ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Public Health Assessment for

ELLENVILLE SCRAP IRON AND METAL
ELLENVILLE, ULSTER COUNTY, NEW YORK
EPA FACILITY ID: NYSFN0204190
FEBRUARY 1, 2006

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment 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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PUBLIC HEALTH ASSESSMENT

ELLENVILLE SCRAP IRON AND METAL

ELLENVILLE, ULSTER COUNTY, NEW YORK

EPA FACILITY ID: NYSFN0204190

Prepared by:

New York State Department of Health
Center for Environmental Health
Under a Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry
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SUMMARY

The Ellenville Scrap Iron and Metal (Ellenville Scrap) site is an inactive recycling and solid waste disposal facility in the Village of Ellenville, Town of Wawarsing, Ulster County. The Ellenville Scrap operators recycled metals and automobile batteries and disposed of solid waste such as tires, scrap metal, and construction and demolition (C&D) debris on ten acres of the 24-acre property. The site operated from the 1950s until 1998. The site was proposed for listing on the National Priorities List (NPL) on September 13, 2001 and was added on September 4, 2002. This public health assessment (PHA) fulfills a congressional mandate that requires public health activities for all sites nominated to the NPL. Ellenville Scrap is also listed in the New York State Department of Environmental Conservation (NYS DEC) Registry of Inactive Hazardous Waste sites. This public health assessment was distributed for public comment on November 21, 2005. The public comment period ended on December 31, 2005. NYS DOH received no comments from the residents.

Lead, polychlorinated biphenyls (PCBs), antimony, cadmium, and hydrogen sulfide are the contaminants of potential health concern associated with this site. On-site soils and groundwater are contaminated with lead. Off-site soils are contaminated with lead at levels that exceed the United States Environmental Protection Agency (US EPA) definition of a lead hazard in soil. Off-site soil samples showed detections above both background and noncancer health comparison values for antimony and cadmium; and above background but below noncancer health comparison values for arsenic, barium, chromium, cobalt, copper, manganese, mercury, nickel, selenium, silver, and zinc. Off-site groundwater is contaminated with lead below the drinking water standards. On- and off-site soils are contaminated with PCB mixtures (Aroclors) above cancer and noncancer health comparison values.

Area residents had complained about odors from the site. The odors were hydrogen sulfide and other compounds released from the decomposition of the C&D materials at the site. The odors were not detected during the most recent site visits. Four off-site sediment samples from the Beer Kill Creek did not contain site-related contaminants at a level of concern. Groundwater from the seven on-site monitoring wells is contaminated with lead, cadmium, manganese, nickel, iron and tetrachloroethene at or above drinking water standards. However, adjacent residents are connected to public water, and the private wells down-gradient and across the Beer Kill Creek do not show any site-related contaminants at concentrations of concern. The off-site, up-gradient monitoring well does not contain any site-related contamination.

Completed off-site exposure pathways include contact with contaminated soil and breathing contaminated ambient air. The completed soil pathway is dermal contact and incidental ingestion of metals (i.e., lead, antimony and cadmium) or PCB-contaminated soil from five nearby residential yards. The completed air pathway is the inhalation of odor-producing gases from the site in the past (e.g., hydrogen sulfide).

Potential exposure pathways for this site include exposure to contaminated soil, leachate, air, and waste materials on-site. These potential pathways may become completed exposure pathways if people trespass on the site and come in contact with contaminants of concern. The facility is not

in operation; consequently there are currently no on-site worker exposures. The property was recently purchased. The site is a potential concern for future exposures should the use of the site change without remediation. Also, an immediate removal response occurred on the residential property believed to formerly be a part of the site. US EPA removed one foot of soil, installed a geofabric membrane and covered it with one foot of topsoil and then sod. The US EPA on-scene coordinator set up air monitors during the removal to detect lead dust stirred up by the removal process and to trigger actions to minimize exposures to the public if action levels were exceeded. The fact sheet, that was mailed out at NYS DEC's request, was prepared for the community addressing the removal process and outlining the contact information for the project managers of the site (US EPA, 2004). In addition, NYS DEC indicated a need for at least a temporary measure to reduce exposures to contaminants on the escarpment where there are hundreds of discarded battery casings and high levels of lead. US EPA has since removed these casings and disposed of them off-site.

No exposures to groundwater contamination above NYS DOH drinking water standards are expected. To date, the five sampled private wells, across the Beer Kill Creek, do not contain any contaminants above the maximum contaminant levels (MCLs) promulgated for public water supplies by NYS DOH. About 15 households adjacent to the site receive drinking water from a public water supplier. Public water is monitored regularly, and immediate corrective action is taken if any contamination is found above drinking water standards.

People living near Ellenville Scrap want to know if there is an elevated incidence of chronic disease, especially cancer and respiratory disease, among area residents. While residents may have been exposed to site-related contamination, there is inadequate information about levels of possible exposure to evaluate potential adverse health effects (e.g. respiratory disease).

Area residents are concerned about the possible health effects from direct contact with lead or PCB contaminated soils in their yards. In 1992, New York State legislation was enacted requiring screening for lead in children under the age of six. The legislation also requires that all blood lead results be reported to NYS DOH. Because possible lead exposure is a concern at this site, NYS DOH staff reviewed the blood lead test results for all children under six years old who were screened between January 1994 and July 2002. No children living in homes on the streets near the site had blood lead levels that exceeded the CDC recommended follow-up level of 10 micrograms per deciliter (mcg/dL). NYS DOH estimates the increased risk from exposure to PCBs in off-site soil to be low for both cancer and noncancer health effects.

People complained about odors from the site in the past and are concerned about health effects from the gases causing the odors. Odors were not detected on site visits and no complaints about odors have been received since 2001. No odors or leachate were observed on a site visit in November of 2004. Available data are insufficient to evaluate potential health effects from this past exposure.

The residents are also concerned about wading in, and eating fish from, Beer Kill Creek. To date, analysis of surface water and Creek sediment have not indicated the presence of site-related contaminants. There is no specific advisory for consumption of fish from the Creek.

The community is concerned about trespassers being exposed to contaminants and physical hazards on-site. NYS DEC installed fencing along the side next to residential areas on River Street. The rest of the site is fenced with the exception of the portion that borders Beer Kill Creek, or the southwestern boundary of the property. The fence is in disrepair in some spots, particularly in two areas. A tree fell on the fence in one spot and the fence was intentionally cut in another area. Fresh garbage bags were found dumped in this spot. This PHA recommends improvements to the perimeter fence.

Finally, the residents expressed concerns that the tires on-site may provide a breeding area for mosquitoes that may carry the West Nile Virus. Local and county officials removed most of the tires from the site in 2001. The remaining tires were removed in June of 2005.

Nearby residents were exposed in the past and may continue to be exposed to site-related contaminants, especially lead and PCBs, in their yards. The soil in the yards of three homes near the Ellenville Scrap Iron and Metal site contains levels of lead that exceed the US EPA's definition of a lead hazard in soil. Additionally, the residence that was possibly a part of the site in the past had levels of lead up to 230,000 mg/kg in the surface soil prior to the removal action. Based on these data and ATSDR's public health hazard categories (Appendix D), the Ellenville Scrap Iron and Metal site represents a public health hazard. In addition, the residential yard that was potentially part of the site in the past contained PCBs at levels above background and health comparison values. Exposure to the highest level of Aroclor 1260 detected is estimated to have posed a low increased risk of cancer and a moderate to high increased risk of noncancer health effects in the past. While the removal of the top foot of soil in this yard has eliminated the immediate exposure concern, potential future exposure to lead and Aroclor 1260 under the foot of clean soil on this property needs to be given consideration during final remedy selection. In addition, further sampling is needed to better characterize the extent of PCB-contaminated soil in residential yards near the site.

