ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Public Health Assessment for

SCRAP PROCESSING COMPANY, INC.
(A/K/A SCRAP PROCESSING)
MEDFORD, TAYLOR COUNTY, WISCONSIN
EPA FACILITY ID: WI046536785
SEPTEMBER 22, 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

SCRAP PROCESSING COMPANY, INC
(A/K/A SCRAP PROCESSING)

MEDFORD, TAYLOR COUNTY, WISCONSIN

EPA FACILITY ID: WID046536785

Prepared by:

Wisconsin Department of Health and Family Services
Division of Public 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 Scrap Processing Company is an active scrap yard located at 510 West Allman Street, approximately one mile northwest of the downtown area of the City of Medford in Taylor County, Wisconsin. Lead battery and automobile recycling activities on the property since 1955 have resulted in extensive contamination of soils and groundwater on the property with lead, acids, other heavy metals, volatile and semivolatile organic compounds (VOCs and SVOCs), polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). The site was placed on the National Priorities List in September 1984. Cleanup of on-site soils, grading and seeding of the property, as well as installation of a fence around the property, were completed in May 2000.

Periodic groundwater monitoring conducted from December 1999 to February 2002 confirms that soil contamination on the property has been cleaned up. Dust wipe samples from the former battery cracking building shows that high levels of lead remain in the dust on the walls and rafters of that building. Fencing around the property has reduced the likelihood that children or others will trespass on the scrap yard or enter the former battery cracking building without permission.

The Scrap Processing Company property does not currently pose a public health hazard to residents living or working near it, or to workers or customers conducting regular business there. Nevertheless, the property poses a potential public health hazard if it is sold or redeveloped in the future, or if the former battery cracking building is used in the future.

The Wisconsin Division of Public Health (DPH) recommends restricting access to the former battery cracking building, and appropriate zoning and deed restrictions on the property, so that future redevelopment will not pose a human health hazard. The U.S. Environmental Protection Agency and the Wisconsin Department of Natural Resources (DNR) have completed a Five Year review of the site in 2004. EPA regularly conducts reviews of Superfund sites five years after the cleanup if some levels of contaminants remain that may limit the use of the site. EPA's purpose for a Five Year Review is to ensure that the site is safe and conditions continue protecting the public and the environment.

PURPOSE AND HEALTH ISSUES

The purpose of this public health assessment is to describe the past and existing conditions at the Scrap Processing Company, Inc., property in Medford, Wisconsin, and how these conditions can have an effect on human health, in response to EPA's Five Year Review of the site. Because a current public health hazard was not identified during the public health assessment process, the public health action plan for this project focuses on reducing the potential for a future public health hazard, as well as providing information about the site remediation and cleanup to any interested community members.

BACKGROUND

SITE DESCRIPTION AND HISTORY

Location

The Scrap Processing Company, Inc. property is located at 510 West Allman Street, approximately one mile northwest of the downtown area of the City of Medford in Taylor County, Wisconsin (see Figure 1.) According to the 2000 US Census, the population of Medford was 4,373, with a median age of 39 years. About 19% are under the age of 15 and 22% are 65 years of age and older. Over 97% speak only English at home. The median household income in 2000 was $35,278.[1, 2]

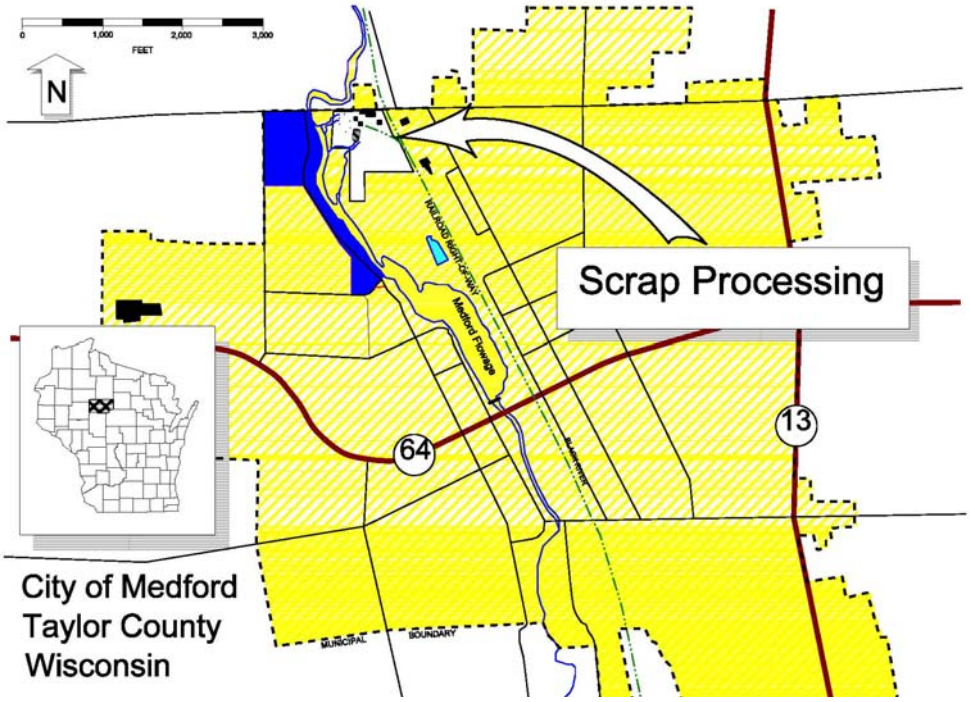

Figure 1. Map of the City of Medford, Taylor County, Wisconsin.

