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Ref: 8EPR-ER

AUG 10 2004

ACTION MEMORANDUM

SUBJECT: Request for Approval of a Time-Critical Removal Action at the Carpenter Snow Creek NPL (Operable Unit #1 - Neihart Residential Soils) Site in the town of Neihart in Cascade County, Montana.

FROM: Steve Way, On-Scene Coordinator
Emergency Response Team

THROUGH: Steve Hawthorn, Supervisor
Emergency Response Unit

Doug Skie, Director
Office of Preparedness, Assessment, and Emergency Response

TO: Max Dodson, Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

Site ID#: 089X - OU 1

Category of Removal: Time-Critical, Fund-Lead

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval for the Removal Action described herein at the Carpenter Snow Creek NPL (Operable Unit #1 - Neihart Residential Soils) site (Site) located in the town of Neihart in Cascade County, Montana. The Removal Action will involve excavation of soils containing elevated levels of lead from designated properties within the Site that have been contaminated by mining/mill waste. Conditions existing at the Site present an imminent and substantial endangerment to human health and the environment and meet the criteria for initiating a Time Critical Removal Action under 40 CFR §300.415 (b) (2) of the National Contingency Plan (NCP).

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

1. Removal site evaluation

The CERCLIS ID number of the Site is MT0001096353 and conditions are such that this Removal Action is classified as Time-Critical. The Site includes portions of the largely recreational community of Neihart, Montana (See Attachment 1 - Site Location Map).

The majority of an estimated 128 residential properties, including a community center, a parking lot, an abandoned "ball mill" area, and an unpaved roadway (that was formerly a rail line leading away from the ore processing mill and is now a common pathway through the community), were sampled by EPA's Response Action Contractor (CDM) between 2003-2004. Of the samples, taken from approximately 100 separate properties and analyzed for 17 heavy metals plus arsenic, approximately 10% exceeded 2900 parts per million (ppm) lead. with the highest level at 44,000 ppm (See Exhibit 1 - attached).

The U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, recently conducted a "Public Health Assessment" for the Site and released recommendations on March 24, 2004, which concluded that exposures to lead in the soils of Neihart present a public health hazard for small children who may reside there as little as 30 days each year.

2. Physical location and site characteristics

The Site covers the town of Neihart, Cascade County, in the central portion of Montana within the Carpenter Snow Creek Mining District and the Little Belt Mountain Range in the Lewis and Clark National Forest. (A map of the Site area is included as Attachment 1). The Site is within the Carpenter Creek drainage basin, with Carpenter and Snow Creeks flowing into Belt Creek, which is classified as a fishery.

The discovery of minerals in the Little Belt Mountains in 1879 caused a rush of mining activity in the area, but ore was not discovered in the Neihart region until 1881. In 1886, a smelter was built in Neihart and operated until 1887. A railroad arrived in Neihart in 1891 and ran until 1945. Silver, lead, and zinc were the major ores extracted from the region, but by 1931 all of the larger mines were closed; over the next 70 years sporadic mining occurred in the region and has completely ceased today.

3. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

Lead has been identified at the Site as the primary contaminant of concern and it is a hazardous substance, as defined by Section 101 (14) of CERCLA. This hazardous

substance appears to have been released onto the Site by historic mineral processing activities and spread through the Community by various means, including flooding along Belt Creek, annual runoff following heavy snow melting, plowing during winter, and excavation and earth movement associated with construction of residences and roads. It appears that at least 10% of the residential properties and several non-residential (i.e., community recreational areas) on the Site have lead at levels of concern to the Removal Program. The major threat posed by this Site is ingestion of lead-contaminated soils by young children. Residential and specific non-residential areas pose a threat of exposure to soil with high levels of lead. Recreational areas in town and mine related properties adjacent to residences present conditions for direct contact and re-contamination due to migration of contaminated soil from erosion and other factors.

Lead is classified as a B2 carcinogen by EPA, and lead compounds are known to cause acute health effects. (The classification as a carcinogen is the result of animal studies determining that these compounds are probable human carcinogens). Lead can enter the body via ingestion and inhalation. Children appear to be the segment of the population at greatest risk from toxic effects of lead. Initially, lead travels in the blood to the soft tissues (heart, liver, kidney, brain, etc.), then it gradually redistributes to the bones and teeth where it tends to remain. Children exposed to high levels of lead have exhibited nerve damage, permanent mental retardation, colic, anemia, brain damage, and death.

Arsenic has also been identified at the Site, however, on a limited number of properties. Arsenic is a hazardous substance, as defined by Section 101(14) of CERCLA, and also appears to have been released onto the Site by historic mineral processing activities and spread to these locations by means similar to lead distribution at the Site. Since the lead and arsenic contamination appear together, the removal activities for lead will also address the limited arsenic contamination.

Arsenic is a human carcinogen and is typically associated with long term exposures. Long term exposures to arsenic can result in internal and external cancer and some non-cancer effects such as skin abnormalities. For more information on the health risks associated with exposure to arsenic, see Attachment 2.

4. NPL status

The Town of Neihart, Operable Unit No. 1, is part of the Carpenter Snow Creek NPL Site, which was listed by EPA in September 2001.

5. Maps and Illustrations

A Site map and sampling analyses are included as Attachments.

B. Previous and Current Actions

Since the Site was designated as an NPL site in September there have been

"Preliminary Site Characterization and Analyses", including soil and water; but, there have not been Remedial or Removal Actions by Region 8 EPA at the Site.

C. State and Local Authorities' Roles

1. State and local actions to date

The State has not conducted any response activities at the Site, but the Montana Department of Environmental Quality (MDEQ), Abandoned Mines Program, has conducted extensive studies of the Carpenter and Snow Creek watersheds, which drain into Belt Creek below Neihart. Included among those State studies was a prioritization of mines and waste piles that have contributed to degradation of the watersheds in the area.