US EPA should better characterize PCB contamination in residential areas to identify the extent of contamination in off-site soil. This action will help to reduce the potential for area residents to be exposed to site-related contaminants. US EPA should also limit access to the site by improving the perimeter fence.

PURPOSE AND HEALTH ISSUES

Congressman Maurice Hinchey requested that the Agency for Toxic Substance and Disease Registry (ATSDR) investigate the Ellenville Scrap Iron and Metal site to determine if people living near the site are being exposed to site-related contaminants. Area residents expressed concern about cancer incidence in the community and the prevalence of other chronic and acute health problems such as respiratory disease. This public health assessment (PHA) will summarize the environmental data, evaluate potential past, current and future human exposures to site-related contaminants and make recommendations for appropriate site-specific health interventions. This PHA also fulfills the congressional mandate for a public health activity for each site proposed to the National Priorities List (NPL).

BACKGROUND

A. Site Description and History

The Ellenville Scrap Iron and Metal site began operation in the 1950s as a battery recycling facility. Scrap metal, tires, and other waste materials, including construction and demolition (C&D) debris were also accepted and stored on about 10 acres of the 24 acre site (Figure 1). The owners accepted waste material from area manufacturers such as Nepera Chemical, IBM, Amour Textiles and C&R Freon Removal. In 1997, a new owner began accepting significantly greater amounts of ground C&D debris and other wastes. A significantly larger waste mass was created by the disposal of the C&D debris on an embankment at the edge of the upper portion of the site. US EPA estimated the volume of this material at approximately 4550 cubic yards. During periods of rainfall, leachate accumulates in a low area beneath the waste debris embankment. An area resident reported that leachate from the site discharged to Beer Kill Creek in February and March of 1998. This observation has not been independently confirmed.

An office building, a drum crusher, metal drums, a hydraulic bailing machine, an aluminum smelter/sweating furnace, a metal shearer, a tub grinder, wrecked trucks, petroleum storage tanks and metal dumpsters were located above the embankment on the upper portion of the site. Additional waste material such as waste tires (now removed), metal and automobile debris, wooden pallets and railroad ties are on the lower portion of the site below the embankment. US EPA is in the process of removing all of this miscellaneous waste.

In March 1987, the site owner acknowledged that he was operating a solid waste facility without a NYS DEC permit. He paid a fine and agreed to close and cover the area where solid waste was disposed. Inspections of the site by NYS DEC, beginning in 1995, indicated that additional solid waste had been deposited at the site and that the operator was in violation of NYS DEC solid waste regulations. The operator agreed, by consent order, to conduct a site assessment. In May 1997, the new owner significantly increased the volume of solid waste at the site, including creation of a large C&D disposal area along an embankment that divided the upper and lower portions of the site. This operator was also cited for operating a solid waste facility without a permit and also agreed, by consent order, to pay a fine, cease operating a solid waste

management facility, and remove illegally dumped solid waste. Because the operator failed to comply with provisions of the consent order and failed to pay the fine, NYS DEC obtained a temporary restraining order from a NYS Supreme Court Justice in August 1998. The restraining order prohibited further activities at the site until the operator complied with NYS DEC regulatory directives. The facility is not currently operating and there are no workers on the site.

In 1998, US EPA contractors collected on- and off-site surface soil samples, sediment samples from Beer Kill Creek and leachate samples from the ponded area at the base of the embankment. These samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs) and trace metals. Analysis of these samples indicated the presence of SVOCs and trace metals in surface soil and leachate that may be due to waste material at the site. The site was proposed for NPL listing on September 9, 2001 and was added on September 4, 2002.

US EPA collected residential soil samples from four residential yards in June of 2004 and tested them for metals. These samples contained lead at levels above New York State background (levels typically found in soils in New York State) and health comparison values (levels at which health effects may potentially be seen). In addition, antimony, and cadmium were found above health comparison values in one residential yard and arsenic above health comparison values in two residential yards.

The Ellenville Scrap site was recently purchased. In addition, an immediate removal response was completed on the residential property believed to formerly be a part of the site. US EPA removed one foot of soil, installed a geofabric membrane and covered it with one foot of topsoil and then sod. The US EPA on-scene coordinator set up air monitors to prevent potential exposures of the community to lead dust stirred up by the removal process. In addition, three buildings were demolished as part of the removal process and roughly twenty drums containing various VOCs and petroleum by-products will be disposed of off-site. NYS DEC requested that a fact sheet be prepared for the community addressing the removal process and outlining the contact information for the project managers of the site. In addition, NYS DEC felt that at least a cover was needed for the escarpment where there are hundreds of discarded battery casings and high levels of lead. US EPA removed the casings and disposed of them off-site. The site is a potential concern for future exposures should the use of the site change without remediation.

B. Site Visit

NYS DEC, NYS DOH, and Ulster County Department of Health (UC DOH) staff visited the site numerous times to collect environmental samples, observe operations at the site and to respond to area resident's complaints. Complaints were chiefly about odors from the site. Agency staff noted hydrogen sulfide (H_2S) and other odors that might be associated with off-gassing of site waste, both on-site and near the perimeter of the site. Slight odors were present on several occasions in residential areas. On September 2, 1998, NYS DOH staff conducted air testing for H_2S with a direct field reading instrument. H_2S levels ranged from less than the instrument minimum detection limit, 0.001 parts per million (ppm), on the perimeter of the site and in

residential areas, to 0.003 ppm on the site. US EPA staff visited the site several times for reconnaissance and sample collection. Representatives of ATSDR, NYS DEC, and NYS DOH visited the site on September 5, 2001 prior to a public availability session with area residents, elected officials and local media. NYS DOH staff visited the site in July 2002 and detected no odors on- or off-site.

Scarlett Messier, the NYS DOH project manager, accompanied by the EPA project manager, and NYS DOH district staff, visited the site in September of 2004. Ms. Messier saw pallet piles, construction and demolition debris landfills, metal waste, battery piles, trucks, a crane, tires and approximately 20 drums. US EPA had previously tested the drums in June of 2004 and determined that some contained various volatile organic compounds while others were assumed to contain waste oil. The residence that is believed to formerly be part of the site appeared to be built on a large car battery pile. The highest lead level (230,000 milligrams per kilogram (mg/kg)) in residential soil was detected in this yard. During a site visit on November 3, 2004, preparations were made for an immediate soil removal response in the yard at this residence. US EPA has since removed one foot of soil on this property, installed a geofabric membrane and covered it with one foot of topsoil and then sod. US EPA has also removed the casings and disposed of them off-site.

C. Demographics

NYS DOH estimated, from the 2000 Census (US Bureau of the Census. 2001) that 2,466 people live within one mile of the Ellenville Scrap Site in Ulster County, NY. The age distribution of the area is similar to that of New York State. There were 553 females of reproductive age (ages 15-44) in the area. The area has a slightly higher proportion of minorities compared to the rest of the state due in part to the sizable Hispanic population in the area. Based on the 2000 Census (US Bureau of the Census. 2002) a higher percentage of the population in this area is living below the poverty level and the median household income is lower than the rest of the state. These comparisons are provided in the following table. In addition, there are three schools and no nursing homes in the area.

	New York State	Ellenville Scrap Area
Age Distribution		
<6	8%	9%
6-19	20%	21%
20-64	60%	58%
>64	13%	12%
Race Distribution		
White	68%	68%
Black	16%	11%
Native American	<1%	<1%
Asian	6%	2%
Pacific Islander	<1%	0%
Other	7%	13%
Multi-Racial	3%	6%
Percent Minority*	38%	43%
Ethnicity Distribution		
Percent Hispanic	15%	28%
1999 Median Income	$43,393	$32,748
% Below Poverty Level[2]	15%	23%

* Minority includes Hispanic, African-Americans, Asian Americans, Pacific Islanders, and American Indians.