The 15-acre scrap yard property is bordered to the west by the Black River, which flows through downtown Medford. Several parks and a campsite are located on the west side of the Black River across and downstream from the property. The ground is generally flat on the property, but slopes gently toward the Black River. Groundwater moves southwest toward the Black River. The groundwater flow direction in the shallow aquifer is to the west-northwest.

Municipal wells currently in use are located more than a mile from the Scrap Processing facility. Most residents near the property are on the municipal drinking water supply; however, at least five private wells are in use within a half mile of the property. Three of these wells are up-gradient from the property.

Because of its location, in a mixed rural, industrial, and residential neighborhood, there are a number of special population concerns near the scrap yard. One block downstream there is a

park with a picnic area, playground, and ball diamonds, all used by the community. There are schools and daycare centers located within one to two miles of the property. A hospital with an attached nursing home is located one mile southwest of the property.

History of the Property

The Scrap Processing Company is an active metal recycling facility that previously functioned as a salvage yard, gas station, and recycler, including a battery cracking operation. The West Allman Street property has been owned by the same family since the late 1940's. Prior to this, the site was not developed.

From 1955 to 1974, lead was recycled from batteries in a building in the northwestern area of the property. During the recycling process, lead/acid batteries were crushed to recover the lead inside the batteries. Acid wastes from the crushed battery casings flowed from the building, through an unlined ditch, and into an unlined pond 200 feet east of the Black River. Contents of the unlined ditch and pond often overflowed into the Black River. During the battery crushing operation, an estimated 399,000 gallons of acid wastes contaminated with lead, cadmium, copper, chromium, nickel and arsenic from the batteries were released into the ditch and pond.

Also during this time, operators on site periodically drained oil from scrap capacitors on electronic appliances. Oil used in capacitors pre-1977 contained polychlorinated biphenyls (PCBs).

In 1983, a court order was issued to the Wisconsin Department of Natural Resources (DNR) to begin cleanup of lead contamination at the site. In September of 1983, Scrap Processing was nominated for inclusion on the National Priorities List (NPL). It was placed on the NPL in September 1984. Also in 1984, the DNR ordered clean-up activities, including the draining of 7,200 gallons of highly acidic water from the pond, and the subsequent disposal of the water into the Medford municipal sewage treatment system. Six inches of highly contaminated soil and sediment were removed from the pond and ditch and disposed of at an out-of-state hazardous waste landfill. Soils and sediments with low-level contamination from these areas were excavated, classified as solid waste, and disposed of in a nearby municipal landfill. These clean-up activities were completed in 1986.[3, 4, 5, 6]

Sediment testing from the Black River and the Medford Flowage (a pond downstream from the site) in 1984 showed no elevated levels of heavy metals or PCBs in either of these two water bodies.[7]

A preliminary Public Health Assessment (PHA) for Scrap Processing was issued in 1989. At the time, data was not available to evaluate human exposures to contamination on the property. The PHA concluded that the property was a potential public health concern because of "the risk to human health caused by the likelihood of exposure to hazardous substances via groundwater at residential wells, fish, soil, sediment, and surface water." The recommendations of the preliminary health assessment included:[8]

- Define the local hydrogeology and the extent of groundwater contamination.
- Test water samples of all nearby private and municipal wells for site-related contamination.
- Test blood levels of any residents whose wells are contaminated with high levels of lead.
- Connect all nearby residences with the municipal water supply to prevent future exposure to potentially contaminated groundwater.
- Evaluate the success of the completed on-site remediation by testing soil, groundwater, sediment or surface water.
- Test off-site soils for contamination.
- Test Black River surface water and sediments for contaminants, and if contaminants are found, evaluate fish for site-related contaminants.

In 1990, a leaking 10,000-gallon underground storage tank containing leaded gasoline was removed from the property. Fifty cubic yards of contaminated soils were excavated, and the pit was backfilled with clean sand. The contaminated soils were stockpiled on-site. A second, 8,000-gallon diesel fuel underground storage tank was removed in May of 2000.[9, 10]

In 1992, the Environmental Protection Agency (EPA), responding to a request from local officials, began an official investigation of the property. Under the Phase I of the remedial investigation (RI), EPA collected soil, surface water, sediment, and groundwater samples from on and off the property.

Sediment sampling from the Black River in 1992 showed that contaminants from the scrap yard and battery cracking had not contaminated the river.[11]

Results of testing of soils from the property showed far more extensive lead and PCB contamination around the battery cracking area than had previously been expected. Lead was found in the soil in levels up to 5,322 ppm, and PCBs from 28,000 to 107,000 ppm. In 1993, the EPA conducted an emergency response action. 300 cubic yards of contaminated soil and 1,500 gallons of wastewater were removed from the area where battery cracking had taken place.[12]

Groundwater sampling was conducted in February 1992 and April 1994 prior to the remedial action. Volatile organic compounds (VOCs) were not detected at elevated levels[13] in any of the monitoring wells. Trichlorethylene (TCE), tetrachloroethylene (PCE), and methylene chloride were detected in two monitoring wells prior to the remedial action, but at levels below health concern.[14] No polychlorinated biphenyls (PCBs) were detected in groundwater prior to the cleanup action. Iron and Manganese were detected in most monitoring wells, including the background wells. Lead was detected at high levels in nine monitoring wells on site. Iron, lead and manganese were detected in the upgradient monitoring wells as well. Arsenic, beryllium, cadmium, chromium, mercury, and nickel were detected in one or two wells, although the levels found were not at levels of health concern.[15]

In September 1997, EPA, in conjunction with DNR, identified the cleanup measures that would be used to address threats or potential threats still posed by the Scrap Processing property. Cleanup included:[16]

- Excavation, stabilization and disposal of lead-contaminated soil exceeding 500 mg/kg (or 500 parts per million (ppm) lead), site restoration including backfill with clean soil, grading and re-vegetation to prevent erosion, installation of a security fence, and deed restrictions.
- Development of a long-term groundwater monitoring plan, including the installation of new wells and repair of existing wells to be included in the groundwater monitoring network.