2. Potential for continued State/local response

Neither the State nor local authorities have the resources to conduct a Removal Action at this time. The State and local agencies have been and will continue to be involved on a regular basis with the assessment and response activities at the Site. The State and Cascade County have been very much involved and are supportive of EPA activities at the Site. Both governmental entities support EPA's efforts to conduct a Time Critical Removal Action at Neihart.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

A. Threats to Public Health or Welfare

The primary potential threat from hazardous substances through direct exposure exists at the Site through the ingestion and inhalation of lead-contaminated soils. The high concentrations of lead found at the Site may have toxic effects on the exposed human populations, especially the children. These include neurological effects and chronic liver and kidney disease (see discussion in Section IIA4). There are also a limited number of properties where arsenic concentrations could pose a threat to human health.

Due to the high concentrations of lead found in the soils and fill, conditions at the Site present an imminent and substantial endangerment to human health and the environment and meet the criteria for initiating a Removal Action under 40 CFR Section 300.415 (b)(2) of the NCP . The following factors from § 300.415 (b)(2) of the NCP form the basis for EPA's determination of the threat presented and the appropriate action to be taken:

(i) Actual or potential exposure to nearby human populations, especially children, from hazardous substances;

(iv) High levels of hazardous substances in soils largely at or near the surface;

(v) Weather conditions that may cause hazardous substances to migrate or be released; and,

(vii) The unavailability of other appropriate federal or state response mechanisms to respond to the release.

B. Threats to the Environment

This Action Memorandum does not propose to address any potential environmental threats. Threats to the environment from hazardous substance release at the Site are being evaluated during the Remedial investigation which is presently underway; but threats to the environment were determined by EPA and the State of Montana to be sufficiently severe, both in Neihart and within the watershed drainages of Belt Creek, as to designate the area a National Priorities List site.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action identified in this Action Memorandum, may present an imminent and substantial endangerment to public health or welfare, or the environment. Based on the concentrations of lead and arsenic measured in the soil, and our knowledge of the adverse short-term and lifetime effects associated with lead and arsenic exposure, the contaminated soil at this site may pose an acute or short-term health risk to the residents. As noted in Attachment 2, the endangerment memorandum from the EPA Region VIII Toxicologist ("Short-term and acute risks to health of residents exposed to lead and arsenic contamination in Neihart, Montana, July 21, 2004) it is recommend that immediate steps be taken to minimize direct exposure to individuals who may come into contact with surficial soils containing lead concentrations greater than 2870 mg/Kg (ppm). In addition, it is recommended that soil with arsenic levels greater than 390 ppm be removed.

V. EXEMPTION FROM STATUTORY LIMITS

Emergency Exemption: At present, it is expected that the removal actions proposed herein will be completed within 12 months.

VI. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

The following represents factors considered in determining whether properties within the community will be included within EPA's time critical removal action. They are based on the need to provide immediate reduction in exposure to lead-contaminated soil. Both current and potential future exposures will be considered in applying the criteria.

Ten to twelve properties are at or above the action level for this action. The priority will be given to those properties with more exposed contaminated soils and those with ability to re-contaminate other properties. These include both residential lots and mine areas adjacent to residences. Most of the residential properties have been sampled and analyzed for 17 heavy metals. Additional properties may be identified as requiring a removal if follow-up sampling results indicate that levels exceed the action levels and established criteria. Where appropriate, soil with lead and arsenic concentrations lower than the action level that is within a planned area for removal may be removed for operational reasons or to be consistent with the potential future Remedial Action. Factors such as the amount of grass cover and current use will also be considered in the decision to perform a removal this season or not.

Properties will generally be included in the Removal Action if the average surface or near surface soil concentration exceeds 2870 ppm of lead, or if it exceeds 390 ppm arsenic. In addition to designated residential sites, the following non-residential areas may also be included in the scope of this action.: 1) ore load-out/source area on the slope above the residence at 635 N. Main, at the north end of town. The slope has waste rock that has migrated into two adjacent residential properties included in this action.; 2) the community center parking area may be used as staging area for contaminated soil to allow load-out of larger capacity trucks, which will improve the efficiency of the operation and reduce costs; and 3) a portion of the unpaved roadway, formerly a rail line leading away from the ore processing mill, which are all public/recreational areas - now a common pathway through the community.

a. The average depth of soil removal will be 18 inches; soil removal depths may range from 12 to 24 inches. In vegetable gardens removal of 18" will provide adequate protection accounting for tilling depths and typical edible root depths. Removal depths may be less in areas where rock and boulders preclude effective excavation, in which case paragraph (b) will apply.

b. Capping, where necessary, with a minimum 6" soil or 4" asphalt may be considered for areas meeting all the following conditions: (1) a removal is not feasible, (2) there is relative certainty that the land use will not change in the short term (e.g. the cap will not be disturbed); and (3) drainage will not be adversely affected.

This Removal Action includes the following specific activities:

a. Individual residences will have soil removed where soil is accessible without moving or going under fixed structures (buildings, etc.). Excavated areas will be backfilled with clean subgrade fill soil and top soil. (Top soil replacement depths will not to exceed 6 inches.) The original grade will be established, unless EPA and the property owner agree otherwise, and the area will be sodded or seeded with drought resistant vegetation. High elevation tolerant species of vegetation typically found in and around Neihart will be used where possible.

b. Structures and fencing on the properties will be left in place or returned to their original locations if removal is necessary. If fencing cannot be reused, it will be replaced.

c. Contaminated soils may be consolidated on site, in a staging area, for loading to haul trucks. In addition, a temporary storage area, near Neihart, may be used to store the contaminated soil for 12 to 24 months, allowing a decision to be made for long term action at the Site. The soil stock pile will be protected from run-on and run-off and access will be restricted. Excavation of the area used for storing contaminated soil will be performed as necessary.

d. Existing Shrubs and/or Bushes (defined as low, densely branched plants that impede soil removal) may be removed and replacement with the same species, standard nursery stock, and number of plants.

e. Existing Perennial Plants: Removal and replacement with the same (to the extent possible) or similar species, approximate size, and number of plants. (Generally, the property owner will perform the actually planting.)

f. Annual Plants: Removal with no replacement.

g. Existing Sprinkler Systems: If the existing system impedes soil removal or will not function after barrier soil is placed, removal and replacement with the same or similar system.

h. Existing Concrete, Asphalt, Brick Stone, or Tile Surfacing (sidewalks, driveways, parking, lots, pads): Remain in place and excavate around unless the existing surfacing has been damaged in the past to the extent that soils exceeding the action levels are exposed.

