact with a substance or chemical that happens over a long period of time. ATSDR considers exposures of more than one year to be *chronic*.

Completed Exposure Pathway: See **Exposure Pathway**.

Comparison Value: **(CVs)** Concentrations or the amount of substances in air, water, food, and soil that are unlikely, upon exposure, to cause adverse health effects. Comparison values are used by health assessors to select which substances and environmental media (air, water, food and soil) need additional evaluation while health concerns or effects are investigated.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): **CERCLA** was put into place in 1980. It is also known as **Superfund**. This act concerns releases of hazardous substances into the environment, and the cleanup of these substances and hazardous waste sites. ATSDR was created by this act and is responsible for looking into the health issues related to hazardous waste sites.

Concern: A belief or worry that chemicals in the environment might cause harm to people.

Concentration: How much or the amount of a substance present in a certain amount of soil, water, air, or food.

Contaminant: See **Environmental Contaminant**.

Dermal Contact: A chemical getting onto your skin. (see **Route of Exposure**).

Dose: The amount of a substance to which a person may be exposed, usually on a daily basis. Dose is often explained as "amount of substance(s) per body weight per day".

Dose / Response: The relationship between the amount of exposure (dose) and the change in body function or health that result.

Duration: The amount of time (days, months, years) that a person is exposed to a chemical.

Environmental Contaminant: A substance (chemical) that gets into a system (person, animal, or the environment) in amounts higher than that found in **Background Level**, or what would be expected.

Environmental Media: Usually refers to the air, water, and soil in which chemicals of interest are found. Sometimes refers to the plants and animals that are eaten by humans. **Environmental Media** is the second part of an **Exposure Pathway**.

U.S. Environmental Protection Agency (EPA): The federal agency that develops and enforces environmental laws to protect the environment and the public's health.

Epidemiology: The study of the different factors that determine how often, in how many people, and in which people will disease occur.

Exposure: Coming into contact with a chemical substance.(For the three ways people can come in contact with substances, see **Route of Exposure**.)

Exposure Assessment: The process of finding the ways people come in contact with chemicals, how often and how long they come in contact with chemicals, and the amounts of chemicals with which they come in contact.

Exposure Pathway: A description of the way that a chemical moves from its source (where it began) to where and how people can come into contact with (or get exposed to) the chemical.

ATSDR defines an exposure pathway as having 5 parts:

- Source of Contamination,
- Environmental Media and Transport Mechanism,
- Point of Exposure,
- Route of Exposure, and
- Receptor Population.

When all 5 parts of an exposure pathway are present, it is called a **Completed Exposure Pathway**. Each of these 5 terms is defined in this Glossary.

Frequency: How often a person is exposed to a chemical over time; for example, every day, once a week, twice a month.

Hazardous Waste: Substances that have been released or thrown away into the environment and, under certain conditions, could be harmful to people who come into contact with them.

Health Effect: ATSDR deals only with **Adverse Health Effects** (see definition in this Glossary).

Indeterminate Public Health Hazard: The category is used in Public Health Assessment documents for sites where important information is lacking (missing or has not yet been gathered) about site-related chemical exposures.

Ingestion: Swallowing something, as in eating or drinking. It is a way a chemical can enter your body (See **Route of Exposure**).

Inhalation: Breathing. It is a way a chemical can enter your body (See **Route of Exposure**).

LOAEL: **L**owest **O**bserved **A**dverse **E**ffect **L**evel. The lowest dose of a chemical in a study, or group of studies, that has caused harmful health effects in people or animals.

MRL: **M**inimal **R**isk **L**evel. An estimate of daily human exposure B by a specified route and length of time -- to a dose of chemical that is likely to be without a measurable risk of adverse, noncancerous effects. An MRL should not be used as a predictor of adverse health effects.

NPL: The **N**ational **P**riorities **L**ist. (Which is part of **Superfund**.) A list kept by the U.S. Environmental Protection Agency (EPA) of the most serious, uncontrolled or abandoned hazardous waste sites in the country. An NPL site needs to be cleaned up or is being looked at to see if people can be exposed to chemicals from the site.

