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Washington County Lead District Site
Remedial Investigation Report

Washington County, Missouri

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Appendix B Field Data Sheets – 2008 RI/FS Field Investigation (BVSPC)

Appendix C XRF Data (Soil and Paint analysis) (CD Insert)

Appendix D ASR #3902 Data Package

Acronyms and Abbreviations

µg/cm^2	Micrograms per Squared Centimeter
µg/dL	Micrograms per Deciliter
µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
ALM	Adult Lead Model
As^{5+}	Arsenate
ASR	Analytical Services Request
ATV	All-terrain Vehicles
BVSPC	Black & Veatch Special Projects Corp
Ca^{2+}	Calcium Cation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response and Liability Information System
COC	Contaminants of Concern
COPC	Contaminants of Potential Concern
COPEC	Contaminant of Potential Ecological Concern
CPUE	Catch Per Unit Effort
Cr^{3+}	Trivalent Chromium
Cr^{6+}	Hexavalent Chromium
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
$CuFeS_2$	Chalcopyrite
DI	Deionized Water
EcoSSLs	Ecological Soil Screening Levels
EPA	U.S. Environmental Protection Agency
ERA	Ecological Risk Assessment
ºF	Degrees Fahrenheit
Fe^{2+}	Iron Cation
FeAsS	Arsenopyrite
FeOOH	Ferric Oxide
FS	Feasibility Study
FSP	Field Sampling Plan
HASP	Health & Safety Plan
HHRA	Human Health Risk Assessment
HI	Hazard Index

HQ	Hazard Quotient
HRS	Hazard Ranking System
HVS3	High Volume Small Surface Sampler
IEUBK	Integrated Exposure Uptake Biokinetic
IDW	Investigation Derived Waste
IVBA	*In Vitro* Bioaccessibility
kg	Kilogram
L	Liter
MCL	Maximum Contaminant Level
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
Mg^{2+}	Magnesium Cation
mg/cm^2	Milligrams per Squared Centimeter
mg/kg	Milligrams per Kilogram
Mn^{2+}	Manganese Cation
mph	Miles per Hour
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSL	Mean seal level
NAWCQ	National Ambient Water Quality Criteria
$(Ni,CO)_3S_4$	Siegenite
NPL	National Priorities List
OU	Operable Unit
P10	Probability that the blood lead level of an exposed individual exceeds 10 ug/dL
PA	Preliminary Assessment
PEM1	Palustrine Emergent Wetland
PF01	Palustrine Forested Wetland
Pb-B	Blood Lead
PbS	Galena
PEC	Probable Effect Concentration
ppb	Parts per billion
PPE	Personal protective equipment
PRG	Preliminary Remediation Goal
PSS1	Palustrine Shrub Scrub Broad Leaf Wetland
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RA	Removal Action

RBA	Relative Bioavailability
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
RPD	Relative Percent Difference
RSE	Removal Site Evaluation
RSL	Regional Screening Level
SI	Site Inspection
SLERA	Screening Level Ecological Risk Assessment
SOP	Standard Operating Procedure
SOW	Statement of Work
SQG	Sediment Quality Guidelines
TAL	Target Analyte List
TEC	Threshold Effect Concentration
TOC	Total Organic Carbon
µg/ft²	Micrograms per square foot
µg/g	Micrograms per gram
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UV	Ultra-violet
XRF	X-ray fluorescence
ZnS	Sphalerite

Executive Summary

Background

The U.S. Environmental Protection Agency (EPA) has initiated a remedial investigation (RI) effort for three mining sites located in the northeastern portion of Washington County, Missouri. Washington County is located in the central/southeastern portion of the state. The RI process is the methodology the Superfund program has established for investigating risks posed by uncontrolled hazardous waste sites. The three sites of concern are the Washington County Lead District (WCLD)-Potosi Site, the WCLD-Richwoods Site, and the WCLD-Old Mines Site. Henceforth, the sites will be referred to as the Potosi site, Richwoods site, and Old Mines site; or the WCLD sites; or the sites. During the remedial investigation, each of these sites was investigated to determine levels of contamination. Data collected from streams within the sites include Mineral Fork, Old Mines Creek, Mine Breton Creek and Mill Creek.

Although this report includes information on multiple environmental media sampled throughout the three mining areas, the focus of this RI is on residential soils. Operable Unit 1 (OU1) of the Washington County Lead District Site has been established to deal specifically with residential soils in all three mining areas.

In September, 2007, all three of the WCLD sites were placed on the National Priorities List (NPL). This was primarily due to the potential exposure to lead-contaminated soil and drinking water. The historical mining operations that occurred throughout the sites during the past two centuries resulted in elevated levels of lead, barium, arsenic, and cadmium found in surface soils, groundwater, surface water, and stream sediments.

Study Area Investigation

Previous field investigations were conducted by EPA and the Missouri Department of Natural Resources (MDNR) at the Potosi, Richwoods, and Old Mines sites from 2005 to 2007 to characterize the nature and extent of residential soil and groundwater contamination throughout Washington County. The EPA conducted additional investigations in 2008 for the purpose of filling data gaps needed for conducting a Remedial Investigation/Feasibility Study (RI/FS) at the sites. Subsequently, the RI/FS will be used to select remedies to address contaminated residential soils and groundwater that will eliminate, reduce, or control risks to human health and the environment. As part of the RI, a Human Health Risk Assessment (HHRRA) was developed.

The RI focused on lead contamination in soil and groundwater created by the historical mining activities which have taken place in the area. The following sampling activities were conducted during the Black & Veatch Special Project Corp. (BVSPC) RI/FS field investigation:

- Collection of surface soil samples at 48 residential properties within the WCLD Site.
- Collection of surface soil samples at 15 locations for in-vitro analysis to determine the bioaccessibility of lead.
- Collection of indoor dust samples with vacuum and wipe techniques at each of the 48 targeted residences within the WCLD (WCLD) Site.
- Collection of indoor tap water (potable groundwater) from 20 of the residences that were sampled for indoor dust during this effort.

EPA has completed a Ecological Risk Assessment (ERA) for the Potosi site. ERAs for the Richwoods and Old Mines Sites are forthcoming. The purpose of the ERA was to fill data gaps from the Screening-Level Ecological Risk Assessment (SLERA) and to complete the evaluation of potential ecological risk. The following sampling activities were conducted during the EPA ERA field investigation:

- Collection of 11 soil samples throughout the WCLD Site, with emphasis on areas in which sensitive wildlife of concern would most likely forage.
- Collection of vegetation samples at each of the 11 soil sampling locations.
- Collection of 21 co-located surface water and sediment samples from Mill Creek and its tributaries.
- Collection of 11 whole body fish samples from Mill Creek, Pond Creek, and tailings ponds.
- Collection of 3 crayfish samples co-located with the fish samples.

Sampling locations, analyses, procedures, and investigation-derived waste management are discussed below with the primary focus on the 2008 BVSPC and EPA ERA field investigations.

Physical Characteristics of the Study Area

Washington County is located in the central/southeast portion of Missouri and is entirely within the Salem Plateau portion of the Ozark Highlands physiographic region. The elevation of Washington County ranges from 1,582 feet above sea level to the lowest point near the confluence of the Meramec River and Big River at 550 feet above sea level. Streams flow to the north with tributaries from the west draining into the Meramec River and tributaries from the east draining into the Big River. Annual precipitation

averages 41 inches per year and average monthly temperatures range from 18 to 89 degrees Fahrenheit.

Bedrock within Washington County consists of sedimentary rocks of the Paleozoic era. Igneous rocks of the Precambrian era are exposed as isolated ridges and pinnacles along the southern edge of the County. Many periods of uplift and erosion have created an irregular topography on the ancient igneous surface. Data records at the Geological Survey & Resource Assessment Division show that over 75 caves and 100 springs are known to be present in Washington County.

The Washington County landscape consists of several terrestrial communities that include woodland, grassland, pasture, agriculture fields and mine-related areas. Wildlife species and habitats occurring throughout Washington County are typical of those occurring in agriculturally altered/wooded ecotones. Streams contain a variety of temperate aquatic species and are characterized by mixed sand, gravel and boulder bottoms that are surrounded by oak-hickory, red cedar, and pine forests or farmland.

Nature & Extent of Contamination

The nature and extent of contamination section presents the results of the analysis of the soil, mine waste, lead bioaccessibility, groundwater, indoor dust, paint surfaces, surface water, and sediment samples that were collected during previous investigations and the 2008 RI/FS field investigation at the WCLD site.

The nature and extent of contamination is discussed in relation to regulatory action levels (Maximum Contaminant Levels [MCLs]) for water and residential Regional Screening Levels (RSLs) for soil) and calculated average background levels for soil.

During previous investigations, the EPA Region 9 Residential Preliminary Remediation Goals (PRGs) were used to evaluate the nature and extent of contamination. In the time since those investigations were conducted, EPA Region 9 has consulted with other EPA Regions including Region 3 and 6, and risk-based RSLs were agreed upon and adopted by each Region (EPA, 2009). EPA Region 7 has also adopted these RSLs; therefore, they were used for the nature and extent discussion in this RI. The following RSLs are the regulatory action levels used to evaluate residential soil in this RI:

Contaminant	Matrix	Residential Soil Action Level	Reference
Lead	Soil	400 mg/kg	EPA RSL
Lead		1,200 mg/kg	EPA Region 7 Time Critical Removal Action Level for Residential Soil
Arsenic		0.39 mg/kg	EPA RSL
Barium		15,000 mg/kg	EPA RSL
Cadmium		70 mg/kg	EPA RSL

The following MCLs are the regulatory action levels used to evaluate the nature and extent of contamination in drinking water at the Sites:

Contaminant	Matrix	Action Level	Reference
Lead	Groundwater	15 µg/L	EPA MCL
Arsenic		10 µg/L	EPA MCL
Barium		2,000 µg/L	EPA MCL
Cadmium		5 µg/L	EPA MCL

During the 2005 Site Investigation/Remedial Action (SI/RA) for the Potosi Site, background surface soils were collected from areas within Washington County where no historical milling, mining, smelting operations, or waste disposal is believed to have occurred. All samples were collected from areas with similar soil types to the study areas and analyzed for lead and arsenic using an X-ray fluorescence (XRF) analyzer. Background sample concentrations in soils were also obtained from the United States Geological Survey (USGS) Mineral Resources On-line Database for Washington County, Missouri (USGS, 2009). The average background concentration of lead in soil established for this RI (calculated average of Potosi and USGS background data) is 165.6 milligrams per kilogram (mg/kg).

Action levels for surface water and sediment were established in the 2008 ERA completed by the EPA. The National Ambient Water Quality Criteria (NAWQC) were used to evaluate surface water, and the Sediment Quality Guidelines (SQG) were used to evaluate sediment (EPA, 2008d). These criteria were used in the RI to evaluate surface water and sediment.

Potosi Site

Several media were evaluated at the Potosi Site during previous investigations and the 2008 RI/FS field investigation including residential soil, mine waste (soil), indoor dust, groundwater, surface water, and sediment.

Residential soil was collected at the Potosi Site during the 2008 RI/FS field investigation and during previous investigations. Based on the findings of this RI, the majority of the residential properties sampled during previous investigations and the 2008 RI/FS investigation contain concentrations of lead that exceed the RSL and the calculated background concentration for lead in residential soil at the Potosi Site. In general, lead contamination is wide-spread in residential soil at the Potosi Site. Residential soil samples collected during previous investigations contained concentrations of barium and cadmium that were within action levels; however, arsenic concentrations exceeded the RSL in the majority of the residential soil samples collected.

Non-residential, mine waste (soil) was collected at the Potosi Site during previous investigations and analyzed for lead. The majority of the mine waste samples collected at the site contained concentrations of lead that exceeded the RSL and the calculated background concentration.

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7 laboratory. Wipe samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Concentrations of lead in dust from the wipe samples ranged from non-detected (U-qualified) to 0.188 micrograms per squared centimeters ($\mu g/cm^2$) at the properties sampled at the Potosi Site. Composite vacuum samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in indoor dust from vacuum samples at all properties sampled within the Potosi Site. Concentrations of lead in dust from the vacuum samples ranged from 13.2 to 581 mg/kg.

Paint surfaces were evaluated during the 2008 RI/FS field investigation at nine locations at the Potosi Site where residential soil was collected to determine if painted surfaces could be the source of the lead in indoor dust. Lead concentrations were obtained from painted walls, ceilings, columns, windows, and cabinets which consisted of wood, drywall, plaster, and concrete located in various interior and exterior living spaces. Positive XRF readings were obtained at five properties and ranged from 1.66 to 5.25 milligrams per square centimeter (mg/cm^2).

Groundwater was collected at the Potosi Site during the 2008 RI/FS field investigation and during previous investigations. During the 2008 RIFS field investigation, potable (residential) groundwater was collected from the tap at 10 residences and analyzed for lead. In addition, area-wide residential groundwater samples were collected at 1,097 properties during previous investigations from 2005 through 2008 and analyzed for lead, arsenic, barium, and cadmium. Two properties were identified during the 2008 RI field investigation and 178 properties were identified during previous investigations that contained concentrations of lead in groundwater that exceeded the

MCL of 15 micrograms per liter (µg/L). For arsenic, barium, and cadmium, the MCL was exceeded at one property for arsenic, six properties for barium, and five properties for cadmium.

Surface water was collected at the Potosi Site during the 2008 ERA field investigation and analyzed for TAL metals. The samples were collected in Mill Creek and its tributaries. The ERA evaluation identified barium, lead, and silver as constituents that contained concentrations exceeding the NAWQC for surface water.

Sediment was collected at the Potosi Site during the 2008 ERA field investigation and analyzed for Target Analyte List (TAL) metals. The samples were collected in Mill Creek and its tributaries. The ERA evaluation identified barium, cadmium, lead, and zinc as constituents that contained concentrations exceeding the Sediment Quality Guidelines (SQGs) for sediment.

Richwoods Site

Several media were evaluated at the Richwoods Site during previous investigations and the 2008 RI/FS field investigation including residential soil, source/mine waste (soil), groundwater, indoor dust, paint surfaces, surface water, and sediment.

Residential soil was collected at the Richwoods Site during the 2008 RI/FS field investigation and during previous investigations. Based on the findings of this RI, the majority of the residential properties sampled during previous investigations and the 2008 RI/FS investigation contain concentrations of lead in soil that exceed the RSL and the calculated background concentration for lead in residential soil at the Richwoods Site. In general, lead contamination is wide-spread in residential soil at the Richwoods Site. Residential soil samples collected during previous investigations contained concentrations of barium and cadmium that were within action levels; however, arsenic concentrations exceeded the RSL in the majority of residential soil samples collected.

Non-residential, mine waste (soil) was collected at the Richwoods Site during previous investigations and analyzed for lead. The majority of these samples contained concentrations of lead that exceeded the RSL and the calculated background concentration.

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7 laboratory. Wipe samples were collected from the living room, dining room, bedroom, and/or kitchen floors. Concentrations of lead in dust from the wipe samples ranged from non-detected (U-qualified) to 0.163 µg/cm^2 at the properties sampled at the Richwoods Site. Composite vacuum samples were collected

from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in 4 out of 5 indoor dust vacuum samples at properties sampled within the Richwoods Site ranging from 24.8 to 419 mg/kg.

Paint surfaces were evaluated during the 2008 RI/FS field investigation at three locations at the Richwoods Site where residential soil was collected to determine if painted surfaces could be the source of the lead in indoor dust. XRF readings were taken on painted walls, ceilings, columns, windows, and cabinets which consisted of wood, drywall, plaster, and concrete located in various interior and exterior living spaces. Lead in paint was detected at each property and ranged from 1.27 to 4.05 mg/cm^2.

During previous site investigtations, potable (residential) groundwater was collected from 398 residences and analyzed for lead, arsenic, barium, and cadmium. A total of 68 properties have been identified to contain concentrations of lead in groundwater that exceed the MCL of 15 µg/L. The MCL was exceeded at two properties for barium and five properties for cadmium. Arsenic was not detected at concentrations greater than the MCL.

Surface water was collected at the Richwoods Site during previous investigations and analyzed for lead. The samples were collected at 12 locations in streams, tributaries, and tailings ponds throughout the Richwoods Site. Four surface water locations contained concentrations of lead that exceeded the NAWQC.

Sediment was collected at the Richwoods Site during previous investigations and analyzed for lead. The samples were collected in streams, tributaries, and tailings ponds throughout the Richwoods Site. Twelve sediment locations contained concentrations of lead that exceeded SQGs.

Old Mines Site

Several media were evaluated at the Old Mines Site during previous investigations and the 2008 RI/FS field investigation including residential soil, source/mine waste (soil), groundwater, indoor dust, surface water, and sediment.

Results from residential soil sampling at the Old Mines indicate that the majority of the residential properties contain concentrations of lead that exceed the RSL and the calculated background concentration for lead in residential soil. In general, lead contamination is wide-spread in residential soil at the Old Mines Site. The 2008 RI/FS field investigation identified nine properties with concentrations of lead in residential soil that exceeded the EPA Region 7 Time Critical Removal Action Level of 1,200 mg/kg. Residential soil samples collected during previous investigations contained concentrations of barium and cadmium that were within action levels; however, arsenic

concentrations exceeded the RSL in the majority of the residential soil samples collected.

Non-residential, mine waste (soil) was collected at the Old Mines Site during previous investigations and analyzed for lead. The majority of the mine waste samples collected at the site contained concentrations of lead that exceeded the RSL and the calculated background concentration

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7 laboratory. Wipe samples were collected from the living room, dining room, bedroom, and/or kitchen floors. Concentrations of lead in dust from the wipe samples ranged from non-detected (U-qualified) to 0.780 $\mu g/cm^2$ at the properties sampled at the Old Mines Site. Composite vacuum samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in indoor dust vacuum samples at all properties sampled within the Old Mines Site. Detected concentrations of lead in dust from the vacuum samples ranged from 9.7 to 356 mg/kg.

Residential groundwater samples were collected at 1,098 properties during previous investigations from 2005 through 2008 and analyzed for lead, arsenic, barium, and cadmium. One property was identified during the 2008 RI field investigation and 179 properties contained concentrations of lead in groundwater that exceeded the MCL of 15 µg/L. The MCL was exceeded at one property for arsenic, six properties for barium, and 5 properties for cadmium.

Surface water was collected at the Old Mines Site during previous investigations, and analyzed for lead. The samples were collected at 20 locations in streams, tributaries, and tailings ponds throughout the Old Mines Site. Seven surface water locations contained concentrations of lead that exceeded the NAWQC.

Sediment was collected at the Old Mines Site during previous investigations and analyzed for lead. The samples were collected at 21 locations in streams, tributaries, and tailings ponds throughout the Old Mines Site. All 21 sediment locations contained concentrations of lead that exceeded SQGs.

Contaminant Fate and Transport

The contaminant fate and transport section addresses the mechanisms by which contaminants are released from these sources and the pathways the contaminants may take from sources to human and ecological receptors.

A conceptual site model (CSM) is used to convey the sources of contamination, mechanisms of contaminant release, pathways of release and transport, and the ways in which human and ecological receptors are exposed to contaminants. It presents the physical, chemical, and biological relationships between sources and affected resources.

The primary sources of contamination at the WCLD Site are the mine waste areas in the vicinity of the Potosi, Richwoods, and Old Mines Sites. The principal contaminants associated with the WCLD Sites are metals with lead being the primary contaminant. Elevated concentrations of certain metals, including barium, cadmium, and lead were detected in a surface soil samples at source/waste areas. Barium and lead were detected at elevated concentrations in groundwater and barium, cadmium, copper, lead, selenium, and zinc were detected in sediment and ecological soil samples collected from streams and local tributaries.

The primary sources of contamination at the WCLD Sites is the mining wastes associated with the historical lead mining and smelting that was prevalent throughout the 1800s and early 1900s, and the mine waste deposits generated from barite mining during the 1900s. The source areas associated with some of the more recent barite mining are uncapped piles with often sparse vegetative cover, tailings ponds, mined pits, and tiff cuts. The source materials primarily consist of the following two types of material depending on the mining process used:

- Tailings - sand and silt sized particles produced by froth flotation which were slurried to diked impoundments and deposited across stream valleys.
- Chat – sand and gravel sized particles produced by a dry process called gravity separation.

The source areas associated with historical lead mining at the sites are suspected to be widespread based on limited records and the nature of the surface mining and smelting of lead ores during the 1800s. The lead deposits were typically located at or near the ground surface. Lead mining spoils or diggings were left on the ground surface. Early smelters were inefficient and generated highly, lead-contaminated wastes that were also discarded on the ground surface. Due to the passage of time and the limited record keeping, the identification of lead mining wastes is somewhat subjective and left to field judgment."

Based on the nature of the contamination and the physical characteristics of the Sites, potential routes of contaminant migration likely include several different routes such as mechanical distribution of mine waste, soil/mine waste to air migration, soil/mine waste to surface water/sediment migration, soil/mine waste to groundwater migration, groundwater to surface water migration, and biological/food chain migration.

Contaminants present at the WCLD Site may migrate away from source areas and affect environmental media downwind or downstream. Some contaminants are expected to remain persistent in site media while others may degrade over time. The metals

detected in concentrations above conservative screening values include arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, and zinc.

Numerous physical and chemical factors interact to control the fate and transport of contaminants in the environment. Changes in intensive chemical parameters such as oxidation state and pH (among others) affect the chemistry of the environmental system including mineral stability, metal speciation, phase solubility, reaction kinetics, and soil-water partition coefficients. These, in turn, affect adsorptive properties, mineral precipitation and dissolution, and other factors that control bioavailability and potential for uptake. Clearly, the fate and transport of contaminants in soil, sediment, and water is highly complex and cannot be reasonably estimated in a general evaluation.

Sampling and analysis conducted at the WCLD Sites indicate that remnant mine wastes are the primary contaminant source in this area. Barite mining tailings areas represent a large volume of fine-grained material, most of which is barren and unvegetated. Undisturbed lead mining wastes appear to typically be small mounds of rocky, brown to red silty clays sometimes found adjacent to shallow excavation pits. Historical mining records together with field observations topographic features and surface soil strata indicate that the early lead and barite surface mining was widespread and that subsequent residential development has occurred on top of the mined areas.

Several mechanisms are capable of transporting contaminants from the sources at the sites. Examples include wind dispersal of fine tailings, water erosion and transport of tailings and contaminated soil, mass wasting of tailings, surface water runoff to streams, and subsurface flow of groundwater.

Human Health Risk Assessment

A Human Heath Risk Assessment (HHRA) was conducted for the WCLD Sites to assess the potential current and future risks to humans from site-related contaminants present in environmental media, including surface soil, indoor dust, sediment, surface water, groundwater, and fish tissue. Since OU1 is limited to residential soils at the Washington County Lead District Site, the focus of this HHRA is on residential soils. The HHRA assumes that no steps are taken to remediate the environment or to reduce human contact with contaminated environmental media. The results of the HHRA are intended to help inform risk managers and the public about potential human risks attributable to site-related contaminants and to help determine if there is a need for remedial action at the site.

There are four steps in the baseline risk assessment process: data collection and evaluation; exposure assessment; toxicity assessment; and risk characterization. Each of

these steps is summarized below, along with how they were conducted for the WCLD Sites.

Step 1: Data collection and evaluation involves gathering and analyzing the site data relevant to the human health evaluation, as well as identifying the contaminants present at the site that are the focus of the risk assessment process.

Based on the environmental sampling results, the risk assessment identified the following metals as Contaminants of Potential Concerns (COPCs) in one or more environmental media: aluminum, antimony, arsenic, barium, cadmium, cobalt, iron, lead, manganese, vanadium, and zinc. COPCs are chemicals which exist in the environment at concentration levels that might be of potential health concern to humans and which are or might be derived, at least in part, from site-related sources. While numerous metals were identified as COPCs, lead is the most prevalent contaminant of health concern at the site. All COPCs were quantitatively evaluated to determine their potential impacts on human health.

Step 2: The exposure assessment is conducted to estimate the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed.

The human populations most likely to be exposed to site-related chemicals include child and adult residents, industrial/commercial workers, construction workers, and child and adult recreational visitors that may utilize mine/tailing areas for activities such as ATV riding, as well as streams and ponds for activities such as fishing, swimming, wading, picnicking, and/or hiking.

For every exposure pathway of potential concern, it is expected that there will be differences between different individuals in the level of exposure at a specific location due to differences in intake rates, body weights, exposure frequencies, and exposure durations. Thus, there is normally a wide range of average daily intakes between different members of an exposed population. Because of this, all daily intake calculations must specify what part of the range of doses is being estimated. Typically, attention is focused on intakes that are "average" or are otherwise near the central portion of the range, and on intakes that are near the upper end of the range (e.g., the 95th percentile). These two exposure estimates are referred to as Central Tendency Exposure (CTE) and Reasonable Maximum Exposure (RME), respectively.

Step 3: A toxicity assessment identifies the types of adverse health effects associated with exposure to a contaminant and how the appearance of these adverse health effects is related to the exposure level. Human health risk assessments typically characterize potential non-cancer and cancer health effects separately. They are evaluated separately because for non-cancer health effects it is assumed there is a level or

"threshold" which will not result in adverse health effects, while for cancer effects it is typically assumed that exposure to any level will increase the risk or probability of developing cancer (i.e., no threshold exists).

Step 4: Risk characterization integrates the exposure and toxicity assessments to quantify the risks or potential for adverse non-cancer and cancer health effects. This final step also discusses the uncertainties of each step of the risk assessment and their impact on the risk estimates.

For most chemicals, the potential for non-cancer effects is evaluated by comparing the estimated daily intake of the contaminant over a specific time period with a level not associated with adverse health effects for that contaminant. This comparison results in a non-cancer Hazard Quotient (HQ) for the contaminant, while a Hazard Index (HI) is calculated when an individual is exposed to more than one chemical or exposure pathway, such as eating and breathing a contaminant. If the HQ or HI for a contaminant(s) is equal to or less than one, it is believed that there is no appreciable risk that non-cancer health effects will occur. If an HQ exceeds one, there is some possibility that non-cancer effects may occur and a level of concern has been exceeded, although the probability of adverse health effects is unknown.

For contaminants that EPA considers potentially carcinogenic in humans, the risk assessment estimates the risk or probability that an individual will develop cancer over a lifetime as a result of exposure to site-related contaminants. For example, the cancer risk is expressed as a probability of 1 in 10,000 in an individual or for every 10,000 people exposed to the contaminant, one extra or excess cancer case may occur beyond what would normally be expected from all other causes of cancer. The cancer risks are summed across all chemicals of concern and all exposure pathways that contribute to exposure of an individual in a given population. In general, EPA considers excess cancer risks that are below 1 in 1,000,000 or 1E-06 to be so small as to be negligible, and risks above 1 in 10,000 or 1E-04 to be sufficiently large that some sort of remediation is desirable. Excess cancer risks that range between 1 in 10,000 and 1 in 1,000,000 are generally considered to be acceptable, although this is evaluated on a case by case basis.

The risks or potential for adverse health effects for lead are evaluated using a different approach than for most other metals. Because lead is widespread in the environment, exposure can occur by many different pathways. Thus, lead risks are based on consideration of total exposure (all pathways) rather than just site-related exposure. In addition, because most studies of lead exposures and resultant health effects in humans have traditionally been described in terms of blood lead level (PbB, expressed in units of micrograms per deciliter or μg/dL), lead exposures and risks are typically assessed using mathematical models.

The Risk Assessment for the WCLD Sites used EPA's Integrated Exposure Uptake Biokinetic Model for Lead in Children to estimate the distribution of blood lead levels in a population of children exposed to lead at the sites. EPA has established a health protection goal that there be no more than a 5% chance that an exposed individual (a child less than 7 years of age) will have a blood lead level that exceeds 10 μg/dL. For convenience, this probability is referred to as P10.

Lead and cobalt were identified as chemicals of concern (COCs) for current and future residential exposures to the residential properties evaluated. Lead was identified as a COC for soil and groundwater at 32 of the 48 residential properties that were evaluated. Cobalt was identified as a COC for non-cancer potential effects associated with concentrations in soil at 1 of the 48 residential properties evaluated.

Ecological Risk Assessment

A SLERA was conducted by EPA in early 2008 which addressed the degree to which the environments and ecological receptors associated with the WCLD Site are potentially at risk (EPA, 2008c). The SLERA used data from the preliminary site assessment to screen COPECs, as well as to develop the screening level problem formulation for the site. Despite the site-specificity of the initial evaluation, many estimates and assumptions were required to fill gaps in needed knowledge and data to complete the evaluation of potential risk. The ERA was intended to fill data gaps from the SLERA. The ERA was conducted at the Potosi Site (only) and additional ERAs for the Richwoods and Old Mines Sites are forthcoming.

The ERA Problem Formulation established the goals, breadth, and focus of the ecological risk assessment. Problem formulation involves the identification of ecological chemicals of potential concern, and it establishes the assessment endpoints or specific ecological values to be protected. The ERA for WCLD Site – Potosi Site identified the following assessment endpoints:

- Assessment Endpoint 1 – Protection of Terrestrial Plant Community
- Assessment Endpoint 2 – Protection of Terrestrial Soil Invertebrate Community
- Assessment Endpoint 3 – Protection of Herbivore Community
- Assessment Endpoint 4 – Protection of Terrestrial Ground-Feeding Insectivore Community
- Assessment Endpoint 5 –Protection of Terrestrial Carnivore Community
- Assessment Endpoint 6 – Protection of Benthic Invertebrate Community
- Assessment Endpoint 7 – Protection of Piscivore Community

- Assessment Endpoint 8 – Protection of Aerial-Feeding Insectivore Community

The ERA field investigation was conducted by EPA and included an assessment of soil, surface water, sediment, and biota. Surface soil samples were collected throughout the Potosi site during the ERA, with emphasis on areas in which sensitive wildlife of concern (e.g., ground-feeding insectivores) would most likely forage, such as the forested edges of clearings and forested riparian areas (EPA, 2008d). Surface water and sediment were collected from Mill Creek and its tributaries to fill data gaps from the SLERA. Terrestrial (vegetation) biota samples were co-located with the soil locations and earthworm abundance was also surveyed at each soil sampling location. A macroinvertebrate survey was performed at six locations corresponding to the sediment and surface water sampling locations on Mill Creek. Fish samples (whole body) were collected at seven locations on Mill Creek, corresponding to the sediment/surface water sampling locations and the macroinvertebrate surveys. In addition, fish were collected at one location in Pond Creek, as well as in three of the tailings ponds. In addition, three crayfish samples were collected from Mill Creek.

As part of the ERA problem formulation, soil, surface water, and sediment was analyzed and screened for all of the metals on the laboratory's target analyte list as part of the ERA. During the expanded contaminant screen, the Contaminant of Potential Ecological Concerns (COPECs) were also refined in one or more of the following ways:

- Comparison to background,
- Frequency and magnitude of detection, and
- Dietary considerations (essential nutrients).

The expanded contaminant screen concluded that in terrestrial habitats, barium, lead, selenium, and zinc are COPECs for several key receptors (soil invertebrates, plants, birds and mammals). Cadmium and copper are COPECs for ground-feeding insectivorous birds and mammals. In aquatic habitats, barium and vanadium are COPECs for sediment based on a comparison with background concentrations from within the watershed. Cadmium, lead, and zinc are COPECs for sediment because they exceeded the Threshold Effect Concentration (TEC) and a Probable Effect Concentration (PEC) at one or more locations. In surface water, silver is a COPEC because of inadequate detection limits. Barium and lead are COPECs for surface water because they exceeded water quality criteria (EPA, 2008d).

During risk characterization, data on exposure and effects were integrated into a statement about risk to each aquatic assessment endpoint. A weight-of-evidence approach was used to interpret the implications of different studies and tests for each assessment endpoint. Additional measurement endpoints were used as well as more site-specific exposure and toxicity information was used to further characterize risk. The ERA risk characterization provided the following conclusions:

- Lead and selenium present a potential risk to avian herbivores
- Barium, cadmium, lead, selenium and zinc present a potential risk to mammalian insectivores
- Cadmium, copper, lead, selenium, and zinc present a potential risk to avian insectivores
- Lead presents a potential risk to carnivorous birds
- Lead and selenium present a potential risk to carnivorous mammals
- Lead presents a potential risk to avian piscivores
- Barium presents a potential risk to mammalian piscivores
- Barium, cadmium, and lead present a potential risk to aerial-feeding insectivores

Based on the risk characterization, the ERA established recommended clean-up goals for soil and sediment. The cleanup goals constitute a site-specific concentration associated with an unacceptable level of ecological risk and are not intended to be the final cleanup goals for the site. The final cleanup goals are established during the FS process and may be modified by the remedy selection criteria. Clean-up goals for barium, cadmium, lead and zinc were adjusted based on the estimated bioavailability for each metal. The following clean-up goals were developed for soil:

Metal	Barium	Cadmium	Copper	Lead	Selenium	Zinc
Clean-up Goal (mg/kg)	9,889	4.9	141	1,534	10.9	1,576

In general, the ERA concluded that cadmium and selenium concentrations at the Site are the primary risk drivers. The overall risk from these metals is greater due to the fact that these are the most bioconcentrative metals on Site. All of the recommended clean-up goals are well above typical background concentrations in Missouri (EPA, 2008d). The following clean-up goals were developed for sediment:

Metal	Barium	Cadmium	Lead	Zinc
Sediment Clean-up Goal (mg/kg)	3,900	3.2	147	305

The ERA concluded that surface water concentrations of barium are elevated throughout the site; however, there are no federal or state of Missouri water quality criteria for barium. The ERA recommended that the clean-up of barium in the aquatic ecosystem be focused on sediment (EPA, 2008d).

1.0 Introduction

The US Environmental Protection Agency (EPA) Region 7 has initiated a Remedial Investigation (RI) of the Washington County Lead District (WCLD) sites in Washington County, Missouri which is located in the central/southeastern portion of the state. The RI process is the methodology the Superfund program has established for investigating risks posed by uncontrolled hazardous waste sites. Documents presenting this methodology for the RI activities at the WCLD sites include a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP).

Although this report includes information on multiple environmental media sampled throughout the three mining areas, the focus of this RI is on residential soils and groundwater. Operable Unit 1 (OU1) of the Washington County Lead District Site has been established to deal specifically with residential soils in all three mining areas. OU2 has been established to deal specifically with groundwater.

This RI Report presents the results of the RI site characterization efforts conducted by Black & Veatch special Projects corp. (BVSPC) at the WCLD sites. In general, the field investigation conducted by BVSPC under this RI focused on addressing the nature and extent of contamination associated with mining activities in terrestrial (residential) environments; however, previous investigations conducted by EPA and Missouri Department of Natural Resources (MDNR) focused on terrestrial and aquatic environments.

Data from previous investigations conducted by EPA and MDNR are discussed in this RI when applicable (MDNR, 2006; Tetra Tech, 2006a, b, c). This data is provided on CD in Appendix A of this RI.

The WCLD has been divided into three (3) separate sites:

- Potosi Site
- Old Mines Site
- Richwoods Site

The general site location and mine waste areas are presented in Figure 1-1. EPA is evaluating the soil contamination at the Sites under OU1 and the groundwater contamination under OU2. This RI addresses both OU1 and OU2 for the Potosi, Richwoods, and Old Mines sites.

1.1 Site Description

The WCLD sites are located in Washington County, Missouri. There are three contiguous sites identified within the WCLD and the entire area is part of the Old Lead

Belt in Missouri. The Potosi site is the southernmost of the three sites, located in the southeastern portion of Washington County and includes the towns of Potosi, Mineral Point, Springtown, Cadet, Summit, Bates Creek Camp, Happy Hollow, and Shibboleth. The Richwoods site is the northernmost site and includes the town of Richwoods in the northeast corner of Washington County. The Old Mines site is located between Potosi and Richwoods along the eastern edge of the county and includes the town of Old Mines, Cruise Mill, Fertile, Latty, Bliss and Cannon Mines.

1.1.1 Potosi Site

The Potosi site encompasses an area of about 45 square miles in the northern portion of Washington County, Missouri, yet is in the southern section of the area in which extensive amounts of lead and barite mining, milling, and smelting activities were conducted for over 200 years. This site is part of the larger WCLD. It is mostly residential, although a number of commercial businesses are present throughout the site. The Potosi site includes the following towns: Potosi, Mineral Point, Springtown, Cadet, Summit, Bates Creek Camp, Happy Hollow and Shibboleth. Soil and groundwater contamination from arsenic, barium, and lead at the Potosi Site is the result of previous mining activities. The Potosi site study area is presented in Figure 1-2.

1.1.2 Richwoods Site

The Richwoods site encompasses an area of approximately 45 square miles in the northeastern portion of Washington County, Missouri. This site is part of the larger WCLD and consists mostly of residential properties. Commercial and industrial land uses around the Richwoods site include: a body shop, a gas station, motor cross race tracks, and an active landfill. Large tailings piles associated with past mining activities are present and visible on aerial photographs. The Richwoods site study area is presented in Figure 1-3.

1.1.3 Old Mines Site

The Old Mines site includes an area greater than 90 square miles in the northeastern portion of Washington County, Missouri, near the Ozark Mountains in southeastern Missouri. It primarily consists of rural residential properties with a number of commercial businesses along the state highways in the following areas: Old Mines, Bellefontaine, Fertile, Latty, Bliss, Cruise Mill, Cannon Mines, Racola and Mud Town. Remnants of past mining operations are located throughout the site and include strip mines, mineshafts, mine dumps, tailings areas, tailings ponds, and associated dams. The Old Mines site study area is presented in Figure 1-4.

1.2 Site History

The Potosi, Richwoods and Old Mines sites each have a long history of mining activities in the past few hundred years. Potosi was established in the late 1700s and quickly prospered into a mining industry town. Records indicate that 1,426 mines have been identified in Washington County. From 1798 to 1804, Potosi produced the highest amount of lead in the entire Upper Louisiana mines combined. Lead deposits declined toward the end of the American Civil War and lead mining was replaced by the surface mining of barium. Barite was used for rubber, paint, soap, and mechanical products. By 1980, Barite production began to decline in Washington County. Lead has been detected above the EPA's action level of 400 milligrams per kilogram (mg/kg) as well as elevated levels of arsenic and barium.

The Richwoods site consists of known soil and groundwater contamination from common contaminants associated with local historical mining activities. These contaminants of concern (COC) include: arsenic, barium, cadmium, and lead. Lead mining has occurred at the Richwoods area for several hundred years. At first, it was mainly surficial, until the mid 1700s when the mines reached several hundred feet below ground surface. It wasn't until the 1940s that lead reserves were depleted and the mining operations transitioned from lead to entirely Barite. Mining operations at the Richwoods area have been owned and operated by numerous companies, most of which no longer are in existence. All mining operations have ceased and the site is now under federal investigation. Lead has been detected in residential surface soil above the EPA's residential screening level of 400 mg/kg. Other COCs found in the soil are arsenic, barium and cadmium.

The Old Mines site has experienced several hundred years of mining operations and began around the same time as Potosi and Richwoods mining. Water-filled subsistence ponds, impoundments, and remnants of mine waste are present throughout the site along with residences with significantly elevated levels of lead in surface soil. Lead as been detected above the EPA's action level of 15 micrograms per liter (µg/L) in surficial aquifers. Arsenic, barium and cadmium have also been detected in the surface soil at elevated concentrations.

1.3 Previous Investigations

1.3.1 Potosi Site

Between 2004 and 2006, MDNR and EPA completed an initial screening of public lands evaluation, a Pre-Comprehensive Environmental Response and Liability Information System (Pre-CERCLIS) screening assessment, abbreviated Preliminary

Assessment (PA), and combined Site Inspection/Removal Assessment (SI/RA) at the Potosi Area Site.

The Hazard Ranking System (HRS) Documentation Record package was completed for the Potosi Site in September 2007 and the site was proposed for addition to the National Priorities List (NPL). The Site was added to the NPL on March 19, 2008 (EPA, 2008a).

1.3.1.1 Initial Public Property Screening

An initial screening effort was made to identify the potential adverse impacts from historical mining in Washington County by focusing on public properties within the Potosi area. Twenty public properties, mostly schools and public parks, were identified by MDNR and sampled in spring and summer 2004. Composite surface soil samples were collected and analyzed for lead, nickel, and zinc using X-ray fluorescence (XRF) analyzer. Seven locations showed elevated concentrations of lead that exceeded EPA Region 9 Residential Preliminary Remediation Goal (PRG) of 400 mg/kg and three locations had concentrations that exceeded the EPA Region 7 Time Critical Removal action level of 1,200 mg/kg of lead (MDNR, 2006).

1.3.1.2 Pre-CERCLIS Screening Assessment

The results of the public property screening initiated a Pre-CERCLIS site screening assessment at the Potosi site in June 2005. Surface soil and groundwater was collected at residential properties throughout the Potosi site. Analytical results from this investigation documented a release of lead to soil at 291 residential properties (MDNR, 2006). In addition, 37 drinking water wells contained concentrations of lead in groundwater that exceeded the EPA's action level of 15 µg/L. Cadmium was also identified as a COC in groundwater (MDNR, 2006).

1.3.1.3 Abbreviated Preliminary Assessment (PA)

The June 2005 Pre-CERCLIS results were also incorporated into an abbreviated PA which documented the scope and significance of mine waste contamination at the Potosi site and recommended further CERCLA investigation in the form of a Site Inspection/Removal Assessment (SI/RA)(MDNR, 2006).

1.3.1.4 Site Inspection/Removal Assessment

In cooperation with the EPA and as part of a state-wide project to identify all lead and zinc mining, milling, smelting, and processing sites, MDNR conducted an integrated SI/RA at the Potosi site from April – December 2005. The purpose of the SI/RA was to evaluate and categorize the Potosi site based on potential risks to human health and the environment and determine the need for removal action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and if necessary, support the HRS for listing the site on the NPL. During the SI/RA, 241 samples were collected from source areas, 427 samples were collected from residential wells, and 836 soil samples were collected from residential yards (MDNR, 2006). The SI/RA also included the collection of 21 background soil samples.

Source area/mine waste samples were collected from 241 locations which included 198 residential locations and 63 non-residential locations. Samples of soil were analyzed for arsenic, barium, cadmium, and lead using an XRF analyzer. Thirty-one samples were also submitted for MDNR's laboratory for confirmatory analysis. Five samples were sent to the University of Colorado Environmental and Geological Sciences for lead speciation and bioaccessibility analysis. The SI/RA concluded that contaminated soils are widespread in the Potosi Area with arsenic and lead detected at concentrations that were above background levels. The bioaccessibility analysis concluded that over half (average of 53 percent) of the lead present in source areas is readily bioaccessible. The lead speciation analysis indicated that the lead present in source area samples is in the form of galena, or it's weatherized mineral forms and that source area composition is the same as found in residential yards (MDNR, 2006).

Groundwater samples were collected from 427 private wells by MDNR, EPA, or EPA's contractors and submitted for barium, cadmium, and lead analysis, with 27 samples submitted for dissolved lead analysis. The SI/RA concluded that of the 427 private wells, 92 contained concentrations of contaminants (primarily lead and cadmium) above EPA action levels or the MCL, which is exposing approximately 313 residents to contaminated groundwater (MDNR, 2006).

1.3.1.5 Removal Site Evaluation (RSE)

From late 2005 through February 2006, EPA's contractor (Tetra Tech EM, Inc.) conducted a Removal Site Evaluation (RSE) at the Potosi site. Soil and groundwater samples were collected to further define the extent of metals contamination in surface soils and drinking water at the site. Out of 1,426 residential properties identified within the Potosi site, a total of 554 properties were sampled as part of the RSE and analyzed for

lead in the field using an XRF. MDNR also collected soil samples at 358 properties. Groundwater samples were collected at 399 properties and analyzed for arsenic, cadmium, and lead at an EPA Region 7 laboratory. Thirty-three groundwater samples were analyzed for dissolved metals (Tetra Tech, 2006a).

The RSE concluded that 344 properties (62 percent) contained lead in soil at a concentration below the EPA Region 9 PRG of 400 mg/kg, 1 property contained lead above 400 mg/kg only in the drip zone, 157 residences (28 percent) contained lead between 400 mg/kg and 1,200 mg/kg outside the drip zone, and 52 residences (10 percent) contained lead above 1,200 mg/kg outside the drip zone (Tetra Tech, 2006a).

In groundwater, 60 samples (15 percent) contained concentrations of lead that were above the Maximum Contaminant Level (MCL) of 15 µg/L, with concentrations ranging from 15 to 110 µg/L. Cadmium was detected in three samples at concentrations that exceeded the MCL of 5 µg/L, with results ranging from 5.83 to 8.11 µg/L.

Based on information obtained during the RSE and previous site evaluations, a removal action was initiated at the Potosi site to address contamination (primarily lead) in soil and groundwater that was shown to exceed regulatory action levels.

1.3.1.6 Removal Actions

Through Time-Critical Removal Actions, surface soil has been replaced at over 200 residences and an alternative drinking water source has been provided to 127 residences (EPA, 2008a).

1.3.2 Richwoods Site

Between 2005 and 2006, MDNR and EPA conducted a Pre-CERCLIS screening assessment, PA/SI, and an RSE at the Richwoods site.

The HRS Documentation Record was completed for the Richwoods site by Tetra Tech EM, Inc. in August 2007 and the site was proposed for addition to the NPL on September 19, 2007. The site went final on the NPL on March 19, 2008 (EPA, 2008a).

1.3.2.1 Pre-CERCLIS Screening Assessment and Preliminary Assessment/Site Inspection

In 2005, MDNR and EPA conducted a Pre-CERLIS assessment and PA/SI at the Richwoods site. The Pre-CERCLIS assessment focused on a general, primarily qualitative, assessment of the Richwoods site while the PA/SI evaluated sampling data to assess the impact of contamination on nearby human health and the environment. Soil and groundwater samples were collected and analyzed for lead, arsenic, barium and

cadmium. Soil samples were collected from 141 properties for XRF screening, 86 soil confirmation samples were submitted to the laboratory, and 125 groundwater samples were collected and analyzed. Of the 141 screened properties, 109 properties contained lead concentrations in soil that were below 400 mg/kg and 32 properties were found to contain lead concentrations that ranged from 400 to 1,200 mg/kg. In addition, elevated levels of arsenic, barium, and cadmium were found in soil samples collected throughout the Richwoods site area (Tetra Tech, 2006b).

Groundwater sampling efforts during the Pre-CERLIS Screening and PA/SI showed lead results of up to 64.7 µg/L detected in the groundwater samples, with 21 samples showing concentrations of lead that exceeded the MCL of 15 µg/L.

1.3.2.2 Removal Site Evaluation (RSE)

The RSE was conducted by EPA contractors (Tetra Tech) in the spring of 2006. Soil and groundwater samples were collected to further define the extent of metals contamination at the Richwoods site.

A total of 489 properties have been identified within the Richwoods site. Of these properties, 301 (62 percent) residential yards were sampled during the RSE and analyzed for lead. The results of the RSE showed that 246 properties (82 percent) contained lead in soil at a concentration below 400 mg/kg.; five properties (2 percent) contained lead above 400 mg/kg only in the drip zone; 40 properties (13 percent) contained lead between 400 ppm and 1,200 mg/kg; and 10 properties (3 percent) contained leave above 1,200 mg/kg outside the drip zone (Tetra Tech, 2006b).

Groundwater samples were collected from 268 privately owned drinking water wells and analyzed for lead, arsenic, barium, and cadmium. Thirty-six properties were analyzed for dissolved metals. The samples were collected from taps or spigots near the wellheads and before connection to any home treatment systems wherever possible. The RSE results showed that 53 groundwater samples contained lead at a concentration above the MCL of 15 µg/L. Barium was detected in one sample at a concentration of 3,330 µg/L, exceeding its MCL of 2,000 µg/L. (Tetra Tech, 2006b).

Based on information obtained during the RSE and previous site evaluations, a removal action was recommended at the Richwoods site to address contamination (primarily lead) in soil and groundwater that was shown to exceed regulatory action levels.

1.3.2.3 Removal Actions

Through Time-Critical Removal Actions, surface soil has been replaced at 18 residences and 1 school, and an alternative drinking water source has been provided to 45 residences (EPA, 2008d).

1.3.3 Old Mines Site

Between 2005 and 2006, MDNR and EPA conducted a Pre-CERCLIS screening assessment, PA/SI, and an RSE at the Old Mines Site.

The HRS Documentation Record package was completed for the Old Mines site by Tetra Tech EM, Inc. in September 2007 and the site was proposed for addition to the NPL. The Site was added to the NPL on March 19, 2008 (EPA, 2008a).

1.3.3.1 Pre-CERCLIS Screening Assessment and Preliminary Assessment/Site Inspection

In 2005, MDNR and EPA conducted a Pre-CERLIS assessment and PA/SI at the Old Mines site. The Pre-CERCLIS assessment focused on a general, primarily qualitative, assessment of the Richwoods site while the PA/SI evaluated sampling data to assess the impact of contamination on nearby human health and the environment (Tetra Tech, 2006c).

Soil and groundwater samples were collected and analyzed for lead, arsenic, barium and cadmium. Soil samples were collected from 71 properties for XRF screening. Of the 71 screened properties, 35 properties contained lead concentrations in soil that exceeded 400 mg/kg and 14 properties had concentrations that exceeded 1,200 mg/kg. Two source areas were also sampled and found to have lead contamination in excess of 1,200 mg/kg (Tetra Tech, 2006c).

Sixty-two groundwater samples were collected during the Pre-CERLIS Screening and PA/SI. Lead up to 20.0 µg/L was detected in the groundwater samples, with 3 samples showing concentrations that exceeded the regulatory action level of 15 µg/L. One groundwater sample exceeded the MCL for barium (2,000 µg/L). Cadmium was detected in two samples at concentrations below the MCL and arsenic was not detected in the private well samples (Tetra Tech 2006c).

1.3.3.2 Combined Removal Site Evaluation and Removal Action.

Based on the analytical results of the PA/SI, EPA's contractor (Tetra Tech) performed a combined RSE and Removal Action at the Old Mines site in 2006. Soil, groundwater, sediment and surface water samples were collected to further characterize the

site. In general, the RSE screened 87 properties for lead. Of the 87 screened properties, 14 properties (16 percent) were found to contain soils with lead concentrations greater than 1,200 mg/kg, 41 properties (47 percent) contained soil lead levels between 400 and 1,200 mg/kg, and 26 properties (30 percent) contained soil lead levels below 400 mg/kg (Tetra Tech 2006b).

1.3.3.2 Removal Actions

Through an ongoing Time-Critical Removal Action, surface soil has been replaced at 59 residences and an alternative drinking water source has been provided to 104 residences.

1.3.4 Background Areas

During the 2005 SI/RA for the Potosi site, 21 background surface soils were collected from areas within Washington County where no historical milling, mining, smelting operations, or waste disposal is believed to have occurred. All samples were collected from areas with similar soil types to the study areas and analyzed for lead using an XRF analyzer.

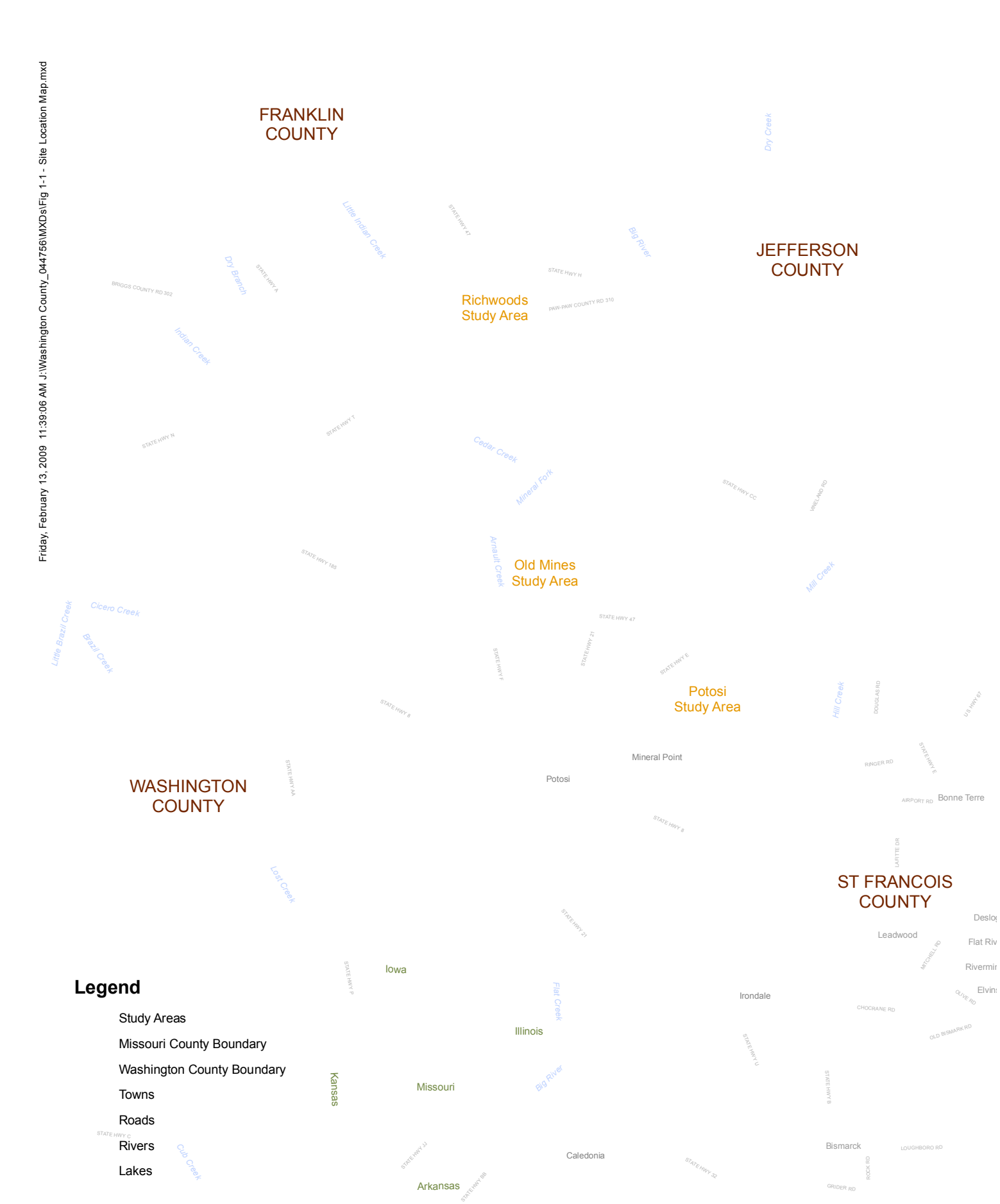
Background sample concentrations in soils were also obtained from the U.S. Geological Survey (USGS) Mineral Resources On-line Database for Washington County, Missouri (USGS, 2009).

The average background concentration established for lead in soil is 165.6 mg/kg.