i. Septic systems and drain fields: As necessary drain fields may be removed and replaced. Septic tanks are expected to remain in place and will not be removed.

j. Existing Landscape Covers and Borders: Removal and replacement with equivalent materials in areas requiring soil removal. The original materials may also be used if soil is removed before replacement and materials are not damaged during removal.

k. Livestock Animals: Temporary relocation during soil removal and replacement activities for individual properties subject to this action.

l. Movable Buildings and Sheds: Temporary relocation during soil removal and replacement.

m. Existing Vegetable Gardens Exceeding Action Levels: Removal of a maximum of 18 inches of soil; replacement with a minimum of, but not

necessarily more than, 18 inches of suitable vegetable garden soil with characteristics acceptable to EPA.

o. Existing Decks: Remain in place and excavate beneath and around as needed unless the existing deck impedes soil removal. Options: should existing deck impede soil removal, include removal of existing deck and replace with an equal deck or utilize "shot crete" under the deck. A grating may be placed around the deck to keep children or pets from contact with the contaminated soil.

Owners will be asked for permission to conduct a removal action on their residential areas. If property owners refuse to grant permission, their property(ies) will not be remediated as part of this action. As necessary, detailed plans will be developed for the properties which are undergoing removals. Access for temporary storage of contaminated soil will be obtained prior to starting the removal action; if not the action will be delayed.

2. Contribution to remedial performance

The Removal Action proposed by EPA for this Site is consistent with any potential long-term plans of the Remedial Program.

3. Description of alternative technologies

As described in Section VI, a flexible approach has been crafted for this Removal Action, based on site-specific circumstances. No other alternative technologies are practical or effective to achieve the Removal Action objectives.

4. EE/CA

This is a Time-Critical Removal Action; thus, an Engineering Evaluation and Cost Analysis (EE/CA)is not required.

5. Applicable or relevant and appropriate requirements (ARARs)

This Removal Action will attain, to the extent practicable, considering the exigencies of the situation, applicable or relevant and appropriate requirements (ARARs) of Federal environmental or more stringent State environmental or facility-siting laws. Following is a list of ARARs that have been identified to date for this Removal Action:

FEDERAL ARARS

a. Clean Water Act (33 USC Sections 1341 and 1344) is relevant & appropriate.
b. Clean Water Act (40 CFR Part 230) is relevant & appropriate.
c. Resource Conservation and Recovery Act (RCRA), Subtitle C (capping and placement requirements may be relevant and appropriate), and Subtitle D (solid waste disposal requirements are applicable).
d. RCRA Standards for CAMUs, and TUs (40 CFR 264.552 & .553) and Staging Piles (40 CFR 264.554) are applicable.

e DOT Hazardous Material Transportation Regulations (49 CFR Parts 107, 171-177) are applicable.

f. Clean Air Act (42 USC Section 7409; CFR Sections 50.6 and 50.12) is applicable.

STATE ARARS

a. Montana Metal Mine Reclamation Act is relevant and appropriate.

b. Montana Water Quality Standards are relevant and appropriate.

c. Montana Comprehensive Environmental Cleanup and Responsibility Act is relevant and appropriate.

d. Montana Air Quality Act, sections 75-2-101, et seq., MCA and ARM Title 17, Chapter 8, is applicable.

6. Project schedule

Due to construction season constraints the project is tentatively planned to be initiated in mid-August of 2004 and, if necessary, completed by July 2005 after demobilization for the Winter.

B. Estimated Costs

Cost Estimate: A table containing cost estimates for the Removal project ceiling is shown below.

Extramural Costs:

Regional Allowance Costs	
Emergency and Rapid Response Services (ERRS) Cost	$600,000
Treatment and Disposal cost	N/A
Total START costs	$100,000
Contingency (15%)	$105,000
Subtotal, Extramural Costs	**$ 805,000**

The total EPA costs for this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated at:

Total Removal Ceiling (extramural)	$805,000
EPA's Direct Intramural Costs	$ 80,000
Subtotal	$885,000
Regional Indirect Cost (27%)	$238,950
Estimated Total EPA Costs	**$1,123,950**

Direct Costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgement interest, do not take

into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of the removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of total costs estimates nor deviation of actual costs from this estimate will affect the United States' right to cost recovery.

VII. ENFORCEMENT

A separate addendum will provide a confidential summary of current and potential future enforcement actions.

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

Delayed or no action will increase public health risks and threats to the environment because the hazardous substances on-site pose a health risk to children or adults who live near the Site, as well as the wildlife in the area.

IX. OUTSTANDING POLICY ISSUES

None

X. RECOMMENDATION

This decision document represents the selected Removal Action for the Site, developed in accordance with CERCLA, as amended, and consistent with the NCP. This decision is based on the Administrative Record for the Site.

Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a Removal, and I recommend your approval of the proposed Removal Action. The total project ceiling if approved will be $1,123,950. Of the total ceiling, an estimated $705,000 comes from the Regional removal allowance.

Approve: Max H Dodson Date: 8/10/04

Max H. Dodson, Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

Disapprove:_____ Date: _____

Max H. Dodson, Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

Attachments:

Attachment 1	-	Site Location Map
Attachment 2	-	Toxicologist Memorandum - "Short-term and acute risks to health of residents exposed to lead and arsenic contamination in Neihart, Montana".
Exhibit 1	-	Sampling Analysis - "Data Compilation Report - 2002 and 2003 Residential (Neihart) Area Sampling", December 2003, CDM.

SUPPLEMENTAL DOCUMENTS

Support/reference documents which may be helpful to the reader and/or have been cited in the report may be found in the Administrative Record at the Superfund Records Center for Region VIII EPA, 999 18th Street, Suite 300, Denver, Colorado 80202.