In December 1998, EPA sampled soils from the Scrap Processing property and prepared a preliminary cleanup design report. Based on the additional sampling information, the EPA developed a cost-effective method of stabilizing soils with high lead levels prior to their disposal. A patented mixture of phosphate and magnesium oxide was mixed with the contaminated soil. After confirmation that the new mixture met the required lead standard, the soil was loaded into rail cars and transported to a licensed landfill in Wisconsin Rapids.

Cleanup of soils contaminated by battery recycling and scrap processing activities, and installation of wells to monitor groundwater on- and off-site were completed between October and December 1999. 17,046 cubic yards of lead-contaminated soils[1] were excavated. 6,789 cubic yards of this contaminated soil was then treated prior to disposal with a stabilization solution of phosphate and magnesium oxide to meet Toxicity Characteristic Leaching Procedure (TCLP) testing. The lead-contaminated soils were then disposed of at a solid waste landfill. Excavated areas were backfilled with clean soil.

Grading and seeding, as well as installation of a fence around the property, was completed in May 2000. A final inspection of the cleanup was conducted in August 2000. Lead contaminated soils on the property were cleaned up to Wisconsin NR720 industrial use standards (500 ppm). The DNR is currently working to get the appropriate deed restrictions put on the property to ensure that it is only used for industrial purposes in the future.[17]

Groundwater sampling post-cleanup has been conducted on a regular basis in order to:

- describe and monitor groundwater conditions at and near the Scrap Processing property;
- determine whether groundwater cleanup standards have been met;
- determine whether additional clean up actions should be considered;
- further assess groundwater flow directions in the shallow and deep aquifers and down gradient from the property; and
- assess any potential routes of exposure to humans.

[1] Those exceeding Wisconsin's direct contact cleanup standard of 500 mg/kg, or 500 ppm, total lead for industrial property use.

SITE VISIT

DPH staff visited the Scrap Processing facility numerous times throughout the investigation, remediation and closure operations. The last of these visits took place on December 11, 2003.

During the December 2003 visit, representatives from DPH and the DNR noted several large piles of scrap waste on the property. This included a long pile of crushed cars, 7 cars wide by 5 cars tall, and a pile of metal scrap at least two stories tall. A new truck scale had recently been built near the entrance to the property, and a large cement foundation had been poured for a new car crusher that was recently purchased by the owners. This car crusher, once in use, will be able to process cars as they arrive at the facility, thereby reducing the amount of visible scrap. The facility also owns at least one large crane, used for separating metal scrap from non-metal garbage in a large scrap pile near the entrance to the property. During the December 2003 visit it had recently snowed; therefore, it was not possible to confirm the condition of the ground or groundcover on-site.

A fence was visible around the northern, eastern and western portions of the site. There was a set of ATV tracks leading from the car piles towards the southwestern edge of the site, although the site boundary was not visible. No people were observed in the park or near the Black River during the visit. The rail tracks that previously ran through the site had been removed.

The building that had formerly housed the battery-cracking operations was still present on the property. A boat was being stored in the first floor of the building. The building had a large doorway along the southern wall of the building that was open to the first and second stories of the building. Through this doorway, anyone on the property could easily gain access to this building. The owner's family home was no longer on the property.

During this site visit, DPH representatives visited the Medford Public Library. The library maintained a special area for the public, with reports and fact sheets on reserve about the Scrap Processing Company property investigation and cleanup activities.

DISCUSSION

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

This section lists contaminants of concern for this property. These contaminants will be further evaluated in the Public Health Implications section of this document to determine if they pose a threat to public health. The selection of these contaminants is based on their levels found in soils, dust and water both on and off the site; data quality in the field and in the laboratory; and comparison of on-site contaminant concentrations and background concentrations with appropriate comparison values for carcinogenic and non-carcinogenic endpoints. The listing of a contaminant in this section does not necessarily mean that the contaminant poses a threat to public health or the environment.

Over fifty chemicals have been detected at some time in soil and groundwater on the Scrap Processing property. These include polychlorinated biphenyls (PCBs), polycyclic aromatic

hydrocarbons (PAHs), volatile organic compounds (VOCs), pesticides, and heavy metals. In particular, the contaminants of concern at this site are: lead around the former battery cracking area, PCBs, VOCs, and PAHs associated with two leaking underground storage tanks found and removed from the property.

Eight rounds of groundwater sampling, starting in December 1999, were conducted after the clean-up was completed.[18] Water samples from monitoring wells were collected and analyzed for semivolatile and volatile organic compounds (SVOCs and VOCs), metals, cyanide, pesticides, and PCBs. Groundwater samples were taken in December 1999, March 2000, June 2000, October 2000, January 2001, June 2001, November 2001, and February 2002. PCBs and pesticides were not detected in monitoring wells during the first five rounds of sampling. Therefore, water samples were not analyzed for PCBs and pesticides after January 2001.

