New York State Department of Health
Center for Environmental Health

# Health Consultation

# Marsh Valve Company

DUNKIRK, CHAUTAUQUA COUNTY
NEW YORK

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## BACKGROUND AND STATEMENT OF ISSUES

The Agency for Toxic Substances and Disease Registry (ATSDR) produced this Health Consultation to assist the United States Environmental Protection Agency (US EPA) in the evaluation of the public health implications of exposure to lead-contaminated soils and foundry slag/sand at the Marsh Valve Company site and to help determine if a remedial action is necessary. Under a cooperative agreement with ATSDR, the New York State Department of Health (NYS DOH) prepared this health consultation. In addition to this health consultation, an ATSDR Record of Activity report was prepared and submitted to the US EPA [1].

### A. Site Description and History

The Marsh Valve Company site, located at the corner of 4th Street and Brigham Road in the City of Dunkirk, is an inactive brass valve and fittings manufacturing facility. According to state and local records, operation at this location started in 1912 and in 1941 a foundry was established at the site. Operations ceased in the early 1990s. The triangular 2.5 acre site contains a solitary building, primarily of cinder block construction, built in 1912 with several additions added between 1912 and 1966. Sections of the building are in disrepair with some areas posing a potential physical hazard to site workers and unauthorized visitors. The site is at the edge of downtown Dunkirk and is immediately bordered on the south by a residential community and on the north by a parcel reportedly owned by the Niagara Mohawk Power Company. The northwest portion of the facility is adjacent to an active, highspeed freight train track. Across Brigham Road to the east lies a recreational activity field. The New York State Department of Environmental Conservation (NYS DEC) placed the Marsh Valve property on the Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 (ID #907023) in February, 2000. A "2" classification signifies that environmental conditions at the site represent a significant threat to public health and/or the environment and action is required.

There is evidence that foundry sand was disposed in the western portion of the site as early as 1971. In 1988, the Chautauqua County Department of Health (CCHD) received reports about dumping of fill material at the rear of the property. CCHD representatives collected samples of fill material in August 1988 and subsequent analysis detected lead at hazardous waste levels. In June 1997, the NYS DEC removed a leaking drum containing benzene, lead, and selenium along with visually contaminated gravel and soil. An additional 15 drums of lead contaminated coolant from inside the facility were decanted and removed along with nine drums of various wastes. Until a referral for site assessment by the NYS DEC to the US EPA, no other state or local actions took place on the site. The US EPA conducted a removal/site assessment in the spring/summer of 2001 and demolished the most dilapidated section of the building on June 6, 2001. The remedial investigation by the NYS DEC is on hold pending completion of US EPA's work.

**B. Site Visit**

Staff from the NYS DOH and NYS DEC visited the Marsh Valve parcel on July 6, 2001. Chain-link fencing with a locked gate was recently erected on the perimeter of the building and asphalt surfaced parking areas, thus preventing casual access to the building portion of the facility. The rest of the site area is unfenced. The US EPA recently removed approximately 193 drums of slag (processing residue) and a considerable volume of loose slag and casting sands in the north end of the building with lesser amounts from the floor in the southern section of the building. Demolition of the southern section of the building was completed with the debris segregated into two distinct tarp-covered piles awaiting disposal. Staff observed a third pile of uncovered debris which appeared to contain old heating radiators, metal beams and piping. A large portion of the asbestos tiled floor area in the southern building section remains, and staff was informed that the tiles are subject to a subsequent removal action by the US EPA. NYS DEC staff stated that portions of the building's roof are collapsing and water exits from the building during precipitation events.

The perimeter of the site is heavily vegetated with the interior unfenced area under a moderately dense tree canopy. Ground surface vegetation is nearly absent under the tree canopy in some areas, possibly due to poor growing conditions caused by a thick layer (up to four feet deep) of foundry sand over much of the site. Large piles of foundry sand and smelting crucibles are scattered on the ground surface throughout the facility and are accessible to trespassers. Some evidence of recent human activity was noted during the visit. During the site visit, strong westerly winds were present, reportedly a common condition for areas like this near Lake Erie. Although at the time of the visit the ground surface was moist due to recent precipitation, the potential for wind erosion exists. NYS DEC staff have seen dust blowing on-site and offsite migration of smaller sized contaminated soil particles onto residential areas east of the site could occur.

In December 2001, NYS DOH staff performed a field inspection of the adjacent residential areas to evaluate the potential for impacts to these properties by surface water runoff and/or wind dispersion. Significant site-related surface water runoff impacts are unlikely because the residential properties are topographically upgradient from the Marsh Valve site. Although wind dispersion of contaminated particles from Marsh Valve to the areas is possible, linking lead contaminants found in off-site areas with that from Marsh Valve would be very difficult. Factors that may contribute to the lead contaminants in residential areas include numerous nearby industrial facilities (both operational and closed), heavy truck and automobile traffic on Brigham Road, active freight train traffic, and lead paint from homes (many constructed between 1850-1905).