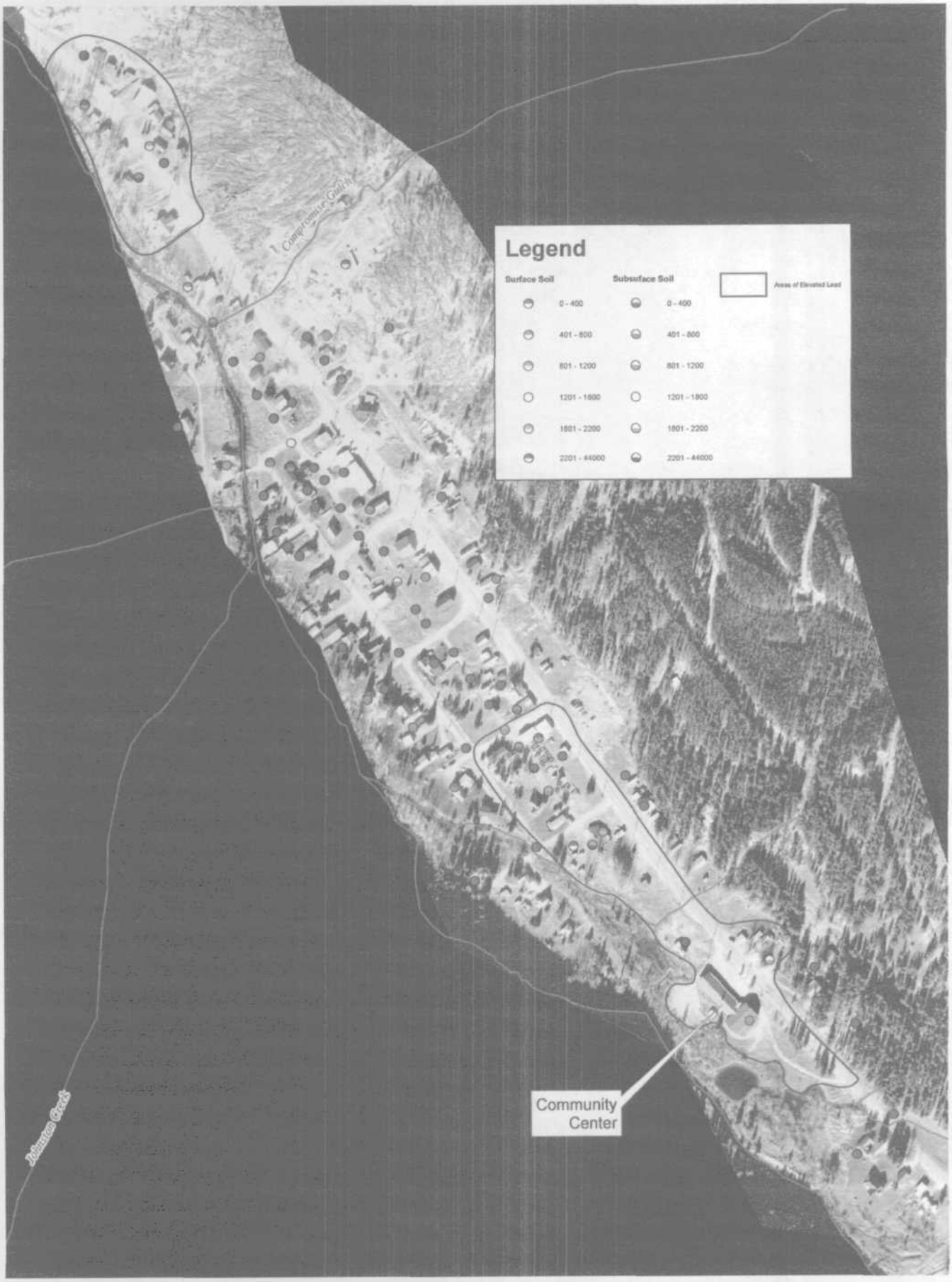
Color Map(s)

The following pages contain color that does not appear in the scanned images.

To view the actual images, please contact the Superfund Records Center at (303) 312-6473.

Attachment 1

Neihart, Montana Residential Soil Lead Concentration Ranges and High Lead Areas (solid line)