DISCUSSION

A. Environmental Contamination and Pathway Analysis

On-site Contamination

US EPA consultants, NYS DEC and a consultant hired by the original site owner sampled on-site surface soil. Sampling occurred between 1998 and 2004. Organic chemicals that were detected at the site included benzene, xylene (total), tetrachloroethene (PCE), trichloroethene, 1,1-dichloroethene, chlorobenzene, toluene, polycyclic aromatic hydrocarbons (PAHs) and PCB Aroclors (commercial mixtures of PCBs). Arsenic, barium, cadmium, chromium (total), copper, iron, lead, and mercury were detected above typical NYS soil background levels. Detection of these compounds in soil is consistent with reports of liquid and solid waste dumping at the site, including lead acid batteries, asphalt, petroleum hydrocarbons, scrap metal and electrical equipment.

US EPA and NYS DEC collected samples from the leachate ponding area beneath the embankment. Analytical results of these samples detected PCBs, arsenic, chromium, lead, mercury, ethylbenzene, and SVOCs indicating possible migration of waste from disposal areas.

Agency staff noted hydrogen sulfide (H_2S) and other odors that might be associated with off gassing of site waste, on-site and near the perimeter of the site. On September 2, 1998, NYS DOH staff conducted air testing for H_2S with a direct reading instrument. H_2S levels ranged from less than the instrument minimum detection limit (0.001 parts per million (ppm)) on the perimeter of the site to 0.003 ppm on the site. The nearest home is approximately 50 feet from the site. Odors appeared to be greater when leachate collected into ponds below the landfill. Odors were not detected during more recent site visits including the one in November 2004.

NYS DEC collected samples from on-site groundwater monitoring wells. Analytical results were compared to results from an off-site, up-gradient monitoring well. Compounds detected at comparatively elevated levels included arsenic, cadmium, chromium, lead, mercury, and tetrachloroethene, indicating that liquid and solid waste on the site have affected on-site groundwater.

People who trespassed onto the site may have been exposed to contaminants by direct contact with contaminated surface soil and/or leachate and may have inhaled hydrogen sulfide or other compounds produced from C&D debris decomposition. Although the site is fenced on three sides, access may be gained along the Beer Kill Creek side (southwestern) and in areas where the fencing is in disrepair. This is a potential exposure pathway. There are no pathways for exposure to contamination from on-site groundwater because there are no drinking water wells or groundwater seeps on-site.

Off-site Contamination

Surface Soil in Residential Yards

US EPA, NYS DEC, NYS DOH, UC DOH and a private consultant for the site owner collected samples from surface soils in five residential yards near the site and at the perimeter of the site. The levels of contaminants in one yard were higher than in the others sampled, so this property will be discussed separately.

In one residential yard, several metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, silver, selenium, and zinc) were detected in off-site surface soil at levels that exceed typical background ranges, or levels usually expected in soil (Table 1). Aroclor 1260 was detected at levels (up to 30 mg/kg) above levels we would typically expect to find in surface soil, and the levels exceeded public health assessment comparison values (Table 2). Lead in this yard was also detected in 37 samples at levels (31 mg/kg to 230,000 mg/kg) above typical background levels for soil in New York State and at levels that exceed the US EPA's definition of a lead hazard in soil (US EPA, 2001). This residential yard is believed to formerly be part of the site. Piles of battery cases on this property were removed in the summer of 2005. For this yard, exposures to lead were likely in the past and may be a future hazard if measures are not taken to minimize the potential for exposure to contaminated soil one foot below the surface.

Levels of contaminants in the other residential yards sampled are lower. In these yards, lead was found in all 22 samples at levels ranging from 36 mg/kg to 11,100 mg/kg. The detected levels of antimony, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc were above typical background levels for soil in New York State (Table 1). Aroclor 1260 was detected in these yards at levels below health comparison values, however, further sampling of these yards is needed to better characterize PCB contamination.

Nearby residents were possibly exposed in the past and may continue to be exposed to site-related contaminants, especially lead, in their yards. This is likely a completed exposure pathway, although further sampling of these yards is needed to better characterize the extent of PCB-contaminated soil in the yards. See the Off-Site Surface Soils discussion in the Public Health Implications section of this document for more detailed analyses.

Off-site indoor air

There is a potential for soil vapor contamination related to contaminated soil or groundwater. VOC soil vapor contamination, if present, could intrude into basements and impact indoor air. This PHA recommends that US EPA and NYS DOH work together to evaluate this potential exposure pathway.

NYS DOH and NYS DEC will evaluate the need to conduct additional investigations to determine the potential for soil vapor intrusion into structures on or near the site.

Off-site ambient air

Area residents reported being exposed to airborne contaminants from the off-gassing of site contaminants and the decomposition and consequent gas production of organic waste. Although hydrogen sulfide can be the dominant compound released from the decomposition of C&D debris, other compounds may have also been present. On September 2, 1998, NYS DOH staff conducted air testing for H_2S with a direct reading instrument. H_2S was not detected at levels above the instrument minimum detection limit (0.001 ppm) in residential areas.

Because residents reported odors near their homes, this is a completed exposure pathway and residents were exposed to some level of site-related contaminants. However, since only H_2S measurements were collected, and only once using field instrumentation, this pathway cannot be completely evaluated. Agency staff observations indicate that the gas phase products of decomposition appear to have diminished significantly since initial reports of odors in 1997. During site visits in 2001 and 2002, and the most recent in November 2004, State agency staff detected no odors on- or off-site. No complaints have been received about odors from the site since 2001.

Off-site drinking water

No drinking water wells are immediately down-gradient of the site. About 15 homes on the opposite side of Beer Kill Creek have individual drinking water wells (Figure 1). The wells appear to be down gradient of the site, however the groundwater direction has not been fully

characterized. UC DOH and NYS DOH collected water samples from five of these wells in March 1998 and December 1999. Samples were analyzed for VOCs, SVOCs, PCBs, pesticides and metals. Low levels of acetone, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, chloroform, diethylphthalate, and di-N-butyl phthalate were found below the NYS DOH drinking water standards promulgated for public water supplies. No other organic contaminants were detected and levels of metals were similar to area background.

Residents down-gradient of the site obtain drinking water from the Ellenville municipal water supply. This supply obtains water from three wells and a reservoir. One well is within two miles of the site and is recharged by the Sandburg Creek Valley Aquifer that flows under the Ellenville Scrap site. Due to the distance between the site and the wells we do not anticipate that the site will affect the public water supply wells. Additional groundwater monitoring is needed to track contaminants as well as to ensure that the private drinking water wells down-gradient and across the stream continue to meet current New York State drinking water standards.

Surface Water, Sediment and Fish in Beer Kill Creek

US EPA consultants collected four samples from the streambed of Beer Kill Creek, one upstream and three downstream of the site, and analyzed them for site-related contaminants. Analytical results of samples collected downstream of the site were similar to the upstream sample and did not indicate that the site had affected stream sediment. Although surface water was not sampled at that time, the sediment indicates that the site has not had a significant effect on Beer Kill Creek. Residents reported that leachate from the site sometimes reaches the Creek. However, leachate discharges to the creek have not been observed by site investigators and may occur only intermittently between rains. There are no specific advisories for fish consumption in the creek. The creek does not appear to be significantly affected by the site to date; therefore exposure pathways associated with the creek will not be discussed further in the public health assessment.

B. Public Health Implications: Toxicological and Epidemiological Evaluation

An analysis of the toxicological and epidemiological implications of the human exposure pathways of concern is presented below. To evaluate the potential health risks from contaminants of concern associated with the Ellenville Scrap Iron and Metal site, NYS DOH assessed the risks for cancer and noncancer health effects. The risks of health effects depend primarily on contaminant concentration, exposure route, exposure frequency and duration. Additional information on the NYS DOH procedure for evaluation of health risks is presented in Appendix C.