**C. Demographics**

According to 2000 United States Census Bureau data, approximately 5,700 people live within a one-mile radius of the site. Of the 5,700 persons, 82.8% are Caucasian, 5.2% African-American,



0.6% Native American, 0.2% Asian, 2% multi-racial, and 9.2% classified as other. There are five schools and two nursing homes in the area. Detailed socioeconomic information for year 2000 had not been made available by the Census Bureau at the time this health consultation was prepared.

## DISCUSSION

**A. Environmental Contamination**

Surface soil samples (0-2") from the Marsh Valve parcel were collected on two occasions (1998 and 2001) and contained high levels of lead. Three on-site samples collected by NYS DEC in 1998 contained lead ranging from 1,050 - 4,700 milligrams per kilogram (mg/kg) with an average concentration of 2,833 mg/kg [2]. The US EPA conducted a more comprehensive surface soil sampling in June, 2001. A 30 foot equilateral triangular sampling grid system was used to determine surface soil samples collection locations across the parcel, excluding the building. The soil samples contained lead ranging from 30 to 2,400 mg/kg with an average concentration of 812 mg/kg [3]. Of the 57 surface soil samples analyzed, approximately 84 percent contained lead levels above the area background value of 177 mg/kg and were evenly dispersed across the sampling grid area with no apparent concentration pattern.

During the June 2001 sampling event, the US EPA also collected soil samples under an asphalt surfaced parking area, which we considered subsurface soil samples. Clay fill had been placed over the surface of the native soil to level the ground surface as part of site preparation for asphalting. The soil samples were collected from the top two inches of native soil beneath the fill and contained lead ranging from 17 to 5,600 mg/kg with an average concentration of 821 mg/kg [3].

Substantial amounts of dust are on rafters in the building. Dust samples contained lead at concentrations of 5,600 to 35,000 mg/kg [3]. In addition, subsurface soil samples were collected from borings drilled through the building floor. Of the 21 soil samples analyzed for lead, only two samples exceeded the US EPA's residential soil lead hazard standard of 400 mg/kg and 14 of 21 samples contained levels of lead below the area background value of 177 mg/kg [2,4]. The NYS DEC sampled drums and foundry sand areas on the floors within the facility in April, 1999. The samples contained lead ranging from 116 to 3,710 mg/kg [5].

The NYS DEC collected groundwater samples from on-site monitoring wells in 1998 and found no exceedances of groundwater standards for lead [2]. In 2001, the US EPA obtained additional groundwater samples from holes dug into the on-site perched water table and the results mirrored that of the 1998 groundwater sampling [3]. Unfortunately, the testing laboratory was not certified by NYS DOH Environmental Laboratory Approval Program (ELAP).

The NYS DEC also collected nearby residential area surface soil samples in 1998. Although some of the samples were not discrete but composite (more than one sample combined and analyzed as one sample), a range of 44.3 - 318 mg/kg of lead with an average concentration of 161 mg/kg was found [2]. An additional composite surface soil sample from a recreational field across the street from the Marsh Valve facility was analyzed to determine an area background value for lead. This sample contained 177 mg/kg of lead [2]. Because none of these soils contain lead above US EPA's residential soil lead hazard standard of 400 mg/kg, off-site migration of contaminants is eliminated from further consideration in this health consultation.

**B. Exposure Pathways**

Observations made during the July 6, 2001 NYS DOH site visit indicate that exposure to site-related contaminants is likely. People accessing the unfenced portion of the Marsh Valve facility could be exposed to high levels of lead from incidental ingestion of lead contaminated soils and/or inhalation of lead dust or lead-containing soil. There are confirmed sightings of children crossing and playing on the site on their way to school. Additional evidence of human activity on the site was observed (i.e., discarded beverage containers, a sneaker, and an all-terrain vehicle trail). Although the building has limited access, it is in disrepair and portions of the roof and walls have gaping holes. People accessing the buildings could be exposed to significantly elevated levels of lead dust through inhalation or incidental ingestion.

Dunkirk/Sheridan Empire Development Zone representatives have indicated that the Marsh Valve site may be slated for future industrial economic development. The site could also be developed for residential use. Based on this information, exposure to site contaminants could occur in the future.

**C. Toxicological and Epidemiological Evaluation for Adult and Children's Health Issues**

The US EPA recently established new standards for lead in soil. Lead levels in bare soil over 400 mg/kg in residential play areas or averaging over 1,200 mg/kg in bare soil over the rest of the yard are considered lead hazards [4]. Forty of 57 surface soil samples exceed 400 mg/kg. Although the Marsh Valve site is not a residential property at this time, children are known to have played on the site, and the possibility exists that some exposures similar to those occurring on residential properties could occur.