Comparison values are presented in the tables that follow, alongside levels of the site contaminants found in on-site and off-site wells. Comparison values are media-specific concentrations used by health assessors to select environmental contaminants for further evaluation. When a contaminant is detected in groundwater at a concentration less than the comparison value, the contaminant is unlikely to pose a health threat. Contamination at concentrations above a comparison value does not necessarily represent a health threat, but may require action or further study. The Wisconsin NR 140 Groundwater Enforcement Standards (ES)[19] are levels set by the state for a particular contaminant that is considered safe for long-term sources of drinking water for the general population. When the ES is exceeded, a different source of drinking water should be used. Enforcement standards are not a level at which health effects are expected, but are an upper limit to the range of values where people can be sure that contaminant levels do not pose a health risk. Only chemicals which have been detected in groundwater above their respective Wisconsin NR 140 Preventive Action Limits (PAL)[20] will be reported on here. PALs are lower than the ES for chemical contaminants, and serve as indicators of potential contamination problems. PALs are also the limits at which certain response actions, under NR 140, may be required.

A. On-site Contamination

Volatile Organic Compound (VOC) Contamination:

Results from post-cleanup testing of groundwater for VOC contamination are summarized in Table 1, below. The table shows the range of the chemical detected, the number of wells where that chemical was detected, and how often the chemical was detected in groundwater (out of a total of eight sampling rounds).

	Range Detected (µg/L)	WI DNR ES (µg/L)	Detected in how many Wells?	Frequency of Detection*
Trichloroethene	ND-2	5	1	7/8
Tetrachloroethene	ND-3	5	1	6/8
1,2-Dichloroethane	ND-2	5	1	6/8
Trans-1,3-Dichloropropene	ND-0.16	0.2	12 *(including two background wells)*	1/8
Methylene Chloride	ND-0.5	5	1	1/8

Table 1. Volatile Organic Compounds (VOCs) found during post-cleanup sampling of groundwater monitoring wells from December 1999 through February 2002. (ND: Not Detected).
*The number of sampling rounds (out of eight rounds total) during which the contaminant was detected.

Trichloroethene and tetrachloroethene were detected in one monitoring well at the southeastern corner of the scrap yard property (MW-1S) during all sampling rounds except the June 2000 and the June 2000 and 2001 testing rounds, respectively. These two chemicals were not detected in any other wells. The levels of trichloroethene and tetrachloroethene found were below the Wisconsin Enforcement Standards (ES), and not of health concern. The Wisconsin ES for trichloroethylene and tetrachloroethene are the same concentrations as their respective U.S. EPA Maximum Contaminant Level for drinking water.

Other VOCs found in samples from monitoring wells on and off the property after the clean up include 1,2-dichloroethane, trans-1,3-dichloropropene, and methylene chloride. All of these chemicals were found below their health-based groundwater and drinking water standards.

1,2-dichloroethane was detected in one background monitoring well up-gradient from the site (MP-10S) during six of the eight sampling rounds. The levels detected ranged between 0.7 to 2 µg/L. These levels are not of health concern. Because this chemical was detected only at a well up-gradient from the site, this contamination is most likely from another source, and not from the scrap yard.

In November 2001, trans-1,3-dichloropropene was detected in twelve groundwater monitoring wells, at levels ranging from 0.11-0.16 µg/L. Because trans-1,3-dichloropropene was detected in two background wells as well as ten on-site wells, it was most likely from another source in the area as well. These levels are all below Wisconsin Enforcement Standards and are not of health concern.

Methylene chloride was detected once, in November 2001, in one well just south and west of the property (MP-4). The level detected is not a health concern.

Semivolatile Organic Compound (SVOC) Contamination:
A common laboratory contaminant, bis(2-ethylhexyl)phthalate, was found in multiple wells after the cleanup was completed. In June 2000, it was found above the ES of 6 µg/L in three wells directly behind the former battery cracking building. In November 2001, it was found in the field blank and at a well up-gradient from the property, suggesting that the level found was due to laboratory contamination. These results are summarized in Table 2, below.

		Sampling Date				
	WI ES	**Dec-99**	**Jun-00**	**Oct-00**	**Nov-01**	**Feb-02**
Bis(2-Ethylhexyl) phthalate	6	1J-4J *(Detected in: MW9D, MP2D)*	25-44 *(Detected in: MW3S, MW4S, MP7)*	1J *(Detected in: MW3S, MP7, MP9S)*	1.9-2.3 *(Detected in: FB01, MBD)*	1.1-1.9 *(Detected in: MP9S, MP9D)*

Table 2. Groundwater monitoring results for bis(2-ethylhexyl)phthalate, a semivolatile organic compound (SVOC) (all units are µg/L). (J: estimated quantity)

In December 1999, phenanthrene and naphthalene were detected in one shallow well (MP-2S) at 19 µg/L and 11 µg/L, respectively. Neither SVOC was detected again in any wells on or off-site after the December 1999 sampling. These levels of phenanthrene and naphthalene found are low (ES for naphthalene: 40 µg/L), and not a health concern.