On-Site Surface Soil

On-site surface soil at the Ellenville Scrap Iron and Metal site contains metals above NYS background soil levels (arsenic, barium, cadmium, chromium (total), copper, iron, lead and mercury), organic chemicals (benzene, 1,1-dichloroethene, chlorobenzene, tetrachloroethene, toluene, trichloroethene, trichlorofluoromethane) and commercial mixtures of PCBs (Aroclors). Samples collected from the leachate ponding area also contained PCBs and metals (lead and

chromium) at levels above those we typically expect to find in the environment. If people gain access to the site, they could be exposed to site contaminants by direct contact with the contaminated surface soil and leachate, and the risk for adverse health effects could increase. However, the site is mostly inaccessible because of topography and fencing. Thus, while access to the site is a possibility, the existing barriers as well as the awareness of hazards by nearby residents suggest that this is currently not a significant exposure concern.

Off-Site Surface Soils

Several metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, silver, selenium, and zinc) were detected in off-site surface soil at levels that exceed typical background ranges, or levels usually expected in soil (ATSDR, 1990; Clarke, et al., 1985; Connor et al., 1957; Dragun, 1988; McGovern, 1988; Seiler, 1988; Shacklette and Boerngen, 1984). Aroclor 1260 was detected above levels we would typically expect to find in surface soil, and the levels exceeded noncancer and cancer public health assessment comparison values based on residential exposure (Table 2). Lead was detected in residential areas above typical background levels and at levels that exceed the US EPA's definition of a lead hazard in soil (US EPA, 2001). Antimony and cadmium were also detected at levels that exceed typical background and noncancer comparison values for residential exposure (Table 2). Aroclor 1260, lead, antimony and cadmium are selected for further evaluation. No other contaminants exceeded both typical soil background levels and their public health comparison values for residential soil with the exception of arsenic in one residential sample.

Lead

Lead was detected in all off-site surface soil samples from five properties. On one property, lead levels in surface soil ranged from 31 mg/kg to 230,000 mg/kg. The sample that contained 230,000 mg/kg of lead was in an area that was described as containing battery parts. For the other properties, lead levels in surface soil ranged from 36 mg/kg to 11,100 mg/kg. All of the properties sampled had lead levels higher than typical background levels and three were higher than the levels US EPA considers to be lead hazards in bare soil (400 mg/kg in bare soils of play areas or averaging over 1200 mg/kg in bare soil for the rest of the yard) (US EPA, 2001).

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 (ATSDR, 1999a). The health risks associated with exposure to lead in surface soil are not quantitatively evaluated as they are for other contaminants because lead does not have a reference dose or comparison value. The higher levels of lead detected in surface soil in the residential areas could increase exposure of people (particularly young children) to this contaminant especially if the contamination is located in bare soil. Exposure to the highest levels of lead detected in soil on the residential properties (11,100 mg/kg and 230,000 mg/kg) would pose a high risk for increasing blood lead levels and causing lead-related adverse health effects.

Other Metals

On the same residential property containing the highest levels of lead, several other metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, manganese, mercury, nickel, silver and zinc) were detected in surface soil at levels that exceed typical background ranges (i.e., levels that we would usually expect to find in soil (ATSDR, 1990; Clarke, et al., 1985; Connor et al., 1957; Dragun, 1988; McGovern, 1988; Seiler, 1988; Shacklette and Boerngen, 1984)). The highest levels of antimony and cadmium on this property also exceed public health assessment comparison values based on residential exposure (Table 2). Antimony and cadmium were selected for further evaluation. The maximum detection of arsenic (28 mg/kg) at this property was the only off-site detection above the typical background range of 2 mg/kg to 20 mg/kg (Clarke, et al., 1985; McGovern, 1988; Shacklette and Boerngen, 1984). The average arsenic level for all the surface soil samples from this property (8.0 mg/kg) is within the typical background range, and therefore the health risk for past exposure to arsenic on this property is estimated to be similar to the health risk associated with arsenic exposure in typical soils. The surface soil from the other off-site residential properties that were sampled contained some metals above typical background levels (cadmium, chromium, copper, manganese, mercury, selenium and zinc), but none of the detected levels exceeded health based soil comparison values for residential exposure. The levels of the remaining metals detected were consistent with typical background levels.

Antimony causes liver damage and blood changes in animals exposed to high levels for long periods of time (ATSDR, 1992). The primary and most sensitive human health effect associated with long-term exposure to cadmium is kidney damage (ATSDR, 1999b). Toxicological data are inadequate to assess the carcinogenicity of antimony and cadmium by the oral route of exposure (ATSDR, 1992, 1999b). Based on the available sampling data, past exposure via incidental ingestion to the highest levels of antimony (660 mg/kg) in off-site residential surface soil is estimated to have resulted in a moderate risk for noncancer health effects. Exposure to the highest level of cadmium in off-site surface soil (92 mg/kg) is estimated to have posed a low risk for noncancer health effects. If the average level of antimony (44 mg/kg) and cadmium (7.3 mg/kg) on the one property having elevated levels of these metals is considered to be more representative of people's potential exposure than the maximum value, the estimated noncancer risk would be minimal for both contaminants (please refer to Appendix C for an explanation of the meaning of the qualitative descriptors of risk).

Aroclors

Surface soil samples from five residential properties were analyzed for Aroclors. Surface soil samples from only one of these five properties contained elevated levels of Aroclors. Samples from the one property, which also had the highest soil lead levels and was possibly once part of the site, contained Aroclor 1260 ranging from nondetect to 30 mg/kg. Other sampling results from this property showed levels that exceed cancer and/or noncancer public health assessment

comparison values based on residential exposure. Therefore, Aroclor 1260 was selected for further evaluation.

Aroclor 1260 is a commercial mixture of polychlorinated biphenyls (PCBs). Studies of workers exposed to PCBs in air (and perhaps through the skin) raise concerns about the human carcinogenicity of PCBs, but the results of these studies are not consistent. The data from these studies are inadequate to prove that exposure to PCBs causes cancer in humans. Some types of PCBs cause cancer in laboratory animals exposed to high levels over their lifetimes (ATSDR, 2000). Chemicals that cause cancer in laboratory animals may also increase the risk of cancer developing in humans who are exposed to lower levels over long periods of time. Based on the results of animal and human studies, long term exposure via incidental ingestion to the average (22.2 mg/kg) or maximum level of Aroclor 1260 (30 mg/kg) detected in surface soil on the residential property that once may have been part of the site is estimated to pose a low increased risk for cancer (i.e., the estimated increased risk is between one-in-one million and one-in-ten thousand).

PCBs are also known to cause adverse noncancer health effects. Industrial workers who were exposed to large amounts of PCBs and other chemicals in air (and perhaps through their skin) experienced skin, eye and respiratory tract irritation and mild changes in the functioning of their livers. Some studies of pregnant women suggest a link between a mother's increased exposure to PCBs and other chemicals (from eating contaminated fish or from other environmental sources) and slight effects on her child's birth weight, short-term memory, and learning. Recent studies also suggest that women who ate fish containing PCBs (and other contaminants) have slightly shorter menstrual cycles and take a longer time to become pregnant than women who did not eat contaminated fish. A study of older adults who ate fish containing PCBs (and other contaminants) suggests that PCB exposure is associated with lower scores on several measures of memory and learning. Although some of these studies did control for the possible effects of other chemical contaminants, the role of these chemicals in causing the observed effects is not fully understood.