1.4 Report Organization

This RI Report is organized as follows:

- Section 1.0 – Introduction;
- Section 2.0 – Study Area Investigation;
- Section 3.0 – Physical Characteristics of the Study Area;
- Section 4.0 – Nature and Extent of Contamination;
- Section 5.0 – Contaminant Fate and Transport;
- Section 6.0 – Human Health and Ecological Risk Assessments;
- Section 7.0 – Summary and Conclusions;
- Section 8.0 – References.



Site Location Map
Washington County Lead District
Washington County, MO

Figure 1-1

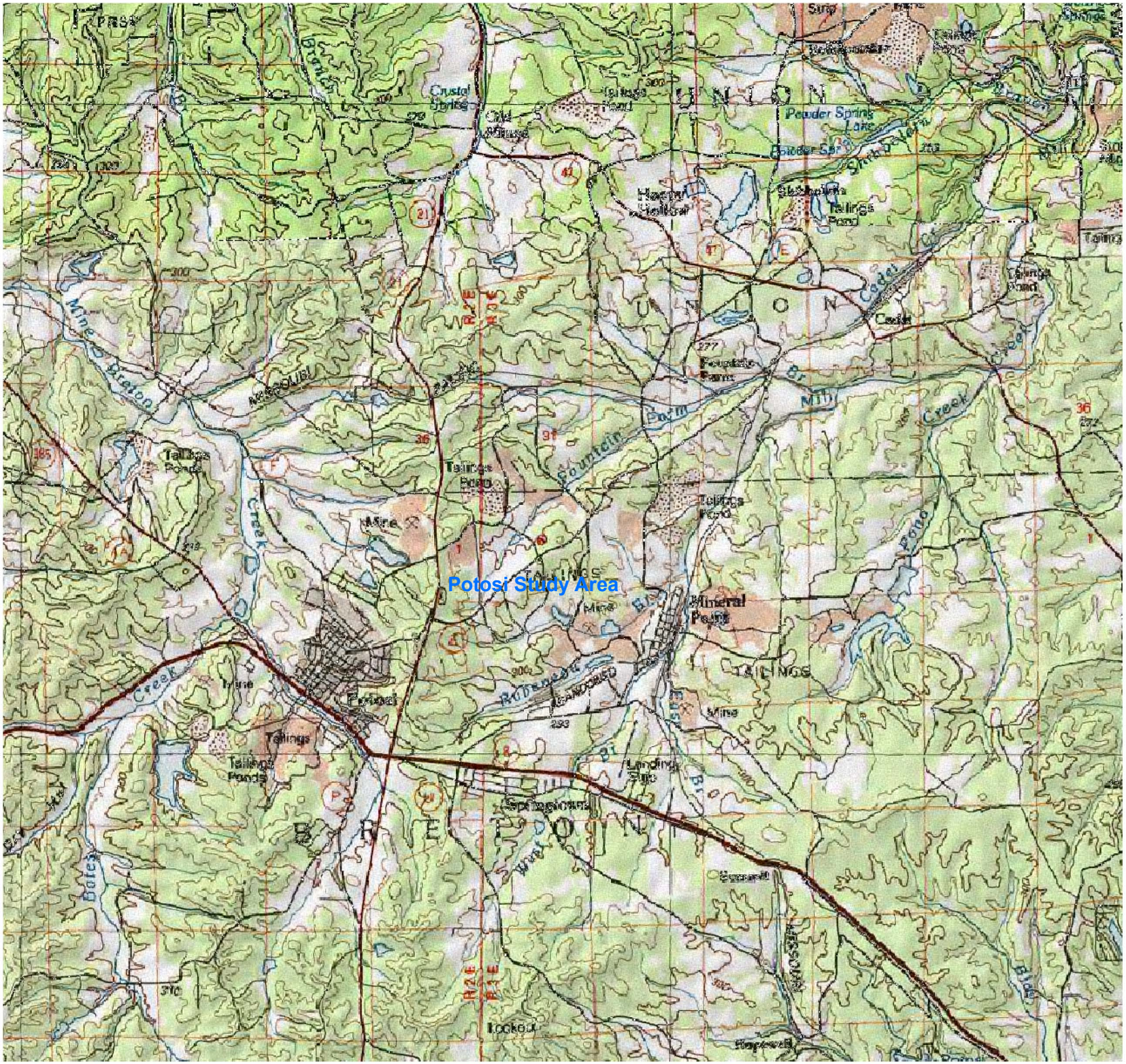


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Figure 1-2
Potosi Site Study Area Map
Washington County Lead District
Washington County, MO

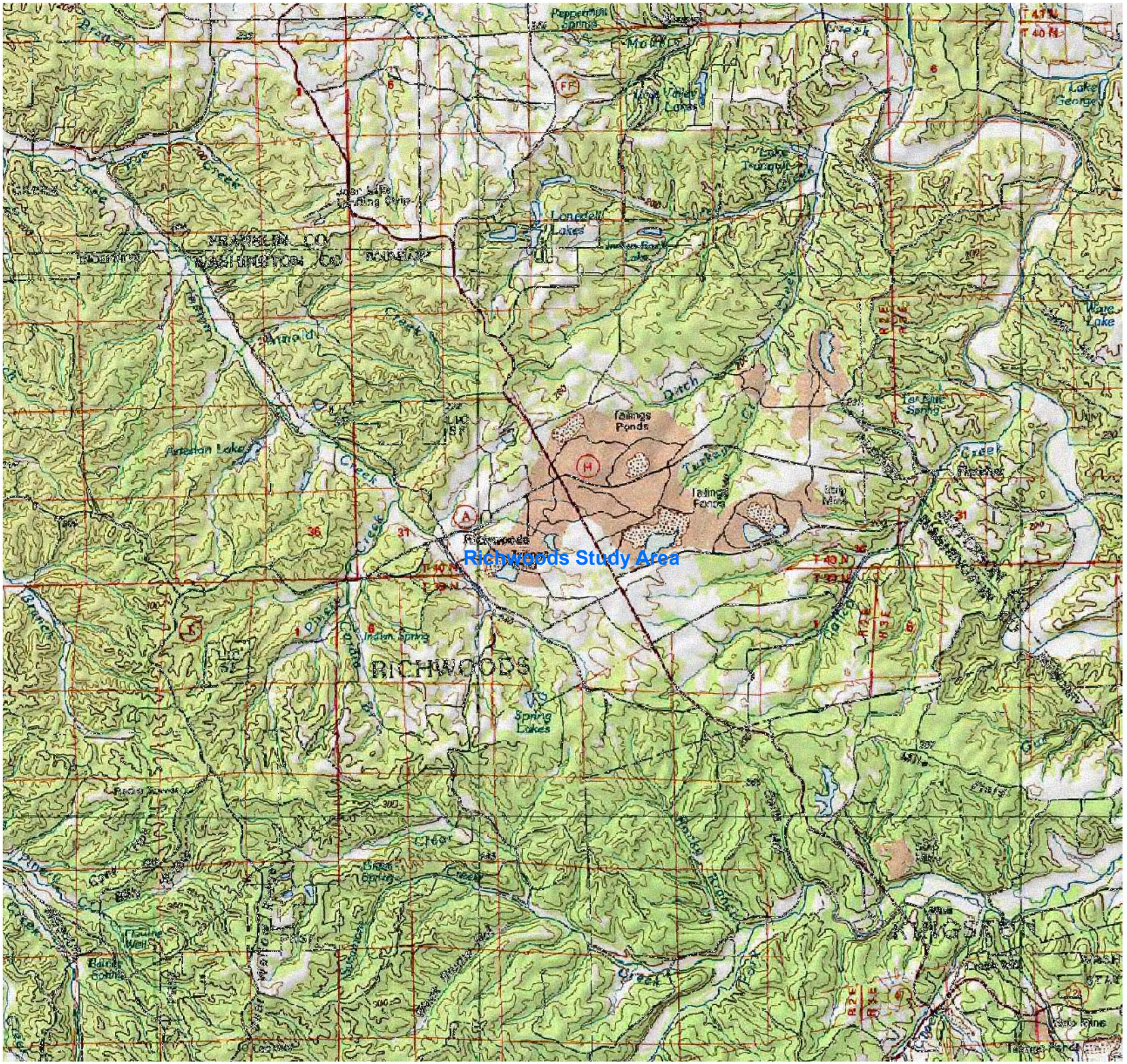

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Figure 1-3
Richwoods Site Study Area Map
Washington County Lead District
Washington County, MO

NAD 1983, UTM, 15N

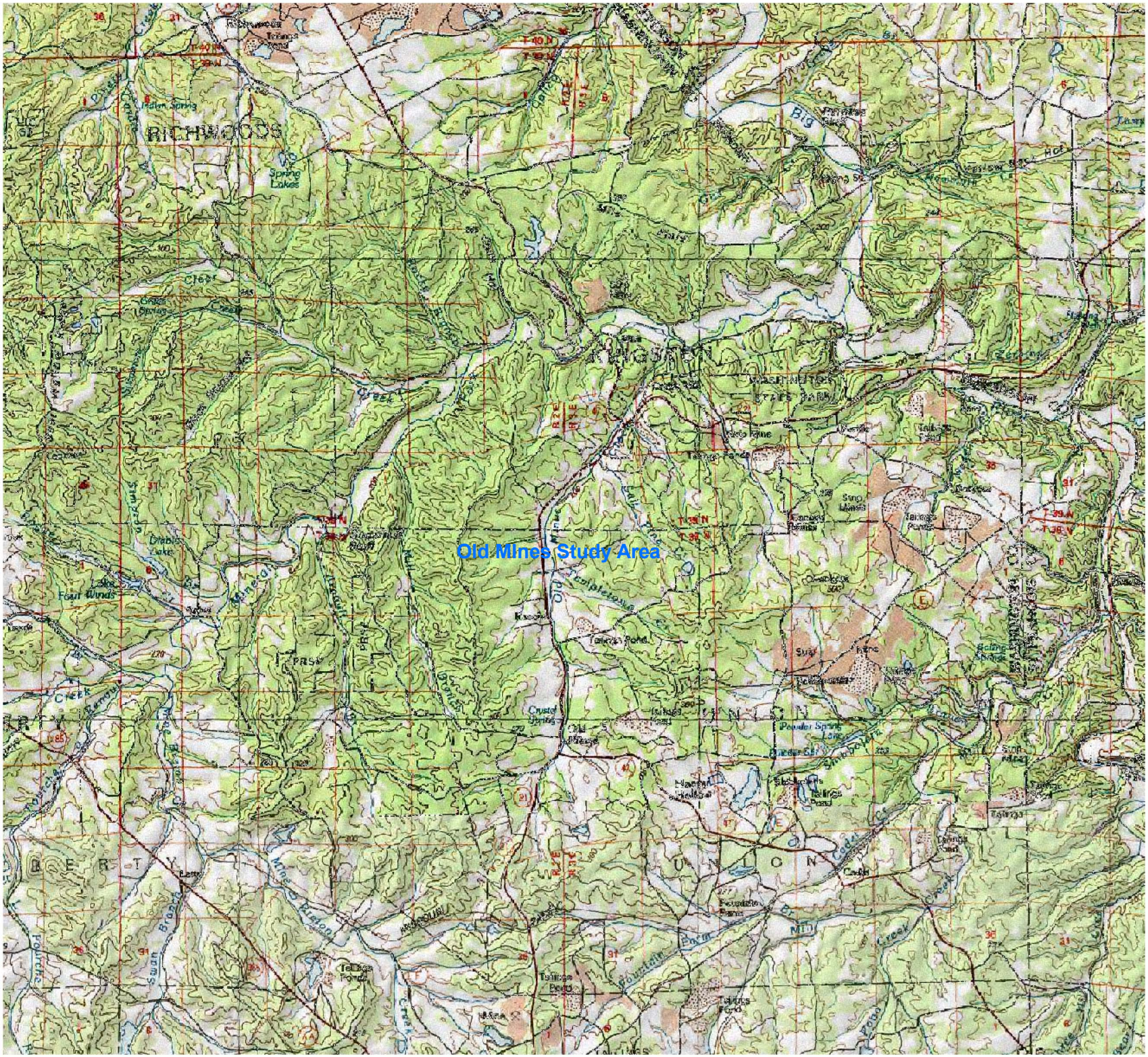

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Figure 1-4
Old Mines Site Study Area Map
Washington County Lead District
Washington County, MO

2.0 Study Area Investigation

Previous investigations were conducted by EPA and MDNR at the Potosi, Richwoods, and Old Mines sites from 2005 through 2007 to characterize the nature and extent of residential soil and groundwater contamination throughout Washington County. Those investigations are discussed in detail in the respective PA/SI and/or RSE reports for each site (MDNR, 2006; Tetra Tech, 2006a, 2006b, 2006c).

This section will focus primarily on the RI/FS field investigation conducted by BVSPC and the Baseline Ecological Risk Assessment (ERA) field investigation conducted by EPA Region 7 Environmental Services Division, both conducted in 2008. Details from previous investigations will be discussed as appropriate for the data in EPA's database for evaluation in this RI and the Baseline Human Health Risk Assessment (HHRA). All BVSPC RI/FS field investigations were conducted pursuant to the approved Sampling and Analysis Plans (BVSPC 2008a; 2008b). The purpose of the field investigation was to conduct a RI/FS at the WCLD sites in order to select remedies for soil and groundwater that will eliminate, reduce, or control risks to human health and the environment. In addition, the data collected was incorporated into a HHRA as part of the RI/FS. The data collected was input into the Integrated Exposure Uptake Biokinetic Model (IEUBK) tool used for predicting risks to children from lead exposure. The IEUBK model incorporates a soil-to-dust transfer factor to describe the potential for lead in soil to be transported indoors and contribute to the concentration of lead in indoor dust. The IEUBK model also utilizes tap water lead concentrations to estimate blood lead levels in children.

The RI/FS investigation focused on lead contamination in soil and groundwater created by the historical mining activities which have taken place in the area. The following sampling activities were conducted by BVSPC during the RI/FS field investigation:

- Collection of surface soil samples at 48 residential properties within the WCLD sites.
- Collection of surface soil samples at 15 locations for in-vitro analysis to determine the bioaccessibility of lead.
- Collection of indoor dust samples with vacuum and wipe techniques at each of the 48 targeted residences within the WCLD sites.
- Collection of indoor tap water (potable residential groundwater) from 20 of the residences that were sampled for indoor dust during this effort.

The ERA field investigation was conducted in December 2008 by EPA and focused only on the Potosi site. Additional ERAs for the Richwoods and Old Mines sites are forthcoming. The purpose of the ERA was to fill data gaps from the Screening-Level Ecological Risk Assessment (SLERA) and to complete the evaluation of potential ecological risk. The following sampling activities were conducted during the EPA ERA field investigation:

- Collection of 11 soil samples throughout the Potosi site, with emphasis on areas in which sensitive wildlife of concern would most likely forage.
- Collection of vegetation samples at each of the 11 soil sampling locations.
- Collection of 21 co-located surface water and sediment samples from Mill Creek and its tributaries.
- Collection of 11 whole body fish samples from Mill Creek, Pond Creek, and tailings ponds.
- Collection of 3 crayfish samples co-located with the fish samples.

Sampling locations, analyses, procedures, and investigation-derived waste management are discussed below with the primary focus on the 2008 BVSPC and EPA ERA field investigations.

2.1 Sample Locations and Analyses

Various sample media that were evaluated for this RI include previous investigations and the 2008 RI sampling. Media evaluated includes residential soil, area-wide (historical) soil, mine waste, ecological soil, indoor dust, groundwater, surface water, sediment, biota, and residential property paint surfaces.

2.1.1 Soil

Soil samples were collected by BVSPC, EPA, and MDNR from residential properties during the RI/FS field investigation, ERA field investigation, and previous investigations. Mine waste samples were collected by EPA during previous investigations and ecological soil samples were collected by EPA for the ERA. The sections below discuss sample locations and analyses for each category of soil samples that were evaluated in this RI.

2.1.1.1 Residential Soil

Residential soil samples were collected by BVSPC at 48 properties during the 2008 RI/FS field investigation as summarized in Table 2-1. A total of 307 soil samples were analyzed in the field and 26 samples were submitted to EPA's Region 7 laboratory

confirmation analysis. The samples that received confirmation analysis are identified in Table 2-1. The locations of the residential soil samples are presented in Figures 2-1, 2-2, and 2-3 for the Potosi, Richwoods, and Old Mines sites, respectively.

Lead was the only constituent analyzed in the field; however, laboratory confirmation samples were analyzed for inorganics including Target Analyte List (TAL) metals.

2.1.1.2 Historical, Area-Wide, Residential Soil

Area-wide residential soil includes historical samples that were collected during previous investigations from 2005 through 2008. A total of 1,746 soil samples were identified in EPA's database for the WCLD sites including 989 soil samples collected from the Potosi site; 191 soil samples collected from the Richwoods site; and 566 soil samples collected from the Old Mines site. Excerpts from the previous investigation reports show the general area-wide coverage of the sample locations as presented in Figures 2-4 and 2-5 for the Potosi and Richwoods sites, respectively (Tetra Tech, 2006a; 2006b). The historical soil samples collected at the Old Mines site are presented in Figure 2-6.

Area-wide residential soil samples were analyzed during previous investigations for lead, arsenic, barium, and cadmium in the field using an XRF analyzer with a percentage analyzed at a laboratory for confirmatory analyses (MDNR, 2006; Tetra Tech, 2006a, 2006b, 2006c).

2.1.1.3 Mine Waste

Mine waste (soil) samples were collected during previous investigations at 260 locations from 2004 through 2005. EPA's database for the WCLD sites identified 215 locations at the Potosi site, 18 locations at the Richwoods site, and 27 locations at the Old Mines site as summarized in Table 2-2. The locations of these samples are presented in Figures 2-7, 2-8, and 2-9 for the Potosi, Richwoods, and Old Mines sites, respectively.

Mine waste soil samples were analyzed for lead in the field using an XRF analyzer.

2.1.1.4 Ecological Soil

Because the soil data from previous site investigation targeted yards of homes and soil samples were only analyzed for arsenic, barium, cadmium and lead, EPA collected an additional 11 soil samples during the 2008 ecological risk assessment conducted throughout the Potosi site (EPA, 2008d). Emphasis was placed on areas in which sensitive wildlife of concern (e.g., ground-feeding insectivores) would most likely

forage, such as the forested edges of clearings and forested riparian areas as summarized in Table 2-3. The location of the ecological surface soil samples is presented in Figure 2-10.

Ecological surface soil samples were analyzed for TAL total metals and physical characteristics including percent moisture, total organic carbon (TOC), and field pH.

2.1.2 Indoor Dust

Residential indoor dust samples were collected by BVSPC at 48 properties during the 2008 RI/FS field investigation as summarized in Tables 2-4 and 2-5. The indoor dust sample locations were co-located with the residential soil samples (discussed above in Section 2.1.1.1) The locations of the indoor dust samples are presented in Figures 2-11, 2-12, and 2-13 for the Potosi, Richwoods, and Old Mines sites, respectively.

The amount of lead in settled dust samples can be expressed as a lead loading or as a lead concentration. Lead loading is the weight of lead per area sampled and the typical units are $\mu g/ft^2$ (EPA, 1995b). Lead concentration is the weight of lead per weight of sample and is typically reported as µg/g (EPA, 1995b). When collecting a wipe dust sample, the results can only be reported in lead loading terms. Vacuum dust collection is able to generate both lead loading and lead concentration results. Both collection methods were used during this investigation.

2.1.3 Groundwater

Groundwater samples were collected by BVSPC, EPA, and MDNR from residential properties during the RI/FS field investigation and previous investigations. Potable groundwater samples (from residential properties) were collected by BVSPC in 2008 and area-wide groundwater was collected by EPA and MDNR from 2005 through 2008. The sections below discuss sample locations and analyses for each category of groundwater samples that were evaluated in this RI.

2.1.3.1 Residential Potable Groundwater

Residential groundwater samples were collected by BVSPC during the 2008 RI/FS field investigation at 21 properties as summarized in Table 2-6. The locations of the potable groundwater samples are presented in Figure 2-14.

Potable groundwater samples were analyzed for TAL metals by the EPA Region 7 laboratory.

2.1.3.2 Historical Area-wide Groundwater

Historical area-wide groundwater samples were collected by EPA and MDNR during previous investigations from 2005 through 2008 (MDNR, 2006; Tetra Tech, 2006a, 2006b, 2006c). A total of 2,603 groundwater samples were identified in EPA's database for the WCLD sites including 1,102 groundwater samples collected from the Potosi site, 395 samples collected from the Richwoods site; and 1,106 samples collected from the Old Mines site. Previous investigation reports show the general area-wide locations of samples as presented in Figures 2-15, 2-16, and 2-16a for the Potosi, Richwoods and Old Mines sites, respectively.

Area-wide groundwater samples were analyzed for total and dissolved lead, arsenic, barium, and cadmium by the EPA Region 7 laboratory (MDNR, 2006; Tetra Tech, 2006a, 2006b, 2006c).

2.1.4 Surface Water and Sediment

Surface water and sediment samples were collected by EPA in 2008 as part of the ecological risk assessment and during previous investigations in 2006. The ecological risk assessment was conducted at the Potosi site and the 2006 previous investigations were conducted at the Richwoods and Old Mines sites. All surface water and sediment samples are summarized in Table 2-7 and the locations are presented in Figure 2-17.

The 2008 ecological risk assessment investigation was conducted by EPA and focused on Mill Creek and its tributaries within the Potosi site. Because Mill Creek originates within the Potosi site, where mining impacts are widespread, two sampling locations on the Big River (upstream of the Leadwood access) were considered background for the Potosi site (EPA, 2008d).

Sediment and surface water collected during previous investigations were collected throughout the Richwoods and Old Mines sites along streams, tributaries, and in tailings ponds.

Surface water samples were filtered in the field and analyzed for TAL dissolved metals, hardness, pH, temperature, and dissolved oxygen. Sediment samples were sieved in the field and analyzed for TAL total metals, TOC, and percent moisture.

2.1.5 Biota

Terrestrial and aquatic biota samples were collected by EPA during the 2008 ecological risk assessment throughout the Potosi site. Vegetation, fish, and crayfish samples were collected as summarized in Table 2-8. A macroinvertebrate survey was also conducted at locations collocated with surface water and sediment (EPA, 2008d).

Vegetation samples were collocated with ecological soil sample locations and analyzed for lead, cadmium, and selenium at the EPA Region 7 laboratory. Vegetation sample locations are presented in Figure 2-18.

Fish and crayfish samples were collocated with the surface water and sediment samples in Mill Creek as presented in Figure 2-19. Small fish were collected for evaluation in the ecological risk assessment and large fish (fillets) were collected for evaluation in the human health risk assessment. All fish and crayfish samples were analyzed for lead, cadmium, and selenium at the EPA Region 7 laboratory. A detailed evaluation of the biota samples and macroinvertebrate survey is provided in the December 2008 ERA for the Potosi site (EPA, 2008d).

2.1.6 Lead In vitro Bioaccessibility

Soil samples were collected by BVSPC at 15 properties where residential soil was collected during the 2008 RI/FS field investigation as summarized in Table 2-9. The general locations of the properties are shown on Figures 2-1, 2-2, and 2-3 for the Potosi, Richwoods, and Old Mines sites, respectively.

Accurate assessment of the human health risks resulting from oral exposure to lead requires knowledge of the amount of lead absorbed from the gastrointestinal tract into the body. This information is especially important for environmental media such as soil or mine waste, because lead in these media may exist in a variety of forms that are absorbed at different levels. One method for obtaining site-specific estimates of relative bioavailability (RBA) of lead in soil is to measure the gastrointestinal absorption in animals dosed with site soils compared to that for a fully soluble form of lead (e.g., lead acetate). However, such tests are costly and take considerable time to perform. An alternative approach to measuring RBA is to measure the *in vitro* bioaccessibility (IVBA) of lead in soil under specific test conditions. The IVBA results for lead are well correlated with the *in vivo* RBA results for lead and can be used to estimate RBA values using the following equation (EPA, 2007b):

$$RBA = 0.878 \times IVBA - 0.028$$

Given this, soil samples were collected from residential properties at the WCLD sites for *in vitro* bioaccessibility analysis.

2.1.7 Paint Surfaces

Paint surfaces were evaluated by BVSPC at 12 locations at the Potosi and Richwoods sites (only) where residential soil was collected as summarized in Table 2-10. The general locations of the properties are shown on Figures 2-1, and 2-2 for the Potosi,

and Richwoods sites, respectively. The purpose was to determine if painted surfaces could be the source of the lead in indoor dust. A Niton XRF analysis was performed on selected painted surfaces and readings were obtained from painted walls, ceilings, columns, windows, and cabinets. The painted surfaces consisted of wood, drywall, plaster, and concrete located in various interior living spaces.

2.2 Sampling Procedures

This section primarily discusses the sampling procedures for the 2008 RI/FS field investigation conducted by BVSPC.

2.2.1 Soil

During the 2008 RI/FS field investigation all soil sampling procedures were based on techniques described in the *Superfund Lead-Contaminated Residential Sites Handbook* (EPA, 2003). Residential surface soil samples were collected after obtaining the property owner's signature on an access form. At each property, up to eight 5-point composite samples were collected: four samples from quadrants (front and back halves of the yard divided into equal areas); one sample from the drip zone; and additional samples from gardens, play areas, and unpaved driveways, if present. Smaller yards or yards with odd geometries were divided into fewer quadrants if necessary. Each soil aliquot was collected from the upper 1-inch soil horizon at randomly selected locations in the quadrant, away from influences of the drip zone. In accordance with the EPA Handbook, a composite drip zone sample was collected from each residence which consisted of a minimum of four aliquots collected between 6 inches and 36 inches from the exterior wall of the house. An aliquot was collected from the midpoint of each side of the house (BVSPC, 2008a).

Area-wide residential soil samples were collected by EPA and MDNR during previous investigations from 2005 through 2008 as summarized and discussed in detail in the respective PA/SI and RSE reports for each site (MDNR, 2006; Tetra Tech, 2006a, 2006b, 2006c).

Mine waste (soil) samples were collected by EPA and MDNR during previous investigations from 2004 through 2005. Ecological soil samples were collected by EPA from the 0- to 12-inch depth interval in accordance with the approved FSP for the ecological risk assessment (EPA, 2008b).

2.2.2 Indoor Dust

Indoor dust samples were collected during the 2008 RI/FS field investigation by wipe and vacuum sampling. Vacuum sampling included carpeted floor and hard surface

floor sampling. In each residence, one composite vacuum dust sample was collected consisting of dust collected from 3 locations in the home. The approximate sample area in each room was 9 square feet.

Since each residence had a different floor plan and furniture arrangement, general sample areas were chosen from the following: entry way, kitchen, family room, and child's room as follows:

1) Entry Way: A portion of the composite vacuum sample was collected from the most frequently used entry way to the residence if no children reside in the home. The sample location was at least one meter away from the door (CS_3, Inc., 1998). If there was an option between a hard floor surface and a carpeted floor surface, the hard floor surface area was chosen over the carpeted surface due to the potential for better sample collection on a hard floor surface.

2) Kitchen: A portion of the composite was a floor sample collected from the kitchen area of the residence. The sample location was based on the floor type(s) in the room. If there was a hard floor surface and a carpeted floor surface in the room, the hard floor surface was sampled. A sample location that was not in the main walking pathway of the room and was also large enough to accommodate the sampling requirements was chosen as the sample location. The sample was collected using the appropriate vacuum method for the floor type.

3) Family Room: A portion of the composite was a floor sample and was collected from the family room area of the residence. The sample location was based on the floor type(s) in the room. If there was a hard floor surface and a carpeted floor surface in the room, the hard floor surface was sampled. A sample location that was not in the main walking pathway of the room and was also large enough to accommodate the sampling requirements was chosen as the sample location. The sample was then collected using the appropriate vacuum method for the floor type.

4) Children's Bedroom: A portion of the composite vacuum sample was collected from the youngest child's bedroom in the residence. The selection of the sample location was based on whether or not a child or children live at the residence. If there was one child living at the residence, their bedroom was selected. If there was more than one child living at the residence, the youngest child's bedroom was selected. If there were no children living at the residence, the entryway was

selected. If a child's room was selected, regardless of floor type, the sample location was chosen based on where the child's play area was located in the room or where they spend the most time on the floor in the room. If an adult bedroom was selected, the sample was collected based on floor type. In the selected bedroom, if there was a hard floor surface and a carpeted floor surface in the room, the hard floor surface was sampled. Once the sample location was determined, the sample was collected using the appropriate vacuum method for the floor type.

Two sampling procedures were used when using a vacuum to collect dust samples. The procedures varied slightly depending on whether a carpeted floor or a bare floor was sampled. All procedures were conducted in accordance with ASTM Standard Practice for Collection of Floor Dust for Chemical Analysis (ASTM, 2005) and approved FSP (BVSPC, 2008a). A High Volume Small Surface Sampler (HVS3) was used to collect samples from both the carpeted and hard surface floor.

Three wipe samples were collected from each residence in this sampling effort. These wipes consisted of three floor wipe samples. Each sample consisted of an individual wipe collected from the room floor. When possible, the floor wipe sample was collected from the same rooms where the vacuum samples were collected. When there were children living at the residence, the floors that are most frequently contacted by the children were sampled. If there were no children living at the residence, the floors that were reported to be most frequently contacted were sampled. The samples were collected using the appropriate wipe method. Whenever possible, dust samples from floors were collected from hard surfaces.

Disposable towels moistened with a wetting agent were used to collect the wipe samples. All wipe sampling was conducted in accordance with EPA's Template Assisted Sampling Procedure (EPA, 1995).

2.2.3 Groundwater

Potable (residential) groundwater was collected from the tap at 20 of the 48 residences where dust/soil sampling was conducted. The sample was collected from the well head or an outside faucet. The water was allowed to purge for at least 5 minutes prior to sample collection. A hose was connected to the faucet and the water is to be purged away from the foundation of the residence or well. The hose was disconnected after the purge period and the sample was collected directly from the faucet.

Area-wide residential groundwater samples were collected by EPA and MDNR during previous investigations from 2005 through 2008. In general the area-wide groundwater was collected in the same fashion as discussed in the paragraph above.

Samples were collected from taps or spigots near the wellhead before any treatment system and purged for at least 5 minutes (MDNR, 2006; Tetra Tech, 2006a, 2006b, 2006c).

2.2.4 Surface Water and Sediment

Surface water and sediment samples collected during the 2008 ecological risk assessment field investigation at the Potosi site were collected by EPA in accordance with the approved Field Sampling Plan (EPA, 2008b). Surface water was filtered in the field and sediment was sieved before placing in the sample containers.

The historical surface water and sediment samples were collected during previous investigations in 2006 at the Richwoods and Old Mines sites.

2.2.5 Biota

Biota samples collected during the 2008 ecological risk assessment field investigation were collected by EPA in accordance with the approved Field Sampling Plan (EPA, 2008b).

2.2.6 Lead In vitro Bioaccessibility

Soil samples were collected from 15 residential properties at the WCLD sites for *in vitro* bioaccessibility analysis. The soil samples were sieved through a No. 60 sieve. The samples were analyzed by XRF using the protocol for residential soil sampling and the values were recorded. Samples were submitted to the EPA Region 7 laboratory for *in vitro* bioaccessibility analysis.

2.2.7 Paint Surfaces

A Niton XRF Analyzer was used to take readings of the lead content of painted surfaces at 12 selected residential properties within the Potosi and Richwoods sites. Sample readings were obtained from painted walls, ceilings, columns, windows, and cabinets. The painted surfaces consisted of wood, drywall, plaster, and concrete located in various interior living spaces.

2.3 Quality Assurance/Quality Control Samples

This section discusses the quality assurance/quality control (QA/QC) samples and procedures that were collected during the 2008 RI/FS field investigation conducted by BVSPC.

2.3.1 Field Blanks

Field blank samples were collected for residential groundwater (tap water) only. These samples were filled with deionized (DI) water and collected at a frequency of 1 in every 10 tap water samples (10%).

2.3.2 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

The purpose of the matrix spike (MS) and matrix spike duplicate (MSD) samples is to evaluate the effect of the sample matrix on the accuracy of the analysis. The EPA Region 7 Laboratory instructed BVSPC that sufficient soil, dust, and water is present in the samples submitted to the laboratory to perform the matrix spike analyses. The number of MS/MSD samples were approximately 5 percent of the total number of primary samples submitted for analysis.

2.3.3 Confirmation Samples

The purposes of confirmation samples are to assess the function of the XRF spectrometer with wet chemistry confirmation analysis. Confirmation samples were collected for residential soil at a rate of approximately 10 percent of the total number of primary samples in accordance with the FSP (BVSPC, 2008a).

2.4 Sample Numbering System

A sample numbering system was used to identify each sample analyzed during the RI/FS field investigation. The purpose of this numbering system is to provide a tracking system for retrieval of information on each sample. The sample identification numbers allocated for all sampling efforts was used on sample labels, chain-of-custody records, field sheets and all other applicable documentation used during the sampling activity. The sample ID consisted of a series of eight alphabetic characters followed by a BVSPC identification number which is unique to each property. The alphabetic characters provided information about each sample in order as follows:

Sample Location

A Front yard sample, the left quadrant (when facing the front of the house) - F1
B Front yard sample, the right quadrant (when facing the front of the house) - F2
C Back yard sample, directly behind F1 – B1
D Back yard sample, directly behind F2 – B2
E Drip zone sample
G Garden area sample
H Home lobby or entryway

I Living area location
J Bedroom location
M Composite vacuum location (entry, kitchen, living area, bedroom)
P Play area sample
R Road/Driveway sample
S Chat pile
T Tailings/Mine waste sample
Z Location type not applicable

Sample matrix

D Dust (Vacuum)
P Potable water
S Soil
T Tailings/Mine waste
W Dust (Wipe)
Z Sample matrix not applicable

Sample derivation

C Composite
G Grab
Z Sample derivation not applicable

Sample quality control status

D Field duplicate (Blank for potable water)
E Equipment rinsate
P Primary
R Re-Sampled yard (Sampled with collection of Dust Samples)
Z Sample quality control status no applicable

Analytical method

L Analyzed by offsite laboratory
X Analyzed by field XRF
Z Analytical method not applicable

Sample interval

A 0-1 inch
B 0-6 inches

C 0-12 inches

Z Sample interval not applicable

Number of XRF readings

(1 – 3, 4 - 6) Number of XRF readings taken to have three sample results within 10%.

Z Number of readings not applicable

The station number at the end of the sample identification number will range from 0 to 10000. Each sampled property will require a unique identification code.

Based upon the preceding, a primary dust wipe sample collected from a residential property, from an entry location with station number 52 would have the following sample ID: HWGPLZZ-52

If the sample was a primary sample, rinsate or MS/MSD sample, no qualifier was designated. Rinsate samples were assigned their own unique identification number but were noted as a rinsate sample on the field sheet and chain of custody record. Field duplicate (blank for tap water) samples were given the same sample identification number as the primary and were qualified FD.

2.5 Documentation

Documentation tools included a field logbook, sample data sheets, sample labels, chain-of-custody forms and seals, and airbills.

2.5.1 Field Logbook

The most important aspect of documentation is thorough, accurate record keeping. All information obtained during the sampling activities was recorded in a bound logbook with consecutively numbered pages. All entries in logbooks and on sample documentation forms were made in waterproof ink. Entries in the logbook include, but are not limited to, the following, as applicable:

- Name and title of author, date and time of entry, and physical/environmental conditions during field activity.
- Purpose of sampling activity.
- Name and address of field contact, names and titles of field crew.
- Pertinent sampling information: collection method, number, volume, description, preservative, time/date collected, and QC lot numbers for bottleware.
- Information concerning sampling changes, scheduling modifications, and change orders.

- Field observations.
- Any field measurements made.
- Information from container labels of reagents used, water used for blanks, etc.
- Sample distribution and transportation (such as the names of the laboratory and approved carrier).
- Activity numbers received from the EPA.
- Chain of custody record numbers received from the EPA.
- Decontamination procedures.
- All documentation concerning derived wastes, such as the following:
  - Contents and approximate volume of waste in each drum.
  - Type and predicted level of contamination.
- Summary of daily tasks (including costs) and scope of work changes required by field conditions.
- Signature of the personnel responsible for observations and the date.

Sampling situations vary widely. No general rules can specify the exact information that must be entered in a logbook for a particular site. However, the logbook must contain sufficient information so that someone can reconstruct the sampling activity without relying on the collector's memory. The logbooks were kept in the field team member's possession or in a secure place during the investigation. Following the investigation, the logbooks became part of the final project file.

2.5.2 Field Data Sheets

Field Data Sheets were used to track access to properties and sample collection. The field team completed a field sheet for each property sampled for soil in accordance with the approved FSP (BVSPC, 2008a). The field sheet incorporated the property access, property information and the sketch of the property. A separate field sheet was used when collecting interior dust samples which included the type of sample collected (wipe, vacuum), area of the home that was sampled (bedroom, floor, window, etc.), type of surface, etc. Field sheets for the 2008 RI/FS field investigations are provided in Appendix B.

2.5.3 Sample Labels

An adhesive sample label was placed on each sample container submitted for chemical analysis. The following information was included on each sample label in accordance with the approved FSP: site name, sample number, name of sampler, sample

collection date and time, analysis requested, and preservatives added (BVSPC, 2008a).

2.5.4 Chain-of-Custody Forms and Custody Seals

A chain-of-custody record was completed for each sample shipment. Standard laboratory chain-of-custody records were used. After completion, the chain-of-custody record was photocopied, enclosed in a sealable plastic bag and secured to the inside of the shipping container lid. The photocopy was retained for reference before receipt of the original form with the laboratory's data deliverable package. Shipping containers were secured and custody seals were placed across the container openings. Custody seals were used to ensure the integrity of the samples should they remain unattended or when they are relinquished to a delivery service until they are opened by the laboratory. The seals were affixed to each shipping container so that it is necessary to break the seals to open the shipping container.

2.5.5 Airbills

An airbill was completed for each different laboratory address to which samples were shipped. A copy of each airbill was maintained by the field personnel and included in the final project file.

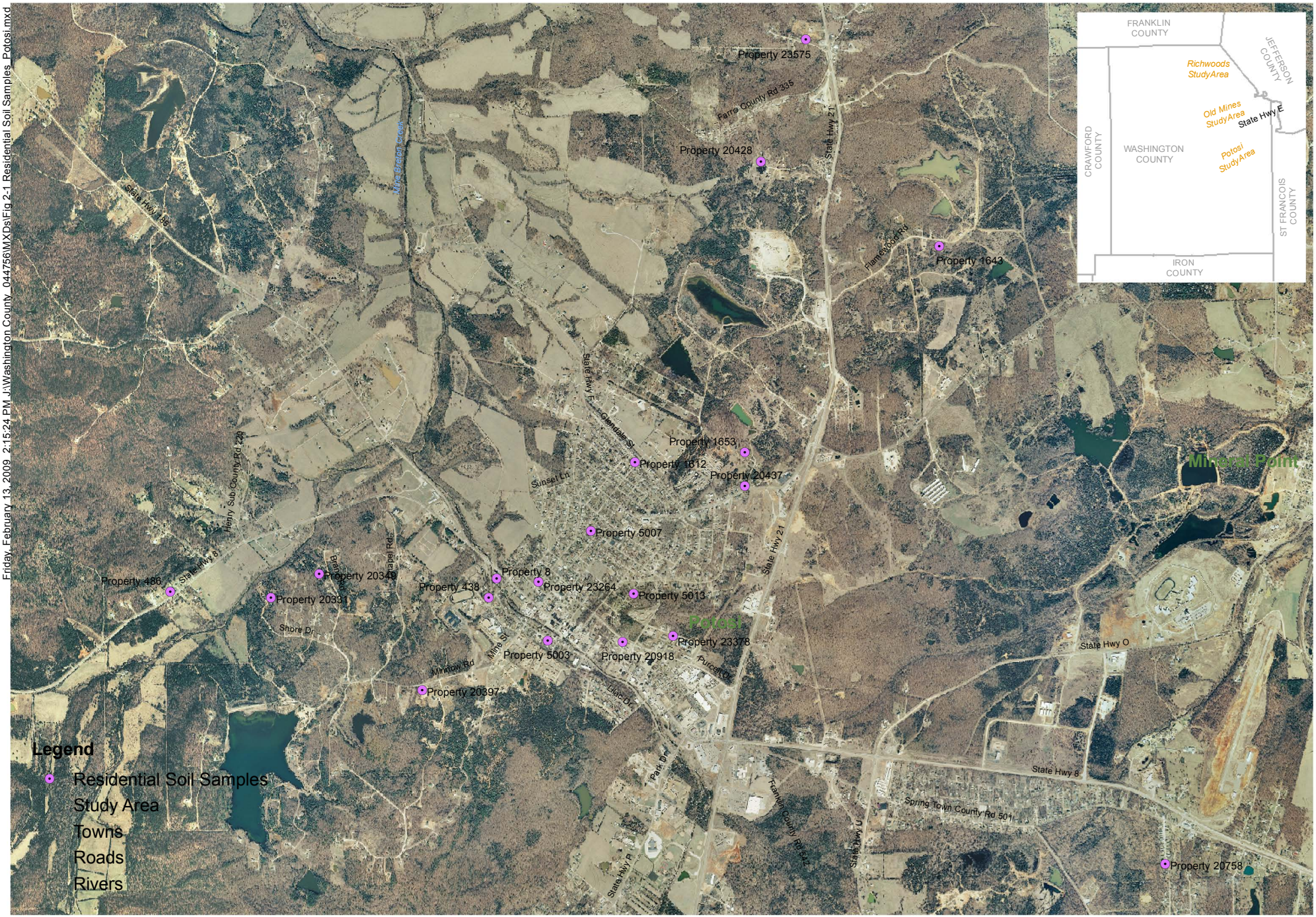
2.6 Decontamination Procedures

Procedures for equipment decontamination were implemented to avoid cross-contamination of samples of various media that were submitted for chemical analysis. Sampling equipment was thoroughly cleaned and decontaminated before initial use and between sample locations. Decontamination of the sampling equipment followed the protocols specified in the approved FSP and HASP (BVSPC, 2008a; 2008c).

2.7 Investigation-Derived Waste Management

This section discusses the investigation-derived waste (IDW) management during the 2008 RI/FS field investigation conducted by BVSPC. The IDW generated at the site included decontamination fluids, soil and personal protective equipment (PPE). All IDW was disposed of in accordance with the approved FSP and Health and Safety Plan (HASP) (BVSPC, 2008a; 2008c).

Liquid IDW consisted of decontamination fluids and was discharged to the sanitary sewer. Disposable PPE and trash was double-bagged in plastic bags and disposed of as municipal solid waste. The unused portions of soil from sampling were separated and disposed of with waste soil generated by site remediation activities.



Friday, February 13, 2009 2:15:24 PM J:\Washington County_044756\MXDs\Fig 2-1 Residential Soil Samples_Potosi.mxd

N

0 0.25 0.5

Miles

NAD 1983, UTM 15N

Residential Soil Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-1

Friday, February 13, 2009, 2:16:23 PM, J:\Washington County_044756\MXDs\Fig 2-2 Residential Soil Samples_Richwoods.mxd

N

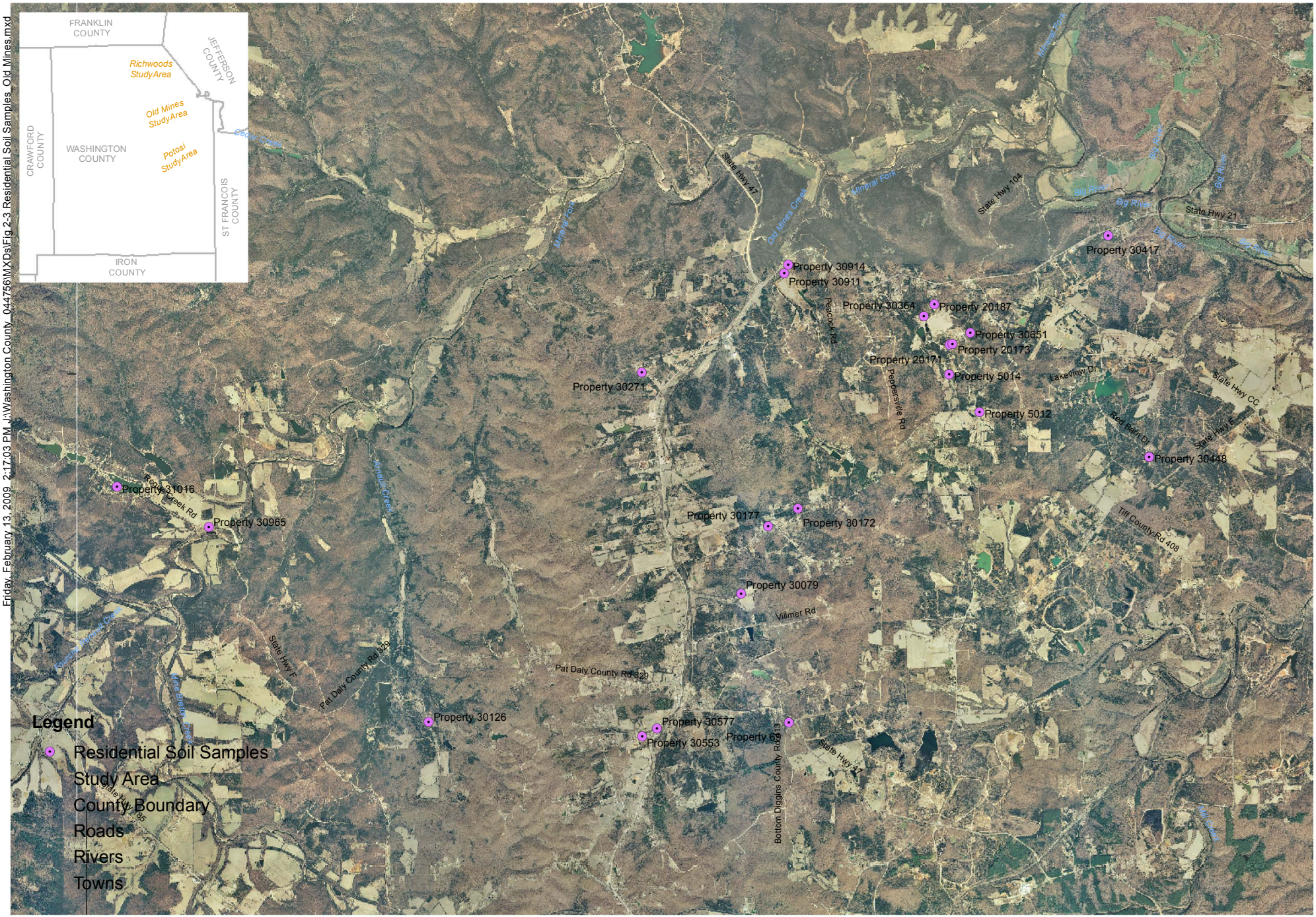
0 0.25 0.5

Miles

NAD 1983, UTM 15N

Residential Soil Sample Location Map
Richwoods Site
Washington County Lead District
Washington County, MO

Figure 2-2



Friday, February 13, 2009 2:17:03 PM J:\Washington County_044756\MXDs\Fig 2-3 Residential Soil Samples_Old Mines.mxd

N

0 1 2

Miles

NAD 1983, UTM 15N

Residential Soil Sample Location Map
Old Mines Site
Washington County Lead District
Washington County, MO

Figure 2-3

Legend

- < 400.00 parts per million (ppm)
- 400.00 - 1199.00 ppm
- > 1,200.00 ppm
- State Highways
- Study Area
- Potosi Area Sampling

Study Area 1
Study Area 2
Study Area 3
Study Area 4
Study Area 5
Study Area 6
Study Area 7
Study Area 8
Study Area 9

Note: Field screening results represent highest average concentration for lead outside of the drip zone at residential properties.

N

0 2,500 5,000

Feet

Source: Washington County, MO DOQ Tileset, 2003 NAIP Imagery

Washington County Lead Site
Washington County, Missouri

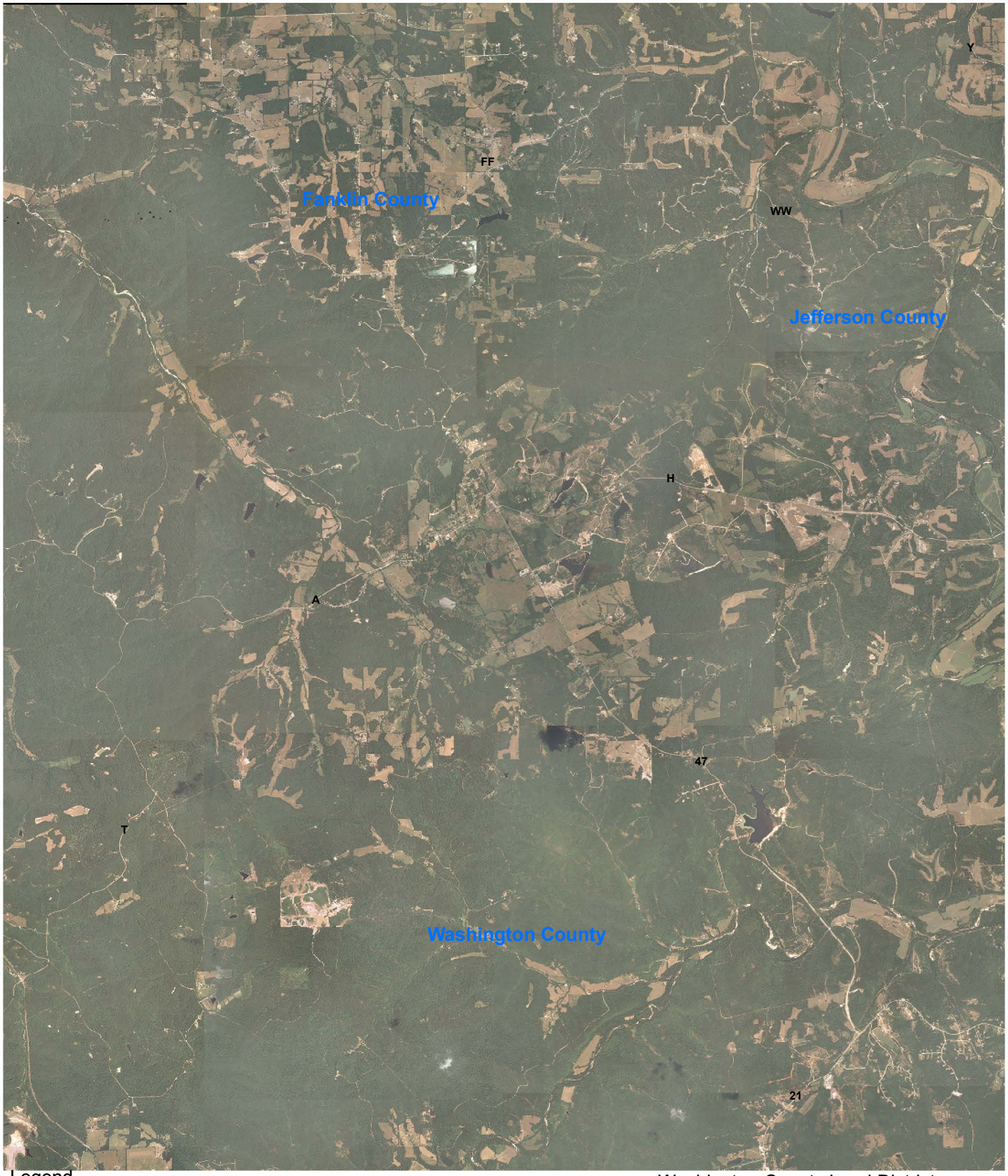
Figure 2-4

Tetra Tech EM Inc.

Date: 03/14/06 Drawn By: Colin Willits Project No: G9011.L.05.0267.00

G:\G9011\0009\2#Projects\031306_Figure4.mxd

Figure 2-4 Historical Area-wide Soil Samples - Potosi



Legend

- Cross-section of Hwy 47 and Hwy A/H
- Historical soil sample location
- State highway
- Richwoods study area
- County boundary

0 0.5 1 2

Miles

Source: Washington County, MO NAIP Aerial Imagery, 2005

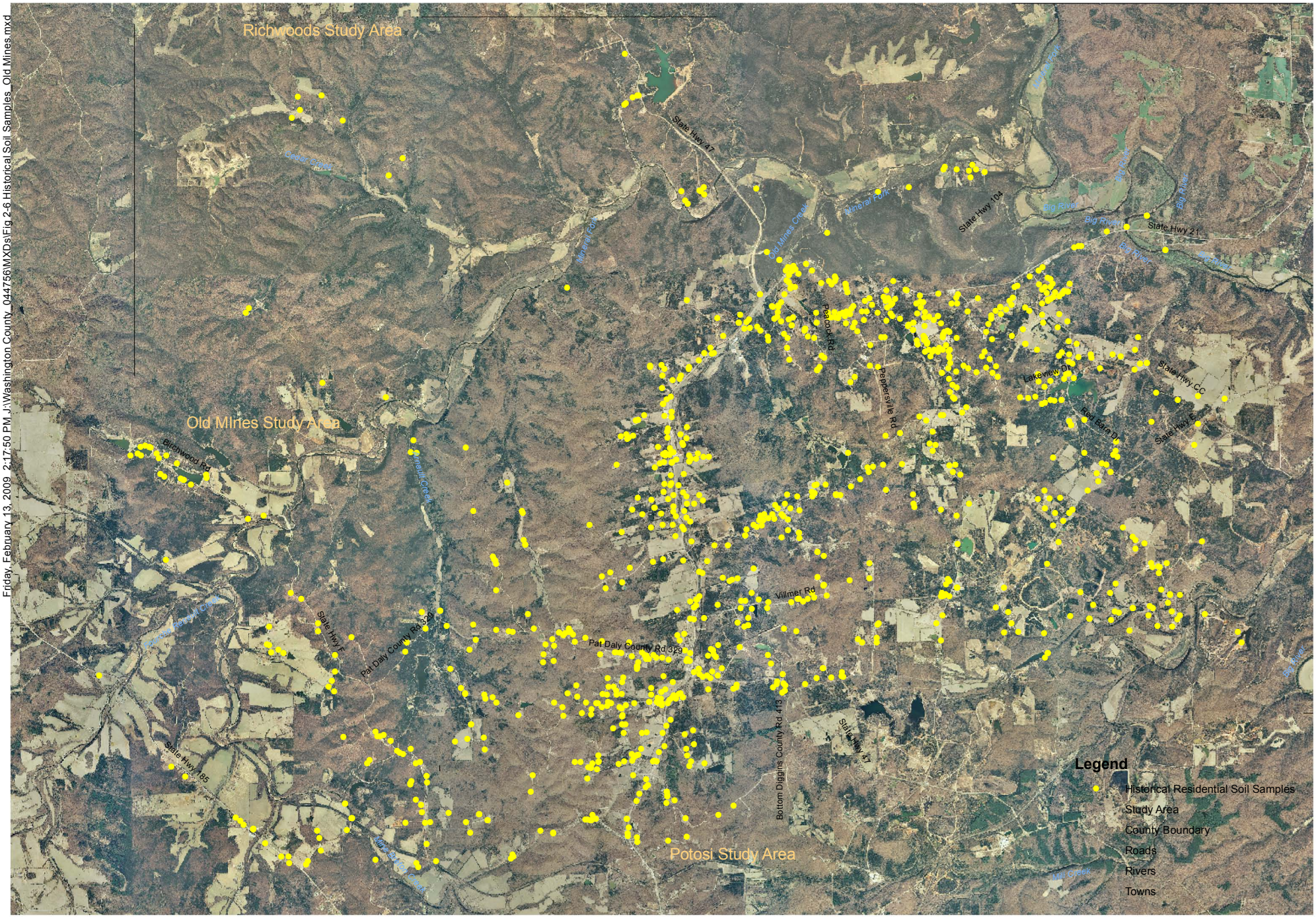
Washington County Lead District
Richwoods Study Area
Washington County, Missouri

Figure 2-5
Historical Soil
Sample Location Map

TETRA TECH EM INC.