Metals Contamination:
Iron
The EPA establishes levels of iron above which the taste and appearance of the water will be altered. 19 of the 20 monitoring wells sampled exceeded the ES for iron (300 µg/L) at least once during the December 1999-February 2002 groundwater sampling process. Although not of health concern, levels found in many of these wells were high enough to alter the taste and appearance of groundwater from these wells. The highest level of iron found in a groundwater monitoring well after the clean up was 32,700 µg/L. Iron was also found in the background wells up-gradient and off the site at levels ranging from 6,240-12,500 µg/L. Iron in the groundwater on-site is most likely from on and off-site sources, as well as naturally occurring in the area.

Manganese
Manganese concentrations at several wells consistently exceeded the ES (50 µg/L) in 18 of the groundwater monitoring wells. Manganese in groundwater ranged from none-detected to 5,610 µg/L. Although not of health concern, the levels of manganese found would cause changes to the taste and appearance of groundwater. Elevated levels of manganese were found in both shallow and deep wells on and off the scrap yard property. Therefore, manganese in area groundwater is probably coming from both on and off-property sources.

In three of the monitoring wells, the level of manganese detected has decreased significantly from December 1999 to February 2002. These wells are all shallow wells on the western side of the site (wells MP9S, MP7, and MP4).

Lead

Wipe samples were taken from the interior walls and rafters of the former battery cracking building in 1992. Very high levels of lead were found in the dust of the building, ranging from 102 to 21,100 μg/m^2 (9 to 1,960 μg/ft^2).[21] These levels are significantly higher than what would be considered safe for a residential setting (40μg/ft^2 for the floor to 250μg/ft^2 for the windowsills for residential settings).[22]

Lead was occasionally found in monitoring wells after the clean up, with levels ranging from none-detected to 28.5 μg/L. Table 3 summarizes the groundwater monitoring results.

Date of Sampling	**Range Detected** (μg/L)	**Detected in how many wells?**
December 1999	2.5 – 28.5	2*
June 2000	4.1	1**
February 2002	2.3 – 3	3**

Table 3. Groundwater monitoring results where lead detected post cleanup.
*20 wells were tested during this sampling round **21 wells were tested during this sampling round

Lead was only found once in groundwater above the ES after the property was cleaned up. The well where lead was detected at 28.5μg/L (ES for Lead is 15μg/L) in December 1999 is located near where battery casings were found and removed approximately two weeks before. Contaminated soils and battery casings were removed from this area to a depth of 5 feet below the surface. Lead was detected only once more in that same well, during the February 2002 sampling, and not at a level of health concern.

Other Metals

Other metals found in groundwater monitoring wells on the property during the post-clean up monitoring include: antimony, chromium, cobalt, and mercury. All of these metals were found well below levels of health concern.

B. Off-site Contamination

The Black River, the Medford Flowage, and private wells have not been significantly affected by the contamination that existed on the Scrap Processing property prior to and during the remediation and cleanup activities. Sampling off of the property has confirmed this. Five private residential wells in the area were tested in 1992. Toluene was detected in very low levels (less than 2 ug/L) in three of these wells, and lead was detected in one private well (2 ug/L). This contamination was minor, and not expected to cause health concerns. No contamination was found in the Black river sediment.

C. Quality Assurance and Quality Control

In preparing this health assessment, the Wisconsin Department of Health and Family Services relies on the information provided in the referenced documents and assumes that adequate quality assurance and quality control measures were followed concerning chain-of-custody, laboratory procedures, and data reporting. The availability and reliability of the referenced information determine the validity of the analysis and conclusions drawn by this assessment.

D. Physical and Other Hazards

A security fence has been installed surrounding the property, as well as a gate across the driveway. Various physical hazards are present on the site, an active recycling and car crushing facility. The public can enter the site during normal business hours, to bring scrap and other items for recycling. Large piles of scrap metal and crushed cars currently cover much of the site. Other physical hazards include large trucks, a car crusher, cranes and other machinery. The machinery used and the large piles of scrap material on the property may create a physical hazard, as they limit the operators' visibility and hearing.

The building where the battery cracking operation formerly took place has a large garage-style door opening that allows access to both the first floor and the second floor of the building. This building is not closed or secured from entry in any way. Currently, a boat is being stored on the first floor of the building. The public is not allowed to walk on this part of the property.

PATHWAYS ANALYSIS

To determine whether there has been exposure to contaminants migrating from the site or on the site, DPH evaluates the environmental and human components that lead to human exposure; the exposure pathway. Pathway analysis consists of five elements: a **source** of contamination, transport through an environmental **medium**, a **point** of exposure, a **route** of human exposure, and a receptor **population**.

DPH identifies exposure pathways as completed or potential if the exposure pathway cannot be eliminated. In completed exposure pathways, the five elements exist and indicate that exposure to a contaminant has occurred in the past, is occurring, or will occur in the future. In a potential pathway, at least one of the five elements is missing but could exist. Potential pathways indicate that exposure to a contaminant could have occurred in the past or may occur in the future. Eliminated exposure pathways are missing at least one of the five elements and that element is never expected to be present. The discussion that follows identifies the completed (past or present) and potential pathways at the Scrap Processing facility property.

As a result of past practices, including battery cracking and lead smelting, soil, groundwater, sediment and surface water had been previously contaminated by heavy metals, PCBs, VOCs, and PAHs. This public health assessment will address only those exposure pathways that remain or potential pathways after the completion of remediation activities at the Scrap Processing property. The remediation activities (see *Site Description and History* section) have greatly

reduced the levels of contaminants in the soil and groundwater, and minimized past and potential exposure pathways.