PCBs affect the skin, liver, and the nervous, immune and reproductive systems of laboratory animals exposed to high levels. PCBs also reduce the birth weight and change the behavior of offspring born to animals exposed before, during and after pregnancy. Some PCBs cause birth defects in offspring born to animals exposed during pregnancy. Although the risks of noncancer health effects from PCBs in surface soil are not completely understood, the available information suggests they would be moderate for exposure to the highest and average level of Aroclor 1260 (30 mg/kg and 22.2 mg/kg, respectively) detected on the residential property that once may have been part of the site. The estimated level of exposure to Aroclor 1260 in soil would be about 30 times lower than the exposure level known to cause PCB-related noncancer health effects in animals. This estimate assumes that a 13.2 kilogram child ingests 82 milligrams of soil five days per week for six months per year, and 40 milligrams of house dust (with an outdoor soil source) each day, and that the soil contains the highest detected level of Aroclor 1260 (30 mg/kg).

If residents consume produce grown in gardens in the areas of lead, antimony, cadmium and Aroclor contamination, exposure and the risk for adverse health effects could increase. We have no knowledge of any samples taken from garden areas off-site. Our estimates of health risks for

exposure to antimony, cadmium, and Aroclor 1260 in off-site surface soil are summarized in the following table.

Contaminant	Range of Levels in Off-site Surface Soil	Average Detected Level in Off-site Surface Soil*	Descriptor for Estimated Increased Cancer Risk**	Descriptor for Estimated Increased Noncancer Risk***
antimony	2.3 mg/kg to 660 mg/kg	44 mg/kg	---	minimal
Aroclor 1260	ND to 30 mg/kg	22.2 mg/kg	low	moderate
cadmium	0.4 mg/kg to 92 mg/kg	7.3 mg/kg	---	minimal
lead (one residence)	31 mg/kg to 230,000 mg/kg	9,085 mg/kg	---	high[a]
lead (other residences)	36 mg/kg to 11,100 mg/kg	728 mg/kg	---	[b]

ND = not detected.

* Averages for property that may have once been part of the site, except for lead results which are also shown for other residences.

** Based on average levels. The descriptor is also "low" if the maximum detected level of Aroclors is used to represent exposure.

*** Based on average levels. The descriptor for noncancer risk would be "low" for cadmium, "moderate" for antimony, and "moderate" for Aroclor 1260 if the maximum detected level is used to represent exposure.

[a] Average level exceeds the US EPA standard for defining a lead hazard in soil (400 mg/kg in bare soils of play areas or averaging over 1200 mg/kg in bare soil for the rest of the yard) (US EPA, 2001).

[b] Average level does not exceed the US EPA standard for defining a lead hazard in soil (400 mg/kg in bare soils of play areas or averaging over 1200 mg/kg in bare soil for the rest of the yard) (US EPA, 2001).

C. Child Health Considerations

ATSDR emphasizes the on-going examination of relevant child health issues in all of the Agency's activities, including evaluating child-focused concerns through its mandated public health assessment activities. ATSDR and NYS DOH consider children when evaluating exposure pathways and potential health effects from environmental contaminants. We recognize that children are of special concern because of their greater potential for exposure from play and other behavior patterns. Children sometimes differ from adults in their susceptibility to hazardous chemicals, but whether there is a difference depends on the chemical. Children may be more or less susceptible than adults to health effects, and the relationship may change with developmental age.

Lead and PCBs (Aroclors) are the primary contaminants of concern associated with the Ellenville Scrap Iron and Metal site. As stated previously, the developing fetus and young children are particularly sensitive to lead-induced health effects (ATSDR, 1999a), and lead exposure is associated with premature birth and low birth weights. Lead may also affect mental and physical development in children. Exposure to the levels of lead detected in soil in some of the off-site areas (as high as 230,000 mg/kg) could increase blood lead levels in children and pose a high risk of lead-related adverse health effects.

The possibility that children or the developing fetus may have increased sensitivity to Aroclor 1260 was taken into account when evaluating the potential health risks associated with

exposure to contaminated soil. As stated previously, human studies suggest that exposure to PCBs and other chemicals during pregnancy may cause slight effects on birth weight, short-term memory and learning in children. In studies of laboratory animals, some PCB mixtures cause birth defects in offspring born to animals exposed during pregnancy at exposure levels that also cause adverse effects in the parent animal (ATSDR, 2000). The estimated level of exposure to Aroclor 1260 in off-site surface soil at the highest detected levels near the Ellenville Scrap Iron and Metal site are at least 32 times lower than the levels of exposure to Aroclors in the animal studies in which adverse developmental effects were observed.

D. Health Outcome Data Evaluation

NYS DOH has not evaluated health outcome data specifically for this site. While residents may have been exposed to site-related contaminants, there is inadequate information about levels of possible exposure. NYS DOH maintains several health outcome databases, which could be used to generate site-specific data, if warranted. These databases include the cancer registry, the congenital malformations registry, vital records (birth and death certificates) and hospital discharge information.

In addition, since 1981, NYS DOH has maintained a registry of individuals found to have elevated blood levels of heavy metals. Any physician, clinical laboratory or health facility in attendance of a person with a blood or urine test with a value of arsenic, cadmium, lead or mercury at or above certain levels has been required to report such occurrence to NYS DOH within 10 days of the receipt of the test results. In 1992, New York State legislation was enacted which requires universal screening for lead in children under the age of six. In addition, the legislation required all blood lead results, regardless of concentration or age of patient, to be reported to the NYS DOH.

Because lead contamination is a concern at this site, we reviewed the blood lead results from all children under six years of age who were screened between January 1994 and July 2002. No children living in homes on the streets near the site had blood lead levels that exceeded 10 micrograms per deciliter (mcg/dL), the United States Centers for Disease Control and Prevention (CDC) recommended follow-up level.

COMMUNITY HEALTH CONCERNS

This public health assessment was distributed for public comment on November 21, 2005. The public comment period ended on December 31, 2005. NYS DOH received no comments from the residents. Community health concerns were expressed to agency staff through the public availability session on September 5, 2001 via personal contact and phone calls.

> **Concern:** A resident was concerned about lead exposures to small children who visit the residences.

Response: Young children are particularly sensitive to lead-induced health effects (ATSDR, 1999), and lead exposure is associated with premature birth and low birth weights. Lead may also affect mental and physical development in children. The levels of lead detected in soil in some of the off-site areas (as high as 230,000 mg/kg) could increase exposure of people (including children) to this contaminant and pose a concern for lead-related health effects, especially if the contamination is located in bare soil. No children living in homes on the streets near the site had blood lead levels that exceeded 10 micrograms per deciliter (mcg/dL), the United States Centers for Disease Control and Prevention (CDC) recommended follow-up level. See Child Health Considerations.

Concern: Area residents and elected officials expressed concerns about a potentially elevated incidence of chronic disease, especially cancer and respiratory diseases, among people who live near the site.

Response: NYS DOH has not evaluated health outcome data specifically for this site. While residents may have been exposed to site-related contaminants, there is inadequate information about levels of possible exposure to evaluate potential adverse health outcomes.

Concern: Residents are also concerned about health effects from inhalation of airborne site-related contaminants such as H_2S, particulates and VOCs and direct contact with soils contaminated with lead or PCBs.

Response: We do not have adequate sampling data to evaluate the potential health effects from past exposure to air-borne contaminants. However, off-site migration of airborne contaminants has significantly diminished since operation of the site ceased in 1998. Additional evaluation of on-going air emissions from the site is needed and recommended in this PHA. Because lead contamination is a concern at this site, we reviewed the blood lead results from all children under six years of age that were screened between January 1994 and July 2002. No children living in homes on the streets near the site had blood lead levels that exceeded 10 mcg/dL, the CDC recommended follow-up level. NYS DOH estimates the increased risk from exposure to PCB in off-site soil to be low for cancer effects and moderate for noncancer health effects.

Concern: During a public availability session in September 2001, residents expressed concerns about consumption of fish from Beer Kill Creek and contact with contaminated surface water while wading in the Creek.

Response: Analysis of Creek sediment did not indicate the presence of site-related contaminants. There are no specific fish consumption advisories for the Creek.