Chronic exposure to lead is predominantly associated with effects on the nervous system and blood (e.g., anemia and increased blood pressure). The developing fetus and young children are particularly sensitive to lead-induced effects. For example, lead exposure is associated with premature birth and low birth weights, and may affect mental and physical development in children [6] The levels of lead detected in surface soil (up to 2,400 mg/kg) at the site could increase exposure of people (particularly young children) to this contaminant, especially since the site has poor vegetation and much of the contamination is in exposed soil. In addition, exposure to lead at the site could increase through incidental ingestion or inhalation of lead-containing dust



(up to 35,000 mg/kg) within the building. The potential continued exposures to lead in the soil and dust at the site pose a health concern for lead-related health effects.

**D. Community Health Concerns**

One resident living adjacent to the site was concerned about site-contaminated groundwater seeping into her basement. The amount of area groundwater is limited and there is a shallow perched water table (approximately two feet below ground surface) on-site due to a very dense till layer. Although analysis of on-site groundwater in 1998 did show groundwater standard exceedances for some metals, it did not show groundwater standard exceedances for volatile and semi-volatile organic contaminants. The area is served by public water, therefore exposure to contaminants in groundwater is minimal, if any. This information was provided to the resident and she indicated that her concerns had been adequately addressed. No other community health concerns have been brought to the attention of NYS DOH, NYS DEC or US EPA staff.

## CONCLUSIONS

Based on the on-site observations, the available sampling data, and ATSDR's hazard category classification, significantly elevated (above background) levels of lead in surface soils and building dust at the Marsh Valve Company site pose a public health hazard. Although the Marsh Valve site is not a residential property at this time, children are known to have played on the site, and the possibility exists that some exposures similar to those occurring on residential properties could occur. The potential for continued exposures to lead in the soil and dust at the site pose a health concern for lead-related health effects.

Although transport of on-site contaminants through the air (i.e., wind) and surface runoff to off-site locations is possible, existing sampling data do not indicate that off-site migration has been significant to date. Therefore, levels of lead in surface soils on adjacent residential areas are no apparent public health hazard.

## RECOMMENDATIONS

Based on the potential for adverse health effects resulting from exposure to elevated levels of lead at the Marsh Valve Company site, the NYS DOH, in consultation with the ATSDR, recommends that measures be taken to prevent or reduce on-site human exposure to the lead-contaminated soils and dust and a course of action to limit all public access to the site should be explored.

## PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the Marsh Valve Company site contains a description of actions taken or to be taken by ATSDR, US EPA and/or the NYS DOH following completion of this health consultation. The purpose of the PHAP is to ensure that this health consultation identifies public health hazards and provides a plan of action designed to mitigate and prevent adverse human health effects resulting from the past, present and/or future exposures to hazardous substances at the site. Included is a commitment on the part of ATSDR and/or the NYS DOH to follow-up on this plan to ensure that it is implemented. The public health actions are as follows:

1. The NYS DOH and ATSDR will continue to coordinate with the NYS DEC and US EPA to implement the recommendations contained in this health consultation. The U.S. EPA has taken measures to reduce human exposure to lead-contaminated soils and dust. These actions include removal and off-site disposal of on-site buildings, dust inside the buildings, and on-site soils.
2. The NYS DOH and ATSDR will provide follow-up to this PHAP, as needed, outlining the actions completed and those in progress. This report will be placed in repositories and will be provided to people who request it.
3. The NYS DOH will coordinate with the appropriate environmental and health agencies to provide community health education activities to people living near the area. These activities should include meeting with the public and providing information on potential health concerns.



## REFERENCES

1. ATSDR (Agency for Toxic Substances and Disease Registry). August 2001. Record of Activity Report. Marsh Valve Company, Dunkirk, New York. U.S. Department of Health and Human Services. Atlanta, Georgia: Public Health Service.

2. New York State Department of Environmental Conservation. August 1998. Immediate Investigative Work Assignment On- and Off-site Soil and Groundwater Sample Report.

3. GLA Laboratories. June 2001. Groundwater, surface soil, and rafter dust sample results.

4. US EPA (United States Environmental Protection Agency). 2001. Lead; Identification of Dangerous Levels of Lead; Final Rule. Federal Register 66: 1206-1240.

5. Columbia Analytical Services. May 1999. Foundry sand and dust sample results to New York State Department of Environmental Conservation.

6. ATSDR (Agency for Toxic Substances and Disease Registry). 1999. Toxicological Profile for Lead (Update). U.S. Department of Health and Human Services. Atlanta, Georgia: Public Health Service.

## CERTIFICATION

The Health Consultation for the Marsh Valve Company site was prepared by the New York State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the Health Consultation was initiated.

Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this Health Consultation and concurs with its findings.

Chief, SSAB, DHAC, ATSDR

# Appendix A

## Public Health Hazard Categories

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**INTERIM PUBLIC HEALTH HAZARD CATEGORIES**

| CATEGORY / DEFINITION | DATA SUFFICIENCY | CRITERIA |
|---|---|---|
| **A. Urgent Public Health Hazard**<br><br>**This category is used for sites where short-term exposures (< 1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid intervention.** | **This determination represents a professional judgement based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.** | **Evaluation of available relevant information* indicates that site-specific conditions or likely exposures have had, are having, or are likely to have in the future, an adverse impact on human health that requires immediate action or intervention. Such site-specific conditions or exposures may include the presence of serious physical or safety hazards.** |
| **B. Public Health Hazard**<br><br>**This category is used for sites that pose a public health hazard due to the existence of long-term exposures (> 1 yr) to hazardous substance or conditions that could result in adverse health effects.** | **This determination represents a professional judgement based on critical data which ATSDR has judged sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.** | **Evaluation of available relevant information* suggests that, under site-specific conditions of exposure, long-term exposures to site-specific contaminants (including radionuclides) have had, are having, or are likely to have in the future, an adverse impact on human health that requires one or more public health interventions. Such site-specific exposures may include the presence of serious physical or safety hazards.** |
| **C. Indeterminate Public Health Hazard**<br><br>**This category is used for sites in which "*critical*" data are *insufficient* with regard to extent of exposure and/or toxicologic properties at estimated exposure levels.** | **This determination represents a professional judgement that critical data are missing and ATSDR has judged the data are insufficient to support a decision. This does not necessarily imply all data are incomplete; but that some additional data are required to support a decision.** | **The health assessor must determine, using professional judgement, the "criticality" of such data and the likelihood that the data can be obtained and will be obtained in a timely manner. Where some data are available, even limited data, the health assessor is encouraged to the extent possible to select other hazard categories and to support their decision with clear narrative that explains the limits of the data and the rationale for the decision.** |
| **D. No Apparent Public Health Hazard**<br>**This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.** | **This determination represents a professional judgement based on critical data which ATSDR considers sufficient to support a decision. This does not necessarily imply that the available data are complete; in some cases additional data may be required to confirm or further support the decision made.** | **Evaluation of available relevant information* indicates that, under site-specific conditions of exposure, exposures to site-specific contaminants in the past, present, or future are not likely to result in any adverse impact on human health.** |
| **E: No Public Health Hazard**<br>**This category is used for sites that, because of the absence of exposure, do NOT pose a public health hazard.** | **Sufficient evidence indicates that no human exposures to contaminated media have occurred, none are now occurring, and none are likely to occur in the future** | |

***Such as environmental and demographic data; health outcome data; exposure data; community health concerns information; toxicologic, medical, and epidemiologic data; monitoring and management plans.***

## Appendix B
## Glossary of Environmental Health Terms

## ATSDR Plain Language 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.

**Additive Effect**: A response to a chemical mixture, or combination of substances, that might be expected if the known effects of individual chemicals, seen at specific doses, were added together.

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

**Antagonistic Effect**: A response to a mixture of chemicals or combination of substances that is **less** than might be expected if the known effects of individual chemicals, seen at specific doses, were added together.

**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 – including animals, fish and plants.

**CAP**: See **C**ommunity **A**ssistance **P**anel.

**Cancer**: A group of diseases which 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**.

**Community Assistance Panel (CAP)**: A group of people from the community and health and environmental agencies who work together on issues and problems at hazardous waste sites.

**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**.

**Delayed Health Effect**: A disease or injury that happens as a result of exposures that may have occurred far in the past.

**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 chemical 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:

1. Source of Contamination,
2. Environmental Media and Transport Mechanism,
3. Point of Exposure,
4. Route of Exposure; and,
5. 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.

**Malignancy**: See **Cancer**.

**MRL**: **M**inimal **R**isk **L**evel. An estimate of daily human exposure – 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:

1. Urgent Public Health Hazard
2. Public Health Hazard
3. Indeterminate Public Health Hazard
4. No Apparent Public Health Hazard
5. 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, life-time exposure of human populations to a possible hazard that is <u>not</u> 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 <u>not</u> 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.

**Statistics**: A branch of the math process of collecting, looking at, and summarizing data or information.

**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.

**Synergistic effect**: A health effect from an exposure to more than one chemical, where one of the chemicals worsens the effect of another chemical. The combined effect of the chemicals acting together are greater than the effects of the chemicals acting by themselves.

**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.

**Tumor:** Abnormal growth of tissue or cells that have formed a lump or mass.

**Uncertainty Factor:** See **Safety Factor**.

**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.