A. Environmental Pathways

Groundwater: In the past, VOCs, SVOCs, metals and PCBs that contaminated soils on-site may have migrated into the groundwater. However, these contaminants were not found at levels expected to cause health concerns, and wells down gradient from the property were not found to be contaminated. Therefore, there do not seem to be significant amounts of VOCs, SVOCs, metals or PCBs in the groundwater from past site contamination. Medford municipal wells are located over one mile away from the site.

Air: No evidence was found to indicate any present or potential exposure through air transmission. Contaminated soils were removed from the site and the areas back-filled with clean soil, and re-vegetated.

Soils: High levels of lead in the dust in the battery cracking building represents a potential for exposure in the future. If the battery cracking building is more actively used, or the building is demolished in the future, care should be taken to reduce the potential for lead dust from the interior walls and rafters of the building to travel through the air and settle on nearby residential properties or the adjacent park.

Part of the remediation plan included the excavation of lead contaminated soil from the site. During excavation, confirmatory soil samples were taken from all excavated areas. Where soil still did not meet the cleanup objectives, an additional 6 inches of soil was excavated and confirmation samples were re-taken to confirm that the cleanup objective had been met. All excavated areas eventually tested below the cleanup objective of 500 mg/kg (ppm).

Surface Water and Sediments: Testing of the water and sediments in the Black River in 1984 and 1992 indicated that there is no contamination of sediments from the Scrap Processing property. Surface water was tested both on and off-property.

The current scrap yard includes a new car crusher, to process cars immediately as they arrive on-site. This will minimize any potential for future runoff problems.

Food Chain: A food chain pathway is not of health concern at this site since the contaminants of concern were not found in the sediments of the nearby Black River or off site groundwater.

B. Human Exposure Pathways

Ingestion: Before the cleanup, the most significant exposure pathway would have involved the hands or clothing of workmen or customers becoming exposed to contaminated soils on the property. Property-related contaminants could have been ingested if the person then prepared or ate food without first washing their hands or changing their clothing. Likewise, family members

of workers or customers could also have been exposed in this manner. Confirmatory sampling of soils has ensured that this route of exposure is no longer of concern.

Currently, the only potential pathway of public health concern involves the lead in dust inside the former battery cracking building. People who enter the building may be exposed to the high levels of lead in the dust on the walls and rafters of this building. Lead dust on hands and clothing can be accidentally ingested. This pathway is summarized in Table 4, below. Exposed individuals can expose others to the lead contaminated dust by bringing home dirty clothing from the site, or by preparing food or eating without first washing their hands. If the battery-cracking building is demolished in the future, care must be taken to control the lead in dust from the demolition. Demolition dust could settle in soils off the property, including the nearby park and residential properties.

Source	Medium	Exposure Point	Exposure Route	Time of Exposure	Exposed Population	Activities	Chemical
former battery cracking process	dust	battery cracking building	ingestion	past, present and future	workers, their families, residents nearby, customers	entering the building, using the boat, future users of the building	Lead
former battery cracking process	demolition products, dust	Soils in park, nearby residences, dust/soils on site	ingestion	future, if battery cracking building is demolished	park users, nearby residents, demolition workers and their families	gardening, digging, playing, any activity that makes people come in contact with soils, dust	Lead

Table 4. Summary of Potential Exposure Pathways

Private residential wells in the area do not have significant levels of contamination from the Scrap Processing property. Two metals, iron and manganese, were found in groundwater at very high levels. These two elements were also found at high levels in wells up-gradient from the scrap yard facility. Iron and manganese are not expected to cause health issues, but are expected to negatively impact the taste and appearance of area groundwater.

Inhalation: There are no inhalation health concerns on the Scrap Processing property.

Dermal Contact: Dermal exposure to contamination is unlikely since the cleanup process has been completed, and contaminated soils are no longer present on the property. Sediment sampling showed no contamination in the Black River. Individuals swimming or wading in the Black River will not be exposed to contamination from the scrap yard facility.

PUBLIC HEALTH IMPLICATIONS

The potential for exposed persons to experience adverse health effects depends on:

- the amount of each chemical to which a person is exposed;
- how long a person is exposed; and
- the health condition of the person exposed.

In this section, the levels of site-related chemicals found in groundwater and other monitoring and sampling will be reviewed to determine if they are of health concern.

No volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), or pesticides were found above levels of health concern in any of the groundwater samples analyzed after the soil cleanup.

A. Lead

High levels of lead were found in the dust inside the former battery cracking building. These levels are significantly higher than what would be considered safe for a residential setting.

When lead is ingested, it will stay in the body, and can accumulate. Long-term exposure to lead can damage the nervous system, reproductive system, kidneys, blood-forming system, and digestive system. Exposure to lead is more dangerous for young and unborn children, and can cause decreased mental abilities and learning difficulties. All exposure to lead should be avoided, when possible.

The levels of lead in dust inside the former battery cracking building are high enough to be a health hazard to children exposed to the dust. This will be discussed in greater detail in the Child Health Considerations section of this public health assessment.

B. Iron

Iron was found in nearly all of the groundwater samples collected on and off-site. Iron contamination in groundwater is a common non-hazardous nuisance to the water supply. Iron is the fourth most common metal in the earth's crust. While high levels of iron in water supplies are not expected to adversely affect health, high iron levels in water can negatively impact the taste and appearance of water, and can signal the presence of nuisance bacteria.