Date: 05/29/07 Drawn By: Bill Spiking Project No: I9004.L.06.0027.000

X:\G\9004\0027\HRS\projects\Richwoods_HRS_Final\Figure4.mxd



Friday, February 13, 2009 2:17:50 PM J:\Washington County_044756\MXDs\Fig 2-6 Historical Soil Samples_Old Mines.mxd

N

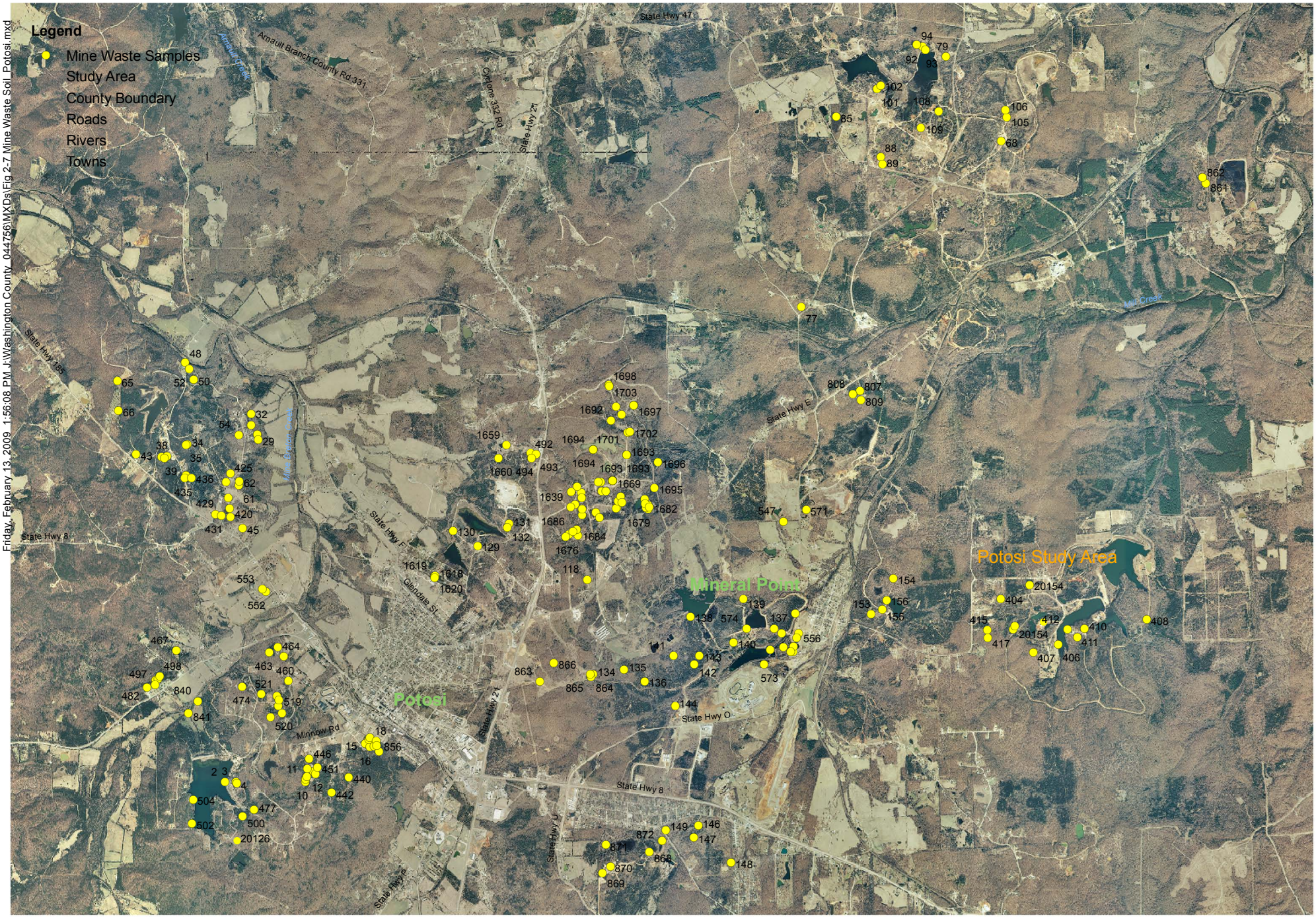
0 1 2

Miles

NAD 1983, UTM 15N

Area-wide Historical Soil Sample Location Map
Old Mines Study Area
Washington County Lead District
Washington County, MO

Figure 2-6



N

0 0.5 1

Miles

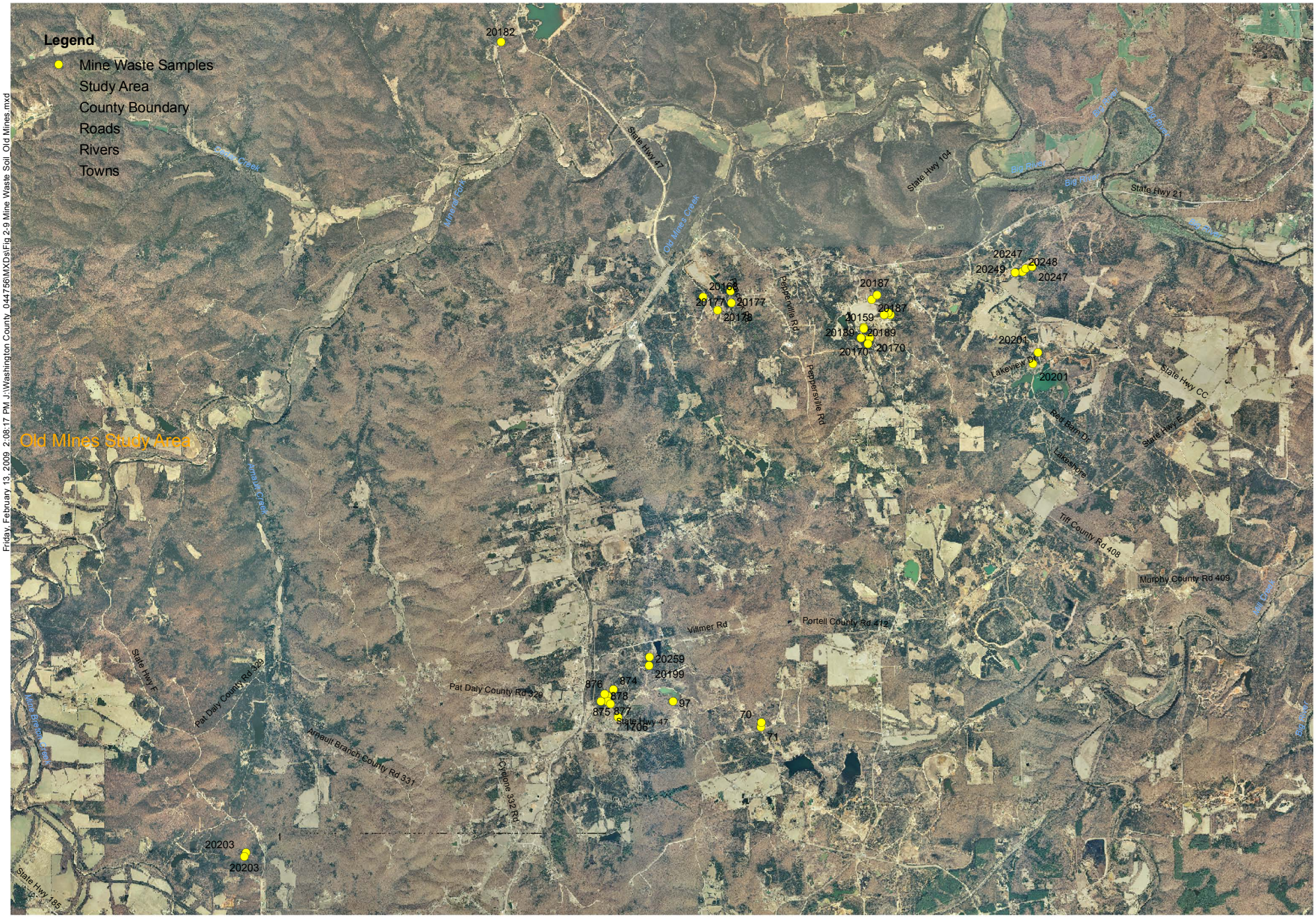
NAD 1983, UTM 15N

Mine Waste Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-7

Mine Waste Soil Sample Location Map
Richwoods Site
Washington County Lead District
Washington County, MO

Figure 2-8



N

0 0.5 1

Miles

NAD 1983, UTM 15N

Mine Waste Soil Sample Location Map
Old Mines Site
Washington County Lead District
Washington County, MO

Figure 2-9

Ecological Soil Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-10

Friday, February 13, 2009 11:35:51 AM J:\Washington County_044756\MXDs\Fig 2-11 Residential DUST Samples_Potosi.mxd

N

0 0.25 0.5

Miles

NAD 1983, UTM 15N

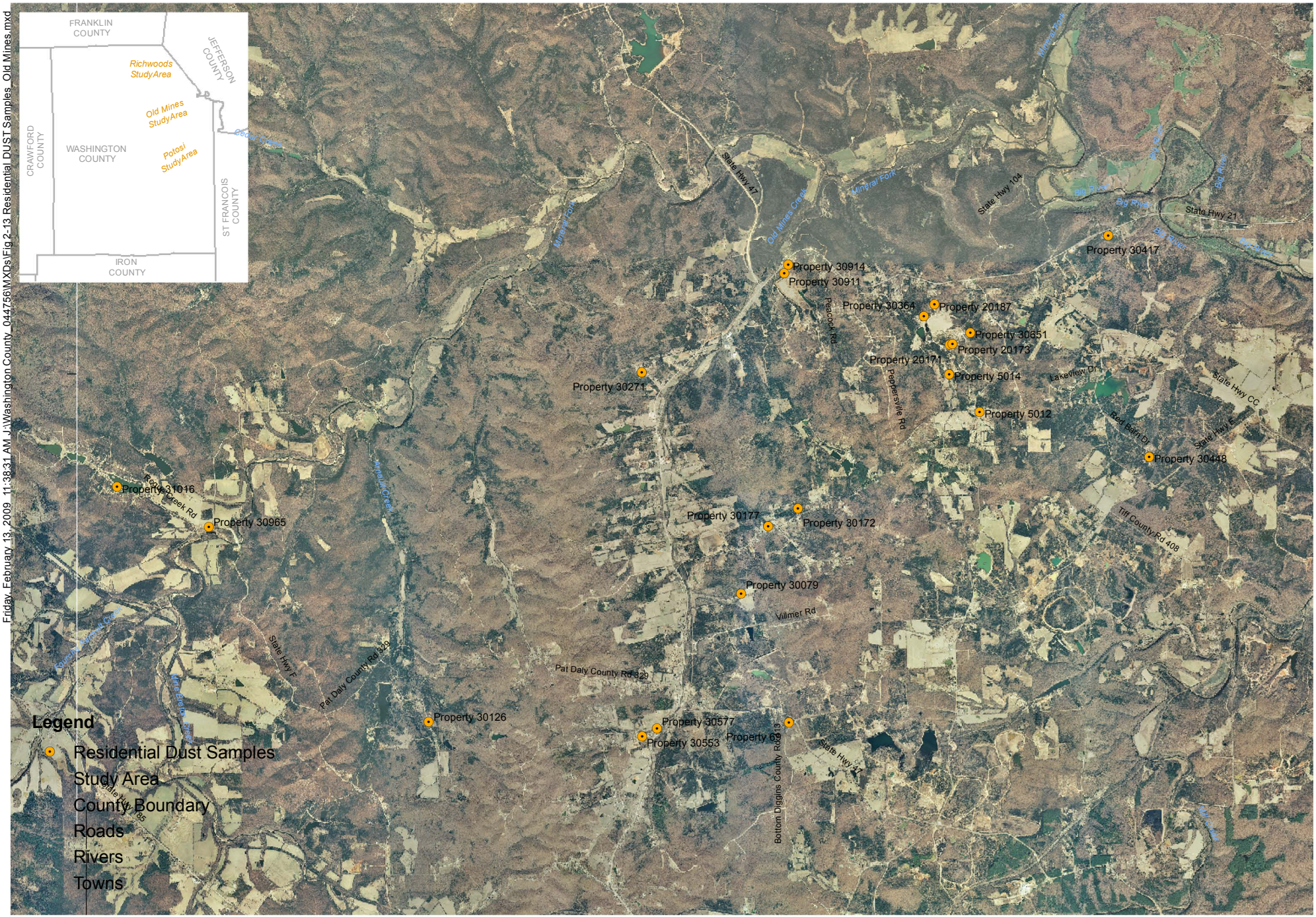
Residential Dust Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-11

Friday, February 13, 2009 11:37:53 AM J:\Washington County_044756\MXDs\Fig 2-12 Residential DUST Samples_Richwoods.mxd

Residential Dust Sample Location Map
Richwoods Site
Washington County Lead District
Washington County, MO

Figure 2-12

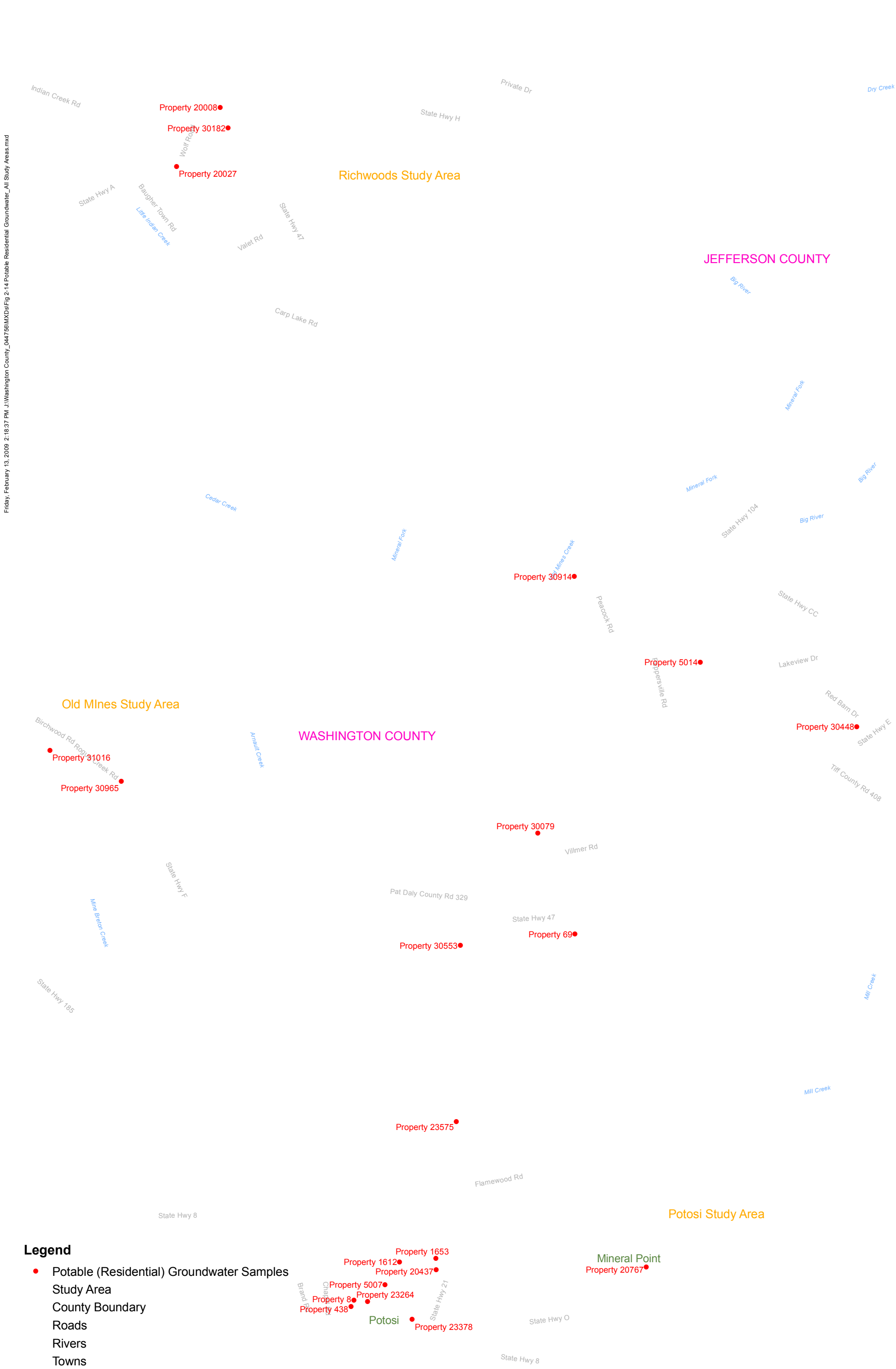


Friday, February 13, 2009 11:38:31 AM J:\Washington County_044756\MXDs\Fig 2-13 Residential DUST Samples_Old Mines.mxd

Residential Dust Sample Location Map
Old Mines Site
Washington County Lead District
Washington County, MO

Figure 2-13

Friday, February 13, 2009 2:18:37 PM J:\Washington County_044756\MXDs\Fig 2-14 Potable Residential Groundwater_All Study Areas.mxd



Legend

- Potable (Residential) Groundwater Samples
- Study Area
- County Boundary
- Roads
- Rivers
- Towns

N

0 1 2

Miles

NAD 1983, UTM 15N

Potable (Residential) Groundwater Sample Location Map
All Study Areas
Washington County Lead District
Washington County, MO

Figure 2-14

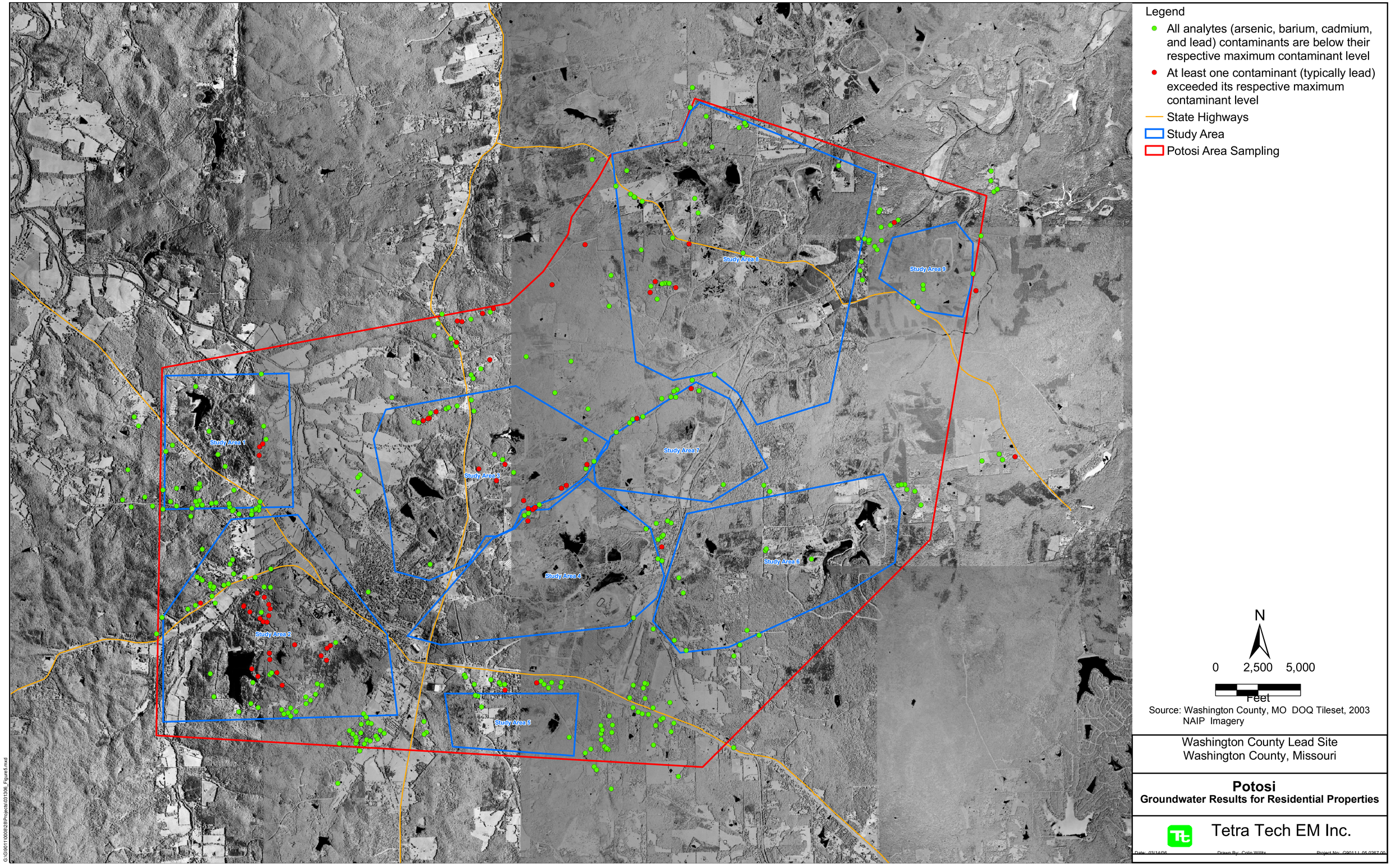
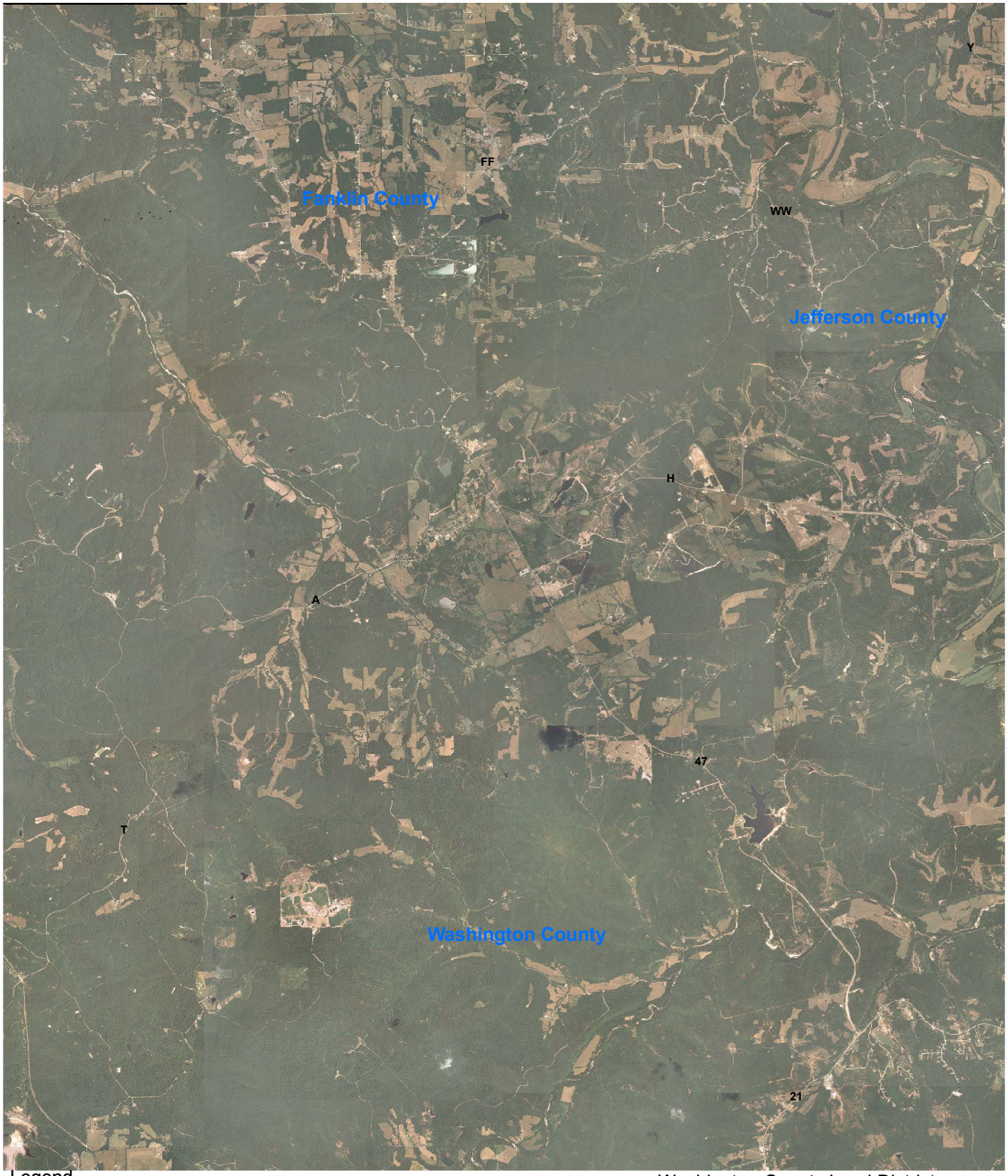


Figure 2-15 Area-wide Historical Groundwater Sample Location Map - Potosi Site



Legend

Cross-section of Hwy 47 and Hwy A/H

Historical ground water sample location

State highway

Richwoods study area

County boundary

Washington County Lead District
Richwoods Study Area
Washington County, Missouri

0.5 0 1 2

Miles

Source: Washington County, MO NAIP Aerial Imagery, 2005

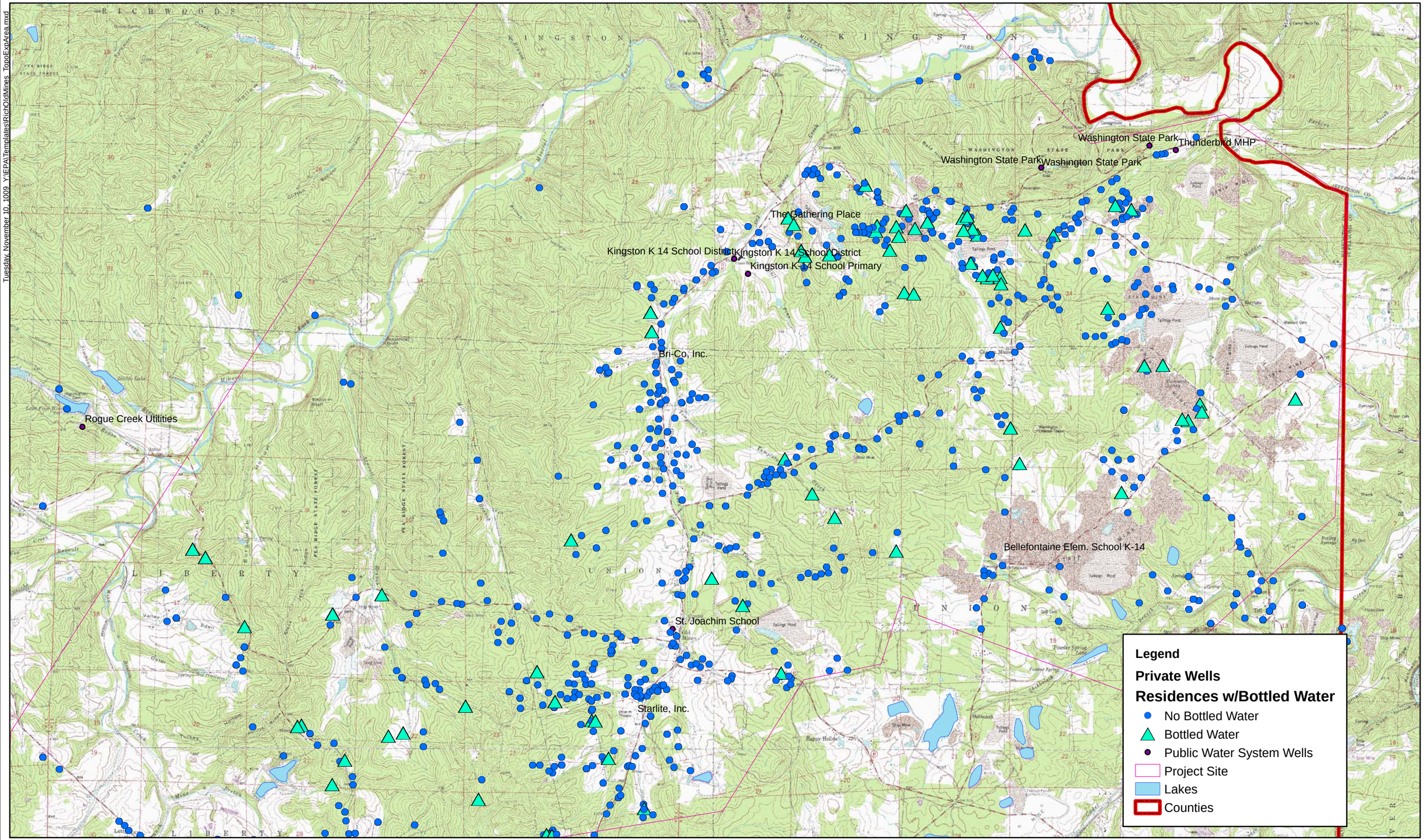
TETRA TECH EM INC.

Date: 05/29/07 Drawn By: Bill Spiking Project No: I9004.L.06.0027.000

X:\G\9004\0027\HRS\gis\mxds\Richwoods_HRS_Final\Figure3.mxd

Figure 2-16 Area-wide Historical Groundwater Sample Location Map - Richwoods Site

Tuesday, November 10, 1009 Y:\EPA\Templates\RichOldMines_TopoExpArea.mxd



N

0 2,150 4,300

Feet

NAD_1983, UTM Zone 15N

Old Mines Bottled Water Sites
Washington County, MO
August 19, 2009

Figure 2-16a

Tuesday, February 24, 2009 2:11:50 PM J:\Washington County_044756\MXDs\Fig 2-17 SD & SW Samples_area wide.mxd

WSS-4
SW/SED-5
SW/SED-4
WSW/WSS-3
WSS-5
WSW/WSS-2
WSW/WSS-1
WSS-6
SW/SED-6
WSW/WSS-8
SW/SED-0
SW/SED-1
WSS-7
SW/SED-2
SW/SED-3
Richwoods Study Area
Private Dr
State Hwy H
Wolf Road
State Hwy 47
Valet Rd
Little Indian Creek
Carp Lake Rd
Dry Creek
JEFFERSON COUNTY
Big River
Mineral Fork
Cedar Creek
Big River
SW/SED-15
SED-14
SW/SED-16
SW-24
SW/SED-25
SW/SED-26
SW/SED-33
Peacock Rd
Old Mines Creek
Peppersville Rd
SW/SED-23
Lakeview Dr
State Hwy CC
Red Barn Dr
State Hwy EE
SED-22
Old MInes Study Area
Arnault Creek
WASHINGTON COUNTY
Rogue Creek Rd
Tiff County Rd 408
SW/SED-28
SED-29
Villmer Rd
SW/SED-21
SW/SD-18
SW/SED-18
SW/SED-19A
SW-20
SS08
SW/SD-19
SW/SED-19
SED-20
SW/SD-11
SW/SED-30
State Hwy F
Pat Daly County Rd 329
Mine Breton Creek
SW/SED-31
SS09
SW/SD-09
SW/SED-4, Area 19
SW/SED-3, Area 19
SW/SED-2, Area 19
State Hwy 185
State Hwy 21
SD/SW22
SW/SD-06
Mill Creek
SW/SD-16
SD15 - water
SW-1, Area 19
Potosi Study Area
Flamewood Rd
SS06
SS05
SW/SD-03
SS07
SW/SD-02
SS04
SS03
SW/SD-14
Mineral Point
SW/SD-04
SS11
SW/SD-20
SD13 - water
Brand Rd
Cloyel Rd
SW/SD-12
Potosi
State Hwy 21
State Hwy O
SS10
SS01
SS02
SW/SD-01
State Hwy 8

Legend

MEDIA

- Surface Water
- Sediment

Study Area
County Boundary
Lakes
Roads
Rivers
Towns

N

0 0.5 1

Miles

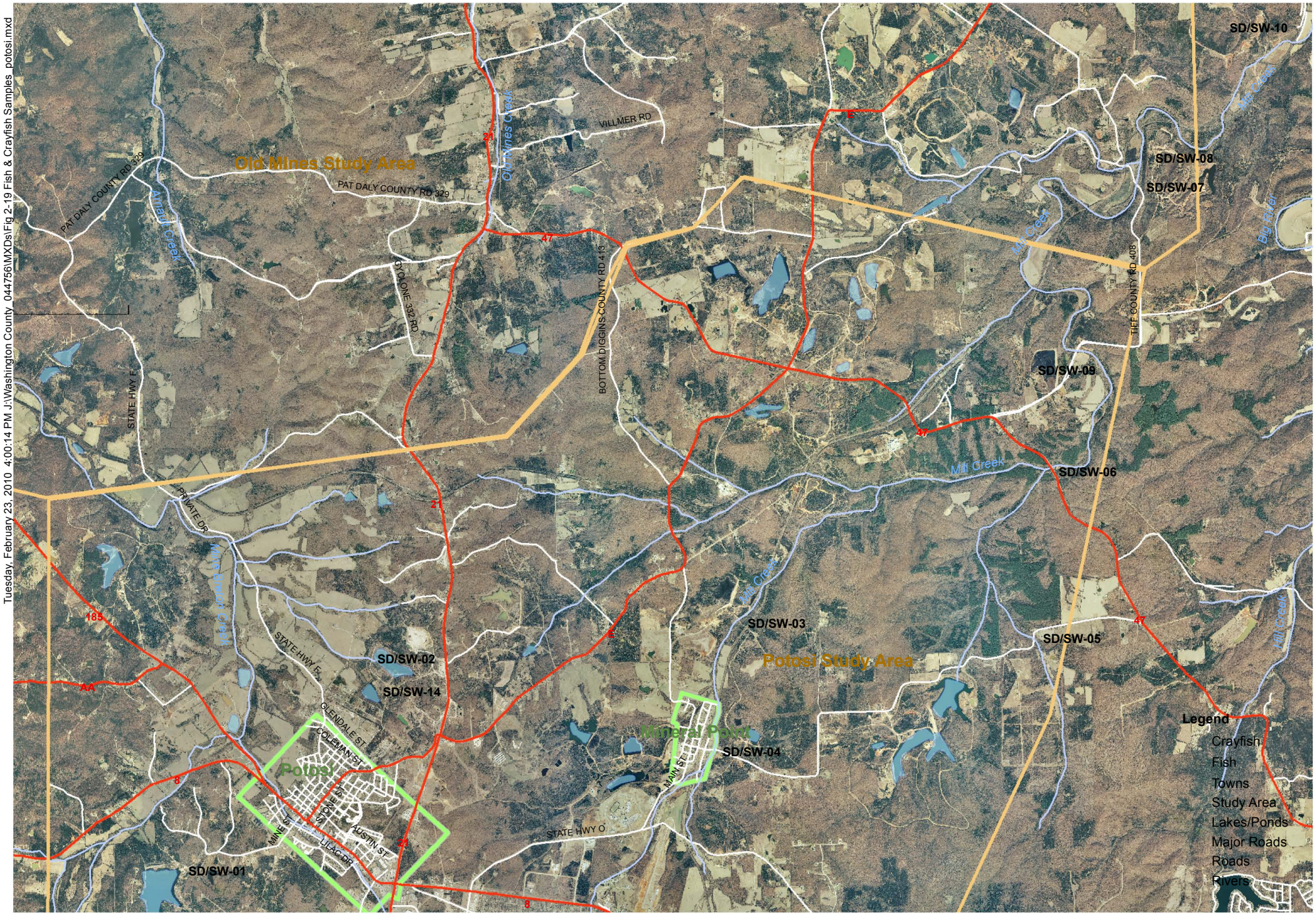
NAD 1983, UTM 15N

Sediment and Surface Water Sample Location Map
All Study Areas
Washington County Lead District
Washington County, MO

Figure 2-17

Vegetation Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-18



Tuesday, February 23, 2010 4:00:14 PM J:\Washington County_044756\MXDs\Fig 2-19 Fish & Crayfish Samples_potosi.mxd

0 0.5 1

Miles

NAD 1983, UTM 15N

Fish & Crayfish Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-19

3.0 Physical Characteristics of the Study Area

3.1 Surface Features

Washington County is part of the Interior Highlands Division, Ozark Plateau Province, Springfield-Salem plateaus section. It has a variety of landforms, surface features, geologic formations, structural complexities, and mineralized trends. Streams typically flow to the north, away from the St. Francois Mountains and the Ozark Dome. Tributaries of the Meramec River drain to the west and tributaries of the Big River drain to the east. Pruitt Mountain is the highest point in the county at 1,582 feet mean sea level. The lowest point is near the confluence of Mineral Fork and Big River at 550 feet mean sea level. While the total relief is approximately 1,030 feet, local relief commonly exceeds 200 feet.

The majority of the county is underlain by sedimentary rocks of the Paleozoic era. Igneous rocks of the Precambrian era are exposed as isolated ridges and pinnacles along the southern edge of the county and northwest of Shirley, Missouri, near Little Pilot Knob (Floyd Tower), Flint Hill, and Litton Hill. Many periods of uplift and erosion have created an irregular topography on the ancient igneous surface prior to deposition of the sedimentary rocks. The Paleozoic strata of the Cambrian and Ordovician systems have been similarly subjected to erosion and deep weathering. Streams and rivers have removed much of the residual and colluvial materials in the valleys. Thick and variable surficial materials occur on much of the uplands and were extensively utilized and developed for their associated mineral deposits.

Fault systems, grabens, and zones of complex structural deformation indicate that basement block tectonism has moved upward through the sedimentary rocks. Solution weathering along structural features has created numerous springs, fens, caves, and related karst examples throughout the county and in adjacent counties. Data records at the Geological Survey and Resource Assessment Division show that over 75 caves and 100 springs are known to be present in Washington County.

Washington County is divided into several distinct physiographic regions, the Springfield, Salem and Ozark Plateau Regions. These regions have landscape shapes controlled by separate geologic units with variable bedding thickness, weatherability, and time of deposition. They vary from igneous mountains to narrow ridgetops with steep hills and narrow valleys to gently rolling uplands. There is an association of soils that dominate each area and is discussed below. (USDA, 2002)

3.2 Meteorology

The southeastern portion of Missouri, where Washington County is located, is about 70 miles southwest of St. Louis; the closest metropolis. The total annual rainfall for Washington County is about 43 inches; snowfall about 15 inches. Precipitation falls regularly throughout the entire year with the month of May being the most active. Washington County can be characterized by hot summers and cold winters with average summer high temperatures at 89 degrees Fahrenheit (ºF) and the average low winter temperatures at 21 ºF. The growing season for Washington County falls between the months of May through September with no days above freezing.

Prevailing winds are generally 7.67 to 11.02 miles per hour (mph) and will increase during severe weather conditions. On average, there are over 200 sunny days and approximately 89 days of cloud cover and/or precipitation in Washington County (City Data, 2008).

3.3 Surface Water Hydrology

All of the streams in Washington County drain into Big River, which is one of the two tributaries that drain into the Meramec River. Washington County lies within two watersheds; the Big River Watershed and the Meramec River Watershed which are located entirely within the Salem Plateau of the Ozark Plateau eco-region. Information regarding average annual discharge and drainage area size for streams were obtained from USGS National Water Information Systems (USGS, 2008).

Several major tributaries are within Washington County that drains into the Big River with Mineral Fork being the largest. Mineral Fork is approximately 189 square miles long and passes through the Old Mines Study Area. Mine Breton Creek and Mill Creek both flow in a north to south direction in the Potosi Study Area. The largest creek to flow through the Richwoods site is the Little Indian Creek.

The Big River Watershed contains many large, privately-owned dams, with the largest dam located in Washington County; 360-acre Sunnun Lake. The dams retain finely-ground (tailings) and coarsely-ground (chat) lead and barite mine waste. Most of these dams were poorly constructed which has led to erosion of the mine waste and caused rivers and streams to become contaminated.

3.4 Geology

3.4.1 Bedrock

The geology in Washington County is Precambrian to Quaternary in age. The Precambrian rocks are typically ash-flow tuffs related to caldera collapse events. Most of

these igneous rocks are rhyolitic in composition and are locally called porphyry or traprock. During the late Cambrian period, alluvial-fluvial sands and gravel were deposited on the then eroded Precambrian terrain; this was then followed by carbonate-dominated marine sediments deposits in the Upper Cambrian period. The Upper Cambrian sequence of carbonate deposits in Washington County are comprised of six formations; Lamotte Sandstone, Bonneterre Formation, Davis Formation, Derby-Doe Run Dolomite, Potosi Dolomite, and Eminence Dolomite. These Upper Cambrian deposit are overlain by two Lower Ordovician strata; the Gasconade Dolomite and the Roubidoux Formation. Quaternary-Pleistocene deposits of loess are also present on some upland ridges (USDA, 2002).

3.4.2 Stratigraphy

The Lamotte Sandstone is the lowermost unit of the Upper Cambrian sequence of carbonate deposits. The formation is comprised of non-marine quartzose sand, arkose, and conglomerate overlain by marine sediments and may locally contain some dolostone near the top of the unit. Thickness of the formation is extremely variable (0 to 400 feet), and abrupt changes in character are common along faults.

The Bonneterre Formation consists of interbedded carbonates (limestones and dolostones), shales, and thin sandstones-siltstones. Dolostone and brecciated zones of the Bonneterre are the primary host-rock for the Mississippi Valley-type lead-zinc-copper deposits of southeast Missouri. The formation thickness varies from 320 to 400 feet.

The Davis Formation is a series of shales with interbedded limestone, dolostone, minor sandstone, and glauconite. Thickness is approximately 180 feet.

The Derby-Doe Run Dolomite consists of non-cherty dolostone with minor shale, silt, and fine-grained glauconite. Cross-bedding is common in the thicker dolostones. Thickness varies from 90 to 120 feet.

The Potosi Dolomite is typically dolostone with locally abundant quartz druse (very fine quartz crystals), chalcedony, chert, and barite. This formation is the principal host-rock for the extensive barite mineralization in the county. Thickness varies from 220 to 370 feet.

The Eminence Dolomite consists of non-cherty dolostone with minor clay and shale seams. The upper part of the formation is thin-bedded and sandy with shale interbeds. Thickness ranges from 120 to 200 feet.

The Gasconade Dolomite is typically cherty dolostone with oolites and reef structures. The basal portion of the formation is known as the Gunter Sandstone Member. In Washington County, it is a sandy dolostone, often poorly developed and inconspicuous. The formation is sometimes separated into upper and lower units. The

upper unit is typically a 40 to 80 feet thick dolostone with minor sand and chert lenses. The lower unit is commonly 160 to 200 feet thick with an increased amount of chert lenses and interbeds. A silicified, stromatolitic dolostone (cryptozoan reef) is located at the top of the lower unit. Total thickness is approximately 250 feet.

The Roubidoux Formation consists of interbedded quartz sandstone, dolostone, and chert with minor oolites. Sandstone beds typically have cross-bedding, ripple marks, and mudcrack fillings. It is present on the upland ridges and along fault/structural boundaries. It is not fully exposed in the county, but thickness can be up to 200 feet.

The Quaternary-Pleistocene is represented by Upper Wisconsin Stage loess deposits. Loess materials have been eroded and redeposited on some lower slopes and tributaries as alluvium and colluvium.

Bedrock at the site is predominantly the Upper Cambrian-aged Eminence and Potosi Dolomites. The Potosi Dolomite contains an abundance of druse-coated chert, while the overlying Eminence Dolomite contains little druse-coated chert. The Eminence dolomite is medium to coarsely crystalline while the Potosi dolomite is medium to finely crystalline. The Potosi ranges from about 75 to 300 feet in thickness in its outcrop area, with an average thickness of 200 feet. The Eminence has an approximate thickness of 200 to 250 feet. The Potosi conformably overlies the Derby-Doerun Dolomite. The Ordovician Gasconade Dolomite and Roubidoux Formation are present to the north and west in portions of the site area (USDA, 2002).

3.4.3 Structures & Tectonics

Several major structural trends and fault systems exist in Washington County. The intense deformation and movement in Precambrian rocks caused numerous fault-bounded blocks (grabens and horsts) to form adjacent to and within the county. They have not been extensively defined and correlated due to the complex regional associations and lack of detailed mapping for portions of the county. The Ste. Genevieve Fault System trends northwest by southeast through the northeastern part of the county. The Palmer Fault System extends east to west across the southern portion of the county. The Mineral Point Fault System is a similar trend that is located between the Ste. Genevieve and Palmer Fault zones. It consists of several east-west trending elongate grabens and has been extended to the northwest to join the Arnault Branch Fault Complex. Big River Fault System trends northeast to southwest through the southeastern part of the county. It branches and merges with portions of the Ste. Genevieve, Mineral Point, and Palmer Fault complexes (USDA, 2002).

3.5 Mineralization

Washington County is part of Missouri's Old Lead Belt, where lead mining has occurred for hundreds of years. Additionally, this area is also part of the barite mineralization district of Missouri. Mineralization in Washington County is the result of a district-wide mineralizing event (EPA, 2008).

3.5.1 Lead Mineralization

Most lead mineralization in the Washington County area occurs within the lower part of the Bonneterre Dolomite on exposed Precambrian topographic highs, generally within a few hundred feet of the boundary where the underlying Lamotte sandstone pinches out. In a few locations, mineralization extends downward into the upper part of the Lamotte Sandstone. Lead ore occurs as deposits of lead and other metallic minerals that have replaced dolomite crystals in portions of the Bonneterre Formation (USGS et al., 1967). The ore occurs as disseminated grains, in horizontal sheets along bedding planes, vug and cavity fillings, and linings on the walls of joints and fractures (USGS et al., 1967). The deposits extend laterally for hundreds of feet and may extend 200 feet vertically. Galena (PbS) is the primary ore mineral (Tarr, 1918).

3.5.2 Barite Mineralization

Only a few minerals are found with barite; sulfides, oxides, carbonate, silicates and sulfates. The usual mineral association is quartz, pyrite or marcasite, limonite, galena, sphalerite and barite. There are three common modes of occurrence of barite in Washington County; veins, disseminated deposits, and residual deposits.

3.5.3 Veins

The vein deposits in Washington County are considered the most widely distributed geographically of all the deposit types. They are most abundant in the Potosi and Proctor formations and become less abundant in the higher formations. The order of deposition in veins deposits are; (1) quartz, (2) pyrite, (3) galena or sphalerite (if present) and (4) barite.

3.5.4 Disseminated Deposits

Disseminated deposits occur as small masses that have formed either from filling small cavities or replacing existing dolomite. Disseminated deposits usually occur in the same beds as vein deposits. The distribution of disseminated barite is therefore almost identical to barite veins and it is inferred that these types of barite deposits are genetically connected.

3.5.5 Residual Deposits

Residual deposits are the most concentrated and economically viable form of barite. Typically the barite occurs as loose fragments scattered through deep red clay. In Washington County residual barite is only found in the Potosi and Proctor formations. Of these two formations, the Potosi contains the greater part (Tarr, 1918).

3.6 Soils

Parent material is the unconsolidated mass in which a soil forms. The formation or the deposition of this material is the first step in the development of a soil profile. The parent material in Washington County is alluvium (material deposited by water), colluvium (material transported by gravity), loess (silty material deposited by wind), and residuum (material weathered from bedrock) (USDA, 2002).

3.6.1 Alluvium

The soils on the flood plains in Washington County formed in alluvial deposits ranging in thickness from about 5 feet to more than 30 feet. These soils differ widely in texture and chemical composition, reflecting a diversity of origin, varying floodwater velocity, distance traveled down the watershed, and various kinds of primary source material. The Big and Meramec River flood plains formed mainly in silty alluvium. Tributary streams are progressively coarser in texture upstream. The gravelly Bloomsdale and Cedargap soils are on narrow upstream reaches, and the silty Haymond and loamy Kaintuck soils dominate the broader flood plains farther downstream. The abundance of loess as a source material and predictable decreases in stream velocity and gradient along descending watercourses cause this gradation in material sizes (USDA, 2002).

3.6.2 Colluvium

Colluvium is material transported by gravity and it contributes to several soils in the survey area. Soils such as Alred, Coulstone, Goss, Ocie, and Rueter, have colluvium comprising the upper part of the profile while residuum comprises the lower part of the profile. These soils have colluvium with a high content of rock fragments while Hartville and Lecoma soils occur on foot slopes, and the colluvial material is thicker with few rock fragments.

3.6.3 Loess

Loess probably once covered all of Washington County. It was deposited during the most recent postglacial period. The sources of this material were the flood plains

along the Mississippi and Missouri Rivers and their tributaries. Filled with sediment deposited by glacial melt water and nearly barren in the still frigid climate, these valleys were the focus of violent dust storms. These windblown deposits blanketed the landscape to depths that were greatest on the river hills and decreased with distance from the source. Erosion removed the loess at widely varying rates. It apparently kept pace with deposition on the steep, sun-warmed south and west exposures where stripping has been complete. North and east aspects, in contrast, remained frozen longer and retained an appreciable amount of the loess, as did the ridgetops. Stable landforms farther from the Missouri River only retain 20 to 40 inches of loess. The upper solum of Aaron, Crider, Fourche, Glensted, Gravois, Hildebrecht, Knobtop, Useful, Wrengart, and Yelton soils formed in loess. The pattern of loess distribution indicates that no major alterations of landforms have occurred since the loess was deposited (Brown, 1981).

3.6.4 Residuum

Most of the residuum in Washington County is derived from dolostone and sandstone formations of the Cambrian and Ordivician Systems. Generally, the mantle rock, or regolith, forms the surface appearance of the land. The thickness of the bedding, degree of cementation, chemical composition, and proximity to geologic faulting have affects on the rate of residual weathering. Depth to bedrock can vary from less than 10 inches to over 10 feet. There are eight geologic formations contributing to the make up of residual soil materials in Washington County. They are listed from youngest to oldest with the dominant soil(s) that formed in them. The youngest residual parent materials in the county are areas of the Roubidoux Formation. These materials are primarily skeletal coarse-grained sands. The Bender soils formed in this geologic material. The Gasconade Formation is composed of thinly bedded dolostone and cherts. The lower layers of Alred and Rueter soils formed in this material. The Eminence Formation is dominated by medium to massive beds of dolostone with small amounts of chert. The Sonsac soils formed in this material. The Potosi Formation is dominated by massive beds of dolostone with an abundance of quartz druse also called mineral blossom. The Goss, Moko, and Sonsac soils dominate these areas. The Derby-Doerun Formation is composed of thinly bedded dolostone that is interbedded with siltstone and shale. The Aaron and Gatewood soils dominate these areas. The Bonneterre Formation is composed of dolostone in which the moderately deep Caneyville soils formed. The Lamotte Formation is composed of quartzose sandstone in which the moderately deep Lily soils formed. The Precambrian strata are dominated by rhyolites, which formed the Irondale and Taumsauk soils (USDA, 2002).

3.7 Hydrogeology

Washington County has two major regional aquifers, the St. Francois and Ozark, separated by the St. Francois confining unit. The Davis Formation and the Derby-Doe Run Dolomite are approximately 300 feet thick and comprise the strata which act as a barrier separating the two aquifers. The Lamotte Sandstone and Bonneterre Formation have a combined thickness that varies from 0 to 800 feet and are the geologic units of the semi-confined St. Francois aquifer. The Potosi, Eminence, Gasconade, and Roubidoux Formations comprise the unconfined Ozark aquifer and have a total thickness of approximately 900 feet. Where erosion and faulting have exposed portions of the aquifers to the surface water regime, groundwater becomes surface water and vice-versa. Solution weathering and fractures create local channels and conduits within the aquifers, which affect both recharge and discharge. They also impact and influence the amount of water available to open boreholes, shafts, and excavations. The Ozark aquifer is a relatively open system that can be readily influenced by nature and man. In the past, pumping to dewater mining excavations has been a major influence on some portions of the aquifers, but such activities have ceased in recent years. Large underground reservoirs in the abandoned mines may provide storage and/or pumping resources for energy/public utilities. Water yields to wells in the St. Francois aquifer vary from 10 to 100 gallons per minute. The Ozark aquifer typically yields water 50 to 1,000 gallons per minute depending on the number of formations intercepted by the well (USDA, 2002).

3.8 Demography and Land Use

Washington County is bound by Franklin County to the north, Jefferson and St. Francois Counties to the east, Iron County to the south, and to the west by Crawford County. It has abundant mineral resources which drew early settlers to the land. Lead, iron ore, barite, and silver have been heavily mined in the past. Currently, there are no active mines that exist in the area and Washington County is predominantly forested and rural. The primary land use within the county is residential and cropland.

According to the 2008 United States census data, Washington County has a population of approximately 24,146, which includes 10,678 households. The median household income is $32,745 with an unemployment rate of 9.3 percent.

The population of Washington County accounts for less than 1 percent of the Missouri state population. On average, the median age of residents in Potosi, Richwoods and Old Mines is between 32 and 33 with the majority of residents over 18 years of age. The fewest amounts of people in Washington County are under 5 years and over 65 years of age. Children under 5 years account for about 5 percent of Washington County's population (U.S. Census, 2000).

3.9 Ecology

Washington County is located in the Salem Plateau, which is within the Ozark Plateau ecoregion of southeastern Missouri. The Ozark Plateau physiography consists of igneous rocks of the Precambrian era, underlain by sedimentary rocks of the Paleozoic era and is almost entirely forested. Of the 487,827 acres of land within Washington County, 406,482 acres is actually forested. Oak-Hickory is the dominant forest type along with eastern red cedar and oak-pine communities located in the upland forests or areas with more shallow bedrock. The remaining farmland is a mixture of land uses such as cropland, pasture and hayland, marsh and residential or urban use. Most of the farmland is located in the valleys and river bottoms. Floodplain sites in Washington County support black walnut, silver maple, American elm, green ash and black willow (USDA 2002).

Historical evidence exists that the ridge tops of the Ozark Mountains vegetation was either savanna-like or barren due to the shallow soil and high rock outcroppings. Topography of Washington County is considered irregular due to several uplift and erosion periods throughout history. Pruitt Mountain, the highest point in Washington County, sits at 1,582 feet mean sea level (MSL). The lowest point is at the confluence of Big River and Mineral Fork at 550 feet MSL. Karst features, such as cave systems, sink holes, natural tunnels and spring-fed streams are also found throughout most of the region.

