UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

23 DEC 2005

TES
Site: Washington Co
ID#: MONDD705027
Breach: 2.0
Other:
12-23-05

ACTION MEMORANDUM

SUBJECT: Request for a Removal Action at the Washington County Lead District – Old Mines Site in Washington County, Missouri
Time-Critical Removal

A78K

FROM: James O. Silver, On-Scene Coordinator
Emergency Response & Removal Branch

THRU: Scott Hayes, Chief
Emergency Response & Removal Branch

TO: Cecilia Tapia, Director
Superfund Division

CERCLIS #: MONDDD705D27
SITE #: A78K

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed removal action described herein for the Washington County Lead District – Old Mines site. Contaminated drinking water, residential properties, or other areas conducive to attracting children where the soil contains lead concentrations equal to or greater than 1,200 milligrams per kilogram (mg/kg) will be included in the removal action. The primary objective of this action is to eliminate or reduce potential ingestion exposure due to the presence of lead and other heavy metals in drinking water and in the soils.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

1. Removal Site Evaluation

The Washington County Lead District site consists of high concentrations of lead contamination from mining. The ore would normally be hauled from the mines to the concentrators (also known as mills) were it was formed into lead concentrate. Lead concentrate at the site was/is derived from the physical concentration of lead sulfide ore and is typically 70 to 80 percent (700,000 to 800,000 parts per million [ppm]) lead sulfide.

The primary problem areas at this site which require action are lead-contaminated soils in yards, and lead-contaminated dust in homes along these roadways.

2. Physical Location and Site Characteristics

The Washington County Lead District – Old Mines site is located in a heavily mined region of eastern Missouri known as the Washington County Lead District. The Old Mines site primarily includes residential areas within and around the communities of Old Mines, Kingston, Fertile, Tiff and other smaller communities, and is only a portion of the larger Washington County Lead Mining District.

Although lead was known to be in Southeast Missouri as early as the 1600's, serious mining did not begin until around 1720 when Phillipe Francois Renault established Mine La Motte in what is now Madison County, Missouri, (part of Madison County Mines National Priorities List [NPL] site). By 1725, Old Mines and Mine Renault were opened in what is now Washington County. The smelted lead was molded (lead pigs) and transported to Ste. Genevieve, Missouri, on the Mississippi river where it was shipped to France via New Orleans. Lead mining in Southeast Missouri has been continuous until the present day where lead is still mined in the Viburnum Trend which includes part of Washington County (Doe Run's Viburnum Mine 29).

In Washington County, Mine Au Breton (currently Potosi) was established in the late 1700's and eventually was taken over by Moses F. Austin (father of Stephen F. Austin of Texas fame) whose mining and reverberatory furnace smelting techniques significantly increased lead production which, at the time, was shipped to Spain. During the years of 1798 to 1804, Mine Au Breton produced more lead than all of the other Upper Louisiana mines combined.

Toward the end of the American Civil War, lead deposits in Washington County ran low and the industry declined. It was soon replaced by the surface mining of barite (Barium Sulfate) which was used in rubber, paint, soap, drilling fluids and medical products. Many lead mines were overmined for the barite which was also associated with galena (lead Sulfide). The barite was separated from the clay initially by hand washing and then by mechanical barite washing plants which were introduced into the area in the 1920's. In 1941, Missouri accounted for 40% of United States barite production.

Mines in the Old Mines Area include the following:

Pfizer Kingston School
Mobar Star Mine
MilchemWhale-Scott Mine
AW Wood Mine
DeSoto Mining Company – Fertile Mine
Dresser minerals Big River
Milchem Sun Mine
General Barite Blackwell

Dresser Minerals Mine #44
Dresser Minerals Racola
H&P Mining Company
General Barite Old Mines
Terrace Mines
Pfizer Arnault School
Dresser Minerals Breton Creek #3
Dresser Minerals Mine #11
NL Bariod Blackwell
Dresser Minerals Mine #6

In August 2005, the U.S. Environmental Protection Agency (EPA) began an integrated assessment, which included soil and groundwater sampling in the Old Mines area. During this sampling event, the EPA sampled the soil at 85 residences located on or near mining or mine waste disposal areas. Based on the data, approximately 47% of the residential properties sampled had soils which exceeded 400 mg/kg and roughly 13% had soils which exceeded 1,200 mg/kg for lead. The EPA also sampled approximately 77 private drinking water wells in the Old Mines area beginning in August 2005. Of these 7 exceeded 15 parts per billion (ppb) for lead, and one well exceeded 3,030 ppb for barium, which exceed the Maximum Contaminant Levels (MCLs) for lead and barium in drinking water.

3. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant

The primary contaminants of concern at this site are lead and lead compounds. The EPA has documented total lead concentrations in soil in residential yards at levels exceeding 1,200 mg/kg. The EPA has currently identified 11 residential yards in the Old Mines area which exceed 1,200 mg/kg. In addition, the EPA has sampled numerous mining areas and mine waste disposal areas which had soil concentrations exceeding 1,200 mg/kg. Drinking water samples collected by the EPA indicate a significant release of heavy metal contaminants, particularly lead, into the groundwater. The EPA sampling documented 7 private drinking water wells which exceeded 15 ppb for lead, and one well that exceeded 3,030 ppb for barium.

Lead and lead compounds are hazardous substances (as defined by Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and is listed at 40 C.F.R. § 302.4) and have been detected in the ground water, soils and mining wastes at the site.

4. NPL Status

The Washington County Lead District site is not currently on or proposed for listing on the NPL. The site is currently undergoing a removal assessment to identify additional lead-contaminated residential yards and additional contaminated wells. The EPA is working on further site assessment activities which may lead to proposed listing on the NPL.

5. Maps, Pictures, and Other Graphic Representations

A map depicting the Old Mines area within the Washington County Lead District is attached.

B. Other Actions to Date

There have been no known EPA response actions at this site to reduce the risks posed by lead contamination.

C. State and Local Authorities' Roles

The EPA is closely coordinating with the Missouri Department of Natural Resources (MDNR), the Missouri Department of Health and Senior Services (MDHSS), and the Washington County Health Department. These agencies, the EPA, and the Agency for Toxic Substances and Disease Registry (ATSDR) hold monthly conference calls to stay updated and discuss various issues with the Washington County site.

The MNDR is currently working with local officials to offer residents a safe alternative to drinking water. It is anticipated that the city of Potosi will allow residents to fill water containers from the city water supply, until the EPA can arrange a more convenient form of alternative water.

Local health officials are assisting in health education and blood-lead testing, but are hampered by a general lack of funding. The EPA is considering assisting the local health departments in conducting health education on lead prevention via a cooperative agreement or grant. The MDHSS has agreed to waive the laboratory fee on blood-lead testing to encourage more participation.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES, ENDANGERMENT DETERMINATION, PROPOSED ACTIONS, AND ESTIMATED COSTS

A. Threats to Public Health or Welfare

At any release, regardless of whether the site is included on the NPL, where the lead agency makes the determination, based on factors in 40 Code of Federal Regulations (C.F.R.) Part 300.415 (b)(2) that there is a threat to the public health or welfare of the United States, or the environment, the lead agency may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release, or threat of release. The factors in 40 C.F.R. Part 300.415 (b)(2) which apply to this site are:

300.415(b)(2)(i) --Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, or pollutants, or contaminants.

Elevated concentrations (greater than 1,200 mg/kg) of lead have been found throughout the site. Children playing in and around the contaminated areas have the highest potential to be exposed. In addition, sampling has determined that numerous private drinking water wells have been contaminated with lead.

Lead is a metal and has been listed as a hazardous waste (D008) in the regulations for the Resource Conservation and Recovery Act (RCRA). Lead is classified by the EPA as a probable human carcinogen and is a cumulative toxicant. The early effects of lead poisoning are nonspecific and difficult to distinguish from the symptoms of minor seasonal illnesses. Lead poisoning causes decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, digestive symptoms (particularly constipation), abdominal cramping, nausea, vomiting, and decreased appetite. With increased exposure, symptoms include anemia, pallor, a "lead line" on the gums, and decreased handgrip strength. Alcohol and physical exertion may exacerbate these symptoms. The radial nerve is affected most severely causing weakness in the hands and wrists. Central nervous system effects include severe headaches, convulsions, coma, delirium, and possibly death. The kidneys can also be damaged after long periods of exposure to lead, with loss of kidney function and progressive azotemia. Reproductive effects in women include decreased fertility, increased rates of miscarriage and stillbirth, decreased birth weight, premature rupture of membrane, and/or pre-term delivery. Reproductive effects in men include erectile dysfunction, decreased sperm count, abnormal sperm shape and size, and reduced semen volume. Lead exposure is associated with increases in blood pressure and left ventricular hypertrophy. A significant amount of lead that enters the body is stored in the bone for many years and can be considered an irreversible health effect.