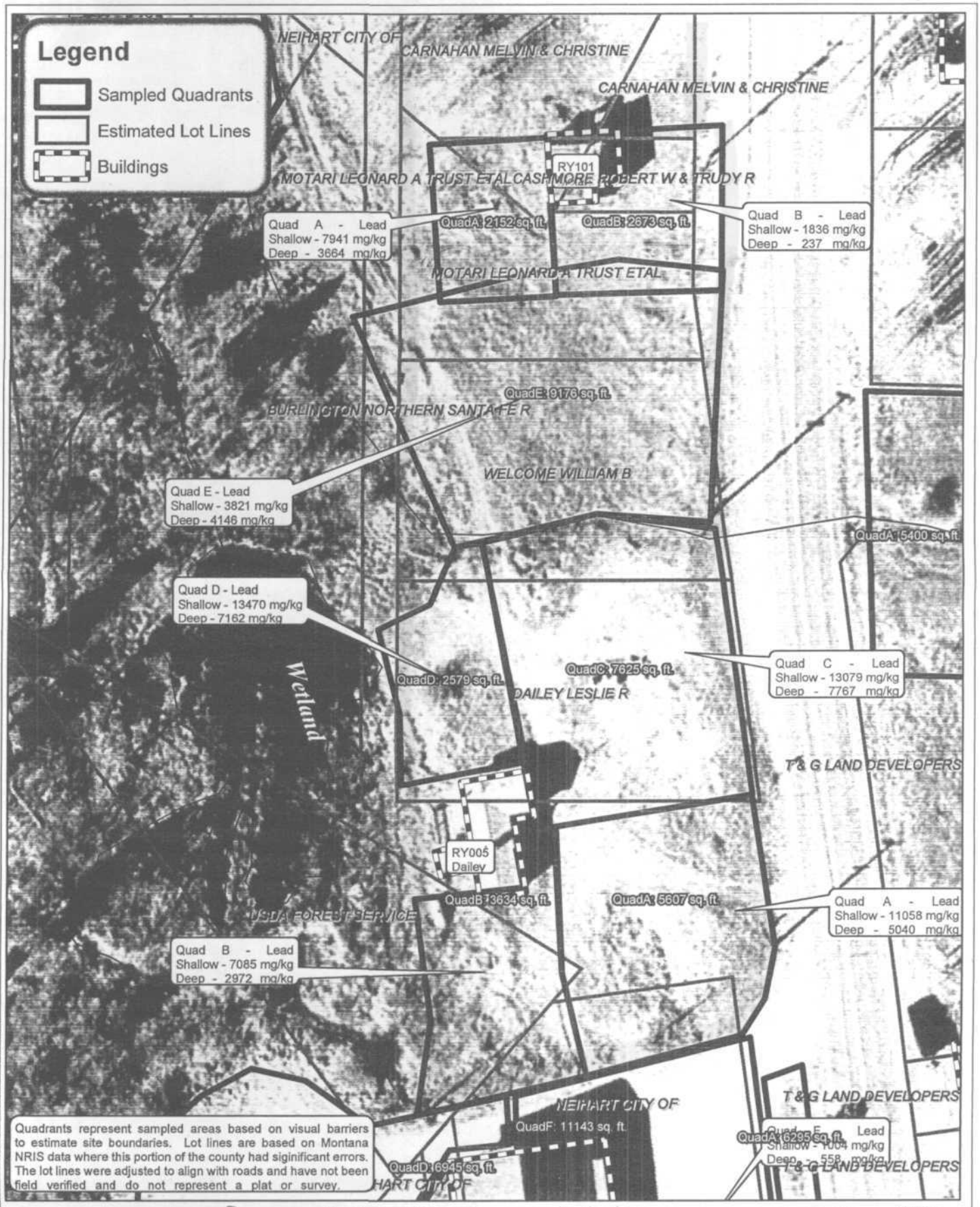


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Figure 3
RY005 - Soil Quadrants and Average Lead Data
Carpenter-Snow Creek Mining District NPL Site

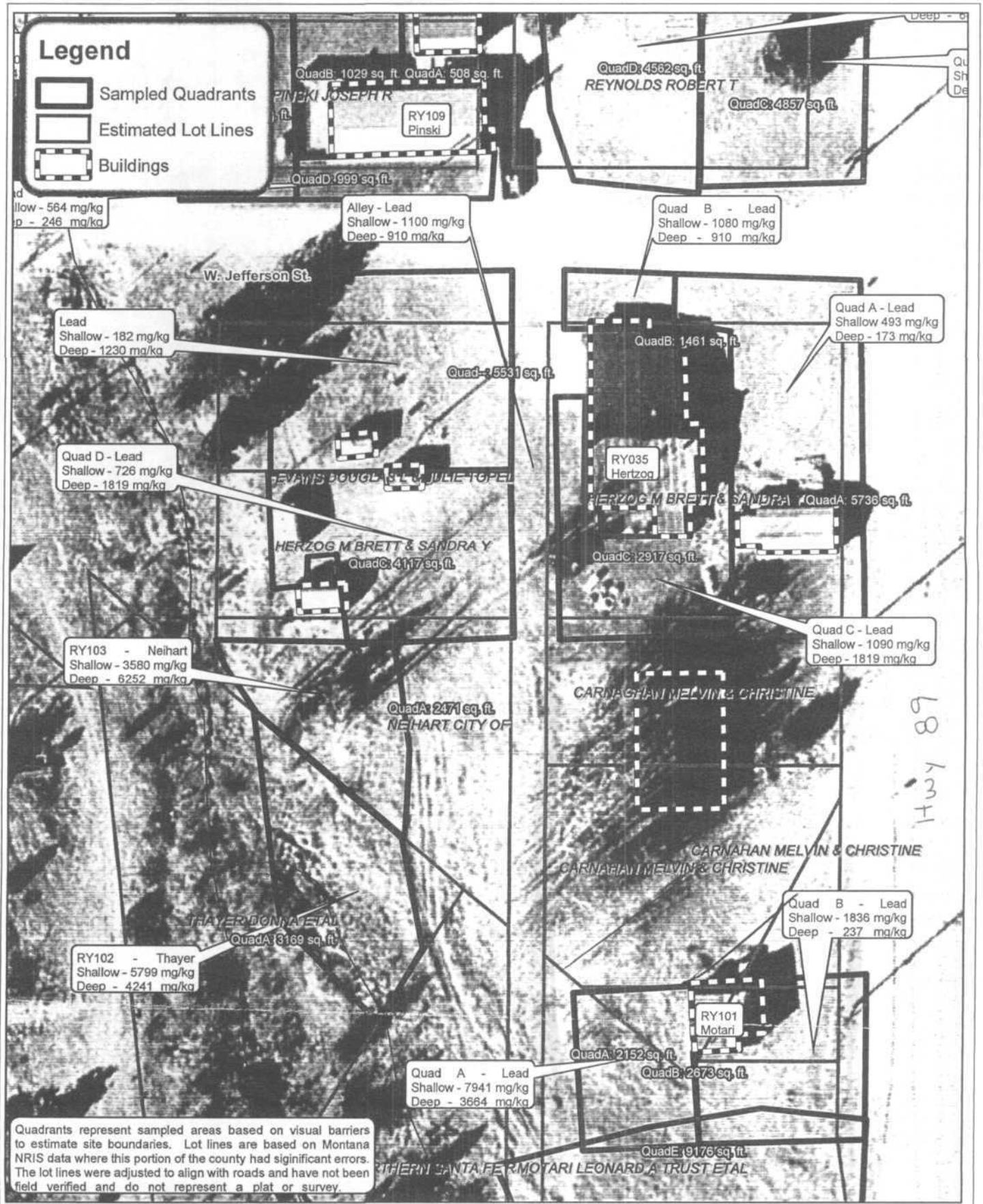

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Figure 4
RY035 Area - Soil Quadrants and Average Lead Data
Carpenter-Snow Creek Mining District NPL Site