3.9.1 Terrestrial

Terrestrial communities exist in abundance throughout the WCLD, including woodland, savannah, cropland and mine-related areas (MDC, 2008). Dominant trees found here include oak-hickory forests: shagbark hickory *(Carya ovata),* bitternut hickory *(Carya cordiformis),* pignut hickory *(Carya glabra),* black hickory *(Carya texana),* white oak *(Quercus alba),* post oak *(Quercus stellata),* chinkapin oak *(Quercus muehlenbergii),* blackjack oak *(Quercus marilandica),* black oak *(Quercus velutina),* scarlet oak *(Quercus coccinea),* and eastern red cedar *(Juniperus virginiana).* Savannah's occupy the higher ridge tops of the Ozark Plateau where soil and bedrock are very shallow. These areas are dominated by early successional grasses and forbs such as leadplant *(Amorpha canescens),* rattlesnake master *(Eryngium yuccifolium),* purple coneflower *(Echinacea palladia),* gerardia *(Gerardia tennifolia),* Virginia lespedeza *(Lespedeza virginiana),* sensitive briar *(Schrankia uncinata),* and Indian paint brush *(Castilleja coccinea).* Cropland communities occur near areas suitable for cultivation such as near rivers and streams and spring lakes. In vegetated and wooded mine-related areas, the dominant grass species include broomsedge, switchgrass, tall fescue, and

yellow nut sedge (*Cyperus esculentus*), and shrub species include winged sumac (*Rhus copallinum*), blackberry (*Rubus L.*). Dominant tree species include eastern cottonwood (*Populus deltoides*), blackgum *(Nyssa sylvatica),* and occasionally yellow poplar *(Liriodendron tulipifera).*

Wildlife habitats and species occurring throughout the WCLD are typical of those occurring in any agriculturally altered tall grass prairie/eastern woodland ecotone. Mammalian predators that are not very common throughout the county but are present in low numbers include raccoon *(Procyon loto*), coyote (*Canis latrans*), striped skunk *(Mephitis mephitis*), muskrat *(Odonatra zibethica)*, red fox *(Vulpes vulp*es), and bobcat *(Felis rufus*). The gray fox *(Urocyon cinereoargenteus)* is actually a fairly common mammalian predator found throughout the county. Dominant small mammals include the white-footed mouse (*Peromyscus leucopus*), deer mouse *(Peromyscus maniculatus),* short-tailed shrew *(Blarina carolinensis*), eastern cottontail *(Sylvilatgus floridanus*), prairie vole *(Microtus orchogaster*), and wood land vole (*M. pinetorum*).

It is estimated that in the state of Missouri, there are at least 400 species of birds, with 150 who primarily nest in the state. Abundant habitats exist for several species migrating or overwintering. Common species found include the barred owl *(Strix varia),* red-tailed hawk *(Buteo jamaicensis),* wild turkey *(Meleagris gallopavo),* and numerous species of purple martins, ovenbirds, swallows, chickadees and finches.

Several species of reptiles and amphibians exist throughout Washington County. Some common frogs and toads include the eastern American toad *(Bufo americanus)*, Fowler's toad *(Bufo fowleri)*, Blanchard's cricket frog *(Acris crepitans)*, gray treefrog *(Hyla chrysoscelis)*, Northern spring peeper *(Pseudacris crucifer)*, Western chorus frog *(Pseudacris triseriata)*, Eastern narrow-mouthed toad *(Gastrophryne carolinensis)*, bullfrog *(Rana catesbeiana)*, greenfrog *(Rana claruitans),* pickerel frog *(Rana palustris)*, Southern leopard frog *(Rana sphenocephala)*, and the wood frog *(Rana sylvatica).* Turtles are a very common reptile throughout Washington County, including the rare alligator snapping turtle *(Macrochelys tenminckii)* and state endangered species. Other turtle species include the common snapping turtle *(Chelydra serpentina),* stinkpot *(Sternotherus odoratus),* river cooter *(Pseudemys concinna),* Western painted turtle *(Chrysemys picta belli),* midland smooth softshell *(Apalone mutica),* and the Eastern spiny softshell *(Apalone spinifera).*

With Missouri's wide variety of wildlife habitats, there are a total of 46 species of snakes found throughout the state. About less than half of those species are found in Washington County. Some common non-venomous snake species found include the western worm snake *(Carphophis vermis),* Northern scarlet snake *(Cemophora coccinea copei),* Great Plains rat snake *(Elaphe guttata),* Eastern hog-nosed snake *(Heterodon*

platirhinos), prairie king snake *(Lampropeltis calligaster),* and the Eastern coachwhip *(Masticophis flagellum).*

3.9.2 Aquatic

Bass and sunfish are typically the dominant group of fish found in Washington County streams and waterways. The majority of species found are the largemouth bass *(Micropterus salmoides),* channel catfish *(Ictalurus punctatus),* green sunfish *(Lepomis cyanellus),* redear sunfish *(Lepomis microlophus)* and the bluegill *(Lepomis macrochinus).*

Wetland habitats occur in several areas within the WCLD Site. The four wetland types that are found throughout the site include (MDC, 2008):

- Palustrine emergent persistent wetlands (PEM1) – Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. Vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants or by species that normally remain standing at least until the beginning of the next growing season.
- Palustrine forested, broad-leaved deciduous (PFO1) – Includes all non-tidal wetlands dominated by trees, shrubs, emergents, mosses or lichens which are characterized by woody vegetation that is 6 meters tall or taller with relatively flat, wide leaves.
- Palustrine shrub scrub, broad-leaved (PSS1) – Includes all non-tidal wetlands dominated by trees, shrubs, emergents, mosses or lichens which are characterized by woody vegetation that is shorter than 6 meters tall (stunted by environmental conditions) with relatively flat, wide leaves.
- Lacustrine wetland (L) – Refers to lake or pond wetlands or on the edge of lakes and ponds. These wetlands are generally greater than 20 acres and have less than 30 percent cover of persistent vegetation.

3.9.3 Threatened and/or Endangered Species

The Missouri Department of Conservation (MDC) lists the following species as federally or state threatened or endangered in Washington County, Missouri (MDC 2008):

- Gray bat (*Myotis grisescens*) – Federal and state endangered. Gray bats use caves year round with stable temperatures at 42-52 ºF. They do not hibernate in houses or any man-made structures and they require a corridor of forest cover between roosting caves and foraging areas for

cover from predation. They are nocturnal insectivores that forage along water or shoreline areas. They may fly up to twelve miles from their roosting cave to feeding area. Gray bats hibernate from September/October to mid-April/May. There are four main causes of the gray bat species decline; commercialization of caves, pesticide use nearby, destruction of riparian habitats and simple human disturbance greatly reduces their hibernation patterns. Currently, while the gray bat is still endangered, it is appearing to do well with increasing numbers of species each year.

- Cerulean warbler (*Dendroica cerulean)* – State threatened. The cerulean warbler is a small bird that lives in mature deciduous forests, usually in floodplain areas. Their numbers have declined due to the destruction of bottomland forests. Their habitat requires a long stretch of live trees over 12 inches in diameter with a high closed canopy. These warblers produce only a single brood each year.
- Regal fritillary (*Speyeria idalia*) – State threatened. Regal fritillaries are large butterflies that live in tallgrass prairies. They belong to a group of butterflies that have been present in North America since prior to the Ice Age. The loss of the tall grass prairie, unintentional insecticide/herbicide poisoning and human collection of these butterflies all contribute to their population decline.

4.0 Nature and Extent of Contamination

This section presents the results of the analysis of the soil, mine waste, lead bioaccessibility, groundwater, indoor dust, paint surfaces, surface water, and sediment samples that were collected during previous investigations and the 2008 RI/FS field investigation at the WCLD sites.

The human health risks posed by the presence of the identified contaminants are discussed in the HHRA prepared for the site (BVSPC, 2009). The ecological risks posed by the presence of the identified contaminants are discussed in the ERA that was prepared by EPA Region 7 (EPA, 2008d). Both of these documents are summarized in Section 6.0 of this RI Report and provided in Appendix A.

The nature and extent of contamination is discussed in relation to regulatory action levels and a calculated average background levels for soil and the MCL for groundwater. This discussion focuses primarily on lead contamination; however, additional constituents are discussed. It should be noted that Time Critical Removal Actions were initiated by EPA at the Potosi, Richwoods, and Old Mines sites for soil and groundwater; therefore, some of the properties identified in the EPA database may have received remediation.

During previous investigations, the EPA Region 9 Residential PRGs were used to evaluate the nature and extent of contamination. In the time since those investigations were conducted, EPA Region 9 has consulted with other EPA regions including Region 3 and 6, and risk-based Regional Screening Levels (RSL) were agreed upon and adopted by each Region (EPA, 2009a). EPA Region 7 has also adopted these RSLs; therefore, they will be used for the nature and extent evaluation herein. The following are the regulatory action levels used to evaluate soil in this RI for lead, arsenic, barium, and cadmium:

Contaminant	Matrix	Action Level	Reference
Lead	Soil	400 mg/kg	EPA RSL
Lead		1,200 mg/kg	EPA Region 7 Time Critical Removal Action Level
Arsenic		0.39 mg/kg	EPA RSL
Barium		15,000 mg/kg	EPA RSL
Cadmium		70 mg/kg	EPA RSL

The regulatory action levels used to evaluate the analytical data during previous investigations at the Site include the following for groundwater (lead, arsenic, barium, and cadmium):

Contaminant	Matrix	Action Level	Reference
Lead	Groundwater	15 µg/L	EPA MCL
Arsenic		10 µg/L	EPA MCL
Barium		2,000 µg/L	EPA MCL
Cadmium		5 µg/L	EPA MCL

During the 2005 SI/RA for the Potosi site, 21 background surface soils were collected from areas within Washington County where no historical milling, mining, smelting operations, or waste disposal is believed to have occurred. All samples were collected from areas with similar soil types to the study areas and analyzed for lead and arsenic using an XRF analyzer. Background sample concentrations in soils were also obtained from the USGS Mineral Resources On-line database for Washington County, Missouri (USGS, 2009).

The average background concentration established for this RI (calculated average of Potosi and USGS background data) is 165.6 mg/kg for lead in soil.

Action levels for surface water and sediment were established in the 2008 ERA completed by the EPA. The National Ambient Water Quality Criteria (NAWQC) were used to evaluate surface water and the Sediment Quality Guidelines (SQG) were used to evaluate sediment (EPA, 2008d). These criteria will also be used in this RI.

Analytical data (raw data and XRF results) are provided in Appendix C of this RI.

4.1 Potosi Site

4.1.1 Soil

Residential soil was collected at the Potosi site during the 2008 RI/FS field investigation and during previous investigations. The 2008 RI/FS field investigation focused on lead in residential soil and the previous investigations focused on lead, barium, and cadmium.

4.1.1.1 Residential Soil - 2008 RI/FS field investigation

Table 4-1 presents the analytical results for lead in residential soil collected during 2008 RI/FS field investigation conducted by BVSPC and a comparison to the EPA RSL for lead (400 mg/kg), EPA Region 7 Time Critical Removal action level for lead (1,200 mg/kg) and the calculated background concentration for lead (165.6 mg/kg). These samples were analyzed in the field using an XRF analyzer. Out of the 21

properties sampled at the Potosi site, 19 properties contained concentrations of lead that exceeded the EPA RSL, 10 properties contained concentrations that exceeded the EPA Region 7 Time Critical Removal action level, and 20 properties contained lead concentrations that exceeded the background concentration for lead in soil. Figure 4-1 presents the lead concentrations detected in residential yards during the 2008 RI/FS field investigation at the Potosi site.

It should be noted that EPA initiated a removal action in 2006 for residential yards that contained concentrations of lead in soil that exceeded the Region 7 Time Critical Removal action level of 1,200 mg/kg.

4.1.1.2 Confirmation Analysis

Confirmation analysis was performed during the 2008 RI/FS field investigation at 26 select locations and analyzed by EPA's Region 7 laboratory. Eleven locations were within the Potosi site. The results of this analysis for lead are presented in Table 4-2 along with a comparison to the XRF analysis performed in the field. The relative percent difference (RPD) between the XRF analysis and the laboratory confirmation analysis ranged from 4.4 percent to 16.3 percent. The QAPP for the 2008 RI/FS investigation established 25 percent as an acceptable RPD for the comparison of XRF and laboratory analysis (BVSPC, 2008b). The confirmation samples collected at the Potosi site are well within this acceptable RPD.

4.1.1.3 Lead Bioaccessibility

Soil samples were collected from 15 residential properties at the WCLD sites for in vitro bioaccessibility analysis. Eight locations were within the Potosi site. The soil samples were sieved through a No. 60 sieve and analyzed by XRF using the protocol for residential soil sampling and also submitted to the EPA Region 7 laboratory for *in vitro* bioaccessibility analysis.

Due to the close proximity to each other and the similarity in site soils, geology, and genesis of soil lead contamination at the Potosi, Richwoods, and Old Mines sites, the IVBA results for all 15 samples are considered representative of each of the WCLD sites.

In general, the IVBA results for lead are well correlated with the *in vivo* RBA results for lead and can be used to estimate RBA values using the following equation (EPA, 2007):

$$RBA = 0.878 \times IVBA - 0.028$$

The IVBA analytical results and calculated RBA are presented in Table 4-3 for the Potosi site. The RBA for lead in soil collected at the Potosi site ranged from 39.9 to 73.8 percent with an average of 55.7 percent.

4.1.1.4 Area-wide Soil – Previous Investigations

Table 4-4 presents the analytical results for lead in area-wide residential soil collected during previous investigations and obtained from the EPA database for the WCLD sites. Analytical results were obtained for 998 properties and compared to the EPA RSL, EPA Region 7 Time Critical Removal Action Level, and the calculated background concentration for lead. Of these samples, 602 properties contained concentrations of lead that exceeded the EPA RSL, 209 properties contained concentrations that exceeded the EPA Region 7 Time Critical Removal Action Level, and 848 properties contained concentrations that exceeded the background concentration established for this RI.

Tables 4-5, 4-6, and 4-7 present the analytical results for arsenic, barium, and cadmium in residential soil collected during previous investigations, respectively. These analytical results were obtained from the EPA database for the WCLD Site and compared to the following EPA RSLs for soil:

- Arsenic = 0.39 mg/kg
- Barium = 15,000 mg/kg
- Cadmium = 70 mg/kg

This comparison showed that all 209 properties contained concentrations of arsenic that exceeded the RSL.

4.1.1.5 Mine Waste

Mine waste (soil) was collected at the Potosi site during previous investigations and analyzed for lead as summarized in Table 4-8. The analytical results were obtained from the EPA database for the WCLD sites and compared to the EPA RSL, Region 7 Time Critical Removal Action Level, and the calculated background concentration for lead. Out of the 215 properties, 165 contained concentrations of lead that exceeded the EPA RSL, 65 properties contained concentrations that exceeded the EPA Region 7 Time Critical Removal Action Level, and 191 properties contained lead concentrations that exceeded the background concentration for lead in soil.

4.1.2 Indoor Dust

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7 laboratory.

Analytical results for wipe samples were reported for 20 properties at the Potosi site as summarized in Table 4-9. Wipe samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Loading of lead in dust from the wipe samples ranged from non-detected to 0.188 micrograms per square centimeter ($\mu g/cm^2$) at the properties sampled at the Potosi Site.

Analytical results for vacuum samples were reported for 22 properties at the Potosi site as summarized in Table 4-10. Composite vacuum samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in indoor dust from vacuum samples at all properties sampled within the Potosi site. Concentrations of lead in dust from the vacuum samples ranged from 13.2 to 581 mg/kg.

4.1.3 Paint Surfaces

Paint surfaces were evaluated during the 2008 RI/FS field investigation at nine locations at the Potosi site where residential soil was collected to determine if painted surfaces could be the source of the lead in indoor dust. A Niton XRF analysis was performed on selected painted surfaces and lead concentrations were obtained from painted walls, ceilings, columns, windows, and cabinets which consisted of wood, drywall, plaster, and concrete located in various interior and exterior living spaces. The analytical results for the paint surfaces are summarized in Table 4-11. Positive XRF readings were obtained at five properties and ranged from 1.66 to 5.25 milligrams per square centimeter (mg/cm^2).

4.1.4 Groundwater

Groundwater was collected at the Potosi site during the 2008 RI/FS field investigation and during previous investigations. Potable (residential) groundwater was collected from the tap at 10 of the 48 residences where soil sampling was conducted and analyzed for lead. In addition, area-wide residential groundwater samples were collected at 1,097 properties during previous investigations from 2005 through 2008 and analyzed for lead, arsenic, barium, and cadmium.

Table 4-12 presents the analytical results for lead in potable (residential) groundwater collected during 2008 RI/FS field investigation and a comparison to the MCL for lead in water (15 µg/L). Out of the 10 properties sampled, two contained concentrations of lead that exceeded the MCL.

Tables 4-13, 4-14, 4-15, and 4-16 presents the analytical results for lead, arsenic, barium, and cadmium in area-wide residential groundwater collected during previous investigations, respectively. The analytical results were obtained from the WCLD sites

database for 1,097 properties and compared to the MCL for lead (15 µg/L), arsenic (1.0 µg/L), barium (2,000 µg/L) and cadmium (5 µg/L). Out of the 1,097 properties, 178 contained concentrations of lead that exceeded the MCL for lead in groundwater. For arsenic, barium, and cadmium, the MCL was exceeded at one property for arsenic, six properties for barium, and five properties for cadmium.

4.1.5 Surface Water

Surface water was collected at the Potosi site during the 2008 ERA field investigation and analyzed for TAL metals. The samples were collected in Mill Creek and its tributaries. The surface water analytical results were compared to the National Ambient Water Quality Criteria (NAWQC) in the ERA to establish contaminants of potential ecological concern (COPEC) as presented in Appendix A of this RI (EPA, 2008d). The ERA evaluation identified barium, lead, and silver as constituents that contained concentrations exceeding the NAWQC for surface water (EPA, 2008d). It should be noted that NAWQC were not available for barium; therefore the ERA recommended that any clean-up goal be established based on sediment. Further, silver was retained as a COPEC due to insufficient detection limits and the ERA recommended that further evaluation be conducted for silver in surface water (EPA, 2008d).

Two surface water locations SW01 and SW22 contained concentrations of lead that exceeded NAWQC as summarized in Table 4-17. SW01 is located at Hornsey Lake (which is a tailings pond) and SW22 is located at the Fountain Farm at Cinbar (a tributary of Mill Creek) location as presented in Appendix A of this RI (EPA, 2008d). These two locations were the only surface water locations with detected concentrations of lead. All other locations on Mill Creek and its tributaries contained concentrations of lead below detection limits for surface water (e.g. reported as non-detects).

4.1.6 Sediment

Sediment was collected at the Potosi site during the 2008 ERA field investigation and analyzed for TAL metals as presented in Appendix A of this RI (EPA, 2008d). The samples were collected in Mill Creek and its tributaries. The sediment analytical results were compared to the consensus-based Sediment Qulaity Guidelines (SQG) in the ERA to establish COPEC. The ERA evaluation identified barium, cadmium, lead, and zinc as constituents that contained concentrations exceeding the SQGs for sediment (EPA, 2008d) as summarized in Table 4-18. COPECs were identified in the majority of the sediment samples including Hornsey Lake (tailings pond), Keyes Branch (tributary to Fountain Farm Branch), Long Hollow Brach (tributary to Fountain Farm Branch), Big River, Shibboleth Branch, Apex Lake (tailings pond), and Fountain Farm Branch at

Cimbar (tributary to Mill Creek). Two samples that contained elevated concentrations of lead in surface water also contained elevated concentrations in sediment (locations SD01 and SD22).

4.2 Richwoods Site

4.2.1 Soil

Residential soil was collected at the Richwoods site during the 2008 RI/FS field investigation and during previous investigations. The RI/FS investigation focused on lead in residential soil and the previous investigations focused on lead, barium, and cadmium.

4.2.1.1 Residential Soil – 2008 RI/FS Investigation

Table 4-19 presents the analytical results for lead in residential soil collected during the 2008 RI/FS field investigation and a comparison to the EPA RSL for lead (400 mg/kg), EPA Region 7 Time Critical Removal action level for lead (1,200 mg/kg) and the calculated background concentration for lead (165.6 mg/kg). All six properties sampled at the Richwoods site contained concentrations of lead that exceeded the EPA RSL. Three properties contained concentrations that exceeded the EPA Region 7 Time Critical Removal action level, and all six contained concentrations that exceeded the background concentration for lead in soil. Figure 4-2 presents the lead concentrations detected in residential yards during the 2008 RI/FS field investigation at the Richwoods site.

It should be noted that EPA initiated a removal action in 2006 for residential yards that contained concentrations of lead in soil that exceeded the Region 7 Time Critical Removal action level of 1,200 mg/kg.

4.2.1.2 Confirmation Analysis

Confirmation analysis was performed during the 2008 RI/FS field investigation at 26 select locations and analyzed by EPA's Region 7 laboratory. Three locations were within the Richwoods site. The results of this analysis for lead are presented in Table 4-20 along with a comparison to the XRF analysis performed in the field. The RPD between the XRF analysis and the laboratory confirmation analysis ranged from 5.6 percent to 97.5 percent in the residential soil samples collected at the Richwoods site. The sample collected at Property #30812 was outside the acceptable RPD of 25 percent established for this investigation (BVSPC, 2008b). However, it should be noted that the overall average RPD for all confirmation samples collected at the WCLD sites was 10.7

percent. This average is well within the acceptable RPD established for this investigation.

4.2.1.3 Lead Bioaccessibility

Soil samples were collected from 15 residential properties at the WCLD sites for *in vitro* bioaccessibility analysis at EPA's Region 7 laboratory. One location was within the Richwoods site. The IVBA analytical results and calculated RBA are presented in Table 4-21 for the Richwoods site. The RBA for lead in soil collected at the Richwoods site was 53 percent.

Due to the close proximity to each other and the similarity in site soils, geology, and genesis of soil lead contamination at the Potosi, Richwoods, and Old Mines sites, the IVBA results for all 15 samples are considered representative of each of the WCLD sites.

4.2.1.4 Area-wide Residential Soil – Previous Investigations

Table 4-22 presents the analytical results for lead in area-wide residential soil collected during previous investigations and obtained from the WCLD sites database for the Richwoods site. Analytical results were obtained from the database for 191 properties and compared to the EPA RSL, EPA Region 7 Time Critical Removal action level, and the calculated background concentration for lead. Of these samples, 71 properties contained concentrations of lead that exceeded the EPA RSL, 20 properties contained concentrations that exceeded the EPA Region 7 Time Critical Removal action level, and 109 properties contained concentrations that exceeded the background concentration established for this RI. It should be noted that EPA initiated a removal action in 2006 for residential yards that contained concentrations of lead that exceeded the Region 7 Time Critical Removal Action Level of 1,200 mg/kg.

Tables 4-23, 4-24, and 4-25 present the analytical results for arsenic, barium, and cadmium in residential soil collected during previous investigations, respectively. These analytical results were obtained from the EPA database for the WCLD sites and compared to the following EPA RSLs for soil:

- Arsenic = 0.39 mg/kg
- Barium = 15,000 mg/kg
- Cadmium = 70 mg/kg

This comparison showed that 179 properties contained concentrations of arsenic that exceeded the EPA RSL.

4.2.1.5 Mine Waste

Mine waste (soil) was collected at the Richwoods site during previous investigations and analyzed for lead as summarized in Table 4-26. The analytical results were obtained from the EPA database for the WCLD sites and compared to the EPA RSL, Region 7 Time Critical Removal action level, and the calculated background concentration for lead. Out of the 18 properties sampled, 15 contained concentrations of lead that exceeded the EPA RSL, two properties contained concentrations that exceeded the EPA Region 7 Time Critical Removal action level, and all 18 properties contained lead concentrations that exceeded the background concentration for lead in soil.

4.2.2 Indoor Dust/Wipe Samples

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7.

Analytical results for wipe samples were reported for six properties at the Richwoods site as summarized in Table 4-27. Wipe samples were collected from the living room, dining room, bedroom, and/or kitchen floors. Loading of lead in dust from the wipe samples ranged from non-detected (U-qualified) to 0.163 $\mu g/cm^2$ at the properties sampled at the Richwoods site.

Analytical results for vacuum samples were reported for five properties at the Richwoods site as summarized in Table 4-28. Composite vacuum samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in 4 out of 5 indoor dust vacuum samples at properties sampled within the Richwoods site. Detected concentrations of lead in dust from the vacuum samples ranged from 24.8 to 419 mg/kg.

4.2.3 Paint Surfaces

Paint surfaces were evaluated during the 2008 RI/FS field investigation at three locations at the Richwoods site where residential soil was collected to determine if painted surfaces could be the source of the lead in indoor dust. A Niton XRF analysis was performed on selected painted surfaces and lead concentrations were obtained from painted walls, ceilings, columns, windows, and cabinets which consisted of wood, drywall, plaster, and concrete located in various interior and exterior living spaces. The analytical results for the paint surfaces are summarized in Table 4-29. Positive XRF readings were obtained all five properties and ranged from 1.27 to 4.05 mg/cm^2.

4.2.4 Groundwater

Groundwater was collected at the Richwoods site during the 2008 RI/FS field investigation and during previous investigations. Potable (residential) groundwater was collected from the tap at three of the 48 residences where soil sampling was conducted and analyzed for lead. Area-wide residential groundwater samples were collected at 1,097 properties during previous investigations from 2005 through 2008 and analyzed for lead, arsenic, and barium.

Table 4-30 presents the analytical results for lead in potable (residential) groundwater collected during 2008 RI/FS field investigation conducted by BVSPC and a comparison to the MCL for lead in water (15 µg/L). Out of the three properties sampled at the Richwoods site, none contained concentrations of lead that exceeded the MCL.

Tables 4-31, 4-32, 4-33, and 4-34 presents the analytical results for lead, arsenic, barium, and cadmium in area-wide residential groundwater collected during previous investigations, respectively. The analytical results were obtained from the WCLD sites database for 395 properties and compared to the MCL for lead (15 µg/L), arsenic (1.0 µg/L), barium (2,000 µg/L), and cadmium (5 µg/L). Out of the 395 properties sampled, 67 contained concentrations of lead that exceeded the MCL for lead in groundwater. The MCL was exceeded at two properties for barium and five properties for cadmium. Arsenic was not detected at concentrations greater than the MCL.

4.2.5 Surface Water

Surface water was collected at the Richwoods site during previous investigations and analyzed for lead. The samples were collected at 12 locations in streams, tributaries, and tailings ponds throughout the Richwoods site. For consistency with the ERA, the surface water analytical results were compared to NAWQC for lead.

Four surface water locations (SW-2, SW-6, WSW-2, and WSW-8) contained concentrations of lead that exceeded NAWQC as summarized in Table 4-35.

4.2.6 Sediment

Sediment was collected at the Richwoods site during previous investigations and analyzed for lead. The samples were collected in streams, tributaries, and tailings ponds throughout the Richwoods site. For consistency with the ERA, the sediment analytical results were compared to the SQG for lead.

Twelve sediment locations (SED-3, SED-4, SED-6, WSS-1, WSS-2, WSS-3, WSS-4, WSS-5, WSS-6, WSS-7, and WSS-8) contained concentrations of lead that exceeded the SQG as summarized in Table 4-36.

4.3 Old Mines Site

4.3.1 Soil

Residential soil was collected at the Old Mines site during the 2008 RI/FS field investigation and during previous investigations. The RI/FS investigation focused on lead in residential soil and the previous investigations focused on lead, barium, and cadmium.

4.3.1.1 Residential Soil – 2008 RI/FS Field Investigation

Table 4-37 presents the analytical results for lead in residential soil during 2008 RI/FS field investigation and a comparison to the EPA RSL for lead (400 mg/kg), EPA Region 7 Time Critical Removal Action Level for lead (1,200 mg/kg) and the calculated background concentration for lead (165.6 mg/kg). Twenty out of 21 properties sampled at the Old Mines site contained concentrations of lead that exceeded the EPA RSL. Nine properties exceeded the EPA Region 7 Time Critical Removal action level, and all 21 properties contained lead concentrations that exceeded the background concentration for lead in soil. Figure 4-3 presents the lead concentrations detected in residential yards during the 2008 RI/FS field investigation at the Old Mines site.

It should be noted that EPA initiated a removal action in 2006 for residential yards that contained concentrations of lead in soil that exceeded the Region 7 Time Critical Removal action level of 1,200 mg/kg.

4.3.1.2 Confirmation Analysis

Confirmation analyses were performed during the 2008 RI/FS field investigation at 26 select locations and analyzed by EPA's Region 7 laboratory. Twelve locations were within the Old Mines site. The results of this analysis for lead are presented in Table 4-38 along with a comparison to the XRF analysis performed in the field. The RPD between the XRF analysis and the laboratory confirmation analysis ranged from 0.1 percent to 12.9 percent in the residential soil samples collected at the Old Mines site. These samples were well within the acceptable RPD of 25 percent established for this investigation (BVSPC, 2008b)

4.3.1.3 Lead Bioaccessibility

Soil samples were collected from 15 residential properties at the WCLD sites for in vitro bioaccessibility analysis at EPA's Region 7 laboratory. Six locations were within the Old Mines site. The IVBA analytical results and calculated RBA are presented in

Table 4-39 for the Old Mines site. The RBA for lead in soil collected at the Old Mines site ranged from 42.6 to 62.5 percent with an average of 50.7 percent.

Due to the close proximity to each other and the similarity in site soils, geology, and genesis of soil lead contamination at the Potosi, Richwoods, and Old Mines sites, the IVBA results for all 15 samples are considered representative of each of the WCLD sites.

4.3.1.4 Area-wide Residential Soil – Previous Investigations

Table 4-40 presents the analytical results for lead in area-wide residential soil collected during previous investigations and obtained from the EPA database for the WCLD sites. Analytical results were obtained for 566 properties and compared to the EPA RSL, EPA Region 7 Time Critical Removal action level, and the calculated background concentration for lead in soil. Of these samples, 273 properties contained concentrations of lead that exceeded the EPA RSL, 63 properties contained concentrations that exceeded the EPA Region 7 Time Critical Removal action level, and 450 properties contained concentrations that exceeded the background concentration established for this RI.

Tables 4-41, 4-42, and 4-43 present concentrations of arsenic, barium, and cadmium detected in residential soil during previous investigations, respectively. These analytical results were obtained from the EPA database for the WCLD sites and compared to the following EPA RSLs for soil:

- Arsenic = 0.39 mg/kg
- Barium = 15,000 mg/kg
- Cadmium = 70 mg/kg

This comparison showed that 562 properties contained concentrations of arsenic that exceeded the EPA RSL. No properties exceeded RSLs for barium or cadmium.

4.3.1.5 Mine Waste

Mine waste (soil) was collected at the Old Mines site during previous investigations and analyzed for lead as summarized in Table 4-44. The analytical results were obtained from the EPA database for the WCLD sites and compared to the EPA RSL, Region 7 Time Critical Removal action level, and the calculated background concentration for lead in soil. Out of the 27 properties sampled, 23 contained concentrations of lead that exceeded the EPA RSL, one property contained concentrations that exceeded the EPA Region 7 Time Critical Removal action level, and 24 properties contained lead concentrations that exceeded the background concentration for lead in soil.

4.3.2 Indoor Dust/Wipe Samples

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7 laboratory.

Analytical results for wipe samples were reported for 24 properties at the Old Mines site as summarized in Table 4-45. Wipe samples were collected from the living room, dining room, bedroom, and/or kitchen floors. Loading of lead in dust from the wipe samples ranged from non-detected (U-qualified) to 0.780 µg/cm^2 at the properties sampled at the Old Mines site.

Analytical results for vacuum samples were reported for 20 properties at the Old Mines site as summarized in Table 4-46. Composite vacuum samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in indoor dust vacuum samples at all properties sampled within the Old Mines site. Detected concentrations of lead in dust from the vacuum samples ranged from 9.7 to 356 mg/kg.

4.3.3 Groundwater

Groundwater was collected at the Old Mines site during the 2008 RI/FS field investigation and during previous investigations. Potable (residential) groundwater was collected from the tap at eight of the 48 residences where soil sampling was conducted and analyzed for lead. Area-wide residential groundwater samples were collected at 1,099 properties during previous investigations from 2005 through 2008 and analyzed for lead, arsenic, cadmium, and barium.

Table 4-47 presents the analytical results for lead in potable (residential) groundwater collected during the 2008 RI/FS field investigation and a comparison to the MCL for lead in water (15 µg/L). Out of the eight properties sampled at the Old Mines site, one contained concentrations of lead that exceeded the MCL.

Tables 4-48, 4-49, 4-50, and 4-51 presents the analytical results for lead, arsenic, barium, and cadmium in area-wide residential groundwater collected during previous investigations, respectively. The analytical results were obtained from the WCLD sites database for 1,098 properties and compared to the MCL for lead (15 µg/L), arsenic (10 µg/L), and barium (2,000 µg/L). Out of the 1,098 properties sampled, 178 contained concentrations of lead that exceeded the MCL for lead in groundwater. The MCL was exceeded at one property for arsenic, six properties for barium, and five properties for cadmium.

4.3.4 Surface Water

Surface water was collected at the Old Mines site during previous investigations

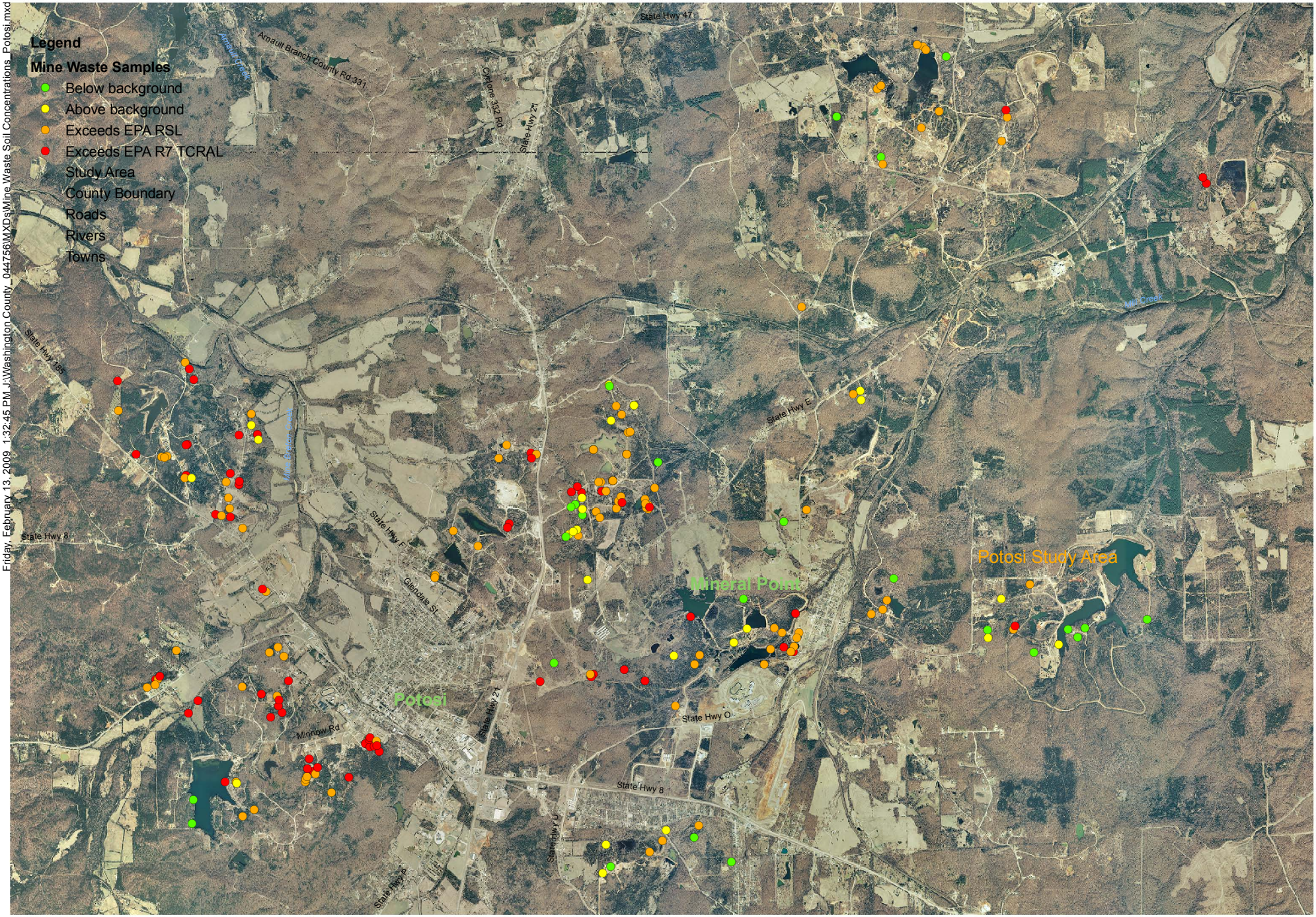
and analyzed for lead. The samples were collected at 20 locations in streams, tributaries, and tailings ponds throughout the Old Mines site. For consistency with the ERA, the surface water analytical results were compared to NAWQC for lead.

Seven surface water locations (SW-1, SW-2, SW-3, SW-15, SW-19, SW-21 and SW-30) contained concentrations of lead that exceeded NAWQC as summarized in Table 4-52.

4.3.5 Sediment

Sediment was collected at the Old Mines site during previous investigations and analyzed for lead. The samples were collected at 21 locations in streams, tributaries, and tailings ponds throughout the Richwoods site. For consistency with the ERA, the sediment analytical results were compared to the SQG for lead.

All 21 sediment locations contained concentrations of lead that exceeded the SQG as summarized in Table 4-53.



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Miles

NAD 1983, UTM 15N

Mine Waste Soil Lead Concentration Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 4-1

Mine Waste Soil Lead Concentration Map
Richwoods Site
Washington County Lead District
Washington County, MO

Figure 4-2

Lead Concentration in Residential Yards
Old Mines Study Area
Washington County Lead District
Washington County, MO

Figure 4-3

5.0 Contaminant Fate and Transport

This section discusses potential contaminant sources, the mechanisms by which contaminants are released from these sources, and the pathways the contaminants may take from sources to human and ecological receptors.

5.1 Conceptual Site Model

A conceptual site model (CSM) is used to convey the sources of contamination, mechanisms of contaminant release, pathways of release and transport, and the ways in which human and ecological receptors are exposed to contaminants. It presents the physical, chemical, and biological relationships between sources and affected resources. Figure 5-1 provides a box diagram of the overall CSM for the WCLD sites. The following sections discuss the major components of the CSM.

5.2 Potential Routes of Migration

The primary sources of contamination at the WCLD sites are the mine waste areas in the vicinity of the Potosi, Richwoods, and Old Mines sites. These areas are described in greater detail in Section 1.0 of this RI Report. The principal contaminants associated with the WCLD sites are metals with lead being the primary contaminant. Elevated concentrations of certain metals, including arsenic, barium, cadmium, and lead were detected in surface soil samples at source/waste areas and at residential properties (soil and dust). Arsenic, barium and lead were detected at elevated concentrations in groundwater and barium, cadmium, copper, lead, selenium, and zinc were detected in sediment samples collected from streams and local tributaries. Lead was also detected in surface water and fish.

The source areas are uncapped exposed piles with often sparse vegetative cover and tailings ponds, as well as mined pits, tiff cuts, and surface soils contaminated from historical lead smelting. The source materials primarily consist of the following types of material depending on the mining processes used:

- Tailings - sand and silt sized particles produced by froth flotation which were slurried to diked impoundments and deposited across stream valleys.
- Chat – sand and gravel sized particles produced by a dry process called gravity separation.
- Surface mining spoils returned to mining pits or spread on the ground surface, typically consisting of chert and red, clay soil.

- Contaminated red clay soil and brown silty clay soil contaminated from historical lead smelting.

Based on the nature of the contamination and the physical characteristics of the Site, potential routes of contaminant migration likely include the following:

- Mechanical distribution of mine waste
- Soil/mine waste to air migration
- Soil/mine waste to surface water/sediment migration
- Soil/mine waste to groundwater migration
- Groundwater to surface water migration
- Biological/food chain migration

5.2.1 Mechanical Distribution of Mining Waste Materials

Mine wastes from the source areas were often used for construction activities, including railroad ballast, road/building fill material, and aggregate for concrete and asphalt. The materials were also used for residential roads, and driveways. Its distribution by private and public entities was reportedly widespread. The exact quantities of mine wastes that were spread by these methods are unknown.

5.2.2 Soil/Mine Waste-to-Air Migration

Fine-grained materials from source areas may be transported by the wind and released to the atmosphere. Constituents bound to waste materials and surface soils may be transported as suspended particulates or dust to downwind locations. Factors influencing the potential for dust entrainment into the atmosphere include surface roughness, surface soil moisture, soil particle size, type and amount of vegetative cover, amount of soil surface exposed to the eroding wind force, physical and chemical properties of the soil, wind velocity, and other meteorological conditions (EPA, 1983). While some areas of the sites are covered with vegetation, there are large portions of the source areas with little or no cover that may generate dust. Dust formation may be significant during extended periods of dry weather. As a result, contaminants in the soil would be expected to be present in the air as dust particles at certain times of the year.

5.2.3 Soil/Mine Waste to Surface Water/Sediment/Floodplain Soil Migration

Contaminants from source areas may be transported by the wind or surface water runoff and deposited in downgradient floodplains, surface waters and/or settle in surface water bodies as sediment. Shallow groundwater beneath the source areas is also likely to flow into these surface water systems. The physical properties of the waste/soil or

sediment material itself may be a factor that affects fate and transport of metal contaminants. Properties such as grain size, total organic carbon, and acidity can drastically affect the availability of inorganic and organic compounds. Fine tailing particles have greater mobility, and contaminants adhered to them may also be more bioaccessible to benthic organisms in depositional areas.

5.2.4 Soil/Mine Waste to Groundwater Migration

During periods of rainfall, water may infiltrate the source areas and contaminate shallow groundwater. A portion of the dissolved constituents are adsorbed by the soils underneath the affected surface soil zone. The remaining portion of the constituents, which is desorbed from the soil particles, continues to leach downward with infiltrating precipitation until it reaches the groundwater. The potential for contaminants to move into groundwater from source material is dependent on several physical and chemical properties of the particular contaminants. Metals (or their related salts) may readily become soluble with infiltrating precipitation and are likely to contaminate groundwater.

In many mine settings, the leaching process begins with the oxidation of certain iron sulfide minerals, especially pyrite, pyrrhotite, and chalcopyrite that form sulfuric acid. The acidity then acts to break down other metal-bearing sulfides, such as sphalerite, or to strip metals from these and other compounds. Depending on the moisture conditions that prevail within the mine wastes or mine workings, metals may become temporarily sequestered in intermediate metal salts, many of which are highly soluble, or the metals may directly become dissolved constituents in shallow groundwater. Metals that become temporarily sequestered are released to shallow groundwater when the metal salts hosting them are dissolved by downward percolating water or fluctuations in the elevation of the groundwater table. Sulfate concentrations in groundwater provide one measure of the importance of sulfide oxidation reactions, since the oxidation of one mole of pyrite produces two moles of sulfate.

The transport of dissolved metals in groundwater is a function of the prevailing physical and chemical conditions, notably pH and Eh. At pH values less than 3 and reducing conditions, many metals remain in solution. However, as pH and oxidation state increase, various oxide, hydroxide, and hydroxysulfate minerals may precipitate from solution and these can lower dissolved metals concentrations though co-precipitation or sorption. Iron and aluminum oxyhydroxides and hydroxysulfates are among the most important phases to precipitate at pH values less than 7. At higher pH values, manganese oxides and hydroxides become important. Sorption of metals onto these phases is generally a function of pH. For example, studies of metal sorption onto hydrous ferric oxide (FeOOH) show that, at high concentrations of FeOOH, 50 percent of

the available lead and copper are sorbed at pH values of 3.5 to 4.5, whereas the sorption of nickel and cadmium does not occur until pH has risen to values of 6.5 to 7.5 (e.g., Smith, 1999). At lower concentrations of FeOOH, 50 percent sorption of these metals shifts to higher pH (Smith, 1999).

5.2.5 Groundwater to Surface Water Migration

Shallow groundwater that migrates from mine waste areas to surface water can contaminate surface water resources. Migration can occur as point or non-point sources of contamination either directly (i.e., contaminated groundwater gains directly to surface streams or ponds) or indirectly (i.e., contaminated groundwater flows from a surface seep or spring that subsequently flows to a stream or pond). The effect of contamination of a stream from a point source in a closed system can be computed as the mass load (in units of mass per time) in which:

$$Q_{bkg}C_{bkg} + Q_{source}C_{source} = Q_{contam}C_{contam} \quad \text{(Equation 1)}$$

Where:

Q = discharge (in units of volume per time)
C = contaminant concentration (in units of mass per volume)

The subscripts “bkg”, “source”, and “contam” represent the stream upstream of the contaminant source, the contaminant source, and the stream downstream of the contaminant source, respectively.

In the case of direct migration, contaminated water may cause chemical reactions to occur in the surface stream due to changes in pH, oxidation state, mineral solubility, and degree of saturation. These reactions, which define open-system behavior, can take various forms that include mineral precipitation or dissolution, metal sorption or desorption, and the formation or destruction of metal complexes. Each of these reactions can complicate the process of contamination and cause contaminant concentrations to be greater than, less than, or similar to the closed system case shown in Equation 1. The case for indirect migration is expected to be generally similar but permits open system behavior of the contaminant stream from the point where it flows onto the surface to the point where it enters surface water.

Groundwater flow beneath tailings ponds and waste piles generally flows consistent with the original surface topography and will generally flow towards and discharge to the nearest surface water features. Shallow groundwater under native soils in this region also typically flows toward the nearest stream and discharges to surface

water; however, it is important to note that there are numerous bedrock outcrops in the area. When infiltrating groundwater from the source areas flows directly into bedrock, the flow direction has not been determined.

5.2.6 Biological/Food Chain Migration

Plants and animals take up metals through direct contact or ingestion of food items and may bioaccumulate metals in their tissues. Dispersion of metals occurs throughout the food web from vegetables grown in contaminated soil and eaten by humans or from benthic invertebrates in contaminated sediments transferred to aquatic biota. This dispersion of metals is not considered a major physical migration pathway, but is included here because it may be an important exposure pathway to humans and ecological receptors.

5.3 Processes that Affect Contaminant Migration

The processes that affect contaminant migration include physical processes and physical-chemical processes which are discussed in the sections below.

5.3.1 Physical Processes Affecting Contaminant Particles

Physical processes affecting contaminant particles include suspended and bed load transport and wind dispersion.

5.3.1.1 Suspended and Bed Load Transport

Contamination in the suspended load and bed load can occur by a variety of processes including:

- Resuspension of contaminated sediment from stream bottoms
- Erosion of contaminated sediment from sediment bars
- Transport of suspended load from tributary drainages.

The transport of suspended load and bed load particles is sensitive to flow velocities, which vary laterally across the river channel, as a function of channel slope and depth, and in response to features that disrupt currents, such as boulders, logs, or other obstructions. Particles can be transported as a suspended load or bed load by higher flow velocities. Consequently, continued transport of the suspended load and bed load from tributaries that join the river depends on whether the river has a sufficient velocity to carry the influent material. In the case of the tributaries and creeks downstream of the WCLD sites, a large amount of material has been deposited throughout the creek channels and continues to be distributed downstream of the mine waste areas.

Increased flow velocity caused by runoff during storm events can re-suspend and transport contaminated sediment from the streambeds and scour material from the margins of sediment bars, increasing turbidity and suspended solids. The amount of sediment redistributed by a given flow velocity depends on sediment particle size and density, with small particles moved most easily. Entrained particles will remain suspended until water velocity drops below the threshold value needed to keep a given particle size suspended. The transport of contaminants in sediments from potential source areas varies from stream to stream, depending on velocity and grain size. In addition, the chemical compositions in sediments of each stream tend to reflect source signatures.

5.3.1.2 Wind Dispersion

The dispersal of fine-grained contaminant particulates can occur through the actions of wind erosion, transport, and deposition. Numerous factors influence the potential for wind dispersal as described in Section 5.2.2. For a given material subject to wind action, erosion and transport of fine particles is expected to be greatest for materials that have been recently disturbed. Once exposed to wind, fine particles are selectively removed, leaving behind a lag deposit of coarser material that serves to stabilize the ground surface under most conditions (this balance can be upset during atypically high wind velocities). This lag represents particle sizes that are too coarse to be moved by typical winds. Mining wastes which have been crushed, milled, and processed to very fine grain sizes lack the coarse fragments that form surface lags over time. Consequently, these wastes require vegetation or other mechanisms to impart surface stability. In contrast, coarsely ground chat commonly forms a surface lag of small gravel-sized particles that will act to reduce wind erosion over time.

Material entrained by wind or that saltates (bounces) across the ground surface due to wind shear will continue moving until such time that wind velocity decreases below the threshold required to maintain motion. This can occur as straight-line or gusty winds subside due to atmospheric effects or when wind encounters a disrupting object such as a tree line or other windbreak. Particles entrained by the wind and carried into a wooded area would be expected to be deposited as turbulence and eddies around obstructions cause wind velocity to drop.

5.3.2 Physical-Chemical Processes Affecting Contaminants

Physical-chemical processes that affect contaminants include absorption/desorption, complexation, oxidation-reduction, pH, water hardness and organic carbon, and photochemical processes as discussed in the sections below.

5.3.2.1 Adsorption/Desorption

Studies of sediment components in aquatic systems show that mineral precipitates, clays, and organic matter are prone to adsorbing dissolved metal species (Tessier and Campbell, 1987). Adsorption is a general term that describes the processes by which ionic species are held to a mineral surface by electrical forces (e.g., Smith 1999). The extent to which metals are sorptively held to sediment particles depends on pH, temperature, oxidation state, and the concentrations of precipitating minerals or sediment particles. Investigations of metal sorption in mine drainage settings generally show that mineral precipitates such as iron oxyhydroxide, aluminum hydroxide, and manganese oxide phases adsorb a variety of dissolved metal ions. When present in abundance, these precipitates cause discoloration of the streambed, offering visual evidence for their presence. Such discoloration was not noted in the streams in the Washington County area, and consequently the mineral precipitates are not considered to be a large reservoir for metals. Most sorbed metals in the WCLD sites area are likely to be held by clay particles that comprise a portion of the sediment in the streambed.

Adsorption of metals by clay particles is also likely to occur in soil materials that underlie mine waste areas. These metals would have been liERAted from the mining wastes by sulfide oxidation and acid generation as described in Section 5.2.4.

5.3.2.2 Complexation

Metal ions in solution are commonly bound to nonmetal ligands in a process termed complexation (Stumm and Morgan, 1996). This process can be important for a variety of metals, especially in the presence of humic (organic) substances, and it affects the ability of metals to be adsorbed or to precipitate as insoluble minerals. The stability of organic-metal complexes varies and often is partly dependent on pH; the dissociation of a given complex is usually inversely proportional to the stability of the complex. In general, metals such as copper and nickel form more stable organic complexes than iron and manganese (Walton-Day, 1999).

Many multivalent metal cations occur in solution as complexes in which the metal cation is coordinated with water, oxygen, or hydroxyl. The cations of certain metals with high ionic potentials may form oxyanionic complexes (Langmuir, 1997). In these cases, metal cations that include arsenic, selenium, and sulfur, occur as anionic species in solution (for example, As5+ commonly occurs as HAsO42-), which greatly affects the metals' solubility and ability to be adsorbed.

5.3.2.3 Oxidation-Reduction

Oxidation and reduction describe the valence state of cations. Numerous metals are subject to oxidation-reduction reactions including arsenic, chromium, copper, iron, and manganese, among others. Changes in the oxidation state of a metal affect the types of complexes it forms, its ability to sorb to clays, precipitating phases, and organic matter, and its solubility under given conditions. Redox changes in water can be brought through contact with a reducing medium (e.g., decaying organic detritus), contact with oxidizing conditions (e.g., exposure to the atmosphere), or microbial action (e.g., thiobacillus ferrooxidans; microbial action can either oxidize or reduce iron, sulfur, and other multivalent cations). Consequently, the behavior of a redox-sensitive metal in water and soil may change as redox conditions change, causing the metal to adsorb or desorb from a host, or for chemical precipitates to form or dissolve. Changes in redox conditions particularly affect groundwater that moves from the underground to surface environments.

Iron sulfide minerals, particularly pyrite, pyrrhotite, and chalcopyrite, are subject to oxidative weathering when exposed to atmospheric oxygen or oxidants such as ferric iron. This weathering creates acidity and produces pore water and shallow groundwater with high concentrations of dissolved iron and sulfate and low pH. The acidity assists in breaking down other metal sulfides (e.g., galena, sphalerite, and siegenite) and can cause metals bound to clays or organic detritus to desorb and be released from their hosts. As a result, acidic waters are typically rich in numerous dissolved metal species. Sulfuric acid formed by pyrite oxidation can be neutralized by reaction of the acidity with a base such as limestone. This neutralization raises pH and can cause metals such as aluminum and iron to precipitate from solution.

Waste materials at the WCLD sites that contain pyrite are expected to be subject to weathering and acid generation. The process of pyrite oxidation and acid generation not only affects groundwater that percolates through mining wastes, but also affects the waste material itself by creating acidic conditions that affect the ability of plants to take up nutrients and to prosper.

5.3.2.4 pH

Changes in ambient pH conditions, which are a measure of the hydrogen ion activity, affect complexation and metal speciation in aqueous and soil environments. These, in turn, affect the adsorption/desorption properties of metals onto clays, organic carbon, and precipitate phases, and the stability of many mineral phases. Values of pH less than 7 indicate an acidic environment, whereas values greater than 7 indicate an alkaline environment. Strong acids, such as sulfuric acid, dissociate more completely in

water and create lower pH conditions than weak acids, such as humic acid, which do not dissociate completely. pH is one of the major controls on the mobility of metals in the environment, with most metals being more mobile under acidic conditions. Changes in pH can be brought about by the generation of acids through the weathering of iron sulfide minerals and decomposition of organic detritus and by the neutralization of these acids through reaction with alkaline substances such as limestone.

5.3.2.5 Water Hardness and Organic Carbon

Missouri water quality criteria for some metals are hardness-based. Hardness is a measure of polyvalent cations (ions with a charge greater than +1) in water. Hardness generally represents the concentration of calcium (Ca2+) and magnesium (Mg2+) ions, because these are the most common polyvalent cations. Other ions, such as iron (Fe2+) and manganese (Mn2+), may also contribute to the hardness of water, but are generally present in much lower concentrations. Hardness mitigates metals toxicity because polyvalent cations (Ca2+ and Mg2+) help keep fish and other aquatic organisms from absorbing metals such as lead, arsenic, and cadmium into their bloodstream through their gills. The greater the hardness of the water, the harder it is for toxic metals to be absorbed through the gills. For this reason, a higher measured hardness in the ambient water results in a higher (less stringent) numeric standard for hardness-based metals. A lower measured hardness results in more stringent criteria for hardness-based metals. Heavy metal precipitates tend to bind with organic carbon, particularly in the absence of other binding substances.