NOAEL: **N**o **O**bserved **A**dverse **E**ffect **L**evel. The highest dose of a chemical in a study, or group of studies, that did not cause harmful health effects in people or animals.

No Apparent Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where exposure to site-related chemicals may have occurred in the past or is still occurring but the exposures are not at levels expected to cause adverse health effects.

No Public Health Hazard: The category is used in ATSDR's Public Health Assessment documents for sites where there is evidence of an absence of exposure to site-related chemicals.

PHA: **P**ublic **H**ealth **A**ssessment. A report or document that looks at chemicals at a hazardous waste site and tells if people could be harmed from coming into contact with those chemicals. The PHA also tells if possible further public health actions are needed.

Plume: A line or column of air or water containing chemicals moving from the source to areas further away. A plume can be a column or clouds of smoke from a chimney

or contaminated underground water sources or contaminated surface water (such as lakes, ponds and streams).

Point of Exposure: The place where someone can come into contact with a contaminated environmental medium (air, water, food or soil). For examples: the area of a playground that has contaminated dirt, a contaminated spring used for drinking water, the location where fruits or vegetables are grown in contaminated soil, or the backyard area where someone might breathe contaminated air.

Population: A group of people living in a certain area; or the number of people in a certain area.

PRP: **P**otentially **R**esponsible **P**arty. A company, government or person that is responsible for causing the pollution at a hazardous waste site. PRP's are expected to help pay for the clean up of a site.

Public Health Assessment(s): See **PHA**.

Public Health Hazard: The category is used in PHAs for sites that have certain physical features or evidence of chronic, site-related chemical exposure that could result in adverse health effects.

Public Health Hazard Criteria: PHA categories given to a site which tell whether people could be harmed by conditions present at the site. Each are defined in the Glossary. The categories are:

- Urgent Public Health Hazard
- Public Health Hazard
- Indeterminate Public Health Hazard
- No Apparent Public Health Hazard
- No Public Health Hazard

Receptor Population: People who live or work in the path of one or more chemicals, and who could come into contact with them (See **Exposure Pathway**).

Reference Dose (RfD): An estimate, with safety factors (see **safety factor**) built in, of the daily, lifetime exposure of human populations to a possible hazard that is not likely to cause harm to the person.

Route of Exposure: The way a chemical can get into a person's body. There are three exposure routes:

- breathing (also called inhalation),
- eating or drinking (also called ingestion), and
- or getting something on the skin (also called dermal contact).

Safety Factor: Also called **Uncertainty Factor**. When scientists don't have enough information to decide if an exposure will cause harm to people, they use "safety factors" and formulas in place of the information that is not known. These factors and formulas can help determine the amount of a chemical that is not likely to cause harm to people.

SARA: The **S**uperfund **A**mendments and **R**eauthorization **A**ct in 1986 amended CERCLA and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from chemical exposures at hazardous waste sites.

Sample Size: The number of people that are needed for a health study.

Sample: A small number of people chosen from a larger population (See **Population**).

Source (of Contamination): The place where a chemical comes from, such as a landfill, pond, creek, incinerator, tank, or drum. Contaminant source is the first part of an **Exposure Pathway**.

Special Populations: People who may be more sensitive to chemical exposures because of certain factors such as age, a disease they already have, occupation, sex, or certain behaviors (like cigarette smoking). Children, pregnant women, and older people are often considered special populations.

Superfund Site: See **NPL**.

Survey: A way to collect information or data from a group of people (**population**). Surveys can be done by phone, mail, or in person. ATSDR cannot do surveys of more than nine people without approval from the U.S. Department of Health and Human Services.

Toxic: Harmful. Any substance or chemical can be toxic at a certain dose (amount). The dose is what determines the potential harm of a chemical and whether it would cause someone to get sick.

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

Urgent Public Health Hazard: This category is used in ATSDR's Public Health Assessment documents for sites that have certain physical features or evidence of short-term (less than 1 year), site-related chemical exposure that could result in adverse health effects and require quick intervention to stop people from being exposed.

CERTIFICATION

The Florida Department of Health, Bureau of Community Environmental Health prepared this Health Consultation under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It followed approved methodology and procedures existing at the time it began. The Cooperative Agreement Partner completed editorial review.

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

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