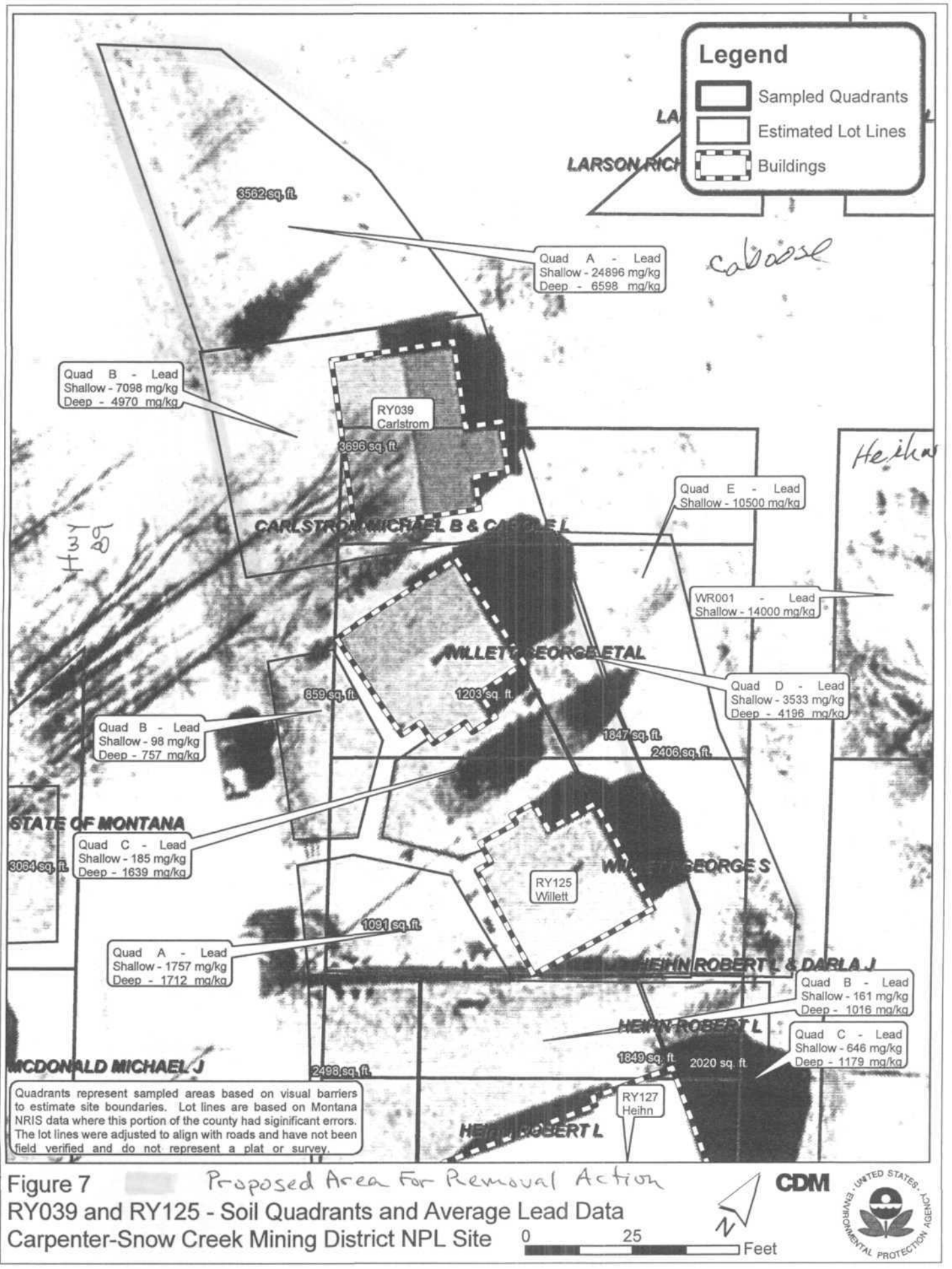

Figure 7
RY039 and RY125 - Soil Quadrants and Average Lead Data
Carpenter-Snow Creek Mining District NPL Site

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Attachment 2

Ref: 8EPR-PS

MEMORANDUM

To: Steve Way, USEPA Region 8 Emergency Response Program
On-Scene Coordinator, Neihart, Montana Superfund Site

From: Wendy O'Brien, D.V.M, Ph.D.
USEPA Region 8 Toxicologist

Subject: Short-term and acute risks to health of residents exposed to lead and arsenic contamination in Neihart, Montana

Date: July 21, 2004

This memorandum is in response to your request for 1) an assessment of potential acute or short-term health risks to residents in Neihart, Montana, and 2) appropriate action levels to address those risks. The town of Neihart is located in Cascade County, Montana, 55 miles south of Great Falls, in the Carpenter and Snow Creek Mining District of the Lewis and Clark National Forest. Peak mining activity in the region occurred from 1882 to 1929; silver was the major ore extracted, although gold, lead, zinc, galena, copper, and other minerals were also mined. By 1930, nearly all mines were closed, and today, mining in the region has completely ceased. Now abandoned, the mines and related facilities left behind waste rock and mill tailings piles.

There are approximately 128 inhabitable properties in the town of Neihart, with an estimated population of 50 full-time residents; the remainder of the population is comprised of part-time residents in vacation homes. The town occupies a strip approximately ¾ mile long in the heart of the Little Belt Mountain Range. An unpaved corridor, located between the main highway (State Highway 89) and Belt Creek, runs through the center of Neihart and serves as the main route of access to local businesses and services, such as the post office and community center. The corridor is located on the former railroad track through town. During the summer months, pedestrians, bicyclists, ATV riders, motorcyclists, and automobiles travel on the unpaved corridor, and a significant amount of dust is generated from these activities.

Elevated levels of lead and arsenic have been detected in outdoor soil in Neihart. Residents at the site could be expected to come into direct contact with contaminated soil and dust via incidental ingestio n, inhalation of particulates, and dermal contact. Based on the concentrations of lead and arsenic measured in the soil, and our knowledge of the adverse short-term and lifetime effects associated with lead and arsenic exposure, the contaminated soil at this

site may pose an acute or short-term health risk to the residents. I recommend that immediate steps be taken to minimize direct exposure to individuals who may come into contact with surficial soils containing lead concentrations greater than 2870 ppm. This soil removal action level for lead is consistent with the Emergency Response removal actions conducted at Eureka Mills, Utah; Jacob's Smelter, Utah; Walkerville, Montana; and Ophir, Utah. Additionally, I recommend a soil removal action level of 390 – 490 ppm for arsenic, a level consistent with Emergency Response removal actions conducted at Fairfield, Utah and Ophir, Utah. Based on inspection of sampling results, soils with elevated arsenic levels appear to be co-located with high lead soils, and thus mitigation of risks associated with exposure to high levels of lead in soil will also address risks associated with exposure to elevated levels of arsenic.