5.3.2.6 Photochemical Processes

Photochemical processes (those occurring as a result of the conversion of light energy to chemical energy; (Stumm and Morgan, 1996) can affect redox processes. In general, photochemical processes affect those constituents that are capable of absorbing ultraviolet or visible light (sunlight). Cyanide, iron, and some organic molecules are subject to photo-oxidation, which can destroy cyanide and organic molecules and cause iron to fluctuate between oxidized and reduced species on a daily basis. Photochemical processes affect only those materials that are exposed to sunlight or the effects of ultra-violet (UV) radiation and, consequently, are unimportant for groundwater and subsurface soil.

5.4 Environmental Behavior of Contaminants

Contaminants present at the WCLD sites may migrate away from source areas and affect environmental media downwind or downstream. Some contaminants are

expected to remain persistent in site media while others may degrade over time. The primary constituents detected at the WCLD sites include arsenic, barium, cadmium, chromium, cobalt, copper, lead, selenium, and zinc. Factors key to the fate and transport of these constituents are discussed below.

As described in Section 5.3.2, numerous physical and chemical factors interact to control the fate and transport of contaminants in the environment. Changes in intensive chemical parameters such as oxidation state and pH (among others) affect the chemistry of the environmental system including mineral stability, metal speciation, phase solubility, reaction kinetics, and soil-water partition coefficients. These, in turn, affect adsorptive properties, mineral precipitation and dissolution, and other factors that control bioavailability and potential for uptake. Clearly, the fate and transport of contaminants in soil, sediment, and water is highly complex and cannot be reasonably estimated in a general evaluation.

5.4.1 Arsenic

Arsenic occurs in arsenic-bearing ore minerals, such as arsenopyrite (FeAsS), and is released by oxidative weathering. Once liERAted, arsenic is generally quite mobile and, depending on its oxidation state, may be leached from soil. Arsenic behaves as an oxyanion in water and is most easily adsorbed to clays or precipitate minerals when oxidized to arsenate (As5+). Sorption can occur at comparatively low pH (less than 3), if host sorbents are present in sufficiently high concentrations (e.g., Smith, 1999). Arsenic is also subject to methylation, which increases its ability for biological uptake.

5.4.2 Barium

In nature, barium occurs in a combined state, the principal forms being barite (barium sulfate) and witherite (barium carbonate). Barium is also present in small quantities in igneous rocks such as feldspar and micas and may also be found as a natural component of fossil fuel. The solubility and mobility of barium is greater in sandy soil increasing with decreasing pH and decreased organic matter content. Barium can react with metal oxides and hydroxides in soils, thus limiting its mobility and increasing absorption. Barium mobility decreases in soils with high sulfate and calcium carbonate content. In biological organisms, barium possesses chemical and physiological properties that allow it to compete with and replace calcium in processes normally mediated by calcium, particularly those relating to the release of adrenal catecholamines and neurotransmitters, such as acetycholine and noradrenaline. Barium does not bioaccumulate in mammals, and concentrations in higher species rarely exceed 10 mg/kg.

5.4.3 Cadmium

Cadmium is derived from ore minerals such as sphalerite (ZnS) in which cadmium substitutes for zinc in the crystal structure. It is relatively mobile in the aquatic environment, but is expected to move slowly through soil. Cadmium is removed from aqueous media by complexing with organic materials and through adsorption to clays or aluminum, iron, and manganese precipitates. In most cases, sorption of cadmium does not become significant until pH is neutral or slightly higher.

5.4.4 Chromium

Chromium occurs as a trace component in iron oxide and other rock-forming phases, and as an oxide mineral under certain geologic conditions. When released, it may exist in either the trivalent (Cr3+) or hexavalent (Cr6+) state. Cr6+ is soluble and mobile in groundwater and aquatic systems. In poorly drained soils, Cr6+ is quickly reduced to Cr3+ which is strongly adsorbed to clays and soils high in organic matter.

5.4.5 Cobalt

Cobalt is derived from siegenite ((Ni,CO)3S4), a component of ores at the Ruth Mine and possibly other mines in the area. Cobalt adsorbs to clay minerals and hydrous oxides of iron, manganese, and aluminum. Sorption is not likely to be significant until pH is neutral or slightly higher.

5.4.6 Copper

Copper occurs in chalcopyrite (CuFeS2). It is among the more mobile metals in the environment and readily complexes with hydroxyl and carbonate anions. The specific species that exist in solution depend on pH, oxidation state, temperature, alkalinity, and the concentrations of other chemical species present. Many copper compounds are readily soluble and as a result, copper is mobile in soil and groundwater. Adsorption to organic matter, clays, and aluminum, iron, and manganese precipitates is the primary process that limits the environmental mobility of copper. Sorption to iron precipitates can occur at pH of less than 4 if the host sorbent is present in sufficient quantities.

5.4.7 Lead

Lead occurs in galena (PbS), the main ore mineral in mines of the Washington County area, as tetraethyl lead, an additive to gasoline, and as a component of certain paints. The organic form of lead is generally unstable and undergoes rapid conversion to inorganic lead compounds. Most forms of inorganic lead are relatively insoluble and not

very mobile. Because lead tends to bind tightly to soils, sorption processes exert a dominant effect on the mobility of lead in the environment.

5.4.8 Selenium

Selenium is a naturally occurring element found in all environmental media: air, soil, sediment, and water. Selenium has a sorptive affinity for hydrous metal oxides, clays, and organic materials. Transformations of selenium in soils appear to be mediated by microbial functions. Oxidized forms of selenium are affiliated with increased availability and toxicity. Immobilization of selenium involves the formation of many organic compounds including amino acids, proteins, selenium compounds and selenides. Selenium is also transformed by mineralization and methylation. Volatilization of selenium from soils is influenced by a variety of factors including microbial activity, temperature, moisture, time, and the concentration of water soluble selenium. In plants, selenium is an essential element for growth. In the environment, uptake and accumulation by plants is influenced by the concentration and form of selenium present in soils.

5.4.9 Zinc

Zinc is present in the ore mineral ZnS. It is comparatively mobile in the environment and moves as a function of pH, salinity, and the concentration of complexing ligands. It is removed from aqueous media by complexing with organic materials and through adsorption to clays or aluminum, iron, and manganese precipitates. In most cases, sorption of zinc does not become significant until pH is neutral or slightly higher. Zinc normally partitions to soil (sediment) to a greater degree than it does to water.

5.5 Fate and Transport

This section relates contamination at each of the major contaminant source areas to the conceptual site model presented in Section 5.1.

5.5.1 Contaminant Sources

Sampling and analysis conducted at the WCLD sites during this RI and previous investigations indicated that remnant mine waste piles are the primary contaminant source in this area. Tailings areas represent a large volume of fine-grained material, most of which is barren and un-vegetated.

5.5.2 Contaminant Transport

Numerous mechanisms are capable of transporting contaminants from the sources within the WCLD sites. These include:

- Wind dispersal of fine tailings material,
- Water erosion and transport of tailings and contaminated soil,
- Mass wasting of tailings through slope failure and debris flow,
- Surface water runoff to streams, and
- Subsurface flow of groundwater.

Wind dispersal of fine tailings may occur, especially when the surface of the tailings is dry. Transport of fine materials depends on wind velocity and duration and is expected to have the most effect along prominent downwind directions. Disruptions of air flow by obstructions along the margins of the tailings impoundment (e.g., trees and other vegetation) may help to decrease wind velocity and assist in deposition of entrained dust.

Water erosion of tailings occurs along the margin of the waste area and is one of the most important mechanisms for tailings transport. Most erosion and transport of tailings occurs in response to storm events. Erosion has carved gullies into some elevated waste areas while water erosion does not appear to be prominent at other areas that are flat.

Surface water runoff (overland flow) occurs from the mine waste areas and has the potential to convey contaminants leached or dissolved from the source areas. Surface water runoff from the mine waste areas includes runoff into the Mill Creek watershed which is known to be affected by mine related activities. Runoff into Mill Creek affects downstream tributary Shibboleth Branch and ultimately Big River. In 2002-2003, MDNR identified elevated levels of dissolved barite in the Big River with probable origins in the Mill Creek watershed (MDNR, 2003).

Shallow groundwater within the WCLD sites will flow as dictated by the potentiometric gradient in the area. In general, shallow groundwater is expected to flow in the same direction as the local topography. Groundwater also could be expected to emerge as seeps along the mine waste-soil interface.

5.5.3 Affected Media

This section describes how the transport of contaminants from the mine waste sources at the WCLD sites has affected soil, indoor dust, groundwater, surface water, and sediment in off-site locations.

5.5.3.1 Potosi Site

Affected media at the Potosi site include mine waste areas, soil (area wide and residential), groundwater, sediment, surface water and biota.

- Soil. Soils at the Potosi site can be affected by transport processes including wind dispersion and overland surface water flow. Elevated concentrations of certain metals, including arsenic, barium, cadmium, and lead were detected in surface soil samples collected in source/mine waste areas and at residential properties.
- Groundwater. Groundwater at the Potosi site can be affected by transport processes including adsorption and dispersion. Elevated concentrations of certain metals, including arsenic, barium, cadmium, and lead were detected in groundwater samples collected from potable wells throughout the Potosi site.
- Sediment. Sediments at the Potosi site can be affected by transport processes including adsorption/desorption, oxidation-reduction, and complexation. Elevated concentrations of certain metals, including aluminum, arsenic, barium, cadmium, cobalt, iron, lead, manganese and vanadium were detected in sediment samples collected in creeks and streams throughout the Potosi site.
- Surface Water. Surface water at the Potosi site can be affected by transport processes including adsorption/desorption, oxidation-reduction, and overland surface water flow. Elevated concentrations of certain metals, including arsenic, barium, and manganese were detected in surface water samples collected in creeks and streams throughout the Potosi site.
- Biota. Biota at the Potosi site can be affected by transport processes including bioaccumulation. Elevated concentrations of certain metals, cadmium and lead were detected in samples of plants, crayfish, and fish collected in creeks and streams throughout the Potosi site.

5.5.3.2 Richwoods Site

Affected media at the Richwoods site include mine waste areas, soil (area wide and residential), groundwater, sediment, and surface water.

- Soil. Soils at the Richwoods site can be affected by transport processes including wind dispersion and overland surface water flow. Elevated concentrations of certain metals, including arsenic, barium, cadmium, and lead were detected in surface soil samples collected in source/mine waste areas and at residential properties throughout the Richwoods site.

- Groundwater. Groundwater at the Richwoods site can be affected by transport processes including adsorption and dispersion. Elevated concentrations of certain metals, including arsenic, barium, cadmium, and lead were detected in groundwater samples collected from potable wells throughout the Richwoods site.
- Sediment. Sediments at the Richwoods site can be affected by transport processes including adsorption/desorption, oxidation-reduction, and complexation. Elevated concentrations of certain metals, including arsenic, barium, and lead were detected in sediment samples collected in creeks and streams throughout the Richwoods site.
- Surface Water. Surface water at the Richwoods site can be affected by transport processes including adsorption/desorption, oxidation-reduction, and overland surface water flow. Elevated concentrations of certain metals, including arsenic, barium, and lead were detected in surface water samples collected in creeks and streams throughout the Richwoods site.
- Biota. Biota at the Richwoods site can be affected by transport processes including bioaccumulation. Although no biota sampling has been performed, it is likely that plants, crayfish, and fish in creeks and streams throughout the Richwoods Site may be impacted by certain metals.

5.5.3.3 Old Mines Site

Affected media at the Old Mines site include mine waste areas, soil (area wide and residential), groundwater, sediment, and surface water.

- Soil. Soils at the Old Mines site can be affected by transport processes including wind dispersion and overland surface water flow. Elevated concentrations of certain metals, including arsenic, barium, cadmium, and lead were detected in surface soil samples collected in source/mine waste areas and at residential properties throughout the Old Mines site.
- Groundwater. Groundwater at the Old Mines site can be affected by transport processes including adsorption and dispersion. Elevated concentrations of certain metals, including arsenic, barium, cadmium, and lead were detected in groundwater samples collected from potable wells throughout the Old Mines site.
- Sediment. Sediments at the Old Mines site can be affected by transport processes including adsorption/desorption, oxidation-reduction, and complexation. Elevated concentrations of certain metals, including arsenic,

barium, cadmium and lead were detected in sediment samples collected in creeks and streams throughout the Old Mines site.

- Surface Water. Surface water at the Old Mines site can be affected by transport processes including adsorption/desorption, oxidation-reduction, and overland surface water flow. Elevated concentrations of certain metals, including arsenic, barium, and lead were detected in surface water samples collected in creeks and streams throughout the Old Mines site.
- Biota. Biota at the Old Mines site can be affected by transport processes including bioaccumulation. Although no biota sampling has been performed, it is likely that plants, crayfish, and fish in creeks and streams throughout the Old Mines Site may be impacted by certain metals.

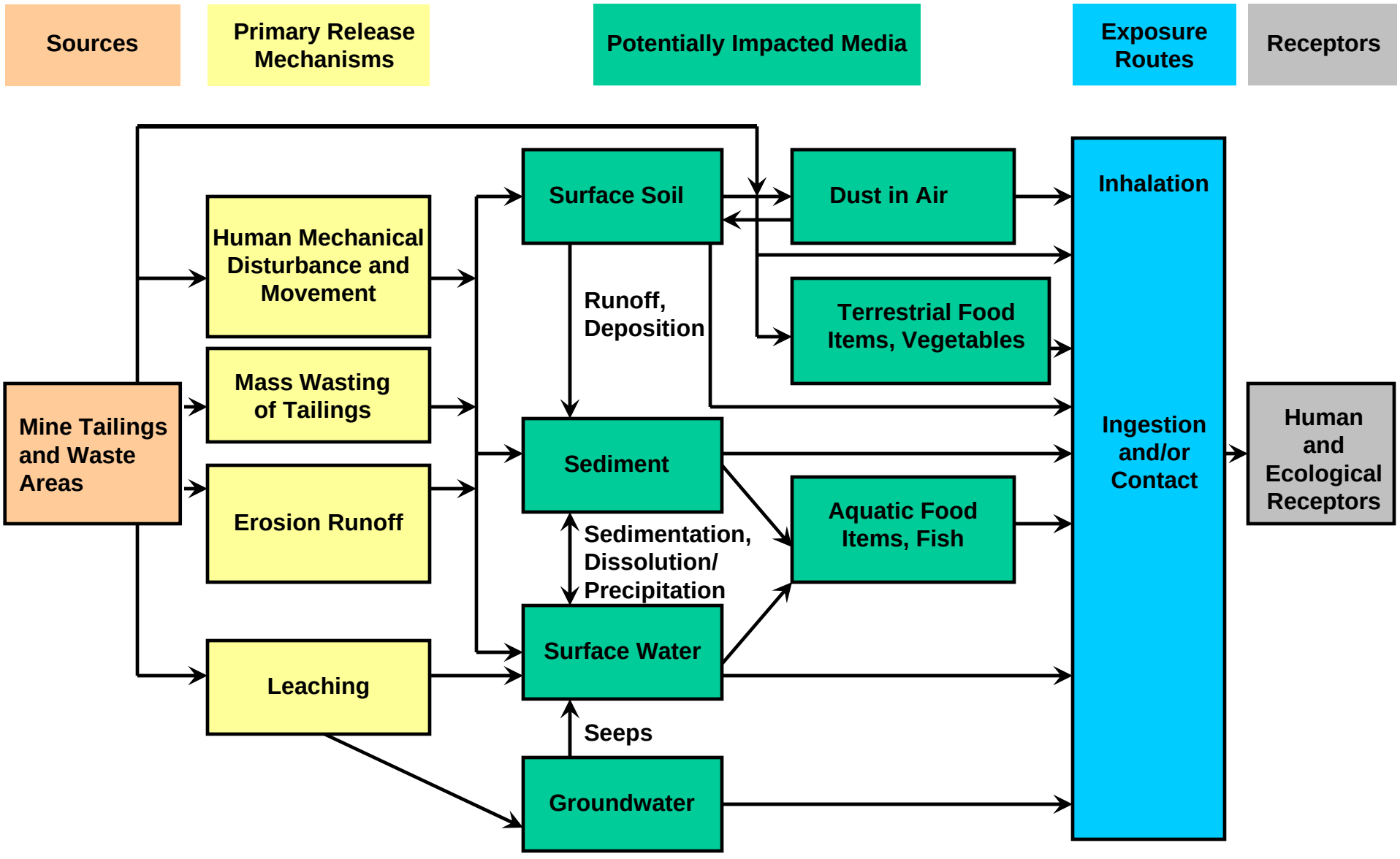

Figure 5-1
Conceptual Site Model
Washington County Lead District Site
Washington County, Missouri

6.0 Human Health and Ecological Risk Assessment

This section of the RI Report summarizes the Human Health Risk Assessment (BVSPC, 2009) and the Ecological Risk Assessment (EPA, 2008d) that were prepared for the WCLD RI.

6.1 Human Health Risk Assessment

The HHRA is an assessment of the potential for exposure and risk to humans from contaminants associated with the site. It describes the CSM for human exposure to site-related contaminants, identifies exposure pathways that could lead to contact with site-related contaminants, identifies which exposure pathways are believed to be most significant, and presents the exposure parameters and model inputs for use in quantifying exposure from each identified pathway. It also describes the approach for selecting Contaminants of Potential Concern (COPCs) in site media and the approaches for quantifying risks for lead and other COPCs. The HHRA is presented in Appendix A of this RI Report.

6.1.1 Chemicals of Potential Concern

COPCs are chemical which exist in the environment at concentration levels that might be of potential health concern to humans and which are or might be derived, at least in part, from site-related sources. Chemicals that are not likely to contribute significant risks to humans are eliminated, while chemicals that might be of potential concern are selected for detailed evaluation. This COPC selection procedure is intended to be conservative; that is, it is expected that some chemicals may be identified as COPCs that are actually of little or no concern, but that no chemicals of authentic concern will be overlooked.

The available data from all sampling media was reviewed to determine if it met data quality requirements for use in the quantitative risk assessment. Through this process, it was determined that most of the historical data (data collected prior to 2008) did not meet the data usability requirements for use in the quantitative risk assessment. Although this data could not be used in the quantitative risk assessment, it was selected for use in a qualitative evaluation of risk. Consequently, all data selected for both quantitative and qualitative risk assessments were included in the COPC selection process.

In Step 1, a chemical may be eliminated from the quantitative risk assessment if it is detected only infrequently in a site medium. In the risk assessment for the WCLD sites, chemicals were excluded only if they were never detected in any site sample. A

review of the analytical detection limits for the chemicals analyzed indicated that most detection limits were sufficiently low (detection limits were below the available screening levels). One exception was arsenic. Arsenic was selected as a COPC for the quantitative risk assessment of potable well water from residential properties on the basis of inadequate detection limits. Arsenic was reported as non-detect in all samples of this data set, but the detection limits were greater than the risk based screening level.

In Step 2, chemicals for which toxicity values are not available are eliminated. If a chemical does not have a toxicity value, this is identified as a source of uncertainty unless the chemical is a beneficial nutrient and the expected intake from the site is within the range that is considered healthful.

In Step 3, detected chemicals whose maximum value is below a level of concern are eliminated from further consideration. If a chemical is detected at least once, but the maximum detected concentration is well below a level of health concern, that chemical is eliminated from further consideration. The screening step was performed using EPA Regional Screening Values (EPA 2007a). Because there are no Regional Screening Values for either sediment or surface water, the values for residential soil and tap water were used, respectively, to screen chemicals in these media. Target risk levels were set to a Hazard Quotient (HQ) value of 0.1 and a cancer risk level or 1E-06 (BVSPC, 2009).

The selected COPCs are summarized in Tables 6-1 and 6-2. The COPCs selected for the quantitative risk assessment (see Table 6-1) include aluminum, antimony, arsenic, barium, cadmium, cobalt, iron, lead, manganese vanadium and zinc. The COPCs selected for qualitative evaluation include aluminum, arsenic, barium, cadmium, cobalt, iron, lead, manganese, and vanadium.

6.1.2 Exposure Assessment

Exposure is the process by which human receptors come into contact with chemicals in the environment. In general, receptors can be exposed to chemicals in a variety of environmental media (e.g., soil, water, air, food), and these exposures can occur through several pathways (e.g., ingestion, dermal contact, inhalation). For the purposes of the HHRA, the WCLD sites are divided into three conceptual categories: Potosi, Richwoods and Old Mines areas or sites.

An analysis of the COPCs in conjunction with the source area characteristics identified the potential constituent migration and exposure pathways. An exposure pathway screening was then conducted to identify those pathways to be included in the detailed quantitative analysis. The complete exposure pathways that were quantitatively evaluated in the HHRA are:

- Current/Future Ingestion of COPCs in Residential Surface Soil by Adult and Child Residents
- Current/Future Dermal Absorption of COPCs in Residential Surface Soil by Adult and Child Residents
- Current/Future Ingestion of COPCs in Residential Potable Wells by Adult and Child Residents
- Current/Future Dermal Absorption of COPCs in Residential Potable Wells by Adult and Child Residents

Exposures to Residents, Recreational Users, All-Terrain Vehicle (ATV) Riders, Industrial/Commercial Workers and Construction Workers to surface water, sediment, mine waste, as well as historical soil and groundwater data were qualitatively evaluated.

For every exposure pathway of potential concern, it is expected that there will be differences between different individuals in the level of exposure at a specific location due to differences in intake rates, body weights, exposure frequencies, and exposure durations. Thus, there is normally a wide range of average daily intakes between different members of an exposed population. Because of this, all daily intake calculations must specify what part of the range of doses is being estimated. Typically, attention is focused on intakes that are "average" or are otherwise near the central portion of the range, and on intakes that are near the upper end of the range (e.g., the 95th percentile). These two exposure estimates are referred to as Central Tendency Exposure (CTE) and Reasonable Maximum Exposure (RME), respectively.

6.1.3 Toxicity Assessment

The toxicity assessment identifies the types of adverse health effects associated with exposure to a contaminant and how the appearance of these adverse health effects is related to the exposure level. Human health risk assessments typically characterize potential non-cancer and cancer health effects separately. This two-part approach is employed because there are typically major differences in the time-course of action and the shape of the dose-response curve for cancer and non-cancer effects.

Toxicity values are available for all of the COPCs selected for the WCLD sites with the exception of lead. Quantitative evaluation of lead toxicity is performed through the estimation of blood-lead (Pb-B) concentrations for receptors of concern. Pb-B concentrations are estimated for using the (IEUBK Model for Lead (Windows® Version 1.1 Build 9), which estimates Pb-B concentrations in children (EPA, 1999b).

6.1.4 Risk Characterization

Risk characterization integrates the exposure and toxicity assessments to quantify the risks or potential for adverse non-cancer and cancer health effects. This final step also discusses the uncertainties of each step of the risk assessment and their impact on the risk estimates.

For most chemicals, the potential for non-cancer effects is evaluated by comparing the estimated daily intake of the contaminant over a specific time period with a level not associated with adverse health effects for that contaminant. This comparison results in a non-cancer HQ, while a Hazard Index (HI) is calculated when an individual is exposed to more than one chemical or exposure pathway, such as eating and breathing a contaminant. If the HQ or HI for a contaminant(s) is equal to or less than 1.0 (1E+00), it is believed that there is no appreciable risk that non-cancer health effects will occur. If an HQ exceeds 1.0 (1E+00), there is some possibility that non-cancer effects may occur. This is because of the margin of safety inherent in the derivation of the HQ value. If the total HI exceeds 1.0, it may be appropriate to perform conduct a more detailed evaluation of the COPCs by critical effect. Separate HIs are calculated by type of effect (target organ-specific HI) because health effects from exposure to different chemicals are only additive if they have the same toxic effect (affect the same target organ system).

For contaminants that EPA considers potentially carcinogenic in humans, the risk assessment estimates the risk or probability that an individual will develop cancer over a lifetime as a result of exposure to site-related contaminants. For example, the cancer risk is expressed as a probability of 1 in 10,000 in an individual or for every 10,000 people exposed to the contaminant, one extra or excess cancer case may occur beyond what would normally be expected from all other causes of cancer. The cancer risks are summed across all chemicals of concern and all exposure pathways that contribute to exposure of an individual in a given population. In general, EPA considers excess cancer risks that are below 1 in 1,000,000 or 1E-06 to be so small as to be negligible, and risks above 1 in 10,000 or 1E-04 to be sufficiently large that some sort of remediation is desirable. Excess cancer risks that range between 1 in 10,000 and 1 in 1,000,000 are generally considered to be acceptable, although this is evaluated on a case by case basis.

The risks or potential for adverse health effects for lead are evaluated using a different approach than for most other metals. Because lead is widespread in the environment, exposure can occur by many different pathways. Thus, lead risks are based on consideration of total exposure (all pathways) rather than just site-related exposure. In addition, because most studies of lead exposures and resultant health effects in humans have traditionally been described in terms of blood lead level (PbB, expressed in units of

micrograms per deciliter (μg/dL), lead exposures and risks are typically assessed using mathematical models.

The risk assessment for the WCLD sites used EPA's IEUBK Model for Lead in Children to estimate the distribution of blood lead levels in a population of children exposed to lead at the site. EPA has established a health protection goal that there be no more than a 5 percent chance that an exposed individual (a child less than 7 years of age) will have a blood lead level that exceeds 10 μg/dL. For convenience, this probability is referred to as P10.

In summary, there are significant health risks to children at the WCLD sites. The exposure pathways, exposure points, and contaminants that have been identified as a concern to human receptors are presented in the following discussion.

6.1.4.1 Quantitative Risks at Residential Properties

The quantitative risk assessment identified cobalt and lead as COCs for current and future residential exposures to the residential properties evaluated. Cobalt was identified as a COC for non-cancer potential effects associated with concentrations in soil at only 1 of the 48 residential properties evaluated. Lead was identified as a COC for in soil and groundwater at 32 of the 48 residential properties that were evaluated.

6.1.4.2 Qualitative Risks with Surface Water

Adult and child recreational users may be exposed to surface water in the Potosi, Richwoods and Old Mines sites. Exposures may occur through incidental ingestion and dermal absorption. To qualitatively evaluate the potential for risk to recreational users, the range of exposure concentrations detected in surface water were compared to the RSLs for tap water and the MCLs. These values are intended to protect human exposures associated with consumption of drinking water, and likely are somewhat overprotective for recreational exposures to surface water. Maximum concentrations of arsenic, barium and manganese in surface water at the Potosi area are below either the MCL or tap water RSL. For the Richwoods site, the maximum concentrations of arsenic and barium are below either the MCL or tap water RSL; however, the maximum concentration of lead exceeds the drinking water action level. For the Old Mines site, the maximum concentrations of barium and lead exceed both MCL and RSL values. Maximum concentrations of arsenic in surface water at the Old Mines site are below the MCL. Based on this evaluation, there is a potential for risk associated with lead in surface water at the Richwoods and Old Mines sites, and a potential for risk associated with barium in surface water at the Old Mines site.

6.1.4.3 Qualitative Risks with Sediment

Adult and child recreational users may be exposed to sediment in the Potosi, Richwoods and Old Mines sites. Exposures may occur through incidental ingestion and dermal absorption. To qualitatively evaluate the potential for risk to recreational users, the range of exposure concentrations detected in sediment were compared to the RSLs for soil. These values are intended to protect human exposures associated with residential and industrial exposures, and likely are somewhat overprotective for recreational exposures to sediment. Maximum concentrations of arsenic and lead exceed the RSLs for both residential and industrial exposures at the Potosi, Richwoods and Old Mines sites. Based on this evaluation, there is a potential for risk associated with arsenic and lead in sediment at the Potosi, Richwoods and Old Mines sites.

6.1.4.4 Qualitative Risks with Mine Waste

Adult and child residents, industrial/commercial workers, construction workers, ATV riders, and adult and child recreational users may be exposed to mine waste soils in the Potosi, Richwoods and Old Mines sites. Exposures may occur through incidental ingestion, dermal absorption and inhalation of particulates. To qualitatively evaluate the potential for risk to these receptors, the range of exposure concentrations detected in mine waste soil were compared to the RSLs for soil. These values are intended to protect human exposures associated with residential and industrial exposures, and likely are somewhat overprotective for recreational exposures to mine waste soil. Maximum concentrations of arsenic and lead exceed the RSLs for both residential and industrial exposures at the Potosi, Richwoods and Old Mines sites. Based on this evaluation, there is a potential for risk associated with arsenic and lead in mine waste soil at the Potosi, Richwoods and Old Mines sites.

6.1.4.5 Qualitative Risks with Historical Soil

Adult and child residents, industrial/commercial workers, construction workers, and adult and child recreational users may be exposed to historical soils in the Potosi, Richwoods and Old Mines sites. Exposures may occur through incidental ingestion, dermal absorption and inhalation of particulates. To qualitatively evaluate the potential for risk to these receptors, the range of exposure concentrations detected in historical soil were compared to the RSLs for soil. These values are intended to protect human exposures associated with residential and industrial exposures, and likely are somewhat overprotective for recreational exposures to historical soil. Maximum concentrations of arsenic and lead exceed the RSLs for both residential and industrial exposures at the Potosi, Richwoods and

Old Mines sites. Based on this evaluation, there is a potential for risk associated with arsenic and lead in historical soil at the Potosi, Richwoods and Old Mines sites.

6.1.4.6 Qualitative Risks with Historical Groundwater

Adult and child residents, industrial/commercial workers, and construction workers may be exposed to historical groundwater in the Potosi, Richwoods and Old Mines sites. Exposures may occur through incidental ingestion and dermal absorption. To qualitatively evaluate the potential for risk to these receptors, the range of exposure concentrations detected in historical groundwater were compared to the RSLs for tap water and MCLs. These values are intended to protect human exposures associated with consumption of drinking water. Maximum concentrations of lead exceed the drinking water action level for lead at the Potosi, Richwoods and Old Mines sites. In addition, maximum concentrations of arsenic and cadmium in historical groundwater at the Old Mines site exceed both the tap water RSL and MCL values. Based on this evaluation, there is a potential for risk associated with lead in historical groundwater at the Potosi, Richwoods and Old Mines sites as well as arsenic and cadmium at the Old Mines site.

6.1.4.7 Qualitative Risks with Fish Tissue

Adult and child recreational users may be exposed to fish tissue in the Potosi, Richwoods and Old Mines sites. Exposures may occur through consumption of fish. Lead was the only COPC selected for fish tissue. Samples of fish fillet tissue were only obtained from two samples. Two fish fillet tissue samples are not adequate for characterizing representative levels of contaminants in fish, especially given the size of the site and that there are numerous surface water bodies present within the WCLD sites where surface water and sediment contamination may vary. In addition, there are no fish tissue RSLs available to compare with the concentrations detected in the fish tissue samples collected. Furthermore, potential risks associated with consumption of fish are also influenced by the quantity of fish consumed. Consequently, there is considerable uncertainty associated with the evaluation of this pathway. Due to the lack of adequate samples, and the known concentrations of lead in surface water and sediment, there is a potential risk associated with consumption of fish in the WCLD sites.

6.2 Ecological Risk Assessment

The site investigation and data analysis for this ERA focused on the Potosi site (only) of the WCLD sites. Additional ERAs for the Richwoods and Old Mines sites are forthcoming (EPA, 2008d).

A SLERA was conducted by EPA in early 2008 which addressed the degree to which the environments and ecological receptors associated with the WCLD sites are potentially at risk (EPA, 2008d). The SLERA used data from the preliminary site assessment to screen COPECs, as well as to develop the screening level problem formulation for the site. Despite the site-specificity of the initial evaluation, many estimates and assumptions were required to fill gaps in needed knowledge and data to complete the evaluation of potential risk. The following sections discuss the scope and extent of additional investigations completed in 2008 to address the uncertainties inherent in the initial SLERA evaluation that were required to complete the ERA.

6.2.1 Problem Formulation

Problem formulation establishes the goals, breadth, and focus of the ecological risk assessment. Problem formulation involves the identification of ecological chemicals of potential concern, and it establishes the assessment endpoints or specific ecological values to be protected.

The ERA for Potosi Site identified the following assessment endpoints:

- Assessment Endpoint 1 – Protection of Terrestrial Plant Community
- Assessment Endpoint 2 – Protection of Terrestrial Soil Invertebrate Community
- Assessment Endpoint 3 – Protection of Herbivore Community
- Assessment Endpoint 4 – Protection of Terrestrial Ground-Feeding Insectivore Community
- Assessment Endpoint 5 –Protection of Terrestrial Carnivore Community
- Assessment Endpoint 6 – Protection of Benthic Invertebrate Community
- Assessment Endpoint 7 – Protection of Piscivore Community
- Assessment Endpoint 8 – Protection of Aerial-Feeding Insectivore Community

6.2.2 ERA Field Investigation

The ERA field investigation was conducted by EPA and included an assessment of soil, surface water, sediment, and biota. Detailed information on the site investigation and data analysis, including all Standard Operating Procedures (SOPs), can be found in the Field Sampling Plan (EPA, 2008b).

6.2.2.1 Soil

The soil data from the SLERA investigation targeted yards of homes, and soil samples were only analyzed for arsenic, barium, cadmium and lead. Therefore, additional soil samples were collected throughout the Potosi site during the ERA, with emphasis on areas in which sensitive wildlife of concern (e.g., ground-feeding insectivores) would most likely forage, such as the forested edges of clearings and forested riparian areas (EPA, 2008c). Eleven surface soil samples were collected from the 0 to 12-inch depth interval and analyzed for TAL total metals and the following physical characteristics: percent moisture, TOC, and field pH.

Background locations within the boundaries of the Potosi site are not available due to the widespread nature of the mining. Therefore, background metal concentrations are based on the range typical for Missouri (EPA, 2008d).

6.2.2.2 Surface Water

The aquatic habitat of primary concern within the Potosi site is the Mill Creek watershed, which originates within the site and flows into the Big River near Blackwell, Missouri. Although some surface water data from Mill Creek is available from the Biological Assessment Report for Mill Creek (MDNR, 2003), no data was collected in Mill Creek or its tributaries as part of EPA's SLERA investigation. Therefore, additional surface water samples were collected for the ERA at a 0 to 12-inch depth interval in Mill Creek and its tributaries (EPA, 2008d). In addition, several tailings ponds throughout the site, as well as Bates Creek and Mine a Breton Creek, which flow through the western edge of Potosi, were sampled. Surface water samples were filtered in the field to represent the dissolved portion of metals, which provides a better estimation of the bioavailable concentrations of contaminants present in surface waters. All surface water samples were analyzed for hardness, pH, temperature, and dissolved oxygen (EPA, 2008d).

6.2.2.3 Sediment

Sediment samples were co-located with surface water samples and collected at a 0 to 6-inch depth interval. All sediment samples were sieved in the field and analyzed for total metals, TOC, and percent moisture. Because Mill Creek originates within the Potosi Site, where mining impacts are widespread, two sampling locations on the Big River (upstream of the Leadwood access) were considered background for the Potosi site (EPA, 2008d).

6.2.2.4 Biota

Terrestrial (vegetation) biota samples were co-located with the soil locations and analyzed for cadmium, lead, and selenium. Earthworm abundance was also surveyed at each soil sampling location. The Catch Per Unit Effort (CPUE) was recorded, with one person collecting worms for a total of 10 minutes (EPA, 2008d).

A macroinvertebrate survey was also performed at six locations corresponding to the sediment and surface water sampling locations on Mill Creek. The methods, analysis, and results of the macroinvertebrate survey for the site are described in detail in the ERA (EPA, 2008d).

Fish samples (whole body) were collected at six locations on Mill Creek, corresponding to the sediment/surface water sampling locations and the macroinvertebrate surveys. In addition, fish were collected at one location in Pond Creek, as well as in two of the tailings ponds. All fish samples were analyzed for cadmium, lead and selenium. In addition to fish tissue, three crayfish samples were collected from Mill Creek and analyzed for cadmium, lead, and selenium (EPA, 2008d).

6.2.3 Exposure Assessment

The assessment of pathways by which ecological receptors may be exposed to COPECs from the Potosi site includes an examination of the source areas, existing migration pathways, and potential exposure routes as well as those that may be reasonably expected in the future. The site conceptual exposure model integrates and summarizes the information concerning sources, constituent migration pathways, exposure routes, and receptors into a combination of potential exposure pathways. The site CSM including a graphical representation of the complete exposure pathways to ecological receptors by direct exposure or through food-chain transfer, is presented in Figure 5-1. This model identifies the key potential release mechanisms, transport media, exposure media, exposure routes, and terrestrial and aquatic ecological receptors for the site.

6.2.4 Expanded Contaminant Screen

Because arsenic, cadmium, lead, and zinc were identified early on as the primary metals of concern at mining sites in Region 7, the data from the ERA, limited laboratory analysis to these metals (with barium being added due to barite mining). Thus, the COPECs identified in the ERA for the site were based on data for these five metals. However, there is a concern over the potential ecological impacts from other trace metals that may be associated with mining. Therefore, as part of the baseline problem formulation for the Potosi site, soil, surface water, and sediment was analyzed and

screened for all of the metals on the laboratory's target analyte list as part of the ERA (EPA, 2008d). During the expanded contaminant screen, the COPECs were also refined in one or more of the following ways (EPA, 2008d):

- Comparison to background,
- Frequency and magnitude of detection, and
- Dietary considerations (essential nutrients).

The expanded contaminant screen concluded that in terrestrial habitats, barium, lead, selenium, and zinc are COPECs for several key receptors (soil invertebrates, plants, birds and mammals). Cadmium and copper are COPECs for ground-feeding insectivorous birds and mammals. In aquatic habitats, barium and vanadium are COPECs for sediment based on a comparison with background concentrations from within the watershed. Cadmium, lead, and zinc are COPECs for sediment because they exceeded the Threshold Effect Concentration (TEC) and a Probable Effect Concentration (PEC) at one or more locations. In surface water, silver is a COPEC because of inadequate detection limits. Barium and lead are COPECs for surface water because they exceeded water quality criteria (EPA, 2008d). The COPEC are summarized in Table 6-2.

6.2.5 Terrestrial Risk Characterization

During risk characterization, data on exposure and effects are integrated into a statement about risk to each aquatic assessment endpoint. A weight-of-evidence approach is used to interpret the implications of different studies and tests for each assessment endpoint. Risk characterization constitutes the final phase of the risk assessment process. The preliminary assessment endpoints have been refined based on the results of the expanded contaminant screen and further evaluation using various additional measurement endpoints as well as more site-specific exposure and toxicity information will be used to further characterize risk (EPA, 2008d).

6.2.5.1 Plants and Soil Invertebrate Communities

To evaluate plant and soil invertebrate communities, additional measurement endpoints for these assessment endpoints were evaluated including the analysis of metal concentrations in vegetation collected at each soil sampling location, earthworm and plant toxicity tests, and the catch per unit effort of earthworms at each soil sampling location. The plant tissue analysis showed that lead concentrations in soil correlate to concentrations observed in plant tissue. The toxicity tests concluded that there are no

significant effects on earthworms or plants from concentrations of metals in soils. Scatter plots of relationships between soil metal concentrations and earthworm abundance showed no relationships between number of individuals and concentrations of barium, lead, selenium, or zinc in soil (EPA, 2008d).

6.2.5.2 Herbivorous Birds and Mammals

Ingestion dose models were used to estimate food chain exposure to herbivores using the mourning dove (*Zenaida macroura*) as the representative receptor for birds and the prairie vole (*Microtus ochrogaster*) as the representative receptor for mammals. Lead, selenium, and zinc were evaluated as COPECs for the herbivorous bird; however, no COPECs were identified for the mammal. The ingestion dose model concluded that lead and selenium present a potential risk to herbivorous birds (EPA, 2008d).

6.2.5.3 Insectivorous Birds and Mammals

Ingestion dose models were used to estimate food chain exposure to insectivores using the American woodcock (*Scolopax minor*) as the representative receptor for birds and the short-tailed shrew (*Blarina brevicauda*) as the representative receptor for mammals. Barium, cadmium, copper, lead, selenium and zinc were identified as COPECs for mammalian insectivores and cadmium, copper, lead, selenium, and zinc were identified as COPECs for avian receptors. The ingestion dose model concluded that cadmium, copper, lead, selenium and zinc present a potential risk to avian insectivores and barium, cadmium, lead, selenium and zinc present a potential risk to insectivorous mammals (EPA, 2008d).

6.2.5.4 Carnivorous Birds and Mammals

Ingestion dose models were used to estimate food chain exposure to carnivores using the red-tailed hawk (*Buteo jamaicencis*) as the representative receptor for birds and the long-tailed weasel (*Mustela frenata*) as the representative receptor for mammals. Lead and selenium were identified as COPECs for mammalian carnivores, and lead as a COPEC for avian carnivores. The ingestion dose model concluded that lead presents a potential risk to carnivorous birds and lead and selenium present a potential risk to carnivorous mammals (EPA, 2008d).

6.2.6 Aquatic Risk Characterization

Just as in the terrestrial risk characterization, data on exposure and effects are integrated into a statement about risk to each aquatic assessment endpoint. A weight-of-

evidence approach is used to interpret the implications of different studies and tests for each assessment endpoint (EPA, 2008d).

6.2.6.1 Benthic Macroinvertebrates

To evaluate benthic macroinvertebrate communities, a macroinvertebrate survey was conducted as an additional measurement endpoint. The survey concluded that locations SD03 (Highway Department) and SD10 (Mill Creek at Blackwell) had biosurvey scores of fair. The score for location SD03 was attributed to the concentrations of metals (barium, lead, vanadium, and zinc) in sediment (EPA, 2008d). The score for SD10 is likely attributed to other influences such as agriculture, heavier sediment loads, and low a water crossing.

6.2.6.2 Piscivores

Ingestion dose models were used to estimate food chain exposure to piscivores using the belted kingfisher (*Ceryle alcyon*) as the representative receptor for birds and the river otter (*Lutra canadensis*) as the representative receptor for mammals. All COPECs in sediment and surface water were evaluated. The ingestion dose model concluded that lead presents a potential risk to piscivorous birds and barium presents a potential risk to piscivorous mammals (EPA, 2008d).

6.2.6.3 Aerial-feeding Insectivore

Ingestion dose models were used to estimate food chain exposure to aerial-feeding insectivores using federally endangered gray bat (*Myotis grisescens*) as the representative receptor. All COPECs in sediment and surface water were evaluated. The ingestion dose model concluded that barium, cadmium, and lead present a potential risk to aerial-feeding insectivores (EPA, 2008d).

6.2.7 Recommended Clean-up Goals

The ERA established recommended clean-up goals for soil and sediment which were derived from calculated risk-based concentrations. The cleanup goals constitute a site-specific concentration associated with an unacceptable level of ecological risk and are not intended to be the final cleanup goals for the site. The final cleanup goals are established during the FS process and may be modified by the remedy selection criteria (EPA, 2008d). Clean-up goals for barium, cadmium, lead and zinc were adjusted based on the estimated bioavailability for each metal. The following clean-up goals were developed for soil:

Metal	Barium	Cadmium	Copper	Lead	Selenium	Zinc
Clean-up Goal (mg/kg)	9,889	4.9	141	1,534	10.9	1,576

In general, the ERA concluded that cadmium and selenium concentrations at the Site are the primary risk drivers. The overall risk from these metals is greater due to the fact that these metals are the most likely to bioconcentrate. All of the recommended clean-up goals are well above typical background concentrations in Missouri (EPA, 2008d).

The following clean-up goals were developed for sediment:

Metal	Barium	Cadmium	Lead	Zinc
Sediment Clean-up Goal (mg/kg)	3,900	3.2	147	305

The ERA concluded that surface water concentrations of barium are elevated throughout the site; however, there are no federal or state of Missouri water quality criteria for barium. The ERA recommended that the clean-up of barium in the aquatic ecosystem be focused on sediment (EPA, 2008d).

7.0 Summary and Conclusions

The following sections summarize the conclusions regarding the nature and extent of contamination at each of the areas included in this investigation and the human health and ecological risks associated with the WCLD sites.

7.1 Nature and Extent

The nature and extent evaluation focused on the analysis of the soil, source/mine waste, lead bioaccessibility, groundwater, indoor dust, paint surfaces, surface water, and sediment samples that were collected during previous investigations conducted by EPA and MDNR and the 2008 RI/FS field investigation conducted by BVSPC at the WCLD sites.

The nature and extent of contamination was evaluated in relation to regulatory action levels and average background levels for soil and MCLs for groundwater. The discussion focused primarily on lead contamination with additional evaluation of arsenic, barium, and cadmium data.

During previous investigations, the EPA Region 9 Residential PRGs were used to evaluate the nature and extent of contamination. In the time since those investigations were conducted, EPA Region 9 has consulted with other EPA regions including Region 3 and 6, and risk-based RSL were agreed upon and adopted by each Region (EPA, 2009a). EPA Region 7 has also adopted these RSLs; therefore, they were used for the nature and extent evaluation in this RI. The following are the regulatory action levels used to evaluate soil in this RI for lead, arsenic, barium, and cadmium:

Contaminant	Matrix	Action Level	Reference
Lead	Soil	400 mg/kg	EPA RSL
Lead		1,200 mg/kg	EPA Region 7 Time Critical Removal Action Level
Arsenic		0.39 mg/kg	EPA RSL
Barium		15,000 mg/kg	EPA RSL
Cadmium		70 mg/kg	EPA RSL

The regulatory action levels used to evaluate the analytical data during previous investigations at the Site include the following for groundwater (lead, arsenic, barium, and cadmium):

Contaminant	Matrix	Action Level	Reference
Lead	Groundwater	15 µg/L	EPA MCL
Arsenic		10 µg/L	EPA MCL
Barium		2,000 µg/L	EPA MCL
Cadmium		5 µg/L	EPA MCL

Background surface soils were collected during previous investigations from areas within Washington County where no historical milling, mining, smelting operations, or waste disposal is believed to have occurred. Background sample concentrations in soils were also obtained from the USGS Mineral Resources On-line database for Washington County, Missouri. An average soil background concentration of 165.6 mg/kg was calculated for this RI.

Action levels for surface water and sediment were established in the 2008 ERA completed by the EPA and included NAWQC for the evaluation of surface water and SQGs, for sediment.

In general, all media analyzed at the WCLD sites contained elevated concentrations of lead and arsenic that exceeded regulatory action levels as well as background levels (soil only). Concentrations of barium and cadmium were shown to occur generally within regulatory action levels. The exception was sediment at the Potosi site which contained elevated concentrations of barium and cadmium that exceeded the respective SQGs.

7.1.1 Potosi Site

Several media were evaluated at the Potosi Site during previous investigations and the 2008 RI/FS field investigation including residential soil, mine waste (soil), indoor dust, groundwater, surface water, and sediment.

7.1.1.1 Residential Soil

Residential soil was collected at the Potosi site during the 2008 RI/FS field investigation and during previous investigations. Based on the findings of this RI, the majority of the residential properties sampled during previous investigations and the 2008 RI/FS investigation contain concentrations of lead that exceed the RSL and the calculated background concentration for lead in residential soil at the Potosi site. In general, lead contamination is wide-spread in residential soil at the Potosi site. The 2008 RI/FS field investigation identified 10 properties with concentrations of lead in residential soil that exceeded the EPA Region 7 Time Critical Removal action level of 1,200 mg/kg. EPA

initiated a removal action in 2006 for residential yards identified with concentrations of lead that exceeded the EPA Region 7 Time Critical Removal action level for lead.

Residential soil samples collected during previous investigations contained concentrations of barium and cadmium that were within action levels; however, arsenic concentrations exceeded action levels in the majority of the residential soil samples collected.

7.1.1.2 Mine waste

Mine waste (soil) was collected at the Potosi site during previous investigations and analyzed for lead. The majority of the mine waste samples collected at the site contained concentrations of lead that exceeded the RSL and the calculated background concentration. One property was identified with concentrations of lead that exceeded the EPA Region 7 Time Critical Removal action level of 1,200 mg/kg.

7.1.1.3 Indoor Dust

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7 laboratory. Wipe samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Concentrations of lead in dust from the wipe samples ranged from non-detected (U-qualified) to 0.188 $\mu g/cm^2$ at the properties sampled at the Potosi site.

Composite vacuum samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in indoor dust from vacuum samples at all properties sampled within the Potosi site. Concentrations of lead in dust from the vacuum samples ranged from 13.2 to 581 mg/kg.

7.1.1.4 Paint Surfaces

Paint surfaces were evaluated during the 2008 RI/FS field investigation at nine locations at the Potosi site where residential soil was collected to determine if painted surfaces could be the source of the lead in indoor dust. Lead concentrations were obtained from painted walls, ceilings, columns, windows, and cabinets which consisted of wood, drywall, plaster, and concrete located in various interior and exterior living spaces. Positive XRF readings were obtained at five properties and ranged from 1.66 to 5.25 mg/cm^2.

7.1.1.5 Groundwater

Groundwater was collected at the Potosi site during the 2008 RI/FS field investigation and during previous investigations. Potable (residential) groundwater was

collected from the tap at 10 residences and analyzed for lead. In addition, area-wide residential groundwater samples were collected at 1,097 properties during previous investigations from 2005 through 2008 and analyzed for lead, arsenic, barium, and cadmium.

Two properties were identified during the 2008 RI field investigation and 178 properties were identified during previous investigations that contained concentrations of lead in groundwater that exceeded the MCL of 15 µg/L. For arsenic, barium, and cadmium, the MCL was exceeded at one property for arsenic, six properties for barium, and five properties for cadmium.

7.1.1.6 Surface Water

Surface water was collected at the Potosi site during the 2008 ERA field investigation and analyzed for TAL metals. The samples were collected in Mill Creek and its tributaries. The ERA evaluation identified barium, lead, and silver as constituents that contained concentrations exceeding the NAWQC for surface water. It should be noted that NAWQC was not available for barium; therefore the ERA recommended that any clean-up goal be established based on sediment. Further, silver was retained as a COPEC due to insufficient detection limits and the ERA recommended that further evaluation be conducted for silver in surface water.

Two surface water locations SW01 and SW22 contained concentrations of lead that exceeded NAWQC. Sample SW01 is located at Hornsey Lake (which is a tailings pond) and SW22 is located at the Fountain Farm at Cinbar (a tributary of Mill Creek). These two locations were the only surface water locations with detected concentrations of lead.

7.1.1.7 Sediment

Sediment was collected at the Potosi site during the 2008 ERA field investigation and analyzed for TAL metals. The samples were collected in Mill Creek and its tributaries. The ERA evaluation identified barium, cadmium, lead, and zinc as constituents that contained concentrations exceeding the SQGs for sediment. COPECs were identified in the majority of the sediment samples including Hornsey Lake (tailings pond), Keyes Branch (tributary to Fountain Farm Branch), Long Hollow Brach (tributary to Fountain Farm Branch), Big River, Shibboleth Branch, Apex Lake (tailings pond), and Fountain Farm Branch at Cimbar (tributary to Mill Creek).

7.1.2 Richwoods Site

Several media were evaluated at the Richwoods site during previous investigations and the 2008 RI/FS field investigation including residential soil, source/mine waste (soil), groundwater, indoor dust, paint surfaces, surface water, and sediment.

7.1.2.1 Residential Soil

Residential soil was collected at the Richwoods site during the 2008 RI/FS field investigation and during previous investigations. Based on the findings of this RI, the majority of the residential properties sampled exceed the RSL and the calculated background concentration for lead in residential soil at the Richwood site. In general, lead contamination is wide-spread in residential soil at the Richwoods site. The 2008 RI/FS field investigation identified three properties with concentrations of lead in residential soil that exceeded the EPA Region 7 Time Critical Removal action level of 1,200 mg/kg. EPA initiated a removal action in 2006 for residential yards identified in previous investigations that contained concentrations of lead that exceeded the EPA Region 7 Time Critical Removal action level.

Residential soil samples collected during previous investigations contained concentrations of barium and cadmium that were within action levels; and arsenic concentrations exceeded action levels in the majority of the residential soil samples collected.

7.1.2.2 Mine waste

Mine waste (soil) was collected at the Richwoods site during previous investigations and analyzed for lead. The majority of the mine waste samples collected at the site contained concentrations of lead that exceeded the RSL and the calculated background concentration. Two properties were identified with concentrations of lead that exceeded the EPA Region 7 Time Critical Removal action level of 1,200 mg/kg.

7.1.2.3 Indoor Dust

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7 laboratory. Wipe samples were collected from the living room, dining room, bedroom, and/or kitchen floors. Concentrations of lead in dust from the wipe samples ranged from non-detected (U-qualified) to 0.163 $\mu g/cm^2$ at the properties sampled at the Richwoods site.

Composite vacuum samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in 4 out of 5 indoor dust

vacuum samples at properties sampled within the Richwoods site. Detected concentrations of lead in dust from the vacuum samples ranged from 24.8 to 419 mg/kg.

7.1.2.4 Paint Surfaces

Paint surfaces were evaluated during the 2008 RI/FS field investigation at three locations at the Richwoods site where residential soil was collected to determine if painted surfaces could be the source of the lead in indoor dust. Lead concentrations were obtained from painted walls, ceilings, columns, windows, and cabinets which consisted of wood, drywall, plaster, and concrete located in various interior and exterior living spaces. Positive XRF readings were obtained at all five properties and ranged from 1.27 to 4.05 mg/cm^2.

7.1.2.5 Groundwater

Groundwater was collected at the Richwoods site during the 2008 RI/FS field investigation and during previous investigations. Potable (residential) groundwater was collected from the tap at 3 residences and analyzed for lead. Area-wide residential groundwater samples were collected at 395 properties during previous investigations from 2005 through 2008 and analyzed for lead, arsenic, barium, and cadmium.

One property was identified during the 2008 RI field investigation and 67 properties were identified during previous investigations that contained concentrations of lead in groundwater that exceeded the MCL of 15 µg/L. The MCL was exceeded at two properties for barium and five properties for cadmium.

7.1.2.6 Surface Water

Surface water was collected at the Richwoods site during previous investigations and analyzed for lead. The samples were collected at 12 locations in streams, tributaries, and tailings ponds throughout the Richwoods site. Four surface water locations (SW-2, SW-6, WSW-2, and WSW-8) contained concentrations of lead that exceeded NAWQC.

7.1.2.7 Sediment

Sediment was collected at the Richwoods site during previous investigations and analyzed for lead. The samples were collected in streams, tributaries, and tailings ponds throughout the Richwoods site. Twelve sediment locations (SED-3, SED-4, SED-6, WSS-1, WSS-2, WSS-3, WSS-4, WSS-5, WSS-6, WSS-7, and WSS-8) contained concentrations of lead that exceeded the SQG.