Children are more vulnerable to lead poisoning than adults. For children, lead can damage the central nervous system, kidneys and reproductive system. At higher levels, it can cause comas, convulsions and death. Even low levels of lead are harmful and are associated with decreased intelligence, impaired neurobehavioral development, decreased stature and growth, impaired hearing acuity, and possibly high blood pressure.

300.415(b)(2)(ii) – Actual or potential contamination of drinking water supplies or sensitive ecosystems.

The EPA sample results showed numerous private drinking water wells were contaminated with lead above federal and state drinking water standards.

300.415(b)(2)(iv) -- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate.

Lead has been detected in surface soils above the proposed action level of 1,200 mg/kg. Lead-contaminated soils may migrate via airborne dusts, surface runoff, percolation into groundwater, construction activity, by children transporting soils/dusts into their homes after playing in the affected areas, and tracked in by foot traffic.

IV. ENDANGERMENT DETERMINATION

The actual release of a hazardous substance at this site, if not addressed by implementing the response action selected in this Action Memorandum, presents an imminent and substantial endangerment to the health of the public that comes in contact with the site and to public welfare and the environment.

V. PROPOSED ACTIONS AND ESTIMATED COST

A. Proposed Actions

1. Proposed Action Description

PROVISION OF ALTERNATIVE DRINKING WATER

An EPA toxicological analysis has determined the appropriate Removal Action Level (RAL) for the drinking water to be 15 ppb for lead and 5 ppb for cadmium. These RAL's are equivalent to the MCLs for these contaminants.

Any residence where the drinking water exceeds 15 ppb for lead will be provided with an alternative source of drinking water if, through sampling and analysis, the EPA suspects contaminated water was the result of groundwater contamination.

SOIL/WASTE EXCAVATION, REMOVAL, AND REPLACEMENT

The EPA will excavate and remove all soils and/or waste from properties where a composite sample exceeds a concentration of 1,200 mg/kg lead. In order to avoid unnecessary mobilization, demobilization and being intrusive to the residents, the EPA will excavate all soils exceeding 400 mg/kg in yards where at least one quandrant, cell, or zone exceeds 1,200 mg/kg.

The EPA will excavate and remove all soils and/or waste from properties where a composite sample exceeds a concentration of 400 mg/kg lead and the property is a highly used area for younger children (72 months of age or younger), or a residence where a young child has an elevated blood-lead (EBL) level greater than 10 micrograms per deciliter (µg/dl).

Properties with soil concentrations exceeding action levels will be excavated up to a depth of 12 inches. The excavation will be conducted with excavating machinery, such as skid loaders, dozers, excavators, backhoes, and hand tools. If soils at a depth of 12 inches exceed 1,200 mg/kg excavation may continue until concentrations fall below 1,200 mg/kg. The EPA may choose to place a warning barrier if excavation below 24 inches will not achieve a concentration level below 1,200 mg/kg.

After removing the soils from the affected area, or areas, and placing the warning barriers where required, the excavated soils will be replaced with clean soils. Clean soils are soils that have been analyzed for lead and results indicate that the lead concentration is below 240 mg/kg and all other hazardous substances, pollutants, or contaminants are below residential soil screening levels determined by the EPA or by referring to the Region 9 Preliminary Remediation Goal tables found at:

http://www.epa.gov/Region9/waste/sfund/prg/index.htm.

Garden soils in any yard that exceeds 400 mg/kg lead (based on discrete samples) will be excavated to a minimum depth of 24 inches. If soils at a depth of 24 inches exceed 1,200 mg/kg, excavation will continue in 6 to 12 inch lifts until the soil concentrations fall below 1,200 mg/kg or the EPA decides to cease excavation and place a warning barrier.

SOIL TREATMENT AND DISPOSAL

The EPA shall collect soil samples to conduct the Toxicity Characteristic Leachate Procedure (TCLP) according to the requirements of SW-846-Chapter 9 (representative sampling for waste piles). Soils that exceed the TCLP limits for lead must be properly treated with an appropriate lead stabilization chemical and re-sampled until the levels are below the TCLP limits for lead. Treatment of soils will not be conducted at the residence.

Transportation, treatment, storage, and disposal of the excavated material shall be in accordance with all applicable local, state, or federal requirements.

POST REMOVAL SITE CONTROL

It is the policy of the EPA that Post Removal Site Control (PRSC) shall be the responsibility of the state, potentially responsible party (PRP), or the remedial program. At this time it is uncertain what, if any, PRSC will be needed. When that determination is made, the OSC, working through regional management, will attempt to obtain PRSC agreements as appropriate.