Environmental Data Evaluation

In 2002 and late 2003, CDM Federal Programs Corporation personnel conducted a soil screening assessment at the Neihart site. The investigation focused on metal contaminant levels in surficial and sub-surface soils at residential lots, alleyways, and the main corridor through town. Analyses of soil samples indicated the presence of lead concentrations ranging from 40 – 44,000 ppm and arsenic concentrations ranging from 4 - 1056 ppm.

Toxicity of Lead

Lead exposure among children is known to cause central nervous system effects resulting in learning disabilities, hearing impairment, and behavioral difficulties. Children are particularly susceptible to the effects of lead due to 1) the tendency for children less than the age of seven years to absorb lead much more efficiently that adults; 2) the particular susceptibility of the developing brain to the toxicological effects of lead; and 3) the tendency for children to be more highly exposed to sources of lead such as dust, soil, and paint due to exploratory behavior. Subtle signs of lead-induced adverse health effects begin to manifest at blood lead levels of 10 µg/dL or even lower, with effects becoming clearer by 20 to 40 µg/dL. The USEPA recommends a blood lead level of 10 µg/dL as the level of concern for these neurological effects. Furthermore, the USEPA Superfund program recommends that exposures to soil lead levels should be limited such that a child would have an estimated risk of no more than 5% of exceeding a 10 µg/dL blood lead level. This estimate was developed using the USEPA's computer simulation model, the Integrated Exposure Uptake Biokinetic (IEUBK) model.

The adverse health effects of lead are typically associated with exposures that occur over a long period of time, and lead levels in contaminated media which are protective for these subtle neurological effects may not be indicative of an acute or short-term health risk. The Centers for Disease Control and Prevention (CDCP) have issued tiered guidelines on appropriate environmental and medical responses to implement for given blood lead levels within a population. At blood lead levels between 10 - 20 µg/dL, the CDCP guidelines indicate that a health threat is not immediate, but children should receive nutritional and educational intervention to reduce their blood lead levels. At the next level, where blood lead levels are between 20 - 44 µg/dL, the CDCP recommends environmental evaluation and remediation, and

pharmacologic treatment if necessary. Health concerns within this category could be interpreted as requiring immediate action to reduce children's blood lead levels.

Toxicity of Arsenic

Excess exposure to arsenic is known to cause a variety of adverse health effects in humans. Exposure via inhalation is associated with increased lung cancer. There is strong evidence from a number of human studies that oral exposure to arsenic increases the risk of skin cancer. The most common type of cancer is squamous cell carcinoma, although basal cell carcinoma may also occur. Chronic oral arsenic exposure may also increase the risk of internal cancers, including cancers of the liver, urinary bladder, and lung. Long-term oral exposure to arsenic is also associated with non-cancer effects such as skin abnormalities that include dark and white spots and a pattern of small corns, especially on the palms of the hands and soles of the feet. Oral exposure to very high doses of arsenic may produce acute irritation of the gastrointestinal tract, leading to nausea and vomiting; weakness, cardiovascular abnormalities, and central/peripheral nervous system effects are also known to occur following high dose oral exposure to arsenic.

The adverse effects of arsenic are typically associated with exposures that occur over a long period of time (*e.g.*, 30 - 70 years), and levels in contaminated media that are protective for these effects may not be indicative of an imminent and substantial health threat. There are, however, several studies that address the question of short-term exposure to arsenic (*e.g.*, from six months to 15 years). These studies were reviewed and discussed in detail in the 2002 memorandum from the Superfund Technical Support Center, National Center for Environmental Assessment (October 30, 2002) entitled "Derivation of Acute and Subchronic Oral Reference Doses for Inorganic Arsenic." This memo describes skin lesions associated with short-term exposures to arsenic in drinking water, food, or medications, and establishes a safe dose level of 0.005 mg/kg-d, at which no short-term adverse effects would be expected to occur. This safe dose level, or acute/subchronic reference dose (RfD), was used to evaluate the arsenic soil levels observed in the town of Neihart and to develop preliminary remediation goals (PRGs) for arsenic in soils that would be protective of short-term exposures.

Exposure to Lead and Arsenic

In order for exposure and risk to occur, a complete exposure pathway must exist. For a complete exposure pathway to exist, there must be: 1) a source of contamination; 2) a release mechanism; 3) a transport of the soils contamination to a receptor; and 4) an exposure route (ingestion, inhalation, or dermal absorption). In the town of Neihart, it appears that the exposure pathway between the contaminated soils and the residents is complete and exposure could occur via incidental ingestion, inhalation of particulates, and dermal contact. In most cases where residential soil is contaminated with metals, the significant exposure route is through incidental ingestion of soil and dust. Due to their atomic charges, metals are not well absorbed by the skin, and the dermal route of exposure is usually insignificant in areas of soil contamination. Therefore, for this assessment, only the incidental ingestion of soil will be quantified. However, exposure to metals in soils by inhalation may pose a significant threat in areas that are dusty where human activity levels are high (*e.g.*, where bicycle, ATV, motorcycle, or automobile

traffic is prevalent). While this route of exposure is generally less significant in typical residential exposure scenarios, it may be significant along the main access corridor that runs through the center of the town of Neihart, where activity from bicycles, ATVs, motorcycles, and/or automobiles may generate a substantial amount of dust.

For evaluation of exposure to lead in soils at the Neihart site, a preliminary action level for addressing acute or short-term health risks from ingestion of contaminated soil and dust was developed based on the IEUBK model's predicted level at which there is no more that a 5% probability that an individual child's blood lead level will exceed 20 µg/dL. Since no site-specific data were available for input into the IEUBK model, recommended IEUBK default values were assumed for all model inputs. Note that the use of default values contributes a greater degree of uncertainty to the model output relative to site-specific conditions. Based on the default input parameters, an action level of 2870 ppm for an acute or short-term health risk from ingestion of lead in soil and dust was calculated. Since the lead concentrations in some of the residential soils at the Neihart site exceed 2870 ppm, it is plausible that unacceptable short-term exposures could occur, and immediate action is recommended to mitigate those exposures. Please note that this action level was developed based on children less than six years of age who represent the most sensitive members of the population to the adverse health effects of lead. This level in soil should be adequately protective for adults and older children.