7.1.3 Old Mines Site

Several media were evaluated at the Old Mine site during previous investigations and the 2008 RI/FS field investigation including residential soil, source/mine waste (soil), groundwater, indoor dust, surface water, and sediment.

7.1.3.1 Residential Soil

Residential soil was collected at the Old Mines site during the 2008 RI/FS field investigation and during previous investigations. Based on the findings of this RI, the majority of the residential properties sampled during previous investigations and the 2008 RI/FS investigation contain concentrations of lead that exceed the RSL and the calculated background concentration for lead in residential soil at the Old Mines site. In general, lead contamination is wide-spread in residential soil at the Old Mines site. The 2008 RI/FS field investigation identified nine properties with concentrations of lead in residential soil that exceeded the EPA Region 7 Time Critical Removal action level of 1,200 mg/kg. EPA initiated a removal action in 2006 for residential yards identified in previous investigations that contained concentrations of lead that exceeded the EPA Region 7 Time Critical Removal action level.

Residential soil samples collected during previous investigations contained concentrations of barium and cadmium that were within action levels; however, arsenic concentrations exceeded action levels in the majority of the residential soil samples collected.

7.1.3.2 Mine Waste

Mine waste (soil) was collected at the Old Mines site during previous investigations and analyzed for lead. The majority of the mine waste samples collected at the site contained concentrations of lead that exceeded the RSL and the calculated background concentration. One property was identified with concentrations of lead that exceeded the EPA Region 7 Time Critical Removal action level of 1,200 mg/kg.

7.1.3.3 Indoor Dust

Indoor dust samples were collected by wipe and vacuum sampling methods and analyzed for lead by EPA's Region 7 laboratory. Wipe samples were collected from the living room, dining room, bedroom, and/or kitchen floors. Concentrations of lead in dust from the wipe samples ranged from non-detected (U-qualified) to 0.780 $\mu g/cm^2$ at the properties sampled at the Old Mines site.

Composite vacuum samples were collected from the living room, family room, bedroom, dining room and/or kitchen floors. Lead was detected in indoor dust vacuum samples at all properties sampled within the Old Mines site. Detected concentrations of lead in dust from the vacuum samples ranged from 9.7 to 356 mg/kg.

7.1.3.4 Groundwater

Groundwater was collected at the Old Mines site during the 2008 RI/FS field investigation and during previous investigations. Potable (residential) groundwater was collected from the tap at eight residences and analyzed for lead. In addition, area-wide residential groundwater samples were collected at 1,098 properties during previous investigations from 2005 through 2008 and analyzed for lead, arsenic, barium, and cadmium.

One property was identified during the 2008 RI field investigation and 178 properties were identified during previous investigations that contained concentrations of lead in groundwater that exceeded the MCL of 15 µg/L. The MCL was exceeded at one property for arsenic, six properties for barium, and 5 properties for cadmium.

7.1.3.5 Surface Water

Surface water was collected at the Old Mines site during previous investigation, and analyzed for lead. The samples were collected at 20 locations in streams, tributaries, and tailings ponds throughout the Old Mines site. Seven surface water locations (SW-1, SW-2, SW-3, SW-15, SW-19, SW-21 and SW-30) contained concentrations of lead that exceeded NAWQC.

7.1.3.6 Sediment

Sediment was collected at the Old Mines site during previous investigations and analyzed for lead. The samples were collected at 21 locations in streams, tributaries, and tailings ponds throughout the Old Mines site. All 21 sediment locations contained concentrations of lead that exceeded the SQG.

7.2 Risk Assessment

Cobalt and lead were identified as COCs for current and future residential exposures to the residential properties evaluated. Cobalt was identified as a COC for non-cancer potential effects associated with concentrations in soil at only 1 of the 48 residential properties evaluated. Lead was identified as a COC in soil and groundwater at 32 of the 48 residential properties that were evaluated.

For terrestrial ecological receptors exposed in the Potosi site, the ingestion dose model concluded that lead and selenium present a potential risk to herbivorous birds; cadmium, copper, lead, selenium and zinc present a potential risk to avian insectivores; barium, cadmium, lead, selenium and zinc present a potential risk to insectivorous mammals; lead presents a potential risk to carnivorous birds; and lead and selenium present a potential risk to carnivorous mammals.

For aquatic ecological receptors exposed to surface water and sediment in the Potosi site, the ingestion dose model concluded that lead presents a potential risk to piscivorous birds; barium presents a potential risk to piscivorous mammals; and barium, cadmium, and lead present a potential risk to aerial-feeding insectivores.

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Tables

Table 2-1
Summary of Residential Soil Samples
Washington County Mining District
Washington County, Missouri

Property #/Sample ID	X Coordinates	Y Coordinates	Town	State	Site	Confirmation Analysis
8	694022.44969	4201321.25139	Potosi	MO	Potosi	
69	698791.24832	4209209.44325	Cadet	MO	Old Mines	
438	693963.66948	4201181.47882	Potosi	MO	Potosi	X
486	691690.01865	4201225.07566	Potosi	MO	Potosi	X
1612	695008.87254	4202147.53079	Potosi	MO	Potosi	X
1643	697184.21753	4203690.87367	Mineral Point	MO	Potosi	
1653	695793.59723	4202220.87186	Potosi	MO	Potosi	
5003	694387.59856	4200876.76157	Potosi	MO	Potosi	X
5007	694695.40102	4201657.84546	Potosi	MO	Potosi	X
5008	NA	NA	Potosi	MO	Potosi	X
5012	702007.91089	4214441.74502	Cadet	MO	Old Mines	X
5013	695001.81154	4201211.27427	Potosi	MO	Potosi	X
5014	701492.71940	4215074.30910	Cadet	MO	Old Mines	
20008	691138.40278	4227035.66308	Richwoods	MO	Richwoods	
20027	690202.24845	4225760.39693	Richwoods	MO	Richwoods	
20028	690652.74800	4225992.70000	Richwoods	MO	Richwoods	X
20070	690223.60570	4224238.88356	Richwoods	MO	Richwoods	X
20108	691477.23456	4226835.35203	Richwoods	MO	Richwoods	
20171	701501.16424	4215570.49013	Blackwell	MO	Old Mines	
20173	701551.67386	4215585.22210	Blackwell	MO	Old Mines	
20187	701242.30244	4216248.16084	Blackwell	MO	Old Mines	
20331	692409.89164	4201182.15097	Potosi	MO	Potosi	X
20349	692752.47577	4201350.03092	Potosi	MO	Potosi	X
20397	693490.47348	4200522.10475	Potosi	MO	Potosi	
20428	695908.70911	4204297.33238	Potosi	MO	Potosi	
20437	695795.80558	4201979.19868	Potosi	MO	Potosi	
20758	698797.33300	4199278.46400	Mineral Point	MO	Potosi	
20767	700324.39911	4202033.96328	Bonne Terre	MO	Potosi	
20918	694922.08830	4200867.05789	Potosi	MO	Potosi	X
23264	694321.10056	4201292.49256	Potosi	MO	Potosi	
23378	695281.11267	4200908.29058	Potosi	MO	Potosi	X
23575	696230.08801	4205166.10597	Cadet	MO	Potosi	
30079	697985.76410	4211384.25064	Cadet	MO	Old Mines	X
30126	692721.21181	4209220.15973	Cadet	MO	Old Mines	X
30172	698944.90473	4212817.42708	Cadet	MO	Old Mines	
30177	698445.93392	4212516.87369	Cadet	MO	Old Mines	X
30182	691310.03686	4226592.48715	Cadet	MO	Richwoods	X
30271	696314.92283	4215107.37098	Blackwell	MO	Old Mines	X
30364	701065.61169	4216052.74005	Blackwell	MO	Old Mines	X
30417	704172.75800	4217413.73800	Cadet	MO	Old Mines	X
30448	704865.16729	4213681.31644	Cadet	MO	Old Mines	
30553	696316.46534	4208971.19127	Cadet	MO	Old Mines	X
30577	696571.14600	4209106.26200	Cadet	MO	Old Mines	
30651	701846.31330	4215778.84230	Blackwell	MO	Old Mines	X
30911	698710.90674	4216776.15172	Blackwell	MO	Old Mines	X
30914	698776.64451	4216919.80092	Blackwell	MO	Old Mines	X
30965	689012.65826	4212499.21287	Potosi	MO	Old Mines	
31016	687472.16613	4213174.27451	Potosi	MO	Old Mines	X

Note: All samples were collected by BVSPC during the 2008 RI/FS field investigation.

Table 2-2
Summary of Mine Waste Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Quad Number	Date Collected	X Coordinates	Y Coordinates	Site
20177.1	S-1	8/10/2004	38.072020	-90.728190	OLD MINES
20071.1	S-1	7/8/2005	38.148460	-90.824500	RICHWOODS
20150.2	S-2	7/23/2005	38.158630	-90.818440	RICHWOODS
20150.1	S-1	7/23/2005	38.156270	-90.820090	RICHWOODS
20150.4	S-4	7/23/2005	38.153870	-90.818320	RICHWOODS
20150.3	S-3	7/23/2005	38.156620	-90.816960	RICHWOODS
20087.2	S-2	8/5/2005	38.148040	-90.823040	RICHWOODS
20087.3	S-3	8/5/2005	38.147090	-90.820450	RICHWOODS
20087.1	S-1	8/5/2005	38.149140	-90.823810	RICHWOODS
20154.2	S-2	8/6/2005	37.942793	-90.698678	POTOSI
20154.1	S-1	8/8/2005	37.943195	-90.698447	POTOSI
20154.3	S-3	8/8/2005	37.947748	-90.696197	POTOSI
20164.1	S-1	8/9/2005	38.186170	-90.815310	RICHWOODS
20164.2	S-2	8/9/2005	38.185630	-90.816140	RICHWOODS
20164.3	S-3	8/9/2005	38.186420	-90.816050	RICHWOODS
20015.1	S-1	7/26/2005	38.164460	-90.822730	RICHWOODS
20187.01	S-1	8/19/2005	38.070983	-90.702376	OLD MINES
20174.1	S-1	8/20/2005	38.068450	-90.700510	OLD MINES
20248.1	S-1	9/8/2005	38.074190	-90.675970	OLD MINES
20249	S-1	9/8/2005	38.073660	-90.677850	OLD MINES
20201.1	S-1	9/9/2005	38.062480	-90.674200	OLD MINES
20203.1	S-1	9/13/2005	37.995350	-90.816070	OLD MINES
20203.2	S-2	9/13/2005	37.994740	-90.816410	OLD MINES
20008.1	S-1	7/27/2005	38.170500	-90.817990	RICHWOODS
20006.1	S-1	8/19/2005	38.161000	-90.821700	RICHWOODS
20006.2	S-2	8/19/2005	38.159970	-90.822400	RICHWOODS
20006.3	S-3	8/19/2005	38.159620	-90.821780	RICHWOODS
20217.1	S-1	8/19/2005	38.068250	-90.701160	OLD MINES
20170.1	S-1	8/20/2005	38.064250	-90.704190	OLD MINES
20189.1	S-1	8/20/2005	38.065090	-90.705410	OLD MINES
20159.1	S-1	8/20/2005	38.066390	-90.704860	OLD MINES
20199.1	S-1	9/12/2005	38.020060	-90.744220	OLD MINES
20259.1	S-1	9/13/2005	38.021280	-90.744100	OLD MINES
20109.1	S-1	7/8/2005	38.172140	-90.814870	RICHWOODS
20126.1	S-1	7/26/2005	38.184360	-90.813000	RICHWOODS
2	S1	6/6/2005	37.928006	-90.809593	POTOSI
3	S2	6/6/2005	37.928015	-90.808082	POTOSI
4	S3	6/6/2005	37.927790	-90.807976	POTOSI
10	S1	6/7/2005	37.927816	-90.798378	POTOSI
11	S2	6/7/2005	37.928082	-90.798301	POTOSI
12	S3	6/7/2005	37.928397	-90.798088	POTOSI
404	S1	6/7/2005	37.946274	-90.700280	POTOSI
15	S1	6/7/2005	37.931867	-90.789809	POTOSI
16	S2	6/7/2005	37.931477	-90.789184	POTOSI
17	S3	6/7/2005	37.932278	-90.789272	POTOSI
18	S4	6/7/2005	37.932576	-90.789137	POTOSI

Table 2-2
Summary of Mine Waste Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Quad Number	Date Collected	X Coordinates	Y Coordinates	Site
807	S1	6/7/2005	37.969718	-90.719326	POTOSI
808	S2	6/7/2005	37.969374	-90.720303	POTOSI
809	S3	6/7/2005	37.968688	-90.719197	POTOSI
415	S1	6/8/2005	37.942820	-90.702326	POTOSI
417	S1	6/8/2005	37.942012	-90.702251	POTOSI
406	S1	6/8/2005	37.941015	-90.692426	POTOSI
407	S2	6/8/2005	37.940217	-90.695946	POTOSI
408	S1	6/8/2005	37.943564	-90.679940	POTOSI
410	S1	6/8/2005	37.942767	-90.688663	POTOSI
411	S2	6/8/2005	37.941782	-90.689716	POTOSI
412	S3	6/8/2005	37.942676	-90.691049	POTOSI
424	S1	6/9/2005	37.961305	-90.808437	POTOSI
425	S1	6/9/2005	37.962214	-90.807844	POTOSI
420	S1	6/9/2005	37.957386	-90.807942	POTOSI
421	S2	6/9/2005	37.958395	-90.808086	POTOSI
422	S3	6/9/2005	37.959518	-90.808185	POTOSI
28	S1	6/10/2005	37.966448	-90.803905	POTOSI
29	S2	6/10/2005	37.965910	-90.803810	POTOSI
31	S1	6/10/2005	37.967561	-90.804748	POTOSI
32	S2	6/10/2005	37.968777	-90.804714	POTOSI
429	S1	6/10/2005	37.957717	-90.810033	POTOSI
431	S3	6/10/2005	37.957598	-90.809193	POTOSI
434	S1	6/10/2005	37.962124	-90.814063	POTOSI
435	S2	6/10/2005	37.961806	-90.814220	POTOSI
436	S3	6/10/2005	37.961859	-90.813275	POTOSI
442	S1	6/13/2005	37.926583	-90.794706	POTOSI
37	S1	6/13/2005	37.964222	-90.817442	POTOSI
38	S2	6/13/2005	37.964316	-90.816683	POTOSI
39	S3	6/13/2005	37.964139	-90.817032	POTOSI
444	S1	6/13/2005	37.928968	-90.797173	POTOSI
445	S2	6/13/2005	37.929255	-90.797998	POTOSI
446	S3	6/13/2005	37.930342	-90.797747	POTOSI
43	S1	6/13/2005	37.964625	-90.820955	POTOSI
450	S1	6/13/2005	37.928695	-90.796887	POTOSI
451	S2	6/13/2005	37.929395	-90.796617	POTOSI
45	S1	6/13/2005	37.956132	-90.806283	POTOSI
440	S1	6/13/2005	37.928163	-90.792242	POTOSI
34	S1	6/13/2005	37.965569	-90.813767	POTOSI
35	S2	6/13/2005	37.965467	-90.813979	POTOSI
1619	S2	6/13/2005	37.950297	-90.779525	POTOSI
1618	S1	6/13/2005	37.950395	-90.779465	POTOSI
1620	S3	6/13/2005	37.950121	-90.779534	POTOSI
462	S1	6/14/2005	37.941795	-90.800946	POTOSI
463	S2	6/14/2005	37.942255	-90.802940	POTOSI
464	S3	6/14/2005	37.942849	-90.801757	POTOSI
1627	S1	6/14/2005	37.956989	-90.756737	POTOSI

Table 2-2
Summary of Mine Waste Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Quad Number	Date Collected	X Coordinates	Y Coordinates	Site
1628	S2	6/14/2005	37.956381	-90.756227	POTOSI
467	S1	6/14/2005	37.942728	-90.815974	POTOSI
61	S1	6/14/2005	37.960913	-90.806650	POTOSI
62	S2	6/14/2005	37.961296	-90.806604	POTOSI
48	S1	6/14/2005	37.974685	-90.813788	POTOSI
456	S1	6/14/2005	37.935543	-90.801383	POTOSI
457	S2	6/14/2005	37.936285	-90.801913	POTOSI
50	S1	6/14/2005	37.972711	-90.812662	POTOSI
52	S1	6/14/2005	37.973893	-90.813238	POTOSI
54	S1	6/14/2005	37.966471	-90.806531	POTOSI
1625	S2	6/14/2005	37.957412	-90.753790	POTOSI
1624	S1	6/14/2005	37.957297	-90.753919	POTOSI
460	S1	6/14/2005	37.939063	-90.800414	POTOSI
77	S1	6/15/2005	37.979202	-90.727256	POTOSI
477	S1	6/15/2005	37.924854	-90.805592	POTOSI
1630	S1	6/15/2005	37.959160	-90.758720	POTOSI
1631	S2	6/15/2005	37.958577	-90.758657	POTOSI
65	S1	6/15/2005	37.972768	-90.823359	POTOSI
66	S2	6/15/2005	37.969513	-90.823300	POTOSI
68	S1	6/15/2005	37.997018	-90.698640	POTOSI
474	S1	6/15/2005	37.938552	-90.806871	POTOSI
70	S1	6/15/2005	38.011161	-90.724668	OLD MINES
71	S2	6/15/2005	38.011779	-90.724620	OLD MINES
1641	S1	6/16/2005	37.960317	-90.755917	POTOSI
85	S1	6/16/2005	38.000213	-90.721692	POTOSI
1642	S2	6/16/2005	37.960291	-90.756325	POTOSI
88	S1	6/16/2005	37.995617	-90.715632	POTOSI
89	S2	6/16/2005	37.994810	-90.715420	POTOSI
79	S1	6/16/2005	38.006550	-90.706152	POTOSI
1635	S1	6/16/2005	37.959859	-90.759280	POTOSI
1636	S2	6/16/2005	37.959233	-90.760114	POTOSI
1638	S1	6/16/2005	37.957903	-90.759613	POTOSI
1639	S2	6/16/2005	37.957566	-90.760217	POTOSI
482	S1	6/16/2005	37.938695	-90.820176	POTOSI
97	S1	6/17/2005	38.014966	-90.740131	OLD MINES
492	S1	6/17/2005	37.963721	-90.765672	POTOSI
493	S2	6/17/2005	37.963503	-90.764948	POTOSI
494	S3	6/17/2005	37.963124	-90.765612	POTOSI
92	S1	6/17/2005	38.007766	-90.709382	POTOSI
93	S2	6/17/2005	38.007378	-90.708944	POTOSI
94	S3	6/17/2005	38.007999	-90.710156	POTOSI
489	S1	6/17/2005	37.939518	-90.818983	POTOSI
490	S2	6/17/2005	37.939644	-90.818661	POTOSI
101	S1	6/20/2005	38.003148	-90.715909	POTOSI
102	S2	6/20/2005	38.003539	-90.715360	POTOSI
497	S1	6/20/2005	37.939015	-90.819077	POTOSI

Table 2-2
Summary of Mine Waste Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Quad Number	Date Collected	X Coordinates	Y Coordinates	Site
498	S2	6/20/2005	37.939946	-90.818403	POTOSI
105	S1	6/20/2005	37.999671	-90.697782	POTOSI
106	S2	6/20/2005	38.000436	-90.697932	POTOSI
500	S1	6/20/2005	37.924161	-90.807232	POTOSI
502	S1	6/20/2005	37.923472	-90.814341	POTOSI
108	S1	6/20/2005	38.000493	-90.707329	POTOSI
109	S2	6/20/2005	37.998686	-90.709848	POTOSI
504	S1	6/20/2005	37.926166	-90.814122	POTOSI
1645	S2	6/20/2005	37.959277	-90.755843	POTOSI
1644	S1	6/20/2005	37.959242	-90.755243	POTOSI
118	S1	6/21/2005	37.949501	-90.758152	POTOSI
1648	S1	6/21/2005	37.958125	-90.753575	POTOSI
1650	S3	6/21/2005	37.958648	-90.753218	POTOSI
1649	S2	6/21/2005	37.958002	-90.753041	POTOSI
518	S1	6/22/2005	37.937425	-90.802035	POTOSI
519	S2	6/22/2005	37.936956	-90.801756	POTOSI
520	S3	6/22/2005	37.935088	-90.802989	POTOSI
521	S4	6/22/2005	37.937628	-90.804226	POTOSI
1659	S1	6/22/2005	37.964629	-90.769060	POTOSI
1660	S2	6/22/2005	37.963219	-90.770225	POTOSI
547	S1	6/24/2005	37.955449	-90.730462	POTOSI
840	S1	6/24/2005	37.937067	-90.813109	POTOSI
841	S1	6/24/2005	37.935712	-90.814462	POTOSI
552	S1	6/27/2005	37.949010	-90.803233	POTOSI
553	S2	6/27/2005	37.949304	-90.803689	POTOSI
561	S6	6/28/2005	37.941530	-90.730906	POTOSI
562	S1	6/28/2005	37.940917	-90.729583	POTOSI
563	S2	6/28/2005	37.941512	-90.729489	POTOSI
564	S3	6/28/2005	37.940949	-90.729942	POTOSI
1672	S1	6/28/2005	37.956691	-90.758655	POTOSI
1673	S2	6/28/2005	37.957328	-90.758659	POTOSI
1675	S1	6/28/2005	37.954576	-90.760582	POTOSI
1676	S2	6/28/2005	37.954309	-90.761051	POTOSI
556	S1	6/28/2005	37.943032	-90.728732	POTOSI
557	S2	6/28/2005	37.942526	-90.729044	POTOSI
1669	S1	6/28/2005	37.960399	-90.754272	POTOSI
1669	S2	6/28/2005	37.960399	-90.754272	POTOSI
1669	S3	6/28/2005	37.960399	-90.754272	POTOSI
1669	S4	6/28/2005	37.960399	-90.754272	POTOSI
1669	S5	6/28/2005	37.960399	-90.754272	POTOSI
1669	S6	6/28/2005	37.960399	-90.754272	POTOSI
1669	S7	6/28/2005	37.960399	-90.754272	POTOSI
559	S4	6/28/2005	37.943580	-90.732143	POTOSI
560	S5	6/28/2005	37.943049	-90.731107	POTOSI
854	S2	6/29/2005	37.931590	-90.788597	POTOSI
855	S3	6/29/2005	37.932174	-90.788291	POTOSI

Table 2-2
Summary of Mine Waste Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Quad Number	Date Collected	X Coordinates	Y Coordinates	Site
856	S4	6/29/2005	37.930969	-90.787882	POTOSI
129	S1	6/29/2005	37.953536	-90.773408	POTOSI
130	S2	6/29/2005	37.955291	-90.776817	POTOSI
131	S3	6/29/2005	37.955940	-90.768933	POTOSI
132	S4	6/29/2005	37.955494	-90.769169	POTOSI
571	S1	6/29/2005	37.956636	-90.727269	POTOSI
134	S1	6/29/2005	37.939029	-90.757650	POTOSI
135	S2	6/29/2005	37.939451	-90.753316	POTOSI
136	S3	6/29/2005	37.938076	-90.750488	POTOSI
572	S1	6/29/2005	37.941261	-90.732730	POTOSI
573	S2	6/29/2005	37.939655	-90.733697	POTOSI
574	S3	6/29/2005	37.943607	-90.735992	POTOSI
137	S4	6/29/2005	37.945171	-90.729119	POTOSI
861	S1	6/29/2005	37.991803	-90.670097	POTOSI
862	S2	6/29/2005	37.992472	-90.670542	POTOSI
1679	S3	6/29/2005	37.957162	-90.749397	POTOSI
1677	S1	6/29/2005	37.957294	-90.749674	POTOSI
1678	S2	6/29/2005	37.957626	-90.749408	POTOSI
1680	S4	6/29/2005	37.958323	-90.749839	POTOSI
1681	S5	6/29/2005	37.957765	-90.749816	POTOSI
1682	S6	6/29/2005	37.957405	-90.749230	POTOSI
1684	S1	6/29/2005	37.954465	-90.759315	POTOSI
1685	S2	6/29/2005	37.955061	-90.759496	POTOSI
1686	S3	6/29/2005	37.954868	-90.760032	POTOSI
853	S1	6/29/2005	37.931679	-90.788254	POTOSI
1694	S1	6/30/2005	37.963932	-90.756923	POTOSI
1694	S2	6/30/2005	37.963932	-90.756923	POTOSI
1694	S3	6/30/2005	37.963932	-90.756923	POTOSI
1695	S1	6/30/2005	37.959510	-90.748420	POTOSI
1696	S1	6/30/2005	37.962342	-90.747887	POTOSI
1697	S1	6/30/2005	37.968701	-90.751077	POTOSI
1697	S2	6/30/2005	37.968701	-90.751077	POTOSI
868	S1	6/30/2005	37.919102	-90.750372	POTOSI
146	S1	6/30/2005	37.921949	-90.743441	POTOSI
147	S2	6/30/2005	37.920607	-90.744093	POTOSI
869	S2	6/30/2005	37.916901	-90.757018	POTOSI
1698	S1	6/30/2005	37.971059	-90.754520	POTOSI
870	S3	6/30/2005	37.917610	-90.755895	POTOSI
148	S3	6/30/2005	37.917759	-90.739000	POTOSI
1699	S1	6/30/2005	37.968654	-90.753532	POTOSI
1700	S1	6/30/2005	37.967760	-90.752802	POTOSI
871	S4	6/30/2005	37.920017	-90.756484	POTOSI
149	S4	6/30/2005	37.921504	-90.748005	POTOSI
1701	S1	6/30/2005	37.965732	-90.751984	POTOSI
872	S5	6/30/2005	37.920351	-90.748588	POTOSI
1702	S1	6/30/2005	37.965791	-90.751718	POTOSI

Table 2-2
Summary of Mine Waste Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Quad Number	Date Collected	X Coordinates	Y Coordinates	Site
1703	S1	6/30/2005	37.970873	-90.754463	POTOSI
138	S5	6/30/2005	37.945125	-90.743834	POTOSI
863	S1	6/30/2005	37.938304	-90.765135	POTOSI
139	S6	6/30/2005	37.946981	-90.736387	POTOSI
864	S2	6/30/2005	37.938720	-90.757940	POTOSI
865	S3	6/30/2005	37.939008	-90.758067	POTOSI
140	S7	6/30/2005	37.942133	-90.737862	POTOSI
866	S4	6/30/2005	37.940350	-90.763131	POTOSI
141	S8	6/30/2005	37.940824	-90.746352	POTOSI
1692	S1	6/30/2005	37.967125	-90.754342	POTOSI
142	S9	6/30/2005	37.939836	-90.743451	POTOSI
1693	S1	6/30/2005	37.963279	-90.752225	POTOSI
1693	S2	6/30/2005	37.963279	-90.752225	POTOSI
1693	S3	6/30/2005	37.963279	-90.752225	POTOSI
143	S10	6/30/2005	37.940784	-90.742716	POTOSI
144	S11	6/30/2005	37.935298	-90.746288	POTOSI
874	S1	7/1/2005	38.016840	-90.750569	OLD MINES
875	S2	7/1/2005	38.015926	-90.751830	OLD MINES
153	S8	7/1/2005	37.944910	-90.718542	POTOSI
876	S3	7/1/2005	38.015939	-90.751657	OLD MINES
154	S9	7/1/2005	37.948824	-90.715252	POTOSI
877	S4	7/1/2005	38.015256	-90.751642	OLD MINES
155	S10	7/1/2005	37.945417	-90.716940	POTOSI
156	S11	7/1/2005	37.946455	-90.716303	POTOSI
878	S5	7/1/2005	38.016216	-90.752183	OLD MINES
1704	S6	7/1/2005	38.015202	-90.752845	OLD MINES
1705	S7	7/1/2005	38.014835	-90.751140	OLD MINES
1706	S8	7/1/2005	38.012968	-90.749858	OLD MINES
20247.1	S-1	9/8/2005	38.074480	-90.674820	OLD MINES
20247.2	S-2	9/8/2005	38.074480	-90.674820	OLD MINES

Note: All samples were collected by EPA contractors (Tetra Tech) during previous investigations.

Table 2-3
Summary of Ecological Soil Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Location	Date Collected	X Coordinates	Y Coordinates	Site
SS01	Hornsey Lake	06/25/2008	37.93073	-90.80707	Potosi
SS02	Hornsey Lake	06/25/2008	37.92926	-90.81449	Potosi
SS03	Small Quarry Pond	06/25/2008	37.95401	-90.77637	Potosi
SS04	Big Quarry Lake	06/25/2008	37.95448	-90.77345	Potosi
SS05	Mill Creek	06/24/2008	37.960935	-90.717077	Potosi
SS06	Highway Department	06/24/2008	37.961795	-90.722253	Potosi
SS07	NA	06/25/2008	37.95754	-90.66928	Potosi
SS08	Shibboleth at Tiff	06/24/2008	38.017305	-90.652042	Potosi
SS09	Highway E	06/24/2008	38.017305	-90.652042	Potosi
SS10	Hornsey Lake	06/25/2008	37.931715	-90.806707	Potosi
SS11	Apex Lake	06/25/2008	37.931715	-90.806707	Potosi

Note: All samples were collected by EPA during the BERA.

Table 2-4
Summary of Residential Dust Wipe Samples
Washington County Mining District
Washington County, Missouri

Lab ID	Property	B&V Sample No. and Description	Date Collected	X Coordinates	Y Coordinates	Town	State	Site
201	23264	IWGPLZZ-23264 (Living rm. floor wipe sample) (Area wipe: 144 in2)	07/21/2008	694321.1006	4201292.493	Potosi	MO	Old Mines
202		ZWGPLZZ-23264 (Dining rm. floor wipe sample) (Area wipe: 144 in2)	07/21/2008					
203		JWGPLZZ-23264 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/21/2008					
204	20758	IWGPLZZ-20758 (Living rm. floor wipe sample) (Area wipe: 144 in2)	07/16/2008	698797.333	4199278.464	Mineral Point	MO	Potosi
205		ZWGPLZZ-20758 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/16/2008					
206		JWGPLZZ-20758 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/16/2008					
207	510	IWGPLZZ-510 (Living rm. floor wipe sample) (Area wipe: 144 in2)	07/15/2008	NA	NA	NA	MO	Old Mines
208		ZWGPLZZ-510 (Kitchen window sill) (Area wipe: 144 in2)	07/15/2008					
209		HWGPLZZ-510 (Hallway dust wipe sample) (Area wipe: 144 in2)	07/15/2008					
210	8	IWGPLZZ-8 (Family rm. floor dust wipe sample) (Area wipe: 144 in2)	07/18/2008	694022.4497	4201321.251	Potosi	MO	Potosi
211		ZWGPLZZ-8 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/18/2008					
212		JWGPLZZ-8 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/18/2008					
213	23575	IWGPLZZ-23579 (Wipe dust sampled from living rm. floor) (Area wipe: 144 in2)	07/22/2008	696230.088	4205166.106	Cadet	MO	Potosi
214		ZWGPLZZ-23575 (Wipe dust sample from kitchen floor) (Area wipe: 144 in2)	07/22/2008					
215		JWGPLZZ-23575 (Wipe sample collected from bedroom floor) (Area wipe: 144 in2)	07/22/2008					
216	69	HWGPLZZ-69 (Laundry rm. floor wipe sample) (Area wipe: 144 in2)	07/23/2008	698791.2483	4209209.443	Cadet	MO	Old Mines
217		IWGPLZZ-69 (Living rm. floor wipe sample) (Area wipe: 144 in2)	07/23/2008					
218		JWGPLZZ-69 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/23/2008					
219	5007	HWGPLZZ-5007 (Wipe dust sample from family rm. floor) (Area wipe: 144 in2)	07/23/2008	694695.401	4201657.845	Potosi	MO	Potosi
220		IWGPLZZ-5007 (Wipe dust sample from living rm. floor) (Area wipe: 144 in2)	07/23/2008					
221		JWGPLZZ-5007 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	07/23/2008					
222	20437	IWGPLZZ-20437 (Wipe dust sample from living rm. floor) (Area wipe: 144 in2)	07/24/2008	695795.8056	4201979.199	Potosi	MO	Potosi
223		HWGPLZZ-20437 (Wipe dust sample from family rm. floor) (Area wipe: 144 in2)	07/24/2008					
224		JWGPLZZ-20437 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	07/24/2008					
225	23378	IWGPLZZ-23378 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/25/2008	695281.1127	4200908.291	Potosi	MO	Potosi
226		ZWGPLZZ-23378 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/25/2008					
227		JWGPLZZ-23378 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/25/2008					
228	20008	IWGPLZZ-20008 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008	691138.4028	4227035.663	Richwoods	MO	Richwoods
229		ZWGPLZZ-20008 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008					
230		JWGPLZZ-20008 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008					
231	30079	IWGPLZZ-30079 (Living room wipe dust sample) (Area wipe: 144 in2)	07/28/2008	697985.7641	4211384.251	Cadet	MO	Old Mines
232		ZWGPLZZ-30079 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/28/2008					
233		JWGPLZZ-30079 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/28/2008					
234	1653	IWGPLZZ-1653 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/24/2008	695793.5972	4202220.872	Potosi	MO	Potosi
235		ZWGPLZZ-1653 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/24/2008					
236		JWGPLZZ-1653 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/24/2008					

Table 2-4
Summary of Residential Dust Wipe Samples
Washington County Mining District
Washington County, Missouri

Lab ID	Property	B&V Sample No. and Description	Date Collected	X Coordinates	Y Coordinates	Town	State	Site
237	20767	IWGPLZXZ-20767 (Wipe sample for dust from living room floor) (Area wipe: 144 in2)	07/29/2008	700324.3991	4202033.963	Bonne Terre	MO	Potosi
238		ZWGPLZZ-20767 (Wipe dust sample from kitchen floor) (Area wipe: 144 in2)	07/29/2008					
239		JWGPLZZ-20767 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	07/29/2008					
240	20918	IWGPLZZ-20918 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008	694922.0883	4200867.058	Potosi	MO	Potosi
241		ZWGPLZZ-20918 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008					
242		JWGPLZZ-20918 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008					
243	20027	IWGPLZZ-20027 (Living room floor dust wipe sample) (Area wipe: 144 in2)	08/04/2008	690202.2484	4225760.397	Richwoods	MO	Richwoods
244		ZWGPLZZ-20027 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	08/04/2008					
245		JWGPLZZ-20027 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	08/04/2008					
246	30965	IWGPLZZ-30965 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008	689012.6583	4212499.213	Potosi	MO	Old Mines
247		ZWGPLZZ-30965 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008					
248		JWGPLZZ-30965 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008					
249	30448	IWGPLZZ-30448 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008	704865.1673	4213681.316	Cadet	MO	Old Mines
250		ZWGPLZZ-30448 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008					
251		JWGPLZZ-30448 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008					
252	5003	IWGPLZZ-5003 (Wipe dust sample from living room floor) (Area wipe: 144 in2)	08/07/2008	694387.5986	4200876.762	Potosi	MO	Potosi
253		HWGPLZZ-5003 (Wipe dust sample from dining room floor) (Area wipe: 144 in2)	08/07/2008					
254		ZWGPLZZ-5003 (Wipe dust sample from kitchen floor) (Area wipe: 144 in2)	08/07/2008					
255	31016	IWGPLZZ-31016 (Wipe dust sample from family room floor) (Area wipe: 144 in2)	08/07/2008	687472.1661	4213174.275	Potosi	MO	Old Mines
256		ZWGPLZZ-31016 (Dust wipe sample from dining room floor) (Area wipe: 144 in2)	08/07/2008					
257		JWGPLZZ-31016 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/07/2008					
258	20028	IWGPLZZ-20028 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/08/2008	690652.748	4225992.7	Richwoods	MO	Richwoods
259		ZWGPLZZ-20028 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/08/2008					
260		JWGPLZZ-20028 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/08/2008					
261	30182	IWGPLZZ-30182 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/11/2008	691310.0369	4226592.487	Cadet	MO	Richwoods
262		ZWGPLZZ-30182 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/11/2008					
263		JWGPLZZ-30182 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/11/2008					
264	438	IWGPLZZ-438 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/12/2008	693963.6695	4201181.479	Potosi	MO	Potosi
265		ZWGPLZZ-438 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/12/2008					
266		JWGPLZZ-438 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/12/2008					
267	1612	IWGPLZZ-1612 (Wipe dust sample from living room floor) (Area wipe: 144 in2)	08/11/2008	695008.8725	4202147.531	Potosi	MO	Potosi
268		ZWGPLZZ-1612 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/11/2008					
269		JWGPLZZ-1612 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/11/2008					
270	20070	IWGPLZZ-20070 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/12/2008	690223.6057	4224238.884	Richwoods	MO	Richwoods
271		ZWGPLZZ-20070 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/12/2008					
272		JWGPLZZ-20070 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/12/2008					
273	30914	IWGPLZZ-30914 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/15/2008	698776.6445	4216919.801	Blackwell	MO	Old Mines
274		ZWGPLZZ-30914 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/15/2008					
275		JWGPLZZ-30914 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	08/15/2008					
276	30553	IWGPLZZ-30553 (Wipe dust sample from living room floor) (Area wipe: 144 in2)	08/13/2008	696316.4653	4208971.191	Cadet	MO	Old Mines
277		ZWGPLZZ-30553 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/13/2008					
278		JWGPLZZ-30553 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/13/2008					
279	30911	IWGPLZZ-30911 (Wipe dust sample from living room floor) (Area wipe: 144 in2)	08/13/2008	698710.9067	4216776.152	Blackwell	MO	Old Mines
280		ZWGPLZZ-30911 (Wipe dust sample from kitchen floor) (Area wipe: 144 in2)	08/13/2008					
281		JWGPLZZ-30911 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	08/13/2008					
282		IWGPLZZ-486 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/13/2008					

Table 2-4
Summary of Residential Dust Wipe Samples
Washington County Mining District
Washington County, Missouri

Lab ID	Property	B&V Sample No. and Description	Date Collected	X Coordinates	Y Coordinates	Town	State	Site
283	486	ZWGPLZZ-486 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/13/2008	691690.0186	4201225.076	Potosi	MO	Potosi
284		JWGPLZZ-486 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/13/2008					
285	30651	IWGPLZZ-30651 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/14/2008	701846.3133	4215778.842	Blackwell	MO	Old Mines
286		ZWGPLZZ-30651 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/14/2008					
287		JWGPLZZ-30651 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	08/14/2008					
288	5008	IWGPLZZ-5008 (Wipe dust sample from living room floor) (Area wipe: 144 in2)	08/19/2008	NA	NA	Potosi	MO	Potosi
289		ZWGPLZZ-5008 (Wipe dust sample from kitchen floor) (Area wipe: 144 in2)	08/19/2008					
290		JWGPLZZ-5008 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	08/19/2008					
291	20331	IWGPLZZ-20331 (Wipe dust sample from living room floor) (Area wipe: 144 in2)	08/15/2008	692409.8916	4201182.151	Potosi	MO	Potosi
292		ZWGPLZZ-20331 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/15/2008					
293		JWGPLZZ-20331 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/15/2008					
294	30417	IWGPLZZ-30417 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/19/2008	704172.758	4217413.738	Cadet	MO	Old Mines
295		ZWGPLZZ-30417 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/19/2008					
296		JWGPLZZ-30417 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/19/2008					
297	5013	IWGPLZZ-5013 (Dust wipe sample from living room floor) (Area wipe: 144in2)	08/20/2008	695001.8115	4201211.274	Potosi	MO	Potosi
298		ZWGPLZZ-5013 (Wipe dust sample from kitchen floor) (Area wipe: 144 in2)	08/20/2008					
299		JWGPLZZ-5013 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/20/2008					
300	20349	IWGPLZZ-20349 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/20/2008	692752.4758	4201350.031	Potosi	MO	Potosi
301		ZWGPLZZ-20349 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/20/2008					
302		JWGPLZZ-20349 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/20/2008					
303	30177	IWGPLZZ-30177 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/21/2008	698445.9339	4212516.874	Cadet	MO	Old Mines
304		ZWGPLZZ-30177 (Dust wipe sample from dining room floor) (Area wipe: 144 in2)	08/21/2008					
305		JWGPLZZ-30177 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/21/2008					
306	30364	IWGPLZZ-30364 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/21/2008	701065.6117	4216052.74	Blackwell	MO	Old Mines
307		ZWGPLZZ-30364 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/21/2008					
308		JWGPLZZ-30364 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/21/2008					
309	20248	IWGPLZZ-20428 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/22/2008	695908.7091	4204297.332	Potosi	MO	Potosi
310		ZWGPLZZ-20428 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/22/2008					
311		JWGPLZZ-20428 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/22/2008					
312	5012	IWGPLZZ-5012 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/21/2008	702007.9109	4214441.745	Cadet	MO	Old Mines
313		ZWGPLZZ-5012 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/21/2008					
314		JWGPLZZ-5012 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/21/2008					
315	30172	IWGPLZZ-30172 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/21/2008	698944.9047	4212817.427	Cadet	MO	Old Mines
316		ZWGPLZZ-30172 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/21/2008					
317		JWGPLZZ-30172 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/21/2008					
318	30126	IWGPLZZ-30126 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/25/2008	692721.2118	4209220.16	Cadet	MO	Old Mines
319		ZWGPLZZ-30126 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/25/2008					
320		JWGPLZZ-30126 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/25/2008					
321	30577	IWGPLZZ-30577 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/25/2008	696571.146	4209106.262	Cadet	MO	Old Mines
322		ZWGPLZZ-30577 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/25/2008					
323		JWGPLZZ-30577 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/25/2008					
324	20397	ZWGPLZZ-20397 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/25/2008	693490.4735	4200522.105	Potosi	MO	Potosi
325		IWGPLZZ-20397 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/25/2008					
326		JWGPLZZ-20397 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/25/2008					
327	30271	IWGPLZZ-30271 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/26/2008	696314.9228	4215107.371	Blackwell	MO	Old Mines
328		ZWGPLZZ-30271 (Dust wipe sample from dining room floor) (Area wipe: 144 in2)	08/26/2008					
329		JWGPLZZ-30271 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/26/2008					
330		IWGPLZZ-1634 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/27/2008					

Table 2-4
Summary of Residential Dust Wipe Samples
Washington County Mining District
Washington County, Missouri

Lab ID	Property	B&V Sample No. and Description	Date Collected	X Coordinates	Y Coordinates	Town	State	Site
331	1634	ZWGPLZZ-1634 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/27/2008			Mineral Point	MO	Potosi
332		JWGPLZZ-1634 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/27/2008					
333	1643	IWGPLZZ-1643 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/27/2008	697184.2175	4203690.874	Mineral Point	MO	Potosi
334		ZWGPLZZ-1643 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/27/2008					
335		JWGPLZZ-1643 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/27/2008					
336	20108	IWGPLZZ-20108 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/28/2008	691477.2346	4226835.352	Richwoods	MO	Richwoods
337		ZWGPLZZ-20108 (Dust wipe sample from dining room floor) (Area wipe: 144 in2)	08/28/2008					
338		JWGPLZZ-20108 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/28/2008					
339	5014	IWGPLZZ-5014 (Dust wipe sample from family room floor) (Area wipe: 144 in2)	08/29/2008	701492.7194	4215074.309	Cadet	MO	Old Mines
340		ZWGPLZZ-5014 (Dust wipe sample from dining room floor) (Area wipe: 144 in2)	08/29/2008					
341		JWGPLZZ-5014 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/29/2008					
342	20171	IWGPLZZ-20171 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/29/2008	701501.1642	4215570.49	Blackwell	MO	Old Mines
343		ZWGPLZZ-20171 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/29/2008					
344		JWGPLZZ-20171 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/29/2008					
345	20173	ZWGPLZZ-20173 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	08/29/2008	701551.6739	4215585.222	Blackwell	MO	Old Mines
346		IWGPLZZ-20173 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	08/29/2008					
347		JWGPLZZ-20173 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	08/29/2008					
348	20187	IWGPLZZ-20187 (Dust wipe sample from living room floor) (Area wipe: 144 in2)	09/03/2008	701242.3024	4216248.161	Blackwell	MO	Old Mines
349		ZWGPLZZ-20187 (Dust wipe sample from kitchen floor) (Area wipe: 144 in2)	09/03/2008					
350		JWGPLZZ-20187 (Dust wipe sample from bedroom floor) (Area wipe: 144 in2)	09/03/2008					

Note: All samples were collected by BVSPC during the 2008 RI/FS field investigation.

Table 2-4
Summary of Residential Dust Wipe Samples
Washington County Mining District
Washington County, Missouri

Lab ID	Property	B&V Sample No. and Description	Date Collected	X Coordinates	Y Coordinates	Town	State	Site
201	23264	IWGPLZZ-23264 (Living rm. floor wipe sample) (Area wipe: 144 in2)	07/21/2008	694321.1006	4201292.493	Potosi	MO	Old Mines
202		ZWGPLZZ-23264 (Dining rm. floor wipe sample) (Area wipe: 144 in2)	07/21/2008					
203		JWGPLZZ-23264 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/21/2008					
204	20758	IWGPLZZ-20758 (Living rm. floor wipe sample) (Area wipe: 144 in2)	07/16/2008	698797.333	4199278.464	Mineral Point	MO	Potosi
205		ZWGPLZZ-20758 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/16/2008					
206		JWGPLZZ-20758 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/16/2008					
207	510	IWGPLZZ-510 (Living rm. floor wipe sample) (Area wipe: 144 in2)	07/15/2008	NA	NA	NA	MO	Old Mines
208		ZWGPLZZ-510 (Kitchen window sill) (Area wipe: 144 in2)	07/15/2008					
209		HWGPLZZ-510 (Hallway dust wipe sample) (Area wipe: 144 in2)	07/15/2008					
210	8	IWGPLZZ-8 (Family rm. floor dust wipe sample) (Area wipe: 144 in2)	07/18/2008	694022.4497	4201321.251	Potosi	MO	Potosi
211		ZWGPLZZ-8 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/18/2008					
212		JWGPLZZ-8 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/18/2008					
213	23575	IWGPLZZ-23579 (Wipe dust sampled from living rm. floor) (Area wipe: 144 in2)	07/22/2008	696230.088	4205166.106	Cadet	MO	Potosi
214		ZWGPLZZ-23575 (Wipe dust sample from kitchen floor) (Area wipe: 144 in2)	07/22/2008					
215		JWGPLZZ-23575 (Wipe sample collected from bedroom floor) (Area wipe: 144 in2)	07/22/2008					
216	69	HWGPLZZ-69 (Laundry rm. floor wipe sample) (Area wipe: 144 in2)	07/23/2008	698791.2483	4209209.443	Cadet	MO	Old Mines
217		IWGPLZZ-69 (Living rm. floor wipe sample) (Area wipe: 144 in2)	07/23/2008					
218		JWGPLZZ-69 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/23/2008					
219	5007	HWGPLZZ-5007 (Wipe dust sample from family rm. floor) (Area wipe: 144 in2)	07/23/2008	694695.401	4201657.845	Potosi	MO	Potosi
220		IWGPLZZ-5007 (Wipe dust sample from living rm. floor) (Area wipe: 144 in2)	07/23/2008					
221		JWGPLZZ-5007 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	07/23/2008					
222	20437	IWGPLZZ-20437 (Wipe dust sample from living rm. floor) (Area wipe: 144 in2)	07/24/2008	695795.8056	4201979.199	Potosi	MO	Potosi
223		HWGPLZZ-20437 (Wipe dust sample from family rm. floor) (Area wipe: 144 in2)	07/24/2008					
224		JWGPLZZ-20437 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	07/24/2008					
225	23378	IWGPLZZ-23378 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/25/2008	695281.1127	4200908.291	Potosi	MO	Potosi
226		ZWGPLZZ-23378 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/25/2008					
227		JWGPLZZ-23378 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/25/2008					
228	20008	IWGPLZZ-20008 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008	691138.4028	4227035.663	Richwoods	MO	Richwoods
229		ZWGPLZZ-20008 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008					
230		JWGPLZZ-20008 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/31/2008					
231	30079	IWGPLZZ-30079 (Living room wipe dust sample) (Area wipe: 144 in2)	07/28/2008	697985.7641	4211384.251	Cadet	MO	Old Mines
232		ZWGPLZZ-30079 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/28/2008					
233		JWGPLZZ-30079 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/28/2008					
234	1653	IWGPLZZ-1653 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/24/2008	695793.5972	4202220.872	Potosi	MO	Potosi
235		ZWGPLZZ-1653 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/24/2008					
236		JWGPLZZ-1653 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/24/2008					
237	20767	IWGPLZXZ-20767 (Wipe sample for dust from living room floor) (Area wipe: 144 in2)	07/29/2008	700324.3991	4202033.963	Bonne Terre	MO	Potosi
238		ZWGPLZZ-20767 (Wipe dust sample from kitchen floor) (Area wipe: 144 in2)	07/29/2008					
239		JWGPLZZ-20767 (Wipe dust sample from bedroom floor) (Area wipe: 144 in2)	07/29/2008					
240	20918	IWGPLZZ-20918 (Living room floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008	694922.0883	4200867.058	Potosi	MO	Potosi
241		ZWGPLZZ-20918 (Kitchen floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008					
242		JWGPLZZ-20918 (Bedroom floor dust wipe sample) (Area wipe: 144 in2)	07/30/2008					

Table 2-5
Summary of Residential Dust Vacuum Samples
Washington County Mining District
Washington County, Missouri

Lab ID	Property	BV Sample No.	Composite Sample Description	Date Collected	X Coordinates	Y Coordinates	Town	State	Site
104	8	MDCPLZZ-8	Family room, kitchen and bedroom floors	07/18/2008	694022.44969	4201321.25139	Potosi	MO	Potosi
106	69	ZDCPLZZ-69	Family room, living room and bedroom floors	07/23/2008	698791.24832	4209209.44325	Cadet	MO	Old Mines
122	438	MDCPLZZ-438	Living room, kitchen and bedroom floors	08/12/2008	693963.66948	4201181.47882	Potosi	MO	Potosi
128	486	MDCPLZZ-486	Living room, kitchen and bedroom floors	08/13/2008	691690.01865	4201225.07566	Potosi	MO	Potosi
123	1612	MDCPLZZ-1612	Living room, kitchen and bedroom floors	08/11/2008	695008.87254	4202147.53079	Potosi	MO	Potosi
145	1643	MDCPLZZ-1643	Living room, kitchen and bedroom floors	08/27/2008	697184.21753	4203690.87367	Mineral Point	MO	Potosi
111	1653	MDCPLZXZ-1653	Living room, kitchen and bedroom floors	07/24/2008	695793.59723	4202220.87186	Potosi	MO	Potosi
118	5003	MDCPLZZ-5003	Dining room, living room, and kitchen floors	08/07/2008	694387.59856	4200876.76157	Potosi	MO	Potosi
107	5007	LDCPLZZ-5007	Living room, kitchen and bedroom floors	07/23/2008	694695.40102	4201657.84546	Potosi	MO	Potosi
130	5008	MDCPLZZ-5008	Living room, family room, and kitchen floors	08/19/2008	NA	NA	Potosi	MO	Potosi
138	5012	MDCPLZZ-5012	Living room, kitchen and bedroom floors	08/21/2008	702007.91089	4214441.74502	Cadet	MO	Old Mines
133	5013	MDCPLZZ-5013	Living room, kitchen and bedroom floors	08/20/2008	695001.81154	4201211.27427	Potosi	MO	Potosi
147	5014	MDCPLZZ-5014	Family room, kitchen and bedroom floors	08/29/2008	701492.71940	4215074.30910	Cadet	MO	Old Mines
110	20008	MDCPLZZ-20008	Living room, kitchen and bedroom floors	07/31/2008	691138.40278	4227035.66308	Richwoods	MO	Richwoods
120	20028	MDCPLZZ-20028	Living room, kitchen and bedroom floors	08/08/2008	690652.74800	4225992.70000	Richwoods	MO	Richwoods
124	20070	MDCPLZZ-20070	Living room, kitchen and bedroom floors	08/12/2008	690223.60570	4224238.88356	Richwoods	MO	Richwoods
146	20108	MDCPLZZ-20108	Living room, kitchen and bedroom floors	08/28/2008	691477.23456	4226835.35203	Richwoods	MO	Richwoods
149	20173	MDCPLZZ-20173	Living room, kitchen and bedroom floors	08/29/2008	701551.67386	4215585.22210	Blackwell	MO	Old Mines
150	20187	MDCPLZZ-20187	Living room, kitchen and bedroom floors	09/03/2008	701242.30244	4216248.16084	Blackwell	MO	Old Mines
131	20331	MDCPLZZ-20331	Living room, kitchen and bedroom floors	08/15/2008	692409.89164	4201182.15097	Potosi	MO	Potosi
134	20349	MDCPLZZ-20349	Living room, kitchen and bedroom floors	08/20/2008	692752.47577	4201350.03092	Potosi	MO	Potosi
142	20397	MDCPLZZ-20397	Living room, kitchen and bedroom floors	08/25/2008	693490.47348	4200522.10475	Potosi	MO	Potosi

Table 2-5
Summary of Residential Dust Vacuum Samples
Washington County Mining District
Washington County, Missouri

Lab ID	Property	BV Sample No.	Composite Sample Description	Date Collected	X Coordinates	Y Coordinates	Town	State	Site
137	20428	MDCPLZZ-20428	Living room, kitchen and bedroom floors	08/22/2008	695908.70911	4204297.33238	Potosi	MO	Potosi
108	20437	MDCPLZZ-20437	Family room, living room and bedroom floors	07/25/2008	695795.80558	4201979.19868	Potosi	MO	Potosi
101	20758	MDCPLZZ-20758	Dining room, living room, and bedroom floors	07/16/2008	698797.33300	4199278.46400	Mineral Point	MO	Potosi
113	20767	MDCPLZZ-20767	Living room, kitchen and bedroom floors	07/29/2008	700324.39911	4202033.96328	Bonne Terre	MO	Potosi
114	20918	MDCPLZZ-20918	Living room, kitchen and bedroom floors	07/30/2008	694922.08830	4200867.05789	Potosi	MO	Potosi
103	23264	MDCPLZZ-23264	Living room, kitchen and bedroom floors	07/21/2008	694321.10056	4201292.49256	Potosi	MO	Potosi
109	23378	MDCPLZZ-23378	Living room, kitchen and bedroom floors	07/25/2008	695281.11267	4200908.29058	Potosi	MO	Potosi
105	23575	ZDCPLZZ-23575	Living room, kitchen and bedroom floors	07/22/2008	696230.08801	4205166.10597	Cadet	MO	Potosi
112	30079	MDCPLZZ-30079	Living room, kitchen and bedroom floors	07/28/2008	697985.76410	4211384.25064	Cadet	MO	Old Mines
140	30126	MDCPLZZ-30126	Living room, kitchen and bedroom floors	08/25/2008	692721.21181	4209220.15973	Cadet	MO	Old Mines
139	30172	MDCPLZZ-30172	Living room, kitchen and bedroom floors	08/21/2008	698944.90473	4212817.42708	Cadet	MO	Old Mines
135	30177	MDGPLZZ-30177	Living room, dining room, and bedroom floors	08/21/2008	698445.93392	4212516.87369	Cadet	MO	Old Mines
121	30182	MDCPLZZ-30182	Living room, kitchen and bedroom floors	08/11/2008	691310.03686	4226592.48715	Cadet	MO	Richwoods
143	30271	MDCPLZZ-30271	Family room, dining room, and bedroom floors	08/26/2008	696314.92283	4215107.37098	Blackwell	MO	Old Mines
136	30364	MDCPLZZ-30364	Living room, kitchen and bedroom floors	08/21/2008	701065.61169	4216052.74005	Blackwell	MO	Old Mines
132	30417	MDCPLZZ-30417	Living room, kitchen and bedroom floors	08/19/2008	704172.75800	4217413.73800	Cadet	MO	Old Mines
117	30448	MDCPLZZ-30448	Living room, kitchen and bedroom floors	07/31/2008	704865.16729	4213681.31644	Cadet	MO	Old Mines
126	30553	MDCPLZZ-30553	Living room, kitchen and bedroom floors	08/13/2008	696316.46534	4208971.19127	Cadet	MO	Old Mines
141	30577	MDCPLZZ-30577	Living room, kitchen and bedroom floors	08/25/2008	696571.14600	4209106.26200	Cadet	MO	Old Mines
129	30651	MDGPLZZ-30651	Living room, kitchen and bedroom floors	08/14/2008	701846.31330	4215778.84230	Blackwell	MO	Old Mines
127	30911	MDCPLZZ-30911	Living room, kitchen and bedroom floors	08/13/2008	698710.90674	4216776.15172	Blackwell	MO	Old Mines
125	30914	MDCPLZZ-30914	Living room, kitchen and bedroom floors	08/15/2008	698776.64451	4216919.80092	Blackwell	MO	Old Mines
116	30965	MDCPLZZ-30965	Living room, kitchen and bedroom floors	07/30/2008	689012.65826	4212499.21287	Potosi	MO	Old Mines
119	31016	MDCPLZZ-31016	Family room, dining room, and bedroom floors	08/07/2008	687472.16613	4213174.27451	Potosi	MO	Old Mines

Note: All samples were collected by BVSPC during the 2008 RI/FS field investigation.