Concern: The community expressed concern about people trespassing onto the site and being exposed to contaminants and physical hazards.

Response: NYS DEC installed fencing along the side next to residential areas on River Street. The rest of the site is fenced with the exception of the portion that borders the Beer Kill Creek. We believe the fencing and resident's knowledge of the site limit trespassing at this time. However, we recommend in this public health assessment that the fencing be improved to further impede trespassing.

Concern: Residents and local officials expressed concerns about exposure to insects such as mosquitoes that could breed in standing water in waste tires on the site and may be vectors of the West Nile Virus.

Response: Local and county officials removed most of the tires from the site in 2001. Removal of the remaining tires from the site in 2005 addressed this concern.

CONCLUSIONS

Nearby residents were exposed in the past and may continue to be exposed to site-related contaminants, especially lead and PCBs, in their yards. The soil in the yards of three homes near the Ellenville Scrap Iron and Metal site contains levels of lead that exceed the US EPA's definition of a lead hazard in soil. Additionally, the residence that was possibly a part of the site in the past had levels of lead up to 230,000 mg/kg in the surface soil prior to the removal action. Based on these data and ATSDR's public health hazard categories (Appendix D), the Ellenville Scrap Iron and Metal site represents a public health hazard. In addition, the residential yard that was potentially part of the site in the past contained PCBs at levels above background and health comparison values. Exposure to the highest level of Aroclor 1260 detected is estimated to have posed a low increased risk of cancer and a moderate to high increased risk of noncancer health effects in the past. While the removal of the top foot of soil in this yard has eliminated the immediate exposure concern, potential future exposure to lead and Aroclor 1260 under the foot of clean soil on this property needs to be given consideration during final remedy selection. In addition, further sampling is needed to better characterize the extent of PCB-contaminated soil in residential yards near the site.

Some waste remains on the site, posing a potential threat of release of contaminants to Beer Kill Creek. Although measures have been taken to reduce public access to the site, wastes on the site are a chemical exposure and physical hazard concern for unauthorized trespassers. Although we do not anticipate that the down-gradient public water supply wells will be affected by the site because of the distance between the site and the wells, additional groundwater investigation is needed. Without remediation, the site is a potential concern for future exposures should the use of the site change.

Past exposure to airborne site-related contaminants cannot be evaluated because of inadequate data. Anecdotal reports of odors from the site have diminished since 1998. Because lead contamination is a concern at this site, NYS DOH staff reviewed the blood lead results from all children under six years of age who were screened between January 1994 and July 2002. No children living in homes on the streets near the site had blood lead levels that exceeded 10 mcg/dL, the CDC recommended follow-up level. NYS DOH has not evaluated other health outcome data specifically for this site.

RECOMMENDATIONS

1. Take actions to reduce the likely exposures to lead in the soil of three yards where clean-up has not been done.

2. Improve fencing around the site to further limit access.

3. Investigate the potential for C & D landfill gas emissions, and if necessary, a remedial action should be implemented to control these emissions to reduce the potential for landfill gas releases.

4. Evaluate the potential for soil vapor contamination related to contaminated soil or groundwater needs to be evaluated.

5. Conduct appropriate on-site clean-up to address current and future exposure concerns.

6. Consider, during final remedy selection, the need to reduce the potential for future exposures to lead and Aroclor 1260 in the soil under the one foot of clean soil in the yard that may have formerly been part of the site.

7. Conduct further sampling to better characterize the extent of PCB-contaminated soil in residential yards near the site.

8. Conduct additional groundwater investigation to determine the extent of groundwater contamination and whether additional actions are needed.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the Ellenville Scrap Iron and Metal site contains a description of actions already taken or to be taken by the NYS DOH and/or ATSDR following completion of this public health assessment. The purpose of the PHAP is to ensure that this public health assessment 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 in contaminated soil and groundwater in this area.

Included is a commitment on the part of the NYS DOH to follow up on this plan to ensure that it is implemented. The public health actions are as follows:

1. NYS DOH and ATSDR will work with US EPA to further reduce potential exposures to lead and PCB contaminated soil in residential yards, evaluate the potential for soil vapor contamination related to the site, and limit onsite exposures by improving the perimeter fence.

2. NYS DOH and ATSDR will review US EPA site investigation work plans to assure that onsite cleanup and sampling, including groundwater, is appropriate to evaluate current and future exposure concerns. US EPA should also investigate the potential for landfill gas emissions.

3. NYS DOH and ATSDR will review additional environmental data as they become available to determine whether additional public health actions are needed to reduce exposure to site-related contaminants. ATSDR and NYS DOH will reevaluate and expand the PHAP when needed.

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CERTIFICATION

The Public Health Assessment for the Ellenville Scrap Iron and Metal 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 public health assessment was initiated. Editorial review was completed by the cooperative agreement partner.

Technical Project Officer, CAT, SPAB, DHAC

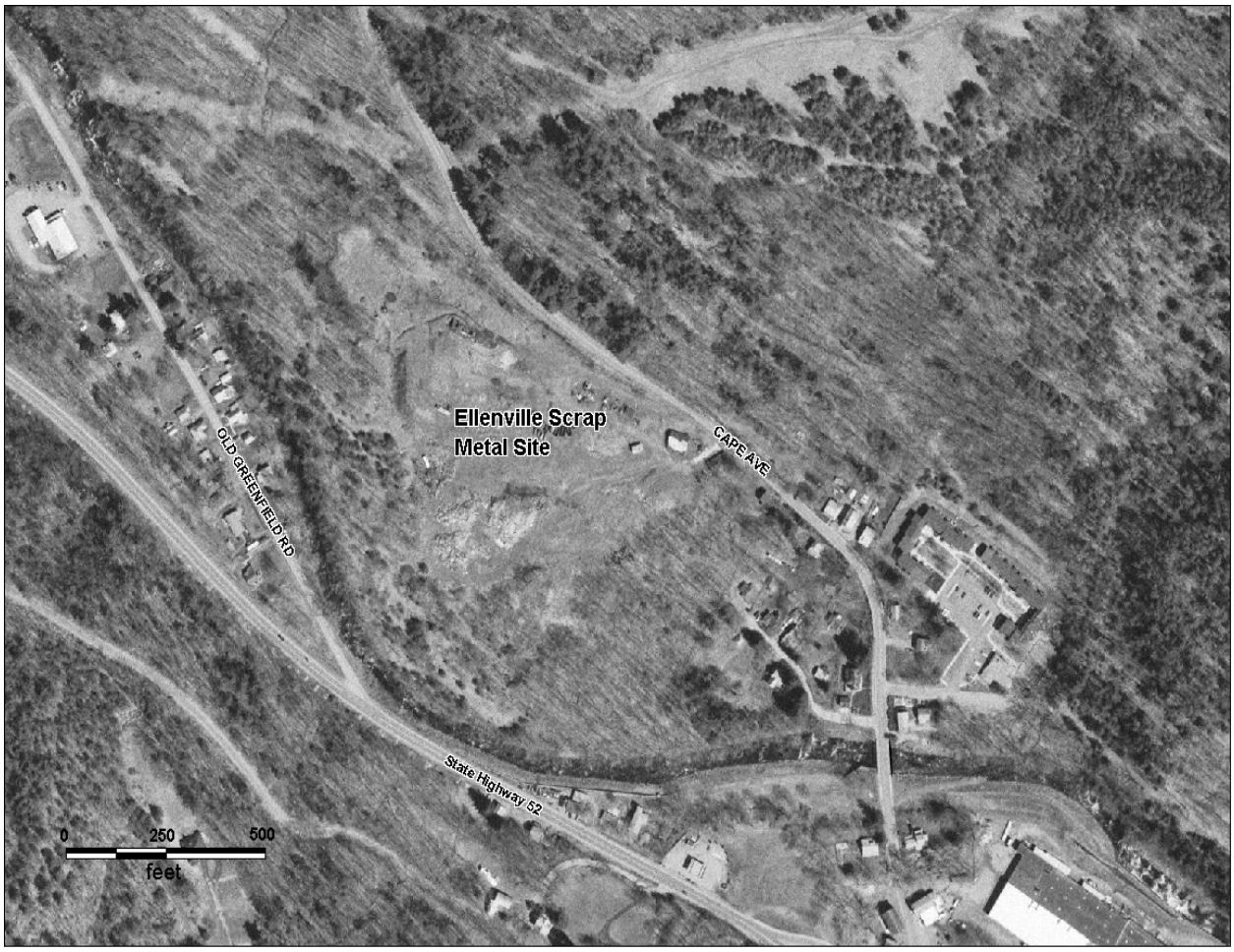
The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation, and concurs with its findings.