To evaluate exposure to arsenic in soils at the site, the conservative assumption that exposure would occur to a child 0 - 6 years of age was assumed because short-term exposure could occur at any age. The equations and assumptions outlined in EPA's *Risk Assessment Guidance for Superfund* were used in conjunction with the subchronic toxicity value discussed above. EPA Region VIII policy recommends that a bioavailability factor of 100% be used for soil contaminated by recent smelter stack emissions or pesticide application. For mining type wastes, an 80% bioavailability factor is recommended. In the absence of site-specific bioavailability data for soils in the town of Neihart, the range of bioavailabilities from 80% to 100% has been provided below to provide perspective on the range of risks possible in the Neihart area.

The calculations are as follows:

$$PRG = \frac{\text{Hazard Index x Averaging Time x 365 days/year}}{\text{1/RfD x 10E-06 kg/mg x Exposure Frequency x Ingestion Factor x Absorption Factor}}$$

where

PRG = Preliminary Remediation Goal
Hazard Index = 1
Averaging Time = 6 years
Acute/Subchronic Reference Dose (RfD) = 0.005 mg/kg-d
Exposure Frequency = 350 days/year
Age-Adjusted Ingestion Factor = 80 mg-yr/kg-day (200 mg/day x 6 years/15 kg)
Absorption Factor (Bioavailability) = 0.8, 1.0

Given an absorption factor of 100%, the PRG in soil that would be protective for short-term effects would be 391 ppm. With an absorption factor of 80%, the PRG would be 489 ppm. Therefore, for risk management purposes, the range of PRGs extends from about 390 to 490 ppm. Since the arsenic concentrations in Neihart soils range from 4 ppm to 1056 ppm, it is plausible that unacceptable short-term exposure could occur and immediate action is recommended to mitigate those exposures. Sampling data indicate that soils with elevated arsenic levels appear to be co-located with high lead soils. Therefore, emergency mitigation of risks associated with exposure to high levels of lead in soil will also address risks associated with short-term exposure to elevated levels of arsenic. While the PRG range recommended above may be protective of effects associated with short-term exposures to arsenic, it may not be protective of lifetime exposures and the cancer risks associated with such exposures.

Exhibit 1

Neihart Residential Soils Results - Proposed Removal Properties 2004

Average of ConcAsNumber					Analyte			
Station	Owner	Location	TopDepth	Quad	As	As	Pb	Pb
RY005	DAILEY	32 S MAIN ST	0	A		290		11058
				B		339		7085
				C		614		13709
				D		1056		13470
				E				3821
				None	155		20033	
			0 Average		155	671	20033	9829
			12	A				5040
				B		166		2972
				C		216		7767
				D		456		7162
				E				4146
				None	75		6900	
			12 Average		75	292	6900	5326
RY005 Average					135	482	16750	7635
RY017	CITY OF NEIHART	200 S MAIN ST	0	A		81		487
				B				732
				C		256		2669
				D				194
				E				53
				F				1004
				None	190		8050	
			0 Average		190	198	8050	971
			12	A				329
				B				506
				C				804
				D				467
				E				102
				F				558
			12 Average					476
RY017 Average					190	198	8050	713
RY039	CARLSTROM	635 N MAIN ST	0	A	678		24896	
				B	309		7098	
				C	273		34157	
			0 Average		420		22050	
			12	A			6598	
				B			4970	
			12 Average				5784	
RY039 Average					420		15544	
RY060	CITY OF NEIHART	Alley South of Montana St.	0	A			177	
			0 Average				177	
			12	A	200		3619	
			12 Average		200		3619	
RY060 Average					200		1898	
RY101	Motari	South Main Street	0	A	156		7941	
				B	10		1836	
			0 Average		83		4889	

RY101	Motari	South Main Street	12	A	84	3664
				B	12	237
			12 Average		48	1951
RY101 Average					65	3420
RY102	Thayer	North of Communit	0	A	189	5799
			0 Average		189	5799
			12	A	292	4241
			12 Average		292	4241
RY102 Average					240	5020
RY103	Neihart	North of Community Center	0	A	128	3580
			0 Average		128	3580
			12	A	270	6252
			12 Average		270	6252
RY103 Average					199	4916
RY125	Willet	627 and 621 N. Main St.	0	A	15	1757
				B	37	99
				C	31	186
				D	70	3533
				E	273	10459
			0 Average		85	3207
			12	A	18	1712
				B	37	758
				C	41	1639
				D	129	4196
			12 Average		56	2076
RY125 Average					72	2704
RY128	Hangen	609 N MAIN ST	0	A	18	331
				B	29	125
			0 Average		23	228
			2	A	131	1578
			2 Average		131	1578
			6	A	234	8044
			6 Average		234	8044
			12	A	34	1355
				B	18	139
			12 Average		26	747
RY128 Average					77	1929
RY130	Cady	500 PINE ST	0	A	4	375
				B	39	231
				C	116	1964
			0 Average		53	857
			12	A	28	103
				B	63	328
				C	160	3672
			12 Average		84	1368
RY130 Average					68	1112
RY138	Black	114 N. Madison St	0	A	9	80
				B	31	672
				C	24	40

RY138	Black	114 N. Madison St	0 Average		21	264
			12	A	233	10332
				B	66	1708
				C	93	1975
			12 Average		131	4672
RY138 Average					76	2468
RY139	Pizinni	619 O'BRIEN ST (no map)	0	A	214	4099
				B	98	3247
			0 Average		156	3673
RY139 Average					156	3673

Carpenter Snow Creek NPL Site
(OU1 - Neihart Residential Soils)

Action Memorandum

ROUTING AND TRANSMITTAL SLIP Date 7/21/04

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2. ~~Dawn Tescrero/[illegible]~~	ENF-RC	[illegible]	7/27/04
3. ~~Richard Baird~~	ENF-L	RBB	7/27/04
4. ~~Sharon Kercher~~	~~ENF-RC~~	SK	8/4/04
5. Steve Hawthorn	EPR-ER		

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REMARKS

[illegible]

~~Doug Skie EPR-ER~~ DMS 8/11/04
~~Max Dodson EPR~~

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