Table 2-6
Summary of Potable (Residential) Groundwater Samples
Washington County Mining District
Washington County, Missouri

Property	BV Sample No.	Date Collected	X Coordinates	X Coordinates	Town	State	Site
8	ZPGPLZZ-8	7/18/2008	694022.449686	4201321.251390	Potosi	MO	Potosi
69	ZPGPLZZ-69	7/23/2008	698791.248322	4209209.443250	Cadet	MO	Old Mines
438	ZPGPLZZ-438	8/12/2008	693963.669481	4201181.478820	Potosi	MO	Potosi
1612	ZPGGPLZZ-1612	8/11/2008	695008.872544	4202147.530790	Potosi	MO	Potosi
1653	ZPGPLZZ-1653	7/28/2008	695793.597228	4202220.871860	Potosi	MO	Potosi
5007	ZPGPLZZ-5007	7/23/2008	694695.401019	4201657.845460	Potosi	MO	Potosi
5014	ZPGPLZZ-5014	8/29/2008	701492.719401	4215074.309100	Cadet	MO	Old Mines
20008	ZPGPLZZ-20008	7/31/2008	691138.402780	4227035.663080	Richwoods	MO	Richwoods
20027	ZPGPLZZ-20027	8/4/2008	690202.248445	4225760.396930	Richwoods	MO	Richwoods
20437	ZPGPLZZ-20437	7/24/2008	695795.805576	4201979.198680	Potosi	MO	Potosi
20767	ZPGPLZZ-20767	8/7/2008	700324.399111	4202033.963280	Bonne Terre	MO	Potosi
23264	ZPGPLZZ-23264	7/21/2008	694321.100555	4201292.492560	Potosi	MO	Potosi
23378	ZPGPLZZ-23378	7/25/2008	695281.112667	4200908.290580	Potosi	MO	Potosi
23575	ZPGPLZZ-23575	7/22/2008	696230.088005	4205166.105970	Cadet	MO	Potosi
30079	ZPGPLZZ-30079	7/28/2008	697985.764103	4211384.250640	Cadet	MO	Old Mines
30182	ZPGPLZZ-30182	8/11/2008	691310.036864	4226592.487150	Cadet	MO	Richwoods
30448	ZPGPLZZ-30448	7/31/2008	704865.167289	4213681.316440	Cadet	MO	Old Mines
30553	ZPGPLZZ-30553	8/13/2008	696316.465342	4208971.191270	Cadet	MO	Old Mines
30914	ZPGPLZZ-30914	8/15/2008	698776.644508	4216919.800920	Blackwell	MO	Old Mines
30965	ZPGPLZZ-30965	7/30/2008	689012.658263	4212499.212870	Potosi	MO	Old Mines
31016	ZPGPLZZ-31016	8/7/2008	687472.166134	4213174.274510	Potosi	MO	Old Mines

Note: All samples were collected by BVSPC during the 2008 RI/FS field investigation.

Table 2-7
Summary of Surface Water and Sediment Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Date Collected	X Coordinates	Y Coordinates	Site
SD/SW-24	Not Available	38.08094	-90.7357	Old Mines
SD/SW-25		38.07527	-90.7400	
SD/SW-26		38.07063	-90.7446	
SD/SW-1, Area 19		37.97428	-90.8121	
SD/SW-30		38.02370	-90.8092	
SD/SW-4, Area 19		37.99177	-90.8303	
SD/SW-2, Area 19		37.98939	-90.8289	
SD/SW-3, Area 19		37.98939	-90.8289	
SD/SW-20		38.01745	-90.6816	
SD/SW-19		38.01420	-90.6809	
SD/SW-28		38.02912	-90.7543	
SD/SW-31		38.00455	-90.8032	
SD/SW-21		38.02609	-90.7021	
SD/SW-15		38.08510	-90.6620	
SD/SW-16		38.08106	-90.6539	
SD/SW-33		38.06876	-90.7078	
SD/SW-23		38.06225	-90.6585	
SD/SW-18		38.02136	-90.6627	
SD/SW-18		38.02136	-90.6627	
SD/SW-19A		38.01978	-90.6720	
SD/SW-19A-FD		38.01978	-90.6720	
SD/SW-6	11/11/2006	38.15670	-90.8408	Richwoods
SD/SW-2		38.14915	-90.8334	
SD/SW-3		38.14445	-90.8285	
SD/WSW-3		38.17055	-90.7974	
SD/WSW-2		38.16576	-90.8033	
SD/WSW-1		38.16232	-90.7884	
SD/WSW-1-FD		38.16232	-90.7884	
SD/WSW-8		38.15511	-90.7982	
SD/SW-4		38.17034	-90.7766	
SD/SW-4-FD		38.17034	-90.7766	
SD/SW-5		38.17369	-90.7738	
SD/SW-0		38.15229	-90.7633	
SD/SW-1		38.15282	-90.7448	
SD/SW-5		38.17369	-90.7738	
SD/SW-01	2008	37.93036	-90.80875	Potosi
SD/SW-02		37.95481	-90.77284	
SD/SW-03		37.960685	-90.717053	
SD/SW-04		37.94411	-90.72163	
SD/SW-06		37.978865	-90.666027	
SD/SW-09		37.994028	-90.661332	
SD/SW-10		38.033	-90.623965	
SD/SW-11		38.014017	-90.692115	
SD/SW-12		37.94026	-90.792645	
SD/SW-14		37.95359	-90.77652	
SD/SW-15		37.972223	-90.92709	
SD/SW-16		37.976033	-90.727803	
SD/SW-17		38.035583	-90.61963	
SD/SW-18		38.022368	-90.660168	
SD/SW-19		38.017248	-90.65177	
SD/SW-20		37.9455	-90.68883	
SD/SW-22		37.97883	-90.71999	

Note: Samples were collected in 2008 were collected by EPA during the BERA.
All other samples were collected during previous investigations.

Table 2-8
Summary of Biota Samples
Washington County Mining District
Washington County, Missouri

Sample ID	Location	Description	Date Collected	X Coordinates	Y Coordinates	Site
SD/SW-01	Hornsey Lake	Small fish	Dec-08	37.93036	-90.80875	Potosi
SD/SW-02	Big Quarry Lake	Small fish		37.95481	-90.77284	
SD/SW-03	NA	Crayfish		37.96069	-90.71705	
SD/SW-04	East Branch Mill Cree	Small fish		37.94411	-90.72163	
SD/SW-06	Mill Creek	Small fish, fish fillets, crayfis		37.97887	-90.66603	
SD/SW-08	Mill Creek	Crayfish		38.01923	-90.64904	
SD/SW-14	Small Quarry Pond	Small fish, fish fillets		37.95359	-90.77652	
SS01	Hornsey Lake	Vegetation		37.93073	-90.80707	
SS02	Hornsey Lake	Vegetation		37.92926	-90.81449	
SS03	Small Quarry Pond	Vegetation		37.95401	-90.77637	
SS04	Big Quarry Lake	Vegetation		37.95448	-90.77345	
SS05	Mill Creek	Vegetation		37.96094	-90.71708	
SS06	Highway Department	Vegetation		37.96180	-90.72225	
SS07	NA	Vegetation		37.95754	-90.66928	
SS08	Shibboleth at Tiff	Vegetation		38.01731	-90.65204	
SS09	Highway E	Vegetation		37.99946	-90.70374	
SS10	Hornsey Lake	Vegetation		37.93172	-90.80671	
SS11	Apex Lake	Vegetation		37.94561	-90.68903	

Note: All samples were collected by EPA during the BERA.

Table 2-9
Summary Soil Samples for Lead In vitro Bioaccessibility
Washington County Lead District Site
Washington County, Missouri

Property	B&V Sample No.	Date Collected	X Coordinates	Y Coordinates	Town	State	Site
8	ASGRLAZ-8	07/18/2008	694022.44969	4201321.25139	Potosi	MO	Potosi
1612	ASGRXA3-1612	08/11/2008	695008.872544	4202147.530790	Potosi	MO	Potosi
5007	CSGPLAZ-5007	07/23/2008	694695.401019	4201657.845460	Potosi	MO	Potosi
20008	CSGRLA3-20008	07/31/2008	691138.402780	4227035.663080	Richwoods	MO	Richwoods
20331	ASGPXA3-20331	08/15/2008	692409.89164	4201182.15097	Potosi	MO	Potosi
20349	ASGRXA3-20349	08/20/2008	692752.47577	4201350.03092	Potosi	MO	Potosi
20428	DSGRXA3-20428	08/22/2008	695908.70911	4204297.33238	Potosi	MO	Potosi
20918	DSGRLA1-20918	07/30/2008	694922.08830	4200867.05789	Potosi	MO	Potosi
23378	DSGRLA8-23378	07/25/2008	695281.112667	4200908.290580	Potosi	MO	Potosi
30177	DSGRXA3-30177	08/21/2008	698445.93392	4212516.87369	Cadet	MO	Old Mines
30417	ASGRXA3-30417	08/19/2008	704172.75800	4217413.73800	Cadet	MO	Old Mines
30448	BSGRLA3-30448	07/31/2008	704865.167289	4213681.316440	Cadet	MO	Old Mines
30553	ASGRXA3-30553	08/13/2008	696316.465342	4208971.191270	Cadet	MO	Old Mines
30911	CSGRXA3-30911	08/13/2008	698710.90674	4216776.15172	Blackwell	MO	Old Mines
31016	DSGRXA3-31016	08/07/2008	687472.166134	4213174.274510	Potosi	MO	Old Mines

Note: All samples were collected by BVSPC during the 2008 RI/FS field investigation.

Table 2-10
Summary Paint Surface Samples
Washington County Lead District Site
Washington County, Missouri

Property/Sample ID	Site	Type	Component	Substrate	Side	Condition	Color	Floor	Room	Misc.
438	Potosi	PAINT	WALL	WOOD	A	FAIR	RED	FIRST	OUTSIDE	
			COLUMN	WOOD	A	INTACT	WHITE	FIRST	OUTSIDE	
			WALL	MINIBLIND	B	INTACT	WHITE	FIRST	KITCHEN	
			WALL	DRYWALL	B	INTACT	WHITE	SECOND	BEDROOM	
1612	Potosi	PAINT	WALL	DRYWALL	B	INTACT	WHITE	FIRST	BATHROOM	
			CEILING	WOOD	C	INTACT	WHITE	FIRST	OUTSIDE	
			WALL	DRYWALL	C	INTACT	WHITE	FIRST	LIVING ROOM	
			WALL	WOOD	A	INTACT	WHITE	FIRST	OUTSIDE	
5007	Potosi	PAINT	WALL	CONCRETE	D	FAIR	TAN	FIRST	OUTSIDE	
			WALL	PLASTER	A	FAIR	WHITE	FIRST	KITCHEN	
			WALL	PLASTER	A	FAIR	WHITE	FIRST	BATHROOM	
			CABINET	WOOD	A	CHALKING	WHITE	FIRST	OUTSIDE	Porch
20019	Richwoods	PAINT	WALL	DRYWALL	C	INTACT	GREEN	FIRST	KITCHEN	
			WALL	DRYWALL	D	INTACT	WHITE	FIRST	HALL	
			CEILING	WOOD	A	CHALKING	WHITE	FIRST	OUTSIDE	Porch
			WINDOW	WOOD	B	CRACKED	WHITE	FIRST	OUTSIDE	
20027	Richwoods	PAINT	WALL	WOOD	D	INTACT	GREEN	FIRST	KITCHEN	
			WINDOW	WOOD	D	INTACT	WHITE	FIRST	OUTSIDE	
			WALL	WOOD	D	INTACT	WHITE	FIRST	OUTSIDE	
			WINDOW	WOOD	B	INTACT	WHITE	FIRST	KITCHEN	
20028	Richwoods	PAINT	WALL	PLASTER	A	INTACT	WHITE	FIRST	LIVING ROOM	
			WALL	PLASTER	B	INTACT	YELLOW	FIRST	HALL	
			COLUMN	WOOD	A	INTACT	WHITE	FIRST	OUTSIDE	Porch
			CEILING	WOOD	A	INTACT	WHITE	FIRST	OUTSIDE	Porch

Table 2-10
Summary Paint Surface Samples
Washington County Lead District Site
Washington County, Missouri

Property/Sample ID	Site	Type	Component	Substrate	Side	Condition	Color	Floor	Room	Misc.
20437	Potosi	PAINT	WINDOW	DRYWALL	A	INTACT	GREEN	FIRST	LIVING ROOM	
			CABINET	DRYWALL	C	INTACT	GREEN	FIRST	LIVING ROOM	
			WALL	WOOD	A	CRACKED	WHITE	FIRST	OUTSIDE	
			DOOR	WOOD	B	CRACKED	WHITE	FIRST	OUTSIDE	
20918	Potosi	PAINT	WALL	PLASTER	A	INTACT	WHITE	FIRST	OFFICE	Siding
			WALL	PLASTER	A	INTACT	WHITE	FIRST	KITCHEN	Siding
			WALL	WOOD	A	INTACT	BEIGE	FIRST	OFFICE	Siding
			WINDOW	WOOD	D	POOR	WHITE	FIRST	OFFICE	Siding
23264	Potosi	PAINT	DOOR	WOOD	B	INTACT	WHITE	FIRST	HALL	
			WALL	WOOD	A	INTACT	WHITE	FIRST	HALL	
			WINDOW	WOOD	B	PEELING	WHITE	FIRST	OUTSIDE	
			WALL	WOOD	A	FAIR		FIRST	OUTSIDE	
23567	Potosi	PAINT	WALL	PLASTER	A	INTACT	TAN	FIRST	LIVING ROOM	
			WALL	DRYWALL	C	INTACT	WHITE	FIRST	KITCHEN	
			WALL	WOOD	A	INTACT	TAN	SECOND	OUTSIDE	
			WINDOW	WOOD	B	INTACT	WHITE	FIRST	OUTSIDE	
23715	Potosi	PAINT	WALL	PLASTER	A	INTACT	BLUE	FIRST	BATHROOM	
			WALL	PLASTER	A	INTACT	WHITE	FIRST	LIVING ROOM	
			WINDOW	WOOD	B	INTACT	WHITE	FIRST	OUTSIDE	
40045	Potosi	PAINT	WALL	WOOD	A	FAIR	WHITE	FIRST	BATHROOM	
			WALL	WOOD	A	FAIR	WHITE	FIRST	LIVING ROOM	
			WALL	WOOD	A	FAIR	WHITE	FIRST	OUTSIDE	
			WINDOW	WOOD	A	FAIR	BLUE	FIRST	OUTSIDE	

Note: All samples were collected by BVSPC during the 2008 RI/FS field investigation.

Table 4-1
Analytical Results for Lead in Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Property/ Sample ID	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentration for lead (165.6 mg/kg)	Site
8	5713		X	X	X	Potosi
438	1238		X	X	X	Potosi
486	1502		X	X	X	Potosi
1612	533		X		X	Potosi
1643	435		X		X	Potosi
1653	978		X		X	Potosi
5003	17124		X	X	X	Potosi
5007	944		X		X	Potosi
5008	893		X		X	Potosi
5013	855		X		X	Potosi
20331	1724		X	X	X	Potosi
20349	1768		X	X	X	Potosi
20397	1049		X		X	Potosi
20428	1125		X		X	Potosi
20437	3348		X	X	X	Potosi
20758	47					Potosi
20767	1392		X	X	X	Potosi
20918	2378		X	X	X	Potosi
23264	780		X		X	Potosi
23378	5934		X	X	X	Potosi
23575	287				X	Potosi

Table 4-2
Analytical Results for Lead in Soil Confirmation Samples – Potosi Site
Washinton County Lead District Site
Washington County, Missouri

Property #/Sample ID	Site	Quad	XRF Result (mg/kg)	Confirmation Result (mg/kg)	Relative % Difference
438	Potosi	F2	1238	1140	8.2
486	Potosi	B1	1331	1130	16.3
1612	Potosi	B1	134	140	4.4
5003	Potosi	B2	7596	6610	13.9
5007	Potosi	F1	706	656	7.3
5008	Potosi	B2	893	850	4.9
5013	Potosi	F1	855	915	6.8
20331	Potosi	B1	786	755	4.0
20349	Potosi	F2	1354	1180	13.7
20918	Potosi	B2	2378	2500	5.0
23378	Potosi	B2	5146	4630	10.6

Table 4-3
Analytical Results for Lead Bioavailability in Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Property	Lab ID	B&V Sample No.	Date Collected	XRF Lead Concentration (mg/kg)	IVBA (%)	RBA (%)	Site
8	601	ASGRLAZ-8	07/18/2008	5089	76.8	67.4	Potosi
1612	608	ASGRXA3-1612	08/11/2008	528	62.5	54.8	Potosi
5007	602	CSGPLAZ-5007	07/23/2008	507	53.8	47.2	Potosi
20331	611	ASGPXA3-20331	08/15/2008	1349	45.5	39.9	Potosi
20349	613	ASGRXA3-20349	08/20/2008	1566	57.4	50.4	Potosi
20428	615	DSGRXA3-20428	08/22/2008	637	52.6	46.2	Potosi
20918	604	DSGRLA1-20918	07/30/2008	2367	74.9	65.7	Potosi
23378	603	DSGRLA8-23378	07/25/2008	5151	84.1	73.8	Potosi

IVBA = *In vitro* bioaccessibility
RBA = Relative bioavailability (*In vivo*)
RBA = 0.878*[IVBA] - 0.028

Minimum	39.9
Maximum	73.8
Average	55.7

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
0505572	06-Jun-05	352				X
0504450	06-Jun-05	363				X
0506712	06-Jun-05	726		X		X
0504452	06-Jun-05	858		X		X
0504453	06-Jun-05	1170		X		X
0506709	06-Jun-05	2180		X	X	X
0506710	06-Jun-05	2310		X	X	X
0504451	06-Jun-05	2620		X	X	X
0504494	07-Jun-05	40.4				
0505481	07-Jun-05	54.5				
0505480	07-Jun-05	59				
0505573	07-Jun-05	224				X
0506702	07-Jun-05	395				X
0506713	07-Jun-05	493		X		X
0506701	07-Jun-05	749		X		X
0506700	07-Jun-05	780		X		X
0505415	07-Jun-05	880		X		X
0505417	07-Jun-05	1080		X		X
0505418	07-Jun-05	1180		X		X
0506693	07-Jun-05	1740		X	X	X
0504458	07-Jun-05	1760		X	X	X
0506711	07-Jun-05	2110		X	X	X
0506699	07-Jun-05	2220		X	X	X
0505416	07-Jun-05	2450		X	X	X
0506698	07-Jun-05	2570		X	X	X
0504454	07-Jun-05	2600		X	X	X
0504459	07-Jun-05	2960		X	X	X
0504456	07-Jun-05	3390		X	X	X
0505600	07-Jun-05	3520		X	X	X
0505596	07-Jun-05	4220		X	X	X
0504457	07-Jun-05	5480		X	X	X
0504455	07-Jun-05	9300		X	X	X
0505468	08-Jun-05	278				X
0505465	08-Jun-05	292				X
0505469	08-Jun-05	352				X
0505467	08-Jun-05	405		X		X
0505574	08-Jun-05	513		X		X
0506692	08-Jun-05	526		X		X
0505575	08-Jun-05	591		X		X
0506694	08-Jun-05	598		X		X
0506696	08-Jun-05	616		X		X
0506690	08-Jun-05	670		X		X
0506688	08-Jun-05	1020		X		X
0505420	08-Jun-05	1080		X		X
0505421	08-Jun-05	1370		X	X	X
0505422	08-Jun-05	1370		X	X	X
0506695	08-Jun-05	2060		X	X	X
0505466	08-Jun-05	2290		X	X	X
0506689	08-Jun-05	2450		X	X	X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
0505581	09-Jun-05	53				
0505471	09-Jun-05	106				
0505423	09-Jun-05	169				X
0505501	09-Jun-05	296				X
0506790	09-Jun-05	350				X
0505470	09-Jun-05	481		X		X
0506684	09-Jun-05	498		X		X
0505582	09-Jun-05	560		X		X
0505435	09-Jun-05	583		X		X
0506683	09-Jun-05	678		X		X
0506691	09-Jun-05	921		X		X
0505413	09-Jun-05	1160		X		X
0505428	09-Jun-05	1220		X	X	X
0506686	09-Jun-05	1290		X	X	X
0505583	09-Jun-05	1610		X	X	X
0506685	09-Jun-05	2240		X	X	X
0505430	09-Jun-05	2410		X	X	X
0505429	09-Jun-05	3390		X	X	X
0505412	09-Jun-05	4940		X	X	X
0506687	09-Jun-05	6290		X	X	X
0504478	10-Jun-05	152				
0504480	10-Jun-05	267				X
0505414	10-Jun-05	342				X
0504479	10-Jun-05	361				X
0506789	10-Jun-05	473		X		X
0506706	10-Jun-05	611		X		X
0506669	10-Jun-05	644		X		X
0505419	10-Jun-05	666		X		X
0506673	10-Jun-05	676		X		X
0505482	10-Jun-05	881		X		X
0506705	10-Jun-05	896		X		X
0504481	10-Jun-05	965		X		X
0504461	10-Jun-05	1260		X	X	X
0506704	10-Jun-05	1270		X	X	X
0506703	10-Jun-05	1790		X	X	X
0504460	10-Jun-05	2220		X	X	X
0504485	13-Jun-05	124				
0504482	13-Jun-05	219				X
0504483	13-Jun-05	292				X
0505487	13-Jun-05	301				X
0505488	13-Jun-05	658		X		X
0506666	13-Jun-05	669		X		X
0504484	13-Jun-05	676		X		X
0505486	13-Jun-05	681		X		X
0506708	13-Jun-05	713		X		X
0506674	13-Jun-05	720		X		X
0506679	13-Jun-05	745		X		X
0506667	13-Jun-05	758		X		X
0506672	13-Jun-05	813		X		X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
0504462	13-Jun-05	816		X		X
0506680	13-Jun-05	888		X		X
0505485	13-Jun-05	932		X		X
0506668	13-Jun-05	1070		X		X
0505483	13-Jun-05	1240		X	X	X
0506671	13-Jun-05	1330		X	X	X
0505489	13-Jun-05	1450		X	X	X
0506675	13-Jun-05	1520		X	X	X
0506676	13-Jun-05	1750		X	X	X
0505484	13-Jun-05	1940		X	X	X
0506707	13-Jun-05	2620		X	X	X
0505431	14-Jun-05	155				
0505494	14-Jun-05	218				X
0505490	14-Jun-05	275				X
0504467	14-Jun-05	301				X
0504469	14-Jun-05	321				X
0505496	14-Jun-05	339				X
0505498	14-Jun-05	352				X
0505495	14-Jun-05	357				X
0506678	14-Jun-05	382				X
0505497	14-Jun-05	386				X
0506720	14-Jun-05	414		X		X
0506715	14-Jun-05	430		X		X
0506714	14-Jun-05	431		X		X
0504487	14-Jun-05	445		X		X
0504465	14-Jun-05	454		X		X
0506745	14-Jun-05	482		X		X
0506717	14-Jun-05	541		X		X
0506742	14-Jun-05	909		X		X
0506716	14-Jun-05	1030		X		X
0506719	14-Jun-05	1050		X		X
0505491	14-Jun-05	1070		X		X
0506718	14-Jun-05	1140		X		X
0506741	14-Jun-05	1180		X		X
0504468	14-Jun-05	1240		X	X	X
0506743	14-Jun-05	1420		X	X	X
0504466	14-Jun-05	1950		X	X	X
0505492	14-Jun-05	2540		X	X	X
0505493	14-Jun-05	4980		X	X	X
0506670	14-Jun-05	13300		X	X	X
0505584	15-Jun-05	58.5				
0505576	15-Jun-05	61.9				
0504486	15-Jun-05	66.4				
0505440	15-Jun-05	145				
0506677	15-Jun-05	334				X
0504489	15-Jun-05	384				X
0504491	15-Jun-05	490		X		X
0506746	15-Jun-05	492		X		X
0506732	15-Jun-05	507		X		X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
0506663	15-Jun-05	842		X		X
0504488	15-Jun-05	940		X		X
0506664	15-Jun-05	998		X		X
0506729	15-Jun-05	1320		X	X	X
0506665	15-Jun-05	1920		X	X	X
0504470	15-Jun-05	2880		X	X	X
0505597	15-Jun-05	3650		X	X	X
0505433	16-Jun-05	130				
0505499	16-Jun-05	303				X
0504492	16-Jun-05	317				X
0506768	16-Jun-05	435		X		X
0506748	16-Jun-05	441		X		X
0506730	16-Jun-05	526		X		X
0506749	16-Jun-05	592		X		X
0506750	16-Jun-05	673		X		X
0506744	16-Jun-05	752		X		X
0506738	16-Jun-05	867		X		X
0506740	16-Jun-05	909		X		X
0506736	16-Jun-05	1060		X		X
0506735	16-Jun-05	1080		X		X
0504471	16-Jun-05	1160		X		X
0504472	16-Jun-05	4580		X	X	X
0505442	17-Jun-05	7.89				
0505441	17-Jun-05	345				X
0505432	17-Jun-05	361				X
0505434	17-Jun-05	390				X
0506737	17-Jun-05	469		X		X
0506697	17-Jun-05	983		X		X
0506774	17-Jun-05	1130		X		X
0506747	18-Jun-05	636		X		X
0505514	20-Jun-05	156				
0505436	20-Jun-05	218				X
0504476	20-Jun-05	230				X
0506776	20-Jun-05	371				X
0505446	20-Jun-05	390				X
0505443	20-Jun-05	438		X		X
0506734	20-Jun-05	484		X		X
0505585	20-Jun-05	504		X		X
0506773	20-Jun-05	737		X		X
0506731	20-Jun-05	744		X		X
0505500	20-Jun-05	983		X		X
0505445	20-Jun-05	1270		X	X	X
0505516	20-Jun-05	1330		X	X	X
0505515	20-Jun-05	2010		X	X	X
0506781	20-Jun-05	2100		X	X	X
0505444	20-Jun-05	2370		X	X	X
0506777	20-Jun-05	3730		X	X	X
0506733	20-Jun-05	3890		X	X	X
0505608	21-Jun-05	215				X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
0505517	21-Jun-05	255				X
0505502	21-Jun-05	260				X
0505503	21-Jun-05	396				X
0505519	21-Jun-05	396				X
0506723	21-Jun-05	461		X		X
0506764	21-Jun-05	515		X		X
0505504	21-Jun-05	542		X		X
0506780	21-Jun-05	544		X		X
0506755	21-Jun-05	626		X		X
0506721	21-Jun-05	671		X		X
0504477	21-Jun-05	674		X		X
0506728	21-Jun-05	675		X		X
0506762	21-Jun-05	726		X		X
0506756	21-Jun-05	917		X		X
0506722	21-Jun-05	984		X		X
0506758	21-Jun-05	1060		X		X
0506775	21-Jun-05	1100		X		X
0506761	21-Jun-05	1490		X	X	X
0506760	21-Jun-05	1510		X	X	X
0506765	21-Jun-05	1570		X	X	X
0505606	21-Jun-05	1630		X	X	X
0506759	21-Jun-05	1640		X	X	X
0505605	21-Jun-05	2600		X	X	X
0506754	21-Jun-05	2980		X	X	X
0505607	21-Jun-05	4270		X	X	X
0505518	21-Jun-05	6040		X	X	X
0506766	21-Jun-05	10300		X	X	X
0505506	22-Jun-05	102				
0505438	22-Jun-05	193				X
0505508	22-Jun-05	329				X
0505520	22-Jun-05	335				X
0505523	22-Jun-05	342				X
0505505	22-Jun-05	404		X		X
0506753	22-Jun-05	466		X		X
0506772	22-Jun-05	514		X		X
0505521	22-Jun-05	520		X		X
0505507	22-Jun-05	702		X		X
0506788	22-Jun-05	729		X		X
0506782	22-Jun-05	739		X		X
0506763	22-Jun-05	1130		X		X
0505437	22-Jun-05	1230		X	X	X
0505448	22-Jun-05	3100		X	X	X
0505447	22-Jun-05	3640		X	X	X
0505602	23-Jun-05	171				X
0505451	23-Jun-05	222				X
0505522	23-Jun-05	275				X
0505577	23-Jun-05	367				X
0504495	23-Jun-05	375				X
0505579	23-Jun-05	477		X		X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
0505601	23-Jun-05	512		X		X
0505578	23-Jun-05	516		X		X
0506724	23-Jun-05	648		X		X
0506726	23-Jun-05	771		X		X
0504496	23-Jun-05	1030		X		X
0506783	23-Jun-05	1260		X	X	X
0505452	23-Jun-05	1490		X	X	X
0506767	23-Jun-05	1520		X	X	X
0505586	23-Jun-05	1840		X	X	X
0505449	23-Jun-05	3710		X	X	X
0504497	23-Jun-05	14200		X	X	X
0505453	24-Jun-05	65.7				
0505450	24-Jun-05	102				
0505525	24-Jun-05	131				
0505524	24-Jun-05	987		X		X
0506770	24-Jun-05	1400		X	X	X
0505603	24-Jun-05	2890		X	X	X
0506725	25-Jun-05	474		X		X
0505456	27-Jun-05	430		X		X
0505457	27-Jun-05	911		X		X
0505455	27-Jun-05	1010		X		X
0505454	27-Jun-05	1190		X		X
0506769	27-Jun-05	1820		X	X	X
0506778	27-Jun-05	1850		X	X	X
0504473	28-Jun-05	70				
0505458	28-Jun-05	187				X
0505459	28-Jun-05	190				X
0505526	28-Jun-05	372				X
0505529	28-Jun-05	595		X		X
0504475	28-Jun-05	952		X		X
0506682	28-Jun-05	1440		X	X	X
0505589	28-Jun-05	1500		X	X	X
0506779	28-Jun-05	1510		X	X	X
0506771	28-Jun-05	1670		X	X	X
0506739	28-Jun-05	1800		X	X	X
0505527	28-Jun-05	1850		X	X	X
0505528	28-Jun-05	1900		X	X	X
0505588	28-Jun-05	2390		X	X	X
0505592	28-Jun-05	2400		X	X	X
0505590	28-Jun-05	2690		X	X	X
0505587	28-Jun-05	3610		X	X	X
0505580	29-Jun-05	33.9				
0505567	29-Jun-05	102				
0505568	29-Jun-05	306				X
0505476	29-Jun-05	347				X
0506784	29-Jun-05	512		X		X
0506787	29-Jun-05	533		X		X
0506727	29-Jun-05	534		X		X
0505477	29-Jun-05	583		X		X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
0504474	29-Jun-05	591		X		X
0505479	29-Jun-05	702		X		X
0505460	29-Jun-05	740		X		X
0505472	29-Jun-05	834		X		X
0505473	29-Jun-05	835		X		X
0505478	29-Jun-05	889		X		X
0505474	29-Jun-05	937		X		X
0505599	29-Jun-05	965		X		X
0505475	29-Jun-05	1060		X		X
0505509	29-Jun-05	1440		X	X	X
0506786	29-Jun-05	1700		X	X	X
0505604	29-Jun-05	2790		X	X	X
0505591	30-Jun-05	318				X
0505511	30-Jun-05	328				X
0506752	30-Jun-05	430		X		X
0506785	30-Jun-05	433		X		X
0505439	30-Jun-05	732		X		X
0505570	30-Jun-05	732		X		X
0505595	30-Jun-05	741		X		X
0505594	30-Jun-05	836		X		X
0505593	30-Jun-05	849		X		X
0505569	30-Jun-05	858		X		X
0505571	30-Jun-05	895		X		X
0506681	30-Jun-05	1400		X	X	X
0505510	30-Jun-05	5300		X	X	X
0506751	01-Jul-05	405		X		X
2730-021	18-Aug-05	1540		X	X	X
2730-023	20-Aug-05	95.2				
2801-017	08-Oct-05	220				X
2801-021	08-Oct-05	437		X		X
2801-010	08-Oct-05	439		X		X
2801-014	08-Oct-05	445		X		X
2801-013	08-Oct-05	450		X		X
2801-015	08-Oct-05	555		X		X
2801-019	08-Oct-05	2510		X	X	X
2801-022	12-Oct-05	178				X
2801-012	12-Oct-05	195				X
2801-024	12-Oct-05	598		X		X
2801-023	12-Oct-05	641		X		X
2801-018	12-Oct-05	1680		X	X	X
2801-011	12-Oct-05	2700		X	X	X
2801-025	13-Oct-05	392				X
2801-004	13-Oct-05	448		X		X
2801-005	13-Oct-05	463		X		X
2801-002	13-Oct-05	508		X		X
2801-008	13-Oct-05	588		X		X
2801-016	13-Oct-05	656		X		X
2801-001	13-Oct-05	753		X		X
2801-003	13-Oct-05	776		X		X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2801-020	13-Oct-05	839		X		X
2801-009	13-Oct-05	2030		X	X	X
2801-006	13-Oct-05	2860		X	X	X
2801-007	13-Oct-05	3400		X	X	X
2801-030	19-Oct-05	434		X		X
2801-027	19-Oct-05	543		X		X
2801-028	19-Oct-05	1100		X		X
2801-026	19-Oct-05	2790		X	X	X
2801-029	19-Oct-05	4100		X	X	X
2823-010	20-Oct-05	636		X		X
2823-015	20-Oct-05	1120		X		X
2823-009	21-Oct-05	648		X		X
2823-016	21-Oct-05	841		X		X
2823-019	22-Oct-05	251				X
2823-020	22-Oct-05	280				X
2823-008	22-Oct-05	287				X
2823-017	22-Oct-05	371				X
2823-021	22-Oct-05	412		X		X
2823-022	22-Oct-05	440		X		X
2823-018	22-Oct-05	455		X		X
2823-012	24-Oct-05	340				X
2823-004	24-Oct-05	454		X		X
2823-013	24-Oct-05	949		X		X
2823-006	24-Oct-05	1140		X		X
2823-005	24-Oct-05	1540		X	X	X
2823-011	24-Oct-05	2120		X	X	X
2823-014	24-Oct-05	2880		X	X	X
2823-007	24-Oct-05	3030		X	X	X
2823-024	25-Oct-05	707		X		X
2823-001	26-Oct-05	513		X		X
2823-023	26-Oct-05	791		X		X
2823-003	26-Oct-05	1230		X	X	X
2823-002	26-Oct-05	1980		X	X	X
2832-001	27-Oct-05	263				X
2823-027	27-Oct-05	280				X
2823-034	27-Oct-05	327				X
2823-029	27-Oct-05	376				X
2832-002	27-Oct-05	383				X
2823-026	27-Oct-05	416		X		X
2823-032	27-Oct-05	496		X		X
2832-005	27-Oct-05	500		X		X
2823-028	27-Oct-05	630		X		X
2832-014	27-Oct-05	673		X		X
2823-031	27-Oct-05	792		X		X
2823-030	27-Oct-05	812		X		X
2832-008	27-Oct-05	1150		X		X
2832-006	27-Oct-05	1300		X	X	X
2832-010	27-Oct-05	1470		X	X	X
2823-025	27-Oct-05	1550		X	X	X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2823-033	27-Oct-05	2090		X	X	X
2823-035	27-Oct-05	2890		X	X	X
2832-016	02-Nov-05	480		X		X
2832-007	02-Nov-05	565		X		X
2832-015	02-Nov-05	734		X		X
2832-012	02-Nov-05	1010		X		X
2832-003	02-Nov-05	1020		X		X
2832-004	04-Nov-05	230				X
2832-009	04-Nov-05	385				X
2832-013	08-Nov-05	194				X
2832-011	15-Nov-05	60.5				
2832-018	15-Nov-05	308				X
0601298	15-Nov-05	368				X
2832-017	15-Nov-05	658		X		X
0601297	15-Nov-05	748		X		X
0601300	16-Nov-05	136				
0601307	16-Nov-05	304				X
0601310	16-Nov-05	316				X
0601299	16-Nov-05	348				X
0601305	16-Nov-05	350				X
0601306	16-Nov-05	363				X
0601306	16-Nov-05	363				X
0601308	16-Nov-05	1250		X	X	X
2832-019	17-Nov-05	336				X
2832-021	17-Nov-05	494		X		X
2832-020	17-Nov-05	523		X		X
2832-022	17-Nov-05	1050		X		X
2832-029	19-Nov-05	228				X
2832-027	19-Nov-05	255				X
2832-024	19-Nov-05	257				X
2832-026	19-Nov-05	460		X		X
2832-035	19-Nov-05	726		X		X
2832-023	19-Nov-05	1210		X	X	X
2832-028	19-Nov-05	1560		X	X	X
2832-036	21-Nov-05	111				
2832-033	21-Nov-05	148				
2832-031	21-Nov-05	273				X
2832-032	21-Nov-05	322				X
2832-034	21-Nov-05	341				X
2832-030	21-Nov-05	505		X		X
2832-037	21-Nov-05	1300		X	X	X
2863-003	22-Nov-05	604		X		X
2863-010	29-Nov-05	525		X		X
2863-007	29-Nov-05	1480		X	X	X
2863-006	30-Nov-05	514		X		X
2863-005	02-Dec-05	358				X
2863-002	02-Dec-05	652		X		X
2863-015	03-Dec-05	122				
2863-008	03-Dec-05	184				X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2863-004	03-Dec-05	364				X
2863-011	03-Dec-05	435		X		X
2863-013	03-Dec-05	512		X		X
2863-009	03-Dec-05	581		X		X
2863-014	03-Dec-05	807		X		X
2882-001	03-Dec-05	1520	J	X	X	X
2863-019	05-Dec-05	353				X
2863-017	05-Dec-05	450		X		X
2863-024	06-Dec-05	84.8				
2863-025	06-Dec-05	407		X		X
2863-016	06-Dec-05	482		X		X
2863-021	07-Dec-05	68.5				
2863-022	07-Dec-05	100				
2863-027	07-Dec-05	157				
2863-032	07-Dec-05	226				X
2863-031	07-Dec-05	431		X		X
2863-020	07-Dec-05	443		X		X
2863-026	07-Dec-05	468		X		X
2863-029	07-Dec-05	560		X		X
2863-028	07-Dec-05	815		X		X
2863-030	07-Dec-05	1010		X		X
2863-023	07-Dec-05	3060		X	X	X
2873-004	12-Dec-05	122				
2873-005	12-Dec-05	268				X
2873-001	12-Dec-05	364	J			X
2873-002	12-Dec-05	704		X		X
2873-003	12-Dec-05	707		X		X
2873-006	13-Dec-05	203				X
2873-007	17-Dec-05	389				X
2873-011	19-Dec-05	190				X
2873-015	19-Dec-05	211				X
2873-016	19-Dec-05	243				X
2873-013	19-Dec-05	363				X
2873-009	19-Dec-05	374				X
2873-008	19-Dec-05	396				X
2873-012	19-Dec-05	396				X
2873-010	19-Dec-05	775		X		X
2873-017	19-Dec-05	951		X		X
2863-001	29-Dec-05	1170		X		X
2882-002	04-Jan-06	174				X
2882-003	04-Jan-06	187				X
2882-004	04-Jan-06	558		X		X
2882-005	04-Jan-06	1130		X		X
2882-007	04-Jan-06	1330		X	X	X
2882-006	04-Jan-06	1640		X	X	X
2882-010	05-Jan-06	287				X
2882-008	05-Jan-06	718		X		X
2882-014	06-Jan-06	59.9				
2882-012	06-Jan-06	382				X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2882-009	06-Jan-06	527		X		X
2882-024	06-Jan-06	576		X		X
2882-011	06-Jan-06	761		X		X
2882-013	06-Jan-06	1200		X	X	X
2882-015	09-Jan-06	56.7				
2882-016	09-Jan-06	119				
2882-018	09-Jan-06	202				X
2882-023	09-Jan-06	298				X
2882-020	09-Jan-06	496		X		X
2882-017	09-Jan-06	527		X		X
2882-021	09-Jan-06	566		X		X
2882-019	09-Jan-06	662		X		X
2882-022	09-Jan-06	813		X		X
2882-026	10-Jan-06	120				
2882-030	10-Jan-06	260				X
2882-025	10-Jan-06	286				X
2882-028	10-Jan-06	296				X
2882-029	10-Jan-06	443		X		X
2882-032	10-Jan-06	450		X		X
2882-027	10-Jan-06	484		X		X
2882-031	10-Jan-06	522		X		X
2882-033	10-Jan-06	1040		X		X
2882-034	11-Jan-06	1060		X		X
2882-035	11-Jan-06	1310		X	X	X
2901-009	17-Jan-06	66.8				
2901-007	17-Jan-06	218				X
2901-001	17-Jan-06	293	J			X
2901-012	17-Jan-06	299				X
2901-005	17-Jan-06	313				X
2901-002	17-Jan-06	338				X
2901-010	17-Jan-06	341				X
2901-003	17-Jan-06	347				X
2901-011	17-Jan-06	385				X
2901-004	17-Jan-06	392				X
2901-014	17-Jan-06	633		X		X
2901-006	17-Jan-06	712		X		X
2901-008	17-Jan-06	873		X		X
2901-013	17-Jan-06	981		X		X
2901-015	17-Jan-06	1220		X	X	X
2901-016	21-Jan-06	407		X		X
2901-017	21-Jan-06	522		X		X
2901-018	23-Jan-06	94.6				
2901-023	23-Jan-06	477		X		X
2901-024	23-Jan-06	529		X		X
2901-022	24-Jan-06	79.4				
2901-028	24-Jan-06	138				
2901-032	24-Jan-06	142				
2901-030	24-Jan-06	169				X
2915-004	24-Jan-06	179				X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2901-019	24-Jan-06	220				X
2901-020	24-Jan-06	368				X
2901-026	24-Jan-06	386				X
2901-027	24-Jan-06	394				X
2915-010	24-Jan-06	432		X		X
2901-031	24-Jan-06	465		X		X
2915-011	24-Jan-06	495		X		X
2915-009	24-Jan-06	497		X		X
2915-002	24-Jan-06	855		X		X
2915-008	24-Jan-06	942		X		X
2915-006	24-Jan-06	1660		X	X	X
2915-012	24-Jan-06	1790		X	X	X
2901-021	24-Jan-06	3710	J	X	X	X
2915-018	24-Jan-06	12000		X	X	X
2915-015	25-Jan-06	138				
2915-017	25-Jan-06	152				
2901-025	25-Jan-06	163				
2915-020	25-Jan-06	200				X
2915-021	25-Jan-06	220				X
2901-029	25-Jan-06	301				X
2915-014	25-Jan-06	419		X		X
2915-005	25-Jan-06	487		X		X
2915-022	25-Jan-06	716		X		X
2915-013	25-Jan-06	941		X		X
2915-003	25-Jan-06	970		X		X
2915-007	25-Jan-06	1170		X		X
2915-016	25-Jan-06	1310		X	X	X
2915-019	25-Jan-06	1900		X	X	X
2915-001	29-Jan-06	698		X		X
2915-026	30-Jan-06	528		X		X
2915-030	06-Feb-06	211				X
2915-024	06-Feb-06	350				X
2915-028	06-Feb-06	1110		X		X
2915-025	06-Feb-06	1270		X	X	X
2915-027	06-Feb-06	1880		X	X	X
2915-023	06-Feb-06	2710		X	X	X
2915-029	06-Feb-06	4230		X	X	X
2915-033	07-Feb-06	325				X
2915-034	07-Feb-06	514		X		X
2915-035	07-Feb-06	986		X		X
2915-031	07-Feb-06	1090		X		X
2915-032	07-Feb-06	1230		X	X	X
2915-040	08-Feb-06	472		X		X
2915-041	08-Feb-06	499		X		X
2915-038	08-Feb-06	552		X		X
2915-039	08-Feb-06	791		X		X
2915-036	08-Feb-06	1050		X		X
2915-037	08-Feb-06	10100		X	X	X
2944-001	17-Feb-06	167	J			X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2938-010	08-Mar-06	1220		X	X	X
3037-002	06-May-06	126				
3037-005	06-May-06	282				X
3037-004	06-May-06	290				X
3037-006	06-May-06	321				X
3037-003	06-May-06	439		X		X
3037-001	06-May-06	3880		X	X	X
3037-011	10-May-06	88.4				
3037-010	10-May-06	188				X
3037-012	10-May-06	283				X
3037-007	11-May-06	45.8				
3037-015	11-May-06	54				
3037-016	11-May-06	177				X
3037-017-	11-May-06	196				X
3037-017	11-May-06	217				X
3037-009	11-May-06	224				X
3037-014	11-May-06	238				X
3037-008	11-May-06	867		X		X
3037-013	12-May-06	193				X
3037-019	18-May-06	97.7				
3037-018	18-May-06	124				
3037-021-	18-May-06	140				
3037-021	18-May-06	141				
3037-020	18-May-06	143				
3037-022	18-May-06	146				
3037-024	18-May-06	232				X
3037-027	18-May-06	235				X
3037-026	18-May-06	342				X
3037-025	18-May-06	379				X
3037-031	23-May-06	135				
3037-023	23-May-06	152				
3037-030	23-May-06	391				X
3037-029-	23-May-06	485		X		X
3037-029	23-May-06	545		X		X
3037-028	23-May-06	45900		X	X	X
3037-032	24-May-06	181				X
3037-034	24-May-06	867		X		X
3037-033	24-May-06	1070		X		X
3053-026	01-Jun-06	58.4				
3053-027	01-Jun-06	86.3				
3053-019	01-Jun-06	277				X
3053-012	01-Jun-06	287				X
3053-006	01-Jun-06	346				X
3053-020	02-Jun-06	79.1				
3053-014	05-Jun-06	70.4				
3053-013	05-Jun-06	165				
3053-028	05-Jun-06	193				X
3053-021	05-Jun-06	195				X
3053-007	05-Jun-06	332				X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3053-008	05-Jun-06	341				X
3053-005	05-Jun-06	728		X		X
3053-011	06-Jun-06	1590		X	X	X
3053-031	10-Jun-06	5.34				
3053-032	10-Jun-06	16.8				
3053-030	10-Jun-06	58.2				
3053-033	10-Jun-06	110				
3053-036	10-Jun-06	167				X
3053-040	10-Jun-06	216	J			X
3053-041	10-Jun-06	225				X
3053-037	10-Jun-06	388				X
3053-042	10-Jun-06	666		X		X
3053-038	11-Jun-06	66.7				
3053-034	11-Jun-06	564		X		X
3053-039	12-Jun-06	101				
3053-029	12-Jun-06	271				X
3053-035	12-Jun-06	387				X
3053-010	13-Jun-06	286				X
3053-004	13-Jun-06	483		X		X
3053-009	13-Jun-06	710		X		X
3053-017	14-Jun-06	122				
3053-023	14-Jun-06	194				X
3053-003	14-Jun-06	258				X
3053-024	14-Jun-06	292				X
3053-001	14-Jun-06	296				X
3053-022	14-Jun-06	385				X
3053-018	14-Jun-06	425		X		X
3053-015	14-Jun-06	429		X		X
3053-002	14-Jun-06	656		X		X
3053-016	14-Jun-06	1060		X		X
3165-004	22-Aug-06	248				X
3227-004	13-Sep-06	1580	J	X	X	X
3227-003	13-Sep-06	4980	J	X	X	X
3227-002	15-Sep-06	206	J			X
3227-001	27-Sep-06	1570	J	X	X	X
3271-003	09-Oct-06	562		X		X
3271-002	02-Nov-06	1070		X		X
3271-010	03-Nov-06	473		X		X
3271-005	03-Nov-06	1530		X	X	X
3271-007	03-Nov-06	1680		X	X	X
3271-004	03-Nov-06	2260		X	X	X
3271-009	03-Nov-06	2580		X	X	X
3271-008	03-Nov-06	2690		X	X	X
3271-001	03-Nov-06	2870		X	X	X
3271-011	04-Nov-06	299				X
3271-012	06-Nov-06	189				X
3271-013	06-Nov-06	341				X
3271-006	07-Nov-06	167				X
3298-005	05-Dec-06	182				X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3298-006	05-Dec-06	220				X
3298-007	05-Dec-06	439		X		X
3298-004	07-Dec-06	154				
3298-003	07-Dec-06	646		X		X
3298-008	07-Dec-06	690		X		X
3298-002	07-Dec-06	1020		X		X
3298-009	07-Dec-06	1310		X	X	X
3339-008	20-Dec-06	146				
3339-017	21-Dec-06	49.6				
3339-005	21-Dec-06	242				X
3339-011	04-Jan-07	406		X		X
3339-012	04-Jan-07	545		X		X
3339-024	04-Jan-07	546		X		X
3339-001	04-Jan-07	569		X		X
3339-014	04-Jan-07	791		X		X
3339-002	04-Jan-07	3610		X	X	X
3339-023	05-Jan-07	8150		X	X	X
3339-047	08-Jan-07	128				
3339-041	08-Jan-07	245	J			X
3339-010	08-Jan-07	299				X
3339-007	08-Jan-07	385				X
3339-015	08-Jan-07	404		X		X
3339-022	08-Jan-07	487		X		X
3339-019	08-Jan-07	535		X		X
3339-003	08-Jan-07	560		X		X
3339-009	08-Jan-07	570		X		X
3339-006	08-Jan-07	630		X		X
3339-018	08-Jan-07	637		X		X
3339-021	08-Jan-07	646		X		X
3339-004	08-Jan-07	673		X		X
3339-016	08-Jan-07	1010		X		X
3339-046	09-Jan-07	278				X
3339-040	09-Jan-07	467		X		X
3339-034	10-Jan-07	164				
3339-028	10-Jan-07	257				X
3339-031	10-Jan-07	367				X
3339-038	10-Jan-07	749		X		X
3339-045	10-Jan-07	752		X		X
3339-033	10-Jan-07	759		X		X
3339-039	10-Jan-07	909		X		X
3339-030	10-Jan-07	1130		X		X
3339-027	10-Jan-07	1680		X	X	X
3339-029	10-Jan-07	2060		X	X	X
3339-032	10-Jan-07	2900		X	X	X
3339-026	11-Jan-07	122				
3339-043	11-Jan-07	294				X
3339-042	11-Jan-07	349				X
3339-044	11-Jan-07	423		X		X
3339-036	11-Jan-07	491		X		X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3339-037	11-Jan-07	719		X		X
3339-035	11-Jan-07	1440		X	X	X
3372-001	12-Jan-07	1420	J	X	X	X
3339-054	15-Jan-07	107				
3339-048	16-Jan-07	632		X		X
3339-025	16-Jan-07	720		X		X
3339-060	17-Jan-07	54				
3339-051	17-Jan-07	159				
3339-052	17-Jan-07	532		X		X
3339-053	17-Jan-07	896		X		X
3339-059	17-Jan-07	1020		X		X
3339-064	17-Jan-07	1020		X		X
3339-050	18-Jan-07	42.5				
3339-049	18-Jan-07	140				
3339-063	19-Jan-07	317				X
3339-055	20-Jan-07	125				
3339-071	22-Jan-07	277				X
3339-069	22-Jan-07	575		X		X
3339-070	23-Jan-07	113				
3339-067	23-Jan-07	118				
3339-057	23-Jan-07	134				
3339-072	23-Jan-07	141				
3339-058	23-Jan-07	258				X
3339-065	23-Jan-07	596		X		X
3339-062	23-Jan-07	629		X		X
3339-068	23-Jan-07	1160		X		X
3339-066	23-Jan-07	1180		X		X
3339-073	24-Jan-07	201				X
3339-061	24-Jan-07	641		X		X
3339-074	24-Jan-07	921		X		X
3359-001	08-Feb-07	4140	J	X	X	X
3359-004	09-Feb-07	190	J			X
3359-002	09-Feb-07	325	J			X
3359-007	09-Feb-07	418	J	X		X
3359-003	09-Feb-07	465	J	X		X
3359-008	09-Feb-07	700	J	X		X
3359-005	09-Feb-07	1550	J	X	X	X
3359-012	10-Feb-07	180	J			X
3359-014	10-Feb-07	180	J			X
3359-011	10-Feb-07	442	J	X		X
3359-013	10-Feb-07	834	J	X		X
3359-010	10-Feb-07	1580	J	X	X	X
3359-006	10-Feb-07	2510	J	X	X	X
3359-018	13-Feb-07	292	J			X
3359-020	13-Feb-07	357	J			X
3359-017	13-Feb-07	399	J			X
3359-021	13-Feb-07	533		X		X
3359-022	13-Feb-07	717		X		X
3359-015	13-Feb-07	743	J	X		X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3359-019	13-Feb-07	1160	J	X		X
3359-023	13-Feb-07	2080		X	X	X
3359-016	13-Feb-07	22900	J	X	X	X
3377-027	12-Mar-07	585		X		X
3483-001	28-Apr-07	496		X		X
3483-001-	28-Apr-07	507		X		X
3483-002	11-May-07	360				X
3483-008	20-May-07	62.7				
3483-004	20-May-07	98.3				
3483-007	20-May-07	115				
3483-006	20-May-07	229				X
3483-005	20-May-07	255				X
3483-003	20-May-07	351				X
3483-003-	20-May-07	553		X		X
3483-010	24-May-07	146				
3483-009	24-May-07	1170		X		X
3534-007	27-Jun-07	203				X
3534-003-	27-Jun-07	397				X
3534-003	27-Jun-07	403		X		X
3534-008	27-Jun-07	523		X		X
3534-002-	27-Jun-07	633		X		X
3534-002	27-Jun-07	651		X		X
3534-001	27-Jun-07	696		X		X
3534-004	27-Jun-07	777		X		X
3534-001-	27-Jun-07	1120		X		X
3534-005	27-Jun-07	3050		X	X	X
3534-009	01-Jul-07	87.4				
3534-012	01-Jul-07	100				
3534-012-	01-Jul-07	107				
3534-010	01-Jul-07	140				
3534-011	01-Jul-07	203				X
3534-011-	01-Jul-07	207				X
3534-013	01-Jul-07	1360		X	X	X
3534-014	01-Jul-07	3610		X	X	X
3534-016	02-Jul-07	136				
3534-018	02-Jul-07	210				X
3534-017	02-Jul-07	236				X
3534-015	02-Jul-07	487		X		X
3534-019	02-Jul-07	9230		X	X	X
3575-005	18-Jul-07	337				X
3575-003	18-Jul-07	1370		X	X	X
3575-003-	18-Jul-07	1370		X	X	X
3575-001	18-Jul-07	1450		X	X	X
3575-001-	18-Jul-07	1640		X	X	X
3575-002-	18-Jul-07	2560		X	X	X
3575-004-	19-Jul-07	219				X
3575-004	19-Jul-07	262				X
3575-006	19-Jul-07	482		X		X
3575-007	19-Jul-07	490		X		X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3575-009	19-Jul-07	1110		X		X
3575-008	19-Jul-07	2260		X	X	X
3575-011	20-Jul-07	3340		X	X	X
3575-010	20-Jul-07	3640		X	X	X
3575-012	21-Jul-07	540		X		X
3575-013	21-Jul-07	1140		X		X
3575-015	24-Jul-07	296				X
3575-015-	24-Jul-07	352				X
3575-014	24-Jul-07	1120		X		X
3575-016-	25-Jul-07	1150		X		X
3575-016	25-Jul-07	1200		X	X	X
3575-017-	25-Jul-07	2190		X	X	X
3575-017	25-Jul-07	2320		X	X	X
3575-018	26-Jul-07	769		X		X
3575-002	28-Jul-07	2260		X	X	X
3575-019	31-Jul-07	1430		X	X	X
3575-020	02-Aug-07	404		X		X
3575-020-	02-Aug-07	467		X		X
3575-021	03-Aug-07	94.2				
3628-017	03-Aug-07	578		X		X
3575-023	05-Aug-07	209				X
3575-023-	05-Aug-07	335				X
3575-022	05-Aug-07	1780		X	X	X
3708-007	11-Sep-07	1390		X	X	X
3675-002	05-Oct-07	759		X		X
3675-002-	05-Oct-07	765		X		X
3675-003	05-Oct-07	796		X		X
3675-005	06-Oct-07	360				X
3675-004	06-Oct-07	402		X		X
3675-006-	08-Oct-07	133				
3675-006	08-Oct-07	142				
3675-008	08-Oct-07	350				X
3675-007	08-Oct-07	981		X		X
3675-009	10-Oct-07	771		X		X
3691-003	19-Oct-07	165	J			X
3691-003-	19-Oct-07	166	J			X
3691-001	19-Oct-07	191	J			X
3691-002	19-Oct-07	847	J	X		X
3691-007	20-Oct-07	1.01	UJ			
3691-004	20-Oct-07	37.3	J			
3691-005-	20-Oct-07	49.1	J			
3691-005	20-Oct-07	53.6	J			
3691-006	20-Oct-07	87.3	J			
3691-008	20-Oct-07	92.2	J			
3691-009	20-Oct-07	159	J			
3691-010	20-Oct-07	644	J	X		X
3691-011	22-Oct-07	140	J			
3691-011-	22-Oct-07	141	J			
3691-012	22-Oct-07	149	J			

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3691-013	22-Oct-07	446	J	X		X
3708-001-	29-Oct-07	168				X
3708-001	29-Oct-07	194				X
3708-002	05-Nov-07	28.4				
3708-003	05-Nov-07	122				
3708-004	06-Nov-07	389				X
3708-008	13-Nov-07	39.5				
3708-010	13-Nov-07	166				X
3708-009	13-Nov-07	378				X
3708-005	13-Nov-07	515		X		X
3708-006	13-Nov-07	1240		X	X	X
3750-001	12-Jan-08	466	J	X		X
3750-002	12-Jan-08	1290	J	X	X	X
3750-015	14-Jan-08	37	J			
3750-013	14-Jan-08	82.9	J			
3750-008	14-Jan-08	83.4	J			
3750-009	14-Jan-08	101	J			
3750-007	14-Jan-08	107	J			
3750-004	14-Jan-08	119	J			
3750-014	14-Jan-08	136	J			
3750-005	14-Jan-08	137	J			
3750-006	14-Jan-08	140	J			
3750-011	14-Jan-08	248	J			X
3750-003	14-Jan-08	304	J			X
3750-010	14-Jan-08	601	J	X		X
3750-012	14-Jan-08	1530	J	X	X	X
3750-024	17-Jan-08	26.5	J			
3750-019	17-Jan-08	123	J			
3750-025	17-Jan-08	216	J			X
3750-022	17-Jan-08	248	J			X
3750-026	17-Jan-08	411	J	X		X
3750-021	17-Jan-08	619	J	X		X
3656-008		19.6				
3449-013		53.7	J			
3449-001-		70.1	J			
3449-001		72.8	J			
3449-016		75.8	J			
3449-016-		75.9	J			
3422-008		80.1				
3521-003		89.9				
3521-003-		90.6				
3656-009		91.8				
3656-008-		93.2				
3521-005		104				
3521-004-		108				
3521-013		134				
3422-005		151				
3449-003-		153	J			
3521-012		155				

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3449-003		159	J			
3521-014		162				
3656-011		165				
3449-008		194	J			X
3521-016		202				X
3521-019		216				X
3656-006		223				X
3521-002-		235				X
3521-004		238				X
3521-005-		245				X
3521-017		250				X
3521-007		261				X
3521-002		262				X
3521-010		265				X
3422-009		280				X
3656-006-		284				X
3656-001		294				X
3422-010		333				X
3521-006		450		X		X
3422-012		459		X		X
3422-007		466		X		X
3656-002		550		X		X
3656-014		609		X		X
3449-017		615		X		X
3521-015		618		X		X
3656-010-		626		X		X
3656-007		673		X		X
3449-004		692	J	X		X
3656-007-		711		X		X
3656-010		777		X		X
3449-010		787	J	X		X
3422-001		796		X		X
3521-008		913		X		X
3656-004-		914		X		X
3656-012		1010		X		X
3422-003		1020		X		X
3449-012		1070	J	X		X
3521-011		1110		X		X
3422-004		1180		X		X
3422-006		1360		X	X	X
3656-013		1460		X	X	X
3656-005		1550		X	X	X
3521-009		1590		X	X	X
3449-002-		1700	J	X	X	X
3449-002		1750	J	X	X	X
3656-004		1810		X	X	X
3449-011		1830	J	X	X	X
3521-001		1900		X	X	X
3656-003		2060		X	X	X

Table 4-4
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3521-018		2180		X	X	X
3422-002		2410		X	X	X
3521-001-		2480		X	X	X
3449-007		2680	J	X	X	X
3449-005		3490	J	X	X	X
3422-011		4800		X	X	X
3449-015		4990	J	X	X	X
3449-006		13500	J	X	X	X
3449-014		15600	J	X	X	X

Notes:

U=not detected

J=Analyte present. Reported value may be estimated.