C. Manganese

Manganese is another common nuisance contaminant that was found in groundwater at high levels. Manganese is necessary for proper nutrition in humans. It is the twelfth most common element in the earth's crust, so it is always found in measurable concentrations in topsoil. The EPA has set a Secondary Maximum Contaminant Level (MCL) for manganese in drinking water at 50 μg/L, because higher levels in water can affect taste, appearance and cause staining. Although Manganese in area groundwater consistently exceeded this amount, the levels found are not expected to cause health problems. If an adult drank 2 liters a day of water at these high levels, their overall manganese intake would still be within levels considered to be safe

according to EPA.[23] The high levels of manganese found on and off the property are most likely a common reason for stained laundry and plumbing fixtures.

D. Other Health Concerns - Physical Hazards

The potential for physical hazards on the Scrap Processing property is high. Low visibility, loud machinery, and large piles of scrap can all create physical hazards if the public are allowed to walk around the site unattended or unaware of the potential for physical injury. However, the probability of this type of hazard is low, as the public is not currently allowed to walk on the majority of the site.

CHILD HEALTH CONSIDERATIONS

Children are often more vulnerable to the impacts of chemical exposures for a number of reasons related to their development and behavior. Parents of small children are naturally concerned about environmental hazards. Lead is of particular concern to children's health, as it is toxic, even in very small amounts, to children's development.

The soil on the scrap yard property was cleaned up to a level of 500 mg/kg. While this level would not be considered safe for soil in which children regularly play, it is an acceptable level for an industrial property where children are not regularly coming onto the property or coming into contact with its soils.

The battery cracking building still has high levels of lead dust on the rafters and walls. The levels of lead in dust inside the former battery cracking building are high enough to create a health hazard to children. Children might be exposed by entering the building or from contact with adults who may have carried dust from the building to another area on their clothes. However, children are not frequently allowed on the scrap yard property at all, and no children have access to the battery cracking building. Furthermore, the building is not entered regularly even by adults, and is used only as a storage area for a boat. Therefore, exposure to the dust in the former battery cracking building is unlikely to occur in children. DPH has not identified an exposure pathway for children living near, but not coming onto, the property to be exposed to lead in dust still in the battery cracking building on the property.

Potential future exposure pathways for lead hazards in dust and soil may include future use of the battery cracking building or the Scrap Processing property in general, or demolition of the battery cracking building. If the battery cracking building is demolished, care should be taken to control dust blowing from the debris toward nearby residential areas or the park adjacent to the property. Likewise, the debris from the demolished building should be assessed for lead content before its disposal.

Currently, a boat is being stored in the battery cracking building. Adults using this boat should take note that they can pick up lead dust by brushing up against the walls of the building when accessing the boat or that lead contaminated dust can also settle onto the boat. Exposure of children to lead dust on their parents clothing is a well-documented route of exposure.[24]

COMMUNITY HEALTH CONCERNS

Throughout the site discovery and remediation process, the USEPA and WIDNR held public meetings to answer community members' concerns on property-related activities and the potential for exposure to contamination in soils and groundwater from the property. Earlier in the investigation and cleanup process, community members voiced the concern that the site discovery and cleanup processes were too time consuming. In particular, that it should not have taken from 1984 (from being listed as an NPL site) to 1992 (when EPA began their investigation) to 1999 (when the remediation was completed).

Another concern voiced by community members was that the investigation and cleanup process produced undue stress. Community members said that they would rather that Scrap Processing be allowed to continue operating, without disturbance.

During the first Five-Year Review of the site completed in April 2004, the DNR and USEPA again met with local officials and interviewed key stakeholders to find what, if any, concerns might remain. No concerns were raised by local officials or by community members at that time.

In addition, DPH made this public health assessment available for public review and comment starting May 17, 2006. DPH made copies of this public health assessment available on the DHFS Web site (http://dhfs.wisconsin.gov/eh/WISites/) as well as at the Frances L. Simek Memorial Library in Medford, the Taylor County Health Department in Medford, the Rhinelander/Northern DPH Region Office in Rhinelander, and the DNR Service Center in Antigo. We requested that comments be provided to DPH by July 17, 2006-and announced this schedule in the Star News of Taylor County, WI. No comments were received during this time. DPH is not aware of any outstanding health concerns in the community related to the Scrap Processing property at this time.

HEALTH OUTCOME DATA

Based on the evaluations performed as a part of this public health assessment, DPH has determined that people have been exposed in the past to property-related contaminants, and that exposure pathways once valid are no longer of concern. No children have ever been found to be lead poisoned as a result of this site, nor does the city of Medford have elevated rates of lead poisoning in children relative to the rest of the state. No other health outcome data have been generated or analyzed for this population due to the small population surrounding the scrap yard and the lack of health concerns voiced by community members. Upon request, the Wisconsin DPH has conducted health outcome data analysis at other sites in Wisconsin.

CONCLUSIONS

Currently, there are no significant exposure risks to residents living near, or to workers at, the Scrap Processing property from any past or current contamination in the soil or groundwater. Soil sampling during the clean up, as well as continued groundwater monitoring following the cleanup, have shown that the remediation of the property was effective.

DPH considers this property to be a no apparent health hazard as long as the Scrap Processing Company continues use the property for industrial or commercial purposes only. Further health studies are not necessary at this time.

Current scrap yard work practices necessitate the use of heavy machinery and the presence of large piles of scrap metal. These two elements combine to create a high potential for physical hazards.