Team Leader, CAT, SPAB, DHAC, ATSDR

APPENDIX A

Figure

FIGURE 1
Ellenville Scrap Metal and Iron Site



APPENDIX B

Tables

Table 1
Range of Detection, Typical Background Levels and Health-Based Comparison Values for Contaminants in Off-site Surface Soil Near the Ellenville Scrap Iron and Metal Site
[All values in milligrams per kilogram (mg/kg)]

Chemicals	Range of Detection	Range of Detection	Typical	Comparison Values*			
	First Home	Other Homes	Background Level	Noncancer	Basis**	Cancer	Basis**
antimony	2.3 - 660	2.2 - 3.0	<1 - 2	77	EPA RfD		
Aroclor 1260	8.6 - 30	0.01 - 0.3		3.87	EPA RfD	1.24	EPA CPF
arsenic	1.9 - 28	4.0 - 20.3	2 - 20	58	EPA RfD	1.65	EPA CPF
barium	17.0 - 1,600	38.0 – 342	200 - 400	3,900	EPA RfD		
cadmium	0.5 - 92	0.4 - 14.4	<0.5 - 1.5	28	NYS DOH RfD		
calcium	350 - 22,000	970 – 3,600	400 - 10,000				
chromium	3.9 - 71	7.5 – 192	10 - 60	580	EPA RfD		
cobalt	2.5 - 17	4.9 – 11	3 - 15	3,900	EPA RfD		
copper	7.5 - 1,100	10 – 929	2 - 40	27,100	IOM RfD		
iron	7,100 - 200,000	10,000 - 23,700	15,000 - 30,000				
lead	31 - 230,000	36.0 - 11,100	10 - 300	400***	---		
manganese	91 - 1,700	230 – 1,250	150 - 1,000	9,700	CA EPA RfD		
mercury	0.03 - 1.5	0.1 - 5.1	0.01 - 1.0	31	EPA RfD		
nickel	6.7 - 72	11.0 – 32	<5 - 25	3,900	EPA RfD		
selenium	0.8 - 1.5	0.7 - 1.3	<0.1 - 1	970	EPA RfD		
silver	0.7 - 1.3	0.7 - 4.0	0.1 - 0.4	970	EPA RfD		
zinc	34 - 3,300	52 – 496	20 - 200	58,000	EPA RfD		

* Comparison Values: Noncancer comparison values assume a 13.2 kg child ingests 80 milligrams of soil per day, 5 days per week, 6 months per year and 40 milligrams of indoor dust with an outdoor soil source per day, 7 days per week, 12 months per year. Cancer comparison values assume an average body weight of 47.7 kg and an average soil ingestion rate of 19.3 milligrams per day for the first 30 years of a 70-year lifetime.

** IOM RfD: Institute of Medicine Reference Dose
CA EPA RfD: California Environmental Protection Agency Reference Dose
EPA RfD: United States Environmental Protection Agency Reference Dose
NYS DOH RfD: New York State Department of Health Reference Dose
EPA CPF: United States Environmental Protection Agency Cancer Potency Factor

*** A comparison value for lead is not available. Sampling results were compared to the US EPA standard for defining a lead hazard in soil (400 mg/kg in bare soils of play areas or averaging over 1200 mg/kg in bare soil for the rest of the yard) (US EPA, 2001).

Table 2
Sampling Results, Typical Background Levels and Public Health Assessment Comparison Values for Chemicals Selected for Evaluation in Off-Site Surface Soil at Ellenville Scrap Iron and Metal Site
[All values in milligrams per kilogram (mg/kg)]

Chemical	Range of Detection	Typical Background Level	Comparison Values*			
			Noncancer	Basis**	Cancer	Basis**
antimony	2.3 – 660	<1 – 2[a]	77	US EPA RfD	---	---
cadmium	0.5 - 92	<0.5 – 1.5[a]	28	NYS DOH RfD	---	---
Aroclor 1260	ND - 30	---	3.87	US EPA RfD [b]	1.24	US EPA CPF
lead	31 - 230,000	10 - 300[a]	400[c]	---	---	---

* Comparison Values: Noncancer comparison values assume a 13.2 kg child ingests 80 milligrams of soil per day, 5 days per week, 6 months per year and 40 milligrams of indoor dust with an outdoor soil source per day, 7 days per week, 12 months per year. Cancer comparison values assume an average body weight of 47.7 kg and an average soil ingestion rate of 19.3 milligrams per day for the first 30 years of a 70-year lifetime.

** EPA RfD: United States Environmental Protection Agency Reference Dose
NYS DOH RfD: New York State Department of Health Reference Dose
US EPA CPF: United States Environmental Protection Agency Cancer Potency Factor (Reference: United States Environmental Protection Agency. 1996. PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures. National Center for Environmental Assessment. Office of Research and Development. Washington, DC.)

Footnotes

[a] References: (1) Clarke, L., C. Hudson, G. Laccetti, W. Stone and B. Ungerman. 1985. Study of metal concentrations in soil and surface sand of seven New York counties. Albany: New York State Department of Health, Bureau of Toxic Substance Assessment. September, 1985. (2) Shacklette, H.T. and J.G. Boerngen. 1984. Element concentrations in soil and other surficial materials of the conterminous United States. U.S. Geological Survey Professional Paper 1270. Washington DC: U.S. Government Printing Office.

[b] Value is based on reference dose for Aroclor 1254.

[c] A comparison value for lead is not available. Sampling results were compared to the US EPA standard for defining a lead hazard in soil (400 mg/kg in bare soils of play areas or averaging over 1200 mg/kg in bare soil for the rest of the yard) (US EPA, 2001).

ND = not detected

APPENDIX C

NYS DOH Procedure for Evaluating Potential Health Risks for Contaminants of Concern

NYS DOH PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS FOR CONTAMINANTS OF CONCERN

To evaluate the potential health risks from contaminants of concern associated with the Ellenville Scrap Iron and Metal site, the New York State Department of Health assessed the risks for cancer and noncancer health effects.

Increased cancer risks were estimated by using site-specific information on exposure levels for the contaminant of concern and interpreting them using cancer potency estimates derived for that contaminant by the US EPA or, in some cases, by the NYS DOH. The following qualitative ranking of cancer risk estimates, developed by the NYS DOH, was then used to rank the risk from very low to very high. For example, if the qualitative descriptor was "low", then the excess lifetime cancer risk from that exposure is in the range of greater than one per million to less than one per ten thousand. Other qualitative descriptors are listed below:

Excess Lifetime Cancer Risk

Risk Ratio	Qualitative Descriptor
equal to or less than one per million	very low
greater than one per million to less than one per ten thousand	low
one per ten thousand to less than one per thousand	moderate
one per thousand to less than one per ten	high
equal to or greater than one per ten	very high

An estimated increased excess lifetime cancer risk is not a specific estimate of expected cancers. Rather, it is a plausible upper bound estimate of the probability that a person may develop cancer sometime in his or her lifetime following exposure to that contaminant.