2. Contribution to Remedial Performance

The enforcement-lead actions proposed *in this Action* Memorandum should not impede any future remedial plans or other response. This is consistent with any long-term remedy in that it fully addresses the direct contact threat posed by lead contamination at this site.

3. Action/Cleanup Level

Yards with soils contaminated with lead above 1,200 mg/kg will be excavated, treated, if TCLP analysis fails, and disposed at an acceptable soil repository. Another suitable option is to dispose of excavated soils that meet the definition of a hazardous waste in a RCRA Subtitle C disposal facility. These levels are consistent with the revised interim guidance for lead-contaminated Superfund sites, Office of Solid Waste and Emergency Response (OSWER) Directive 9355.4-12, and have been concurred on by the ATSDR.

All site-sampling activities for comparison to the action levels will be conducted in accordance with the approved Quality Assurance Project Plan (QAPP).

4. Applicable Relevant and Appropriate Requirements (ARARs)

Section 300.415(j) of the National Contingency Plan (NCP) provides that fund-financed removal actions under Section 104 of, and removal actions pursuant to CERCLA Section 106 shall, to the extent practicable considering the exigencies of the situation, attain ARARs under federal environmental or state environmental facility citing laws. The following specific ARARs have been identified for this action:

- Subtitle D of the RCRA, Section 1008, Section 4001, et seq., 42 U.S.C. §6941, et seq., State or Regional Solid Waste Plans and implementing federal and state regulations.

- Occupational Safety and Health Act, 29 C.F.R. Part 1910 will be applicable to all actions.

- Subtitle C of RCRA, 42 U.S.C. Section 6901, et seq., 40 C.F.R. Part 260, et seq. and implementing federal and state regulations for contaminated soils that exhibit the characteristic of toxicity and are considered RCRA hazardous waste.

  Subtitle C of RCRA is potentially applicable for the removal of soils contaminated with heavy metals from spills of lead concentrate, particularly if these soils exceed the TCLP regulatory threshold. However, soils contaminated with heavy metals from extraction, beneficiation or processing of ores are exempt from the requirements of RCRA, Subtitle C pursuant to the Bevill amendment, Section 3001(b)(3)(A) of RCRA, 42 U.S.C. Section 6921(b)(3)(A), and implementing regulations, 40 C.F.R. Section 261.4(b)(7).

- 40 C.F.R. Part 122, Section 122.26, National Pollution Discharge Elimination System storm water discharge regulations may be relevant and appropriate for management of storm water runoff from the repository.

- 49 C.F.R. Parts 107, 171-177, Department of Transportation hazardous material transportation regulations may be relevant and appropriate for transportation of the contaminated soils to the repository.

In a letter dated October 5, 2005, the EPA requested potential state ARARs. When received, these ARARs will be evaluated per the EPA guidance on consideration of ARARs during removal actions.

Any lead-bearing wastes exceeding the TCLP regulatory threshold will undergo treatment in accordance with the requirements of RCRA.

5. Project Schedule

Response activities are anticipated to begin within thirty days of the signing of this Action Memorandum. It is expected that this removal action will take several months to complete.

B. Estimated Costs

The costs associated with this removal action are estimated as follows:

Extramural Costs:

ERRS	$ 657,951
START Contractor	$ 64,793
Contingency	$ 144,549
Total Removal Project Ceiling	$ 867,293

The EPA indirect costs, although cost recoverable, do not count toward the total removal project ceiling for this removal action.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delayed action will continue to potentially expose residents, particularly children, to the contaminated soils and drinking water exceeding the federal action levels.

VII. OUTSTANDING POLICY ISSUES

None.

VIII. ENFORCEMENT

See attached Confidential Enforcement Addendum for this site. For NCP consistency purposes, it is not a part of this Action Memorandum.

IX. RECOMMENDATION

This decision document represents the selected removal action for the contaminated soils and drinking water at the Washington County Lead District – Old Mines site. The removal action was developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based on the Administrative Record for the site.

Conditions at the site meet NCP Section 300.415(b) criteria for a removal action and I recommend your approval of this removal action. The removal ceiling, if approved, will be $867,293. This amount comes from the Regional Removal Allowance.

Approved:

Cecilia Tapia, Director
Superfund Division

12-23-05
Date

Attachments: Site Map Showing Areas of Contamination