Past access to contaminated soils on the property may have caused exposure to heavy metals, VOCs, PCBs, PAHs, or pesticides. Children in particular may have been lead poisoned if they came into contact with soil from the site, or dust from the battery cracking building. The on-site remediation activities of soil and waste removal, fencing of the site, and the establishment of vegetation, have adequately removed contaminated soil and waste from the property, and reduced the potential for exposure on and off-site.

Any future development of the salvage yard may create a potential for human exposures to lead in dust still remaining in the former battery cracking building.

RECOMMENDATIONS

DPH recommends the following:

1) Appropriate deed restrictions need to be placed on the property, to ensure that it continues to be used only for industrial purposes.

2) Better signage around the Scrap Processing property, especially at the entrance, to let people know that heavy machinery is operating in the area and that the operators of that machinery may not have good visibility, maneuverability or ability to hear what's around them.

3) Workers on the site should be made aware of the high levels of lead dust in the former battery cracking building. Should the building be used more frequently in the future, further testing of the dust in the building may be necessary to determine what risks from lead poisoning are possible and if further cleanup is warranted.

4) If the site is redeveloped in the future, and the battery cracking building torn down, care must be taken to not release lead dust into the air or left to settle in the soil.

PUBLIC HEALTH ACTION PLAN

1) DNR will ensure that the appropriate deed restrictions are placed on the property.

No further actions are required at this time by DPH.

REPORT AUTHOR

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GLOSSARY OF TERMS

This glossary defines words used by ATSDR in communications with the public. It includes many of the terms used in this document. For terms not found below, see the ATSDR online glossary at: http://www.atsdr.cdc.gov/glossary.html or the EPA online glossary at: http://www.epa.gov/OCEPAterms/.

µg/ft2: micrograms per square foot

µg/L: micrograms per liter

µg/m3: micrograms per meter cubed

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

Aquifer: An underground geological formation, or group of formations, containing water. Are sources of groundwater for wells and springs.

ATSDR: Agency for Toxic Substances and Disease Registry - A federal health agency, based in Atlanta, Georgia, that deals with hazardous substance and waste site issues. ATSDR gives people information about harmful chemicals in their environment and tells people how to protect themselves from coming into contact with chemicals.

Carcinogen: A substance that causes cancer.

Comparison values: 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

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.

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

DHFS: Wisconsin Department of Health and Family Services

DNR: Wisconsin Department of Natural Resources

EPA: United States Environmental Protection Agency.

ES: Wisconsin Groundwater Quality Enforcement Standards. As detailed under Wisconsin Administrative Code NR140, the numerical concentration of a polluting substance in groundwater that provides adequate safeguards to protect public health, yet at which action is needed to prevent human exposure.

Exposure: Coming into contact with a chemical substance. There are three exposure routes: 1) breathing; 2) ingestion, or eating and drinking; and, 3) touching or dermal contact.

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.

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

Human 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 that could result in harmful health effects. (see also public health hazard)

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].

MCL: EPA Maximum Contaminant Level, the maximum permissible level of a contaminant in water delivered to any user of a public system. MCLs are enforceable standards.

Media: Soil, water, air, plants, animals, or any other parts of the environment that can contain contaminants.

Migrating: Moving from one location to another.

Monitoring Well: A well drilled at a hazardous waste management facility or Superfund site to collect ground-water samples for the purpose of physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants in the groundwater beneath the site.

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.

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.

PAH: Polycyclic aromatic hydrocarbon

PAL: Wisconsin NR 140 Preventive Action Limit

PCB: Polychlorinated biphenyl

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

Ppm: Parts per million, units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air.

Public Health Assessment (PHA): A report that is a comprehensive evaluation of chemical contamination at a hazardous waste site and assesses the past, current or future impact on the health of people who live and work nearby. The report also examines whether further public health actions or studies are needed to evaluate or prevent human exposures or health effects.

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 that could result in harmful health effects. (see also public health hazard)

Public meetings: A public forum with community members for communication about a site.

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

Remediation: Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a Superfund site.

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].

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.

Scrap Metal Processing: Intermediate operating facility where recovered metal is sorted, cleaned of contaminants, and prepared for recycling.

Sediment: Topsoil, sand, and minerals washed from the land into water, usually after rain or snow melt.

Smelting: A process that melts or fuses ore, often with an accompanying chemical change, to separate its metal content. Emissions cause pollution.

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.

Stabilization: Conversion of the active organic matter in sludge into inert, harmless material.

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

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

SVOC: Semivolatile organic compound

TCE: Trichloroethylene, a stable, low boiling-point colorless liquid, toxic if inhaled. Used as a solvent or metal degreasing agent, and in other industrial applications.

TRI: US EPA Toxic Release Inventory, database of toxic releases in the United States.

Underground Storage Tank (UST): A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

VOC: Volatile organic compound. A large number of low-molecular weight carbon-hydrogen compounds that are liquids at room temperature, but have a low vapor pressure and easily become vapors or gases. Many VOCs are commonly used as solvents.

CERTIFICATION

The Wisconsin Department of Health and Family Services prepared this Public Health Assessment under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It followed approved methodology and procedures existing at the time it began. The Cooperative Agreement Partner completed editorial review.

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

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[13] Wisconsin NR 140 Groundwater Enforcement Standard (ES) are levels set by the state that are considered safe for long-term sources of drinking water for the general population. When the standards are exceeded, a different source of drinking water should be used. Enforcement standards are not a level at which health effects are expected, but are an upper limit to the range of values where people can be sure that contaminant levels do not pose a health risk.
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