There is insufficient knowledge of cancer mechanisms to decide if there exists a level of exposure to a cancer-causing agent below which there is no risk of getting cancer, namely, a threshold level. Therefore, every exposure, no matter how low, to a cancer-causing compound is assumed to be associated with some increased risk. As the dose of a carcinogen decreases, the chance of developing cancer decreases, but each exposure is accompanied by some increased risk.

There is general consensus among the scientific and regulatory communities on what level of estimated excess cancer risk is acceptable. An increased lifetime cancer risk of one in one million or less is generally not considered a significant public health concern.

For noncarcinogenic health risks, the contaminant intake was estimated using exposure assumptions for the site conditions. This dose was then compared to a risk reference dose (estimated daily intake of a chemical that is likely to be without an appreciable risk of health effects) developed by the US EPA, ATSDR and/or NYS DOH. The resulting ratio was then compared to the following qualitative scale of health risk:

Qualitative Descriptions for
Noncarcinogenic Health Risks

Ratio of Estimated Contaminant Intake to Risk Reference Dose	Qualitative Descriptor
equal to or less than the risk reference dose	minimal
greater than one to five times the risk reference dose	low
greater than five to ten times the risk reference dose	moderate
greater than ten times the risk reference dose	high

Noncarcinogenic effects unlike carcinogenic effects are believed to have a threshold, that is, a dose below which adverse effects will not occur. As a result, the current practice is to identify, usually from animal toxicology experiments, a no-observed-effect-level (NOEL). This is the experimental exposure level in animals at which no adverse toxic effect is observed. The NOEL is then divided by an uncertainty factor to yield the risk reference dose. The uncertainty factor is a number that reflects the degree of uncertainty that exists when experimental animal data are extrapolated to the general human population. The magnitude of the uncertainty factor takes into consideration various factors such as sensitive subpopulations (for example, children or the elderly), extrapolation from animals to humans, and the incompleteness of available data. Thus, the risk reference dose is not expected to cause health effects because it is selected to be much lower than dosages that do not cause adverse health effects in laboratory animals.

The measure used to describe the potential for noncancer health effects to occur in an individual is expressed as a ratio of estimated contaminant intake to the risk reference dose. A ratio equal to or less than one is generally not considered a significant public health concern. If exposure to the contaminant exceeds the risk reference dose, there may be concern for potential noncancer health effects because the margin of protection is less than that afforded by the reference dose. As a rule, the greater the ratio of the estimated contaminant intake to the risk reference dose, the greater the level of concern. This level of concern depends upon an evaluation of a number of factors such as the actual potential for exposure, background exposure, and the strength of the toxicologic data.

APPENDIX D

Public Health Hazard Categories

INTERIM PUBLIC HEALTH HAZARD CATEGORIES

CATEGORY / DEFINITION	DATA SUFFICIENCY	CRITERIA
A. Urgent Public Health Hazard 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 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 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 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 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 E

ATSDR Glossary of Terms

ATSDR Glossary of Terms

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. ATSDR is not a regulatory agency, unlike the U.S. Environmental Protection Agency (EPA), which is the federal agency that develops and enforces environmental laws to protect the environment and human health. This glossary defines words used by 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.

General Terms

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].

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.

Biomedical testing - Testing of persons to find out whether a change in a body function might have occurred because of exposure to a hazardous substance.

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

Body burden - The total amount of a substance in the body. Some substances build up in the body because they are stored in fat or bone or because they leave the body very slowly.

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.

CAS registry number - A unique number assigned to a substance by the American Chemical Society Abstracts Service.

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.

Disease prevention - Measures used to prevent a disease or reduce its severity.

Disease registry - A system of ongoing registration of all cases of a particular disease or health condition in a defined population.

DOD - United States Department of Defense.

DOE - United States Department of Energy.

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 followup 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.

Geographic information system (GIS) - A mapping system that uses computers to collect, store, manipulate, analyze, and display data. For example, GIS can show the concentration of a contaminant within a community in relation to points of reference such as streets and homes.

Grand rounds - Training sessions for physicians and other health care providers about health topics.

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

Half-life ($t_{½}$) - The time it takes for half the original amount of a substance to disappear. In the environment, the half-life is the time it takes for half the original amount of a substance to disappear when it is changed to another chemical by bacteria, fungi, sunlight, or other chemical processes. In the human body, the half-life is the time it takes for half the original amount of the substance to disappear, either by being changed to another substance or by leaving the body. In the case of radioactive material, the half life is the amount of time necessary for one half the initial number of radioactive atoms to change or transform into another atom (that is normally not radioactive). After two half lives, 25% of the original number of radioactive atoms remain.

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 consultation - A review of available information or collection of new data to respond to a specific health question or request for information about a potential environmental hazard. Health consultations are focused on a specific exposure issue. Health consultations are therefore more limited than a public health assessment, which reviews the exposure potential of each pathway and chemical [compare with public health assessment].

Health education - Programs designed with a community to help it know about health risks and how to reduce these risks.

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.

Health promotion - The process of enabling people to increase control over, and to improve, their health.

Health statistics review - The analysis of existing health information (i.e., from death certificates, birth defects registries, and cancer registries) to determine if there is excess disease in a specific population, geographic area, and time period. A health statistics review is a descriptive epidemiologic study.

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.

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].

Morbidity - State of being ill or diseased, the occurrence of a disease or condition that alters health and quality of life.

Mortality - Death. Usually the cause (a specific disease, a condition, or an injury) is stated.

Mutagen - A substance that causes mutations (genetic damage).

Mutation - A change (damage) to the DNA, genes, or chromosomes of living organisms.

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]

Physiologically based pharmacokinetic model (PBPK model) - A computer model that describes what happens to a chemical in the body. This model describes how the chemical gets into the body, where it goes in the body, how it is changed by the body, and how it leaves the body.

Pica - A craving to eat nonfood items, such as dirt, paint chips, and clay. Some children exhibit pica-related behavior.

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.

Prevalence - The number of existing disease cases in a defined population during a specific time period.

Prevalence survey - The measure of the current level of disease(s) or symptoms and exposures through a questionnaire that collects self-reported information from a defined population.

Prevention - Actions that reduce exposure or other risks, keep people from getting sick, or keep disease from getting worse.

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 [compare with health consultation].

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.

Public meeting - A public forum with community members for communication about a site.

Radioisotope - An unstable or radioactive isotope (form) of an element that can change into another element by giving off radiation.

Radionuclide - Any radioactive isotope (form) of any element.

RCRA - [see Resource Conservation and Recovery Act (1976, 1984)]

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.

Registry - A systematic collection of information on persons exposed to a specific substance or having specific diseases [see exposure registry and disease registry].

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

Resource Conservation and Recovery Act (1976, 1984) (RCRA) - This Act regulates management and disposal of hazardous wastes currently generated, treated, stored, disposed of, or distributed.

RFA - RCRA Facility Assessment. An assessment required by RCRA to identify potential and actual releases of hazardous chemicals.

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.

Solvent - A liquid capable of dissolving or dispersing another substance (for example, acetone or mineral spirits).

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.

Stakeholder - A person, group, or community who has an interest in activities at a hazardous waste site.

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.

Substance-specific applied research - A program of research designed to fill important data needs for specific hazardous substances identified in ATSDR's toxicological profiles. Filling these data needs would allow more accurate assessment of human risks from specific substances contaminating the environment. This research might include human studies or laboratory experiments to determine health effects resulting from exposure to a given hazardous substance.

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, methylene chloride, and methyl chloroform.

Other glossaries and dictionaries:
Environmental Protection Agency - http://www.epa.gov/OCEPAterms/
National Library of Medicine (NIH) - http://www.nlm.nih.gov/medlineplus/mplusdictionary.html

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