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
0505572	06-Jun-05	6.44		X
0506712	06-Jun-05	11.2		X
0504450	06-Jun-05	21.5		X
0504453	06-Jun-05	24.5		X
0506709	06-Jun-05	25.8		X
0506710	06-Jun-05	26.2		X
0504451	06-Jun-05	28.6		X
0504452	06-Jun-05	32		X
0504494	07-Jun-05	6.09		X
0505481	07-Jun-05	6.87		X
0505480	07-Jun-05	7.1		X
0506700	07-Jun-05	10.8		X
0505600	07-Jun-05	13.4		X
0506713	07-Jun-05	13.4		X
0506698	07-Jun-05	13.5		X
0506702	07-Jun-05	14.3		X
0504454	07-Jun-05	14.4		X
0505416	07-Jun-05	14.8		X
0505415	07-Jun-05	15.8		X
0504456	07-Jun-05	16.5		X
0506701	07-Jun-05	17.1		X
0506711	07-Jun-05	17.8		X
0505418	07-Jun-05	19		X
0504455	07-Jun-05	21.1		X
0505417	07-Jun-05	23.1		X
0504458	07-Jun-05	23.4		X
0506693	07-Jun-05	26		X
0504457	07-Jun-05	28.7		X
0506699	07-Jun-05	37		X
0505573	07-Jun-05	37.3		X
0504459	07-Jun-05	45		X
0505596	07-Jun-05	45.3		X
0505574	08-Jun-05	5.74		X
0505465	08-Jun-05	7.32		X
0505469	08-Jun-05	9.85		X
0505420	08-Jun-05	10.6		X
0506690	08-Jun-05	10.6		X
0505575	08-Jun-05	11		X
0505467	08-Jun-05	11.2		X
0505421	08-Jun-05	11.3		X
0505468	08-Jun-05	11.8		X
0506692	08-Jun-05	13.2		X
0505466	08-Jun-05	13.5		X
0506695	08-Jun-05	13.9		X
0505422	08-Jun-05	14.6		X
0506696	08-Jun-05	14.8		X
0506688	08-Jun-05	15.5		X
0506689	08-Jun-05	26		X
0506694	08-Jun-05	28.1		X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
0505581	09-Jun-05	4.64		X
0505423	09-Jun-05	6.11		X
0506691	09-Jun-05	6.39		X
0505583	09-Jun-05	6.66		X
0505428	09-Jun-05	6.78		X
0505429	09-Jun-05	6.78		X
0505582	09-Jun-05	7.73		X
0505471	09-Jun-05	8.64		X
0505430	09-Jun-05	8.88		X
0505435	09-Jun-05	9.33		X
0505413	09-Jun-05	9.35		X
0506790	09-Jun-05	9.47		X
0506687	09-Jun-05	9.64		X
0505501	09-Jun-05	11.5		X
0505412	09-Jun-05	13.2		X
0506685	09-Jun-05	14		X
0506686	09-Jun-05	15		X
0506683	09-Jun-05	15.5		X
0506684	09-Jun-05	20.8		X
0505470	09-Jun-05	42.5		X
0505414	10-Jun-05	7.58		X
0505482	10-Jun-05	9.66		X
0506704	10-Jun-05	9.92		X
0504478	10-Jun-05	10.4		X
0506705	10-Jun-05	10.9		X
0504460	10-Jun-05	11.8		X
0504479	10-Jun-05	12		X
0506669	10-Jun-05	12.2		X
0506703	10-Jun-05	13.7		X
0504480	10-Jun-05	15.2		X
0506789	10-Jun-05	15.6		X
0506673	10-Jun-05	16		X
0504461	10-Jun-05	17.4		X
0504481	10-Jun-05	26.1		X
0505419	10-Jun-05	37.2		X
0506706	10-Jun-05	41.3		X
0505485	13-Jun-05	6.78		X
0505487	13-Jun-05	7.13		X
0506674	13-Jun-05	10.3		X
0506675	13-Jun-05	12		X
0504485	13-Jun-05	12.8		X
0505486	13-Jun-05	13.3		X
0506708	13-Jun-05	13.7		X
0506666	13-Jun-05	17.6		X
0504462	13-Jun-05	19.5		X
0505488	13-Jun-05	19.6		X
0506676	13-Jun-05	19.8		X
0506680	13-Jun-05	20.1		X
0506672	13-Jun-05	21.1		X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
0505489	13-Jun-05	21.4		X
0504482	13-Jun-05	22		X
0504484	13-Jun-05	22.3		X
0506668	13-Jun-05	26.7		X
0506667	13-Jun-05	27.5		X
0504483	13-Jun-05	29.9		X
0506671	13-Jun-05	30.7		X
0506679	13-Jun-05	30.8		X
0506707	13-Jun-05	38.2		X
0505484	13-Jun-05	41.2		X
0505483	13-Jun-05	61.4		X
0505494	14-Jun-05	3.21		X
0505431	14-Jun-05	3.39		X
0505495	14-Jun-05	3.87		X
0505496	14-Jun-05	5.72		X
0506745	14-Jun-05	8.94		X
0506678	14-Jun-05	9.37		X
0505490	14-Jun-05	9.63		X
0506742	14-Jun-05	11.2		X
0506716	14-Jun-05	12.5		X
0506741	14-Jun-05	12.5		X
0504465	14-Jun-05	13.5		X
0505497	14-Jun-05	13.5		X
0506717	14-Jun-05	13.9		X
0504487	14-Jun-05	14.4		X
0504469	14-Jun-05	14.6		X
0506720	14-Jun-05	15.3		X
0505498	14-Jun-05	15.4		X
0506719	14-Jun-05	15.9		X
0506670	14-Jun-05	17		X
0505491	14-Jun-05	17.1		X
0504468	14-Jun-05	18		X
0504467	14-Jun-05	19.8		X
0506714	14-Jun-05	20		X
0506718	14-Jun-05	20.3		X
0504466	14-Jun-05	20.8		X
0505492	14-Jun-05	22.1		X
0505493	14-Jun-05	27.2		X
0506743	14-Jun-05	27.4		X
0506715	14-Jun-05	53.4		X
0504491	15-Jun-05	4.17		X
0504486	15-Jun-05	4.98		X
0505584	15-Jun-05	5.24		X
0505440	15-Jun-05	7.43		X
0505576	15-Jun-05	8.79		X
0506665	15-Jun-05	9.15		X
0504489	15-Jun-05	12.7		X
0506663	15-Jun-05	14.4		X
0506732	15-Jun-05	15.6		X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
0506664	15-Jun-05	18.1		X
0506677	15-Jun-05	18.1		X
0504470	15-Jun-05	18.4		X
0506746	15-Jun-05	20.5		X
0504488	15-Jun-05	24.9		X
0505597	15-Jun-05	27.7		X
0506729	15-Jun-05	29.3		X
0505433	16-Jun-05	5.35		X
0504492	16-Jun-05	5.65		X
0505499	16-Jun-05	5.94		X
0506736	16-Jun-05	9.1		X
0506748	16-Jun-05	10.4		X
0506744	16-Jun-05	10.7		X
0506768	16-Jun-05	11.7		X
0506749	16-Jun-05	12.7		X
0506740	16-Jun-05	13.4		X
0506750	16-Jun-05	14.7		X
0506738	16-Jun-05	15.2		X
0506735	16-Jun-05	17.8		X
0504471	16-Jun-05	21		X
0504472	16-Jun-05	22.9		X
0506730	16-Jun-05	40.8		X
0505442	17-Jun-05	2.72		X
0505434	17-Jun-05	7.45		X
0506774	17-Jun-05	7.69		X
0505441	17-Jun-05	8.9		X
0506697	17-Jun-05	11.8		X
0505432	17-Jun-05	12.8		X
0506737	17-Jun-05	22		X
0506747	18-Jun-05	16.1		X
0505446	20-Jun-05	6.09		X
0505514	20-Jun-05	7.06		X
0505585	20-Jun-05	9.63		X
0505500	20-Jun-05	9.66		X
0506776	20-Jun-05	10.4		X
0505436	20-Jun-05	10.5		X
0506734	20-Jun-05	11		X
0504476	20-Jun-05	12.1		X
0506731	20-Jun-05	12.1		X
0505516	20-Jun-05	16.5		X
0506773	20-Jun-05	16.6		X
0505445	20-Jun-05	17.8		X
0506733	20-Jun-05	18.5		X
0505443	20-Jun-05	19.4		X
0506781	20-Jun-05	21.8		X
0505444	20-Jun-05	27.2		X
0506777	20-Jun-05	28.7		X
0505515	20-Jun-05	28.8		X
0505607	21-Jun-05	6.77		X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
0505503	21-Jun-05	8.03		X
0505502	21-Jun-05	8.22		X
0506780	21-Jun-05	9.22		X
0506721	21-Jun-05	9.87		X
0505517	21-Jun-05	10.3		X
0505608	21-Jun-05	10.3		X
0505606	21-Jun-05	10.4		X
0506722	21-Jun-05	10.5		X
0506775	21-Jun-05	10.8		X
0504477	21-Jun-05	11.3		X
0505504	21-Jun-05	11.5		X
0506755	21-Jun-05	11.8		X
0506723	21-Jun-05	13.1		X
0506756	21-Jun-05	13.2		X
0506764	21-Jun-05	13.8		X
0506765	21-Jun-05	15		X
0506762	21-Jun-05	16		X
0506759	21-Jun-05	16.9		X
0505519	21-Jun-05	17.1		X
0505518	21-Jun-05	19		X
0506728	21-Jun-05	19.6		X
0506760	21-Jun-05	21		X
0506758	21-Jun-05	23.3		X
0506761	21-Jun-05	27.3		X
0506766	21-Jun-05	28.3		X
0505605	21-Jun-05	31.9		X
0506754	21-Jun-05	35.1		X
0505438	22-Jun-05	3.46		X
0505437	22-Jun-05	3.86		X
0505523	22-Jun-05	5.51		X
0505506	22-Jun-05	8.14		X
0505520	22-Jun-05	8.91		X
0506753	22-Jun-05	13.8		X
0506763	22-Jun-05	13.8		X
0505508	22-Jun-05	14.5		X
0505521	22-Jun-05	16.6		X
0506782	22-Jun-05	17.6		X
0506772	22-Jun-05	17.8		X
0505507	22-Jun-05	20.4		X
0505505	22-Jun-05	21.5		X
0506788	22-Jun-05	37.7		X
0505447	22-Jun-05	42.4		X
0505448	22-Jun-05	82.7		X
0505451	23-Jun-05	3.48		X
0505602	23-Jun-05	7.82		X
0505522	23-Jun-05	9.15		X
0506767	23-Jun-05	9.92		X
0504497	23-Jun-05	10.5		X
0505452	23-Jun-05	10.5		X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
0505577	23-Jun-05	10.8		X
0506726	23-Jun-05	11		X
0506724	23-Jun-05	11.7		X
0505578	23-Jun-05	12.2		X
0504495	23-Jun-05	13.1		X
0505586	23-Jun-05	13.2		X
0506783	23-Jun-05	13.3		X
0505449	23-Jun-05	15.2		X
0505601	23-Jun-05	17.3		X
0505579	23-Jun-05	20.6		X
0504496	23-Jun-05	23		X
0505453	24-Jun-05	3.41		X
0505450	24-Jun-05	4.04		X
0505525	24-Jun-05	6.16		X
0506770	24-Jun-05	8.48		X
0505524	24-Jun-05	8.7		X
0505603	24-Jun-05	14.7		X
0506725	25-Jun-05	11.9		X
0505455	27-Jun-05	11.5		X
0506769	27-Jun-05	18.8		X
0506778	27-Jun-05	28.5		X
0505456	27-Jun-05	29		X
0505454	27-Jun-05	44		X
0505457	27-Jun-05	93.9		X
0505526	28-Jun-05	5.51		X
0504473	28-Jun-05	12		X
0505458	28-Jun-05	13.3		X
0505459	28-Jun-05	14.3		X
0505590	28-Jun-05	15.1		X
0505529	28-Jun-05	15.4		X
0505528	28-Jun-05	15.7		X
0505589	28-Jun-05	19.4		X
0505592	28-Jun-05	21.7		X
0506739	28-Jun-05	22.9		X
0504475	28-Jun-05	25.5		X
0506771	28-Jun-05	27.4		X
0506682	28-Jun-05	28		X
0506779	28-Jun-05	30.6		X
0505588	28-Jun-05	31		X
0505527	28-Jun-05	34.8		X
0505587	28-Jun-05	37.8		X
0505580	29-Jun-05	4.26		X
0505567	29-Jun-05	4.7		X
0505478	29-Jun-05	8.55		X
0505568	29-Jun-05	9.59		X
0505476	29-Jun-05	10.7		X
0505473	29-Jun-05	11.3		X
0506787	29-Jun-05	11.7		X
0505477	29-Jun-05	12.2		X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
0504474	29-Jun-05	12.5		X
0505472	29-Jun-05	14		X
0505599	29-Jun-05	14.3		X
0505475	29-Jun-05	14.4		X
0506784	29-Jun-05	14.4		X
0505479	29-Jun-05	14.9		X
0505474	29-Jun-05	16.1		X
0506727	29-Jun-05	16.7		X
0506786	29-Jun-05	29.8		X
0505460	29-Jun-05	30.9		X
0505604	29-Jun-05	47.8		X
0505509	29-Jun-05	138		X
0505591	30-Jun-05	5.55		X
0506785	30-Jun-05	5.72		X
0505439	30-Jun-05	7.57		X
0505569	30-Jun-05	11.9		X
0505570	30-Jun-05	12.5		X
0506681	30-Jun-05	15.8		X
0505593	30-Jun-05	16.2		X
0506752	30-Jun-05	18.4		X
0505595	30-Jun-05	20.7		X
0505571	30-Jun-05	22.6		X
0505594	30-Jun-05	26.4		X
0505510	30-Jun-05	31.1		X
0505511	30-Jun-05	78		X
0506751	01-Jul-05	15		X
2730-021	18-Aug-05	54.9		X
2730-023	20-Aug-05	4.83	J	X
2801-015	08-Oct-05	4.36	J	X
2801-019	08-Oct-05	11.3	J	X
2801-014	08-Oct-05	12.5	J	X
2801-013	08-Oct-05	13.4	J	X
2801-017	08-Oct-05	13.5	J	X
2801-021	08-Oct-05	13.7	J	X
2801-010	08-Oct-05	17.6	J	X
2801-024	12-Oct-05	6.76	J	X
2801-023	12-Oct-05	9.05	J	X
2801-012	12-Oct-05	9.79	J	X
2801-022	12-Oct-05	14.9	J	X
2801-018	12-Oct-05	25.5	J	X
2801-011	12-Oct-05	26.6	J	X
2801-002	13-Oct-05	7.12	J	X
2801-016	13-Oct-05	8.54	J	X
2801-008	13-Oct-05	11.1	J	X
2801-009	13-Oct-05	15.4	J	X
2801-025	13-Oct-05	16.7	J	X
2801-020	13-Oct-05	17.2	J	X
2801-004	13-Oct-05	18.9	J	X
2801-005	13-Oct-05	23.8	J	X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2801-006	13-Oct-05	24	J	X
2801-007	13-Oct-05	26.6	J	X
2801-003	13-Oct-05	26.9	J	X
2801-001	13-Oct-05	27	J	X
2801-027	19-Oct-05	5.84	J	X
2801-030	19-Oct-05	11.8	J	X
2801-028	19-Oct-05	12.7	J	X
2801-029	19-Oct-05	24.5	J	X
2801-026	19-Oct-05	33.1	J	X
2823-015	20-Oct-05	9.05	UJ	X
2823-010	20-Oct-05	10.7	J	X
2823-009	21-Oct-05	5.46	UJ	X
2823-016	21-Oct-05	10.7	J	X
2823-008	22-Oct-05	4.24	UJ	X
2823-022	22-Oct-05	4.83	UJ	X
2823-018	22-Oct-05	7.63	UJ	X
2823-020	22-Oct-05	9.29	UJ	X
2823-017	22-Oct-05	10.2	UJ	X
2823-021	22-Oct-05	11.8	J	X
2823-019	22-Oct-05	12.3	J	X
2823-004	24-Oct-05	4.78	UJ	X
2823-012	24-Oct-05	8.21	UJ	X
2823-013	24-Oct-05	10.7	J	X
2823-011	24-Oct-05	11.9	J	X
2823-007	24-Oct-05	12.8	J	X
2823-005	24-Oct-05	13.1	J	X
2823-014	24-Oct-05	19.1		X
2823-006	24-Oct-05	24.9		X
2823-024	25-Oct-05	8.96	UJ	X
2823-003	26-Oct-05	6.45	UJ	X
2823-023	26-Oct-05	8.61	UJ	X
2823-001	26-Oct-05	12.4	J	X
2823-002	26-Oct-05	17.7		X
2832-001	27-Oct-05	5	U	X
2832-002	27-Oct-05	5	U	X
2832-008	27-Oct-05	5	U	X
2832-010	27-Oct-05	5	U	X
2832-014	27-Oct-05	5	U	X
2823-034	27-Oct-05	5.2	UJ	X
2832-005	27-Oct-05	6.1		X
2823-027	27-Oct-05	6.14	UJ	X
2823-035	27-Oct-05	6.24	UJ	X
2823-029	27-Oct-05	6.89	UJ	X
2823-028	27-Oct-05	6.92	UJ	X
2823-031	27-Oct-05	7.56	UJ	X
2832-006	27-Oct-05	8.73		X
2823-032	27-Oct-05	9.32	UJ	X
2823-026	27-Oct-05	9.33	UJ	X
2823-030	27-Oct-05	11.5	J	X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2823-025	27-Oct-05	17.5		X
2823-033	27-Oct-05	23		X
2832-003	02-Nov-05	5	U	X
2832-007	02-Nov-05	5	U	X
2832-012	02-Nov-05	5	U	X
2832-015	02-Nov-05	5.21		X
2832-016	02-Nov-05	10.9		X
2832-004	04-Nov-05	5	U	X
2832-009	04-Nov-05	5	U	X
2832-013	08-Nov-05	11.8		X
2832-011	15-Nov-05	5	U	X
2832-018	15-Nov-05	5	UJ	X
0601298	15-Nov-05	6.97		X
0601297	15-Nov-05	10.4		X
2832-017	15-Nov-05	28	J	X
0601300	16-Nov-05	4.96		X
0601308	16-Nov-05	5.17		X
0601307	16-Nov-05	6.22		X
0601305	16-Nov-05	6.44		X
0601306	16-Nov-05	7.1		X
0601306	16-Nov-05	7.1		X
0601310	16-Nov-05	7.14		X
0601299	16-Nov-05	8.96		X
2832-019	17-Nov-05	5	UJ	X
2832-020	17-Nov-05	5	UJ	X
2832-021	17-Nov-05	5	UJ	X
2832-022	17-Nov-05	5	UJ	X
2832-024	19-Nov-05	5	UJ	X
2832-027	19-Nov-05	5	UJ	X
2832-035	19-Nov-05	5	UJ	X
2832-029	19-Nov-05	5.01	J	X
2832-023	19-Nov-05	6.38	J	X
2832-026	19-Nov-05	9.02	J	X
2832-028	19-Nov-05	21	J	X
2832-031	21-Nov-05	5	UJ	X
2832-033	21-Nov-05	5	UJ	X
2832-034	21-Nov-05	5	UJ	X
2832-036	21-Nov-05	5	UJ	X
2832-037	21-Nov-05	5	UJ	X
2832-032	21-Nov-05	5.76	J	X
2832-030	21-Nov-05	5.95	J	X
2863-003	22-Nov-05	6.1		X
2863-007	29-Nov-05	5	U	X
2863-010	29-Nov-05	6.42		X
2863-006	30-Nov-05	5	U	X
2863-005	02-Dec-05	5.94		X
2863-002	02-Dec-05	9.62		X
2863-009	03-Dec-05	5	U	X
2863-008	03-Dec-05	7.01		X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2863-004	03-Dec-05	7.61		X
2882-001	03-Dec-05	8.6		X
2863-011	03-Dec-05	8.86		X
2863-015	03-Dec-05	9.16		X
2863-014	03-Dec-05	13.7		X
2863-013	03-Dec-05	14		X
2863-019	05-Dec-05	8.13		X
2863-017	05-Dec-05	14		X
2863-024	06-Dec-05	5	U	X
2863-016	06-Dec-05	6.68		X
2863-025	06-Dec-05	8.6		X
2863-020	07-Dec-05	5	U	X
2863-021	07-Dec-05	5	U	X
2863-027	07-Dec-05	5	U	X
2863-031	07-Dec-05	5.4		X
2863-023	07-Dec-05	5.98		X
2863-029	07-Dec-05	6.2		X
2863-022	07-Dec-05	6.84		X
2863-026	07-Dec-05	7.88		X
2863-028	07-Dec-05	10.7		X
2863-030	07-Dec-05	13		X
2863-032	07-Dec-05	15.1		X
2873-003	12-Dec-05	5	U	X
2873-004	12-Dec-05	5	U	X
2873-001	12-Dec-05	6.85		X
2873-002	12-Dec-05	7.11		X
2873-005	12-Dec-05	16.7		X
2873-006	13-Dec-05	5	U	X
2873-007	17-Dec-05	17.8		X
2873-008	19-Dec-05	5	U	X
2873-011	19-Dec-05	5	U	X
2873-015	19-Dec-05	5	U	X
2873-016	19-Dec-05	5	U	X
2873-017	19-Dec-05	5	U	X
2873-010	19-Dec-05	7.23		X
2873-013	19-Dec-05	9.48		X
2873-012	19-Dec-05	12.2		X
2873-009	19-Dec-05	12.5		X
2863-001	29-Dec-05	17.9		X
2882-004	04-Jan-06	5	U	X
2882-005	04-Jan-06	6.16		X
2882-002	04-Jan-06	6.27		X
2882-007	04-Jan-06	6.41		X
2882-003	04-Jan-06	6.65		X
2882-006	04-Jan-06	16.2		X
2882-010	05-Jan-06	5.45		X
2882-008	05-Jan-06	11.6		X
2882-012	06-Jan-06	7.43		X
2882-011	06-Jan-06	7.45		X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2882-014	06-Jan-06	10.2		X
2882-013	06-Jan-06	11.8		X
2882-009	06-Jan-06	14.2		X
2882-024	06-Jan-06	16		X
2882-016	09-Jan-06	5	U	X
2882-018	09-Jan-06	5	U	X
2882-020	09-Jan-06	5	U	X
2882-021	09-Jan-06	5	U	X
2882-015	09-Jan-06	5.41		X
2882-017	09-Jan-06	8.69		X
2882-019	09-Jan-06	10.3		X
2882-022	09-Jan-06	13.2		X
2882-023	09-Jan-06	16.8		X
2882-026	10-Jan-06	5	U	X
2882-027	10-Jan-06	5	U	X
2882-028	10-Jan-06	5	U	X
2882-031	10-Jan-06	5	U	X
2882-029	10-Jan-06	5.43		X
2882-032	10-Jan-06	6.99		X
2882-025	10-Jan-06	9.07		X
2882-030	10-Jan-06	12.3		X
2882-033	10-Jan-06	14.5		X
2882-034	11-Jan-06	5	U	X
2882-035	11-Jan-06	6.47		X
2901-002	17-Jan-06	5	U	X
2901-009	17-Jan-06	5	U	X
2901-010	17-Jan-06	5	U	X
2901-004	17-Jan-06	5.52		X
2901-005	17-Jan-06	5.68		X
2901-012	17-Jan-06	6.03		X
2901-007	17-Jan-06	6.12		X
2901-003	17-Jan-06	6.14		X
2901-013	17-Jan-06	7.32		X
2901-011	17-Jan-06	9.09		X
2901-008	17-Jan-06	10.1		X
2901-015	17-Jan-06	11.5		X
2901-001	17-Jan-06	18.2		X
2901-006	17-Jan-06	22.7		X
2901-014	17-Jan-06	27.8		X
2901-017	21-Jan-06	7.25		X
2901-016	21-Jan-06	8.33		X
2901-018	23-Jan-06	5	U	X
2901-023	23-Jan-06	10.9		X
2901-024	23-Jan-06	12.3		X
2915-006	24-Jan-06	4.94	UJ	X
2901-019	24-Jan-06	5	U	X
2901-020	24-Jan-06	5	U	X
2901-026	24-Jan-06	5	U	X
2915-009	24-Jan-06	5.2	UJ	X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2901-022	24-Jan-06	5.36		X
2901-030	24-Jan-06	5.98		X
2915-018	24-Jan-06	6.2	UJ	X
2901-032	24-Jan-06	6.24		X
2901-028	24-Jan-06	6.57		X
2901-031	24-Jan-06	7.13		X
2915-004	24-Jan-06	7.47	UJ	X
2915-008	24-Jan-06	8.47	UJ	X
2915-011	24-Jan-06	8.96	UJ	X
2915-002	24-Jan-06	12.6	J	X
2901-021	24-Jan-06	14.1		X
2915-010	24-Jan-06	14.6	J	X
2915-012	24-Jan-06	51.4	J	X
2901-027	24-Jan-06	313		X
2901-025	25-Jan-06	5.54		X
2915-015	25-Jan-06	6.68	UJ	X
2915-021	25-Jan-06	6.83	UJ	X
2915-017	25-Jan-06	7.78	UJ	X
2915-013	25-Jan-06	8.3	UJ	X
2901-029	25-Jan-06	8.86		X
2915-016	25-Jan-06	9.99	J	X
2915-019	25-Jan-06	10.4	J	X
2915-022	25-Jan-06	11.5	J	X
2915-020	25-Jan-06	11.8	J	X
2915-003	25-Jan-06	12.1	J	X
2915-014	25-Jan-06	13.3	J	X
2915-005	25-Jan-06	17.1	J	X
2915-007	25-Jan-06	22.7	J	X
2915-001	29-Jan-06	4.32	UJ	X
2915-026	30-Jan-06	16.7	J	X
2915-029	06-Feb-06	7.98	UJ	X
2915-030	06-Feb-06	8.18	UJ	X
2915-024	06-Feb-06	8.46	UJ	X
2915-025	06-Feb-06	8.62	UJ	X
2915-028	06-Feb-06	13	J	X
2915-027	06-Feb-06	14.3	J	X
2915-023	06-Feb-06	19.1	J	X
2915-035	07-Feb-06	7.13	UJ	X
2915-034	07-Feb-06	7.2	UJ	X
2915-031	07-Feb-06	8.45	UJ	X
2915-032	07-Feb-06	8.77	UJ	X
2915-033	07-Feb-06	12.8	J	X
2915-037	08-Feb-06	7.77	UJ	X
2915-036	08-Feb-06	7.93	UJ	X
2915-041	08-Feb-06	9.4	J	X
2915-038	08-Feb-06	23.9	J	X
2915-040	08-Feb-06	27.4	J	X
2915-039	08-Feb-06	28.6	J	X
2938-010	08-Mar-06	3.31	U	X

Table 4-5
Analytical Results for Arsenic in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
3165-004	22-Aug-06	16.4		X
3372-001	12-Jan-07	2.6	U	X
3377-027	12-Mar-07	9.12		X
3628-017	03-Aug-07	5.9		X

Notes:

U=not detected

J=Analyte present. Reported value may be estimated.

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
3691-007	20-Oct-07	20.3	UJ	
3053-032	10-Jun-06	29		
3656-008	NA	78.8		
3708-002	05-Nov-07	97.7		
3053-034	11-Jun-06	107		
3750-024	17-Jan-08	121	J	
3483-004	20-May-07	149		
2915-037	08-Feb-06	159		
3422-008	NA	229		
3053-031	10-Jun-06	231		
2882-026	10-Jan-06	253		
3037-007	11-May-06	256	J	
3339-050	18-Jan-07	262		
3708-008	13-Nov-07	296		
3449-001	NA	305	J	
3037-015	11-May-06	306	J	
3053-012	01-Jun-06	306		
2801-012	12-Oct-05	310	J	
3449-001-FD	NA	315	J	
2863-021	07-Dec-05	320	J	
3675-008	08-Oct-07	320		
3656-008-FD	NA	330		
3691-010	20-Oct-07	340	J	
3675-006-FD	08-Oct-07	343		
3675-006	08-Oct-07	350		
2832-034	21-Nov-05	353		
2901-022	24-Jan-06	381		
3656-009	NA	382		
3053-041	10-Jun-06	386		
3691-004	20-Oct-07	390	J	
2915-016	25-Jan-06	392	J	
3339-029	10-Jan-07	397		
3037-034	24-May-06	402	J	
2915-018	24-Jan-06	406	J	
3339-017	21-Dec-06	413		
3339-073	24-Jan-07	413		
3339-052	17-Jan-07	415		
3339-070	23-Jan-07	430		
2915-034	07-Feb-06	436		
3656-006	NA	461		
3037-011	10-May-06	463	J	
3750-008	14-Jan-08	464	J	
2882-020	09-Jan-06	465		
3053-027	01-Jun-06	472		
3750-015	14-Jan-08	477	J	
3339-058	23-Jan-07	484		
3691-005-FD	20-Oct-07	497	J	
3053-026	01-Jun-06	503		
3750-007	14-Jan-08	503	J	
3628-017	03-Aug-07	506		
3691-006	20-Oct-07	511	J	
3165-004	22-Aug-06	518		

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
3750-009	14-Jan-08	518	J	
3339-027	10-Jan-07	532		
2882-014	06-Jan-06	533		
3339-072	23-Jan-07	533		
3656-006-FD	NA	539		
3750-013	14-Jan-08	544	J	
3691-005	20-Oct-07	547	J	
2901-028	24-Jan-06	548		
3037-001	06-May-06	549	J	
3339-060	17-Jan-07	559		
3422-007	NA	566		
3339-030	10-Jan-07	568		
2901-027	24-Jan-06	592		
3750-019	17-Jan-08	599	J	
2901-032	24-Jan-06	608		
3053-017	14-Jun-06	639		
2882-021	09-Jan-06	651		
3037-005	06-May-06	651	J	
3037-006	06-May-06	657	J	
3483-008	20-May-07	660		
3691-009	20-Oct-07	663	J	
3521-003	NA	670		
3449-016-FD	NA	675	J	
3521-003-FD	NA	675		
3449-016	NA	700	J	
3053-003	14-Jun-06	706		
2832-035	19-Nov-05	726		
3422-005	NA	729		
2882-015	09-Jan-06	736		
2873-011	19-Dec-05	743		
3037-012	10-May-06	752	J	
2832-011	15-Nov-05	755		
2915-021	25-Jan-06	759		
2901-002	17-Jan-06	760		
3750-014	14-Jan-08	770	J	
3339-074	24-Jan-07	773		
2823-020	22-Oct-05	774		
2882-030	10-Jan-06	778		
3575-021	03-Aug-07	782		
3037-008	11-May-06	795	J	
2832-033	21-Nov-05	796		
3750-006	14-Jan-08	799	J	
3750-005	14-Jan-08	808	J	
3339-025	16-Jan-07	825		
3750-003	14-Jan-08	828	J	
2901-021	24-Jan-06	840	J	
2901-009	17-Jan-06	847		
3359-004	09-Feb-07	854	J	
3483-007	20-May-07	854		
3227-002	15-Sep-06	859		
2863-022	07-Dec-05	864	J	
3037-028	23-May-06	871	J	

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
3483-010	24-May-07	885		
3037-021	18-May-06	887	J	
3053-013	05-Jun-06	887		
3691-003	19-Oct-07	888	J	
3691-011-FD	22-Oct-07	888	J	
2901-018	23-Jan-06	895		
2801-024	12-Oct-05	897	J	
2832-021	17-Nov-05	898		
2832-024	19-Nov-05	906		
3691-001	19-Oct-07	909	J	
3521-012	NA	922		
3750-025	17-Jan-08	924	J	
2801-010	08-Oct-05	928	J	
3708-007	11-Sep-07	931		
3037-021-FD	18-May-06	932	J	
3483-009	24-May-07	933		
3534-012-FD	01-Jul-07	938		
3339-021	08-Jan-07	943		
3691-003-FD	19-Oct-07	944	J	
2915-030	06-Feb-06	951		
3534-012	01-Jul-07	951		
2823-022	22-Oct-05	953		
3037-002	06-May-06	956	J	
3339-055	20-Jan-07	957		
3053-020	02-Jun-06	961		
3483-001	28-Apr-07	965		
3750-022	17-Jan-08	966	J	
3053-030	10-Jun-06	972		
3339-008	20-Dec-06	980		
2832-031	21-Nov-05	984		
2901-019	24-Jan-06	995		
2801-017	08-Oct-05	1010	J	
2873-008	19-Dec-05	1020		
2882-032	10-Jan-06	1030		
2901-025	25-Jan-06	1030		
3037-016	11-May-06	1030	J	
3359-020	13-Feb-07	1040	J	
3691-011	22-Oct-07	1040	J	
2901-005	17-Jan-06	1050		
3339-026	11-Jan-07	1050		
3708-010	13-Nov-07	1050		
2901-010	17-Jan-06	1060		
3053-035	12-Jun-06	1060		
3483-001-FD	28-Apr-07	1080		
3037-010	10-May-06	1090	J	
2863-007	29-Nov-05	1100	J	
3037-023	23-May-06	1100	J	
3534-013	01-Jul-07	1100		
2863-006	30-Nov-05	1110	J	
3339-028	10-Jan-07	1110		
3053-001	14-Jun-06	1130		
2882-003	04-Jan-06	1140		

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
3339-047	08-Jan-07	1140		
2901-001	17-Jan-06	1150		
3708-006	13-Nov-07	1150		
2873-013	19-Dec-05	1170		
3053-015	14-Jun-06	1180		
3691-008	20-Oct-07	1180	J	
2832-013	08-Nov-05	1190		
3037-031	23-May-06	1190	J	
3053-024	14-Jun-06	1190		
3053-009	13-Jun-06	1200		
3037-033	24-May-06	1210	J	
3339-061	24-Jan-07	1210		
2901-030	24-Jan-06	1220		
3053-038	11-Jun-06	1220		
3053-037	10-Jun-06	1230		
3521-016	NA	1230	J	
2915-015	25-Jan-06	1240	J	
3339-057	23-Jan-07	1240		
2832-001	27-Oct-05	1250		
3037-020	18-May-06	1250	J	
3534-008	27-Jun-07	1260		
2823-019	22-Oct-05	1270		
2832-012	02-Nov-05	1270		
3037-019	18-May-06	1270	J	
3271-012	06-Nov-06	1270		
3750-011	14-Jan-08	1270	J	
3037-022	18-May-06	1280	J	
3339-067	23-Jan-07	1280		
2801-002	13-Oct-05	1290	J	
3271-013	06-Nov-06	1290		
3339-035	11-Jan-07	1290		
3339-051	17-Jan-07	1290		
3339-069	22-Jan-07	1290		
2832-027	19-Nov-05	1300		
3037-026	18-May-06	1300	J	
3339-045	10-Jan-07	1300		
2832-026	19-Nov-05	1310		
3037-024	18-May-06	1320	J	
3339-059	17-Jan-07	1320		
2823-008	22-Oct-05	1330		
3053-014	05-Jun-06	1330		
3534-017	02-Jul-07	1330	J	
3339-053	17-Jan-07	1340		
3053-028	05-Jun-06	1350		
2823-003	26-Oct-05	1360		
2873-004	12-Dec-05	1360		
2882-023	09-Jan-06	1360		
3037-018	18-May-06	1360	J	
3359-001	08-Feb-07	1360	J	
2901-029	25-Jan-06	1370		
3037-014	11-May-06	1370	J	
3750-026	17-Jan-08	1370	J	

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
2823-013	24-Oct-05	1390		
2863-020	07-Dec-05	1390	J	
2882-001	03-Dec-05	1390		
3339-009	08-Jan-07	1390		
3656-014	NA	1390		
3339-068	23-Jan-07	1400		
3483-006	20-May-07	1400		
3675-007	08-Oct-07	1400		
3053-005	05-Jun-06	1410		
3053-029	12-Jun-06	1410		
3359-016	13-Feb-07	1410	J	
3656-010-FD	NA	1410		
2873-016	19-Dec-05	1420		
3037-017	11-May-06	1440	J	
3708-003	05-Nov-07	1450		
3339-016	08-Jan-07	1460		
3750-010	14-Jan-08	1460	J	
3372-001	12-Jan-07	1470	J	
3053-039	12-Jun-06	1480		
3656-004	NA	1480		
3691-013	22-Oct-07	1480	J	
3037-017-FD	11-May-06	1490	J	
3037-030	23-May-06	1490	J	
3521-005	NA	1490		
3534-010	01-Jul-07	1490		
3339-031	10-Jan-07	1500		
3750-002	12-Jan-08	1500	J	
3575-023	05-Aug-07	1510		
3339-039	10-Jan-07	1520		
3534-014	01-Jul-07	1520		
3656-011	NA	1520		
2801-022	12-Oct-05	1530	J	
3339-038	10-Jan-07	1530		
3037-004	06-May-06	1540	J	
3037-027	18-May-06	1540	J	
3656-004-FD	NA	1540		
3053-004	13-Jun-06	1560		
3053-011	06-Jun-06	1560		
2730-023	20-Aug-05	1580	J	
2882-035	11-Jan-06	1580		
3483-002	11-May-07	1580		
2832-015	02-Nov-05	1590		
3271-007	03-Nov-06	1590		
2801-021	08-Oct-05	1600	J	
3037-032	24-May-06	1610	J	
3339-042	11-Jan-07	1610		
2832-029	19-Nov-05	1620		
3037-009	11-May-06	1620	J	
3708-004	06-Nov-07	1620		
3037-029-FD	23-May-06	1630	J	
3339-012	04-Jan-07	1630		
3037-013	12-May-06	1640	J	

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
3339-022	08-Jan-07	1640		
3339-066	23-Jan-07	1640		
3037-029	23-May-06	1650	J	
2801-014	08-Oct-05	1660	J	
3483-005	20-May-07	1660		
3534-016	02-Jul-07	1660		
3483-003	20-May-07	1670		
3656-010	NA	1670		
3483-003-FD	20-May-07	1690		
2832-036	21-Nov-05	1700		
3339-043	11-Jan-07	1700		
3521-004-FD	NA	1700		
3534-009	01-Jul-07	1710		
2901-014	17-Jan-06	1730		
2882-013	06-Jan-06	1750		
2915-011	24-Jan-06	1750	J	
3271-010	03-Nov-06	1750		
2832-008	27-Oct-05	1760		
2873-017	19-Dec-05	1760		
2901-015	17-Jan-06	1760		
3449-014	NA	1760	J	
2832-020	17-Nov-05	1770		
2901-016	21-Jan-06	1770		
2873-003	12-Dec-05	1780		
2901-013	17-Jan-06	1790		
2915-029	06-Feb-06	1790		
2915-017	25-Jan-06	1800	J	
3575-012	21-Jul-07	1810		
3053-023	14-Jun-06	1830		
3271-011	04-Nov-06	1830		
3339-018	08-Jan-07	1840		
3449-008	NA	1840	J	
3521-009	NA	1840		
3675-005	06-Oct-07	1840		
2901-026	24-Jan-06	1850		
3339-048	16-Jan-07	1860		
3298-002	07-Dec-06	1870		
3575-016-FD	25-Jul-07	1880		
3750-012	14-Jan-08	1880	J	
2823-012	24-Oct-05	1890		
3339-002	04-Jan-07	1910		
3575-014	24-Jul-07	1910		
2832-007	02-Nov-05	1920		
2901-031	24-Jan-06	1920		
2882-019	09-Jan-06	1930		
3575-016	25-Jul-07	1930		
3575-017-FD	25-Jul-07	1930		
3422-003	NA	1940		
3339-023	05-Jan-07	1950		
2801-013	08-Oct-05	1960	J	
2915-023	06-Feb-06	1960		
2915-020	25-Jan-06	1970	J	

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
3053-040	10-Jun-06	1970	J	
3575-023-FD	05-Aug-07	1970		
3708-001	29-Oct-07	1970	J	
2882-012	06-Jan-06	1980		
2882-029	10-Jan-06	1990		
2901-024	23-Jan-06	1990		
3656-005	NA	2000		
2863-032	07-Dec-05	2010	J	
2944-001	17-Feb-06	2020		
2882-031	10-Jan-06	2040		
3271-002	02-Nov-06	2040		
2882-011	06-Jan-06	2060		
2901-006	17-Jan-06	2060		
3271-006	07-Nov-06	2060		
3037-003	06-May-06	2080	J	
3227-004	13-Sep-06	2080		
3534-002	27-Jun-07	2080		
2901-020	24-Jan-06	2090		
2915-041	08-Feb-06	2100		
3359-014	10-Feb-07	2100	J	
2901-017	21-Jan-06	2110		
2901-008	17-Jan-06	2130		
2901-012	17-Jan-06	2130		
2823-018	22-Oct-05	2150		
3656-001	NA	2150		
2801-008	13-Oct-05	2160	J	
3750-001	12-Jan-08	2160	J	
2915-035	07-Feb-06	2170		
3053-006	01-Jun-06	2170		
2915-036	08-Feb-06	2180		
2882-005	04-Jan-06	2190		
2901-007	17-Jan-06	2190		
3521-005-FD	NA	2190		
2801-025	13-Oct-05	2200	J	
2823-031	27-Oct-05	2210		
2832-003	02-Nov-05	2210		
2915-012	24-Jan-06	2210	J	
3534-019	02-Jul-07	2220		
2901-004	17-Jan-06	2230		
3449-002	NA	2240	J	
2832-018	15-Nov-05	2250		
3708-001-FD	29-Oct-07	2270		
3037-025	18-May-06	2280	J	
3521-004	NA	2280		
3575-017	25-Jul-07	2300		
2823-017	22-Oct-05	2310		
2901-011	17-Jan-06	2320		
3339-010	08-Jan-07	2340		
3656-007-FD	NA	2340		
2832-030	21-Nov-05	2350		
3575-004-FD	19-Jul-07	2350		
2832-019	17-Nov-05	2360		

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
2901-003	17-Jan-06	2360		
3449-002-FD	NA	2370	J	
3534-001	27-Jun-07	2370		
3750-004	14-Jan-08	2370	J	
2882-007	04-Jan-06	2380		
2915-027	06-Feb-06	2380		
3298-004	07-Dec-06	2380		
2801-019	08-Oct-05	2390	J	
2863-010	29-Nov-05	2390	J	
3053-033	10-Jun-06	2400		
2832-032	21-Nov-05	2440		
2938-010	08-Mar-06	2440		
2832-037	21-Nov-05	2450		
3339-036	11-Jan-07	2460		
2832-009	04-Nov-05	2470		
2832-022	17-Nov-05	2470		
3053-021	05-Jun-06	2480		
3534-003	27-Jun-07	2480		
3053-008	05-Jun-06	2490		
3298-007	05-Dec-06	2490		
3339-033	10-Jan-07	2510		
3359-017	13-Feb-07	2510	J	
3534-007	27-Jun-07	2510		
3656-002	NA	2510		
3449-010	NA	2520	J	
3534-003-FD	27-Jun-07	2520		
2882-010	05-Jan-06	2530		
3339-032	10-Jan-07	2530		
3534-001-FD	27-Jun-07	2530		
2801-027	19-Oct-05	2540	J	
2882-027	10-Jan-06	2540		
3339-007	08-Jan-07	2540		
3339-024	04-Jan-07	2550		
3691-012	22-Oct-07	2550	J	
2832-016	02-Nov-05	2560		
2863-031	07-Dec-05	2560	J	
3656-007	NA	2560		
2823-023	26-Oct-05	2570		
3339-054	15-Jan-07	2580		
2832-010	27-Oct-05	2590		
2873-012	19-Dec-05	2590		
2915-032	07-Feb-06	2590		
3339-065	23-Jan-07	2600		
3449-004	NA	2610	J	
2901-023	23-Jan-06	2630		
3298-005	05-Dec-06	2630		
3339-003	08-Jan-07	2630		
3656-013	NA	2630		
2832-028	19-Nov-05	2650		
3053-007	05-Jun-06	2650		
3575-007	19-Jul-07	2660		
3339-034	10-Jan-07	2680		

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
2832-004	04-Nov-05	2690		
2832-014	27-Oct-05	2690		
2882-034	11-Jan-06	2700		
3339-001	04-Jan-07	2720		
3708-009	13-Nov-07	2730		
3449-012	NA	2740	J	
3339-044	11-Jan-07	2760		
3422-010	NA	2760		
2832-023	19-Nov-05	2770		
2882-028	10-Jan-06	2780		
3339-014	04-Jan-07	2780		
3575-015-FD	24-Jul-07	2780		
3359-021	13-Feb-07	2790		
2823-011	24-Oct-05	2800		
3339-005	21-Dec-06	2810		
3422-011	NA	2810		
3575-015	24-Jul-07	2810		
3339-037	11-Jan-07	2820		
3339-049	18-Jan-07	2820		
2823-024	25-Oct-05	2830		
2823-002	26-Oct-05	2840		
3422-012	NA	2840		
3521-013	NA	2840		
3521-017	NA	2840	J	
2915-007	25-Jan-06	2880	J	
2832-002	27-Oct-05	2890		
3339-064	17-Jan-07	2890		
3521-002-FD	NA	2910		
3053-010	13-Jun-06	2930		
3339-041	08-Jan-07	2930		
2832-005	27-Oct-05	2940		
2832-006	27-Oct-05	2940		
3575-004	19-Jul-07	2940		
3339-062	23-Jan-07	2950		
3359-006	10-Feb-07	2980	J	
2823-010	20-Oct-05	2990		
3339-040	09-Jan-07	3000		
3339-004	08-Jan-07	3010		
3656-012	NA	3010		
2832-017	15-Nov-05	3020		
3449-017	NA	3020		
3575-003	18-Jul-07	3020		
3575-020-FD	02-Aug-07	3050		
3575-006	19-Jul-07	3060		
3656-003	NA	3060		
2882-002	04-Jan-06	3070		
2882-004	04-Jan-06	3070		
3359-018	13-Feb-07	3100	J	
2882-017	09-Jan-06	3120		
2915-031	07-Feb-06	3140		
3339-011	04-Jan-07	3140		
3053-019	01-Jun-06	3150		

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
3521-002	NA	3150		
2863-009	03-Dec-05	3160	J	
2915-004	24-Jan-06	3160	J	
3675-009	10-Oct-07	3160		
3575-003-FD	18-Jul-07	3170		
2863-002	02-Dec-05	3200	J	
3271-004	03-Nov-06	3200		
3339-006	08-Jan-07	3200		
3449-005	NA	3200	J	
2915-013	25-Jan-06	3210	J	
3053-042	10-Jun-06	3210		
2873-015	19-Dec-05	3230		
2863-027	07-Dec-05	3240	J	
3339-019	08-Jan-07	3240		
3053-002	14-Jun-06	3270		
3708-005	13-Nov-07	3270		
3575-020	02-Aug-07	3290		
3053-018	14-Jun-06	3300		
3675-003	05-Oct-07	3300		
3575-005	18-Jul-07	3320		
2823-027	27-Oct-05	3330		
3339-063	19-Jan-07	3330		
2863-024	06-Dec-05	3340	J	
3359-003	09-Feb-07	3350	J	
3534-005	27-Jun-07	3350		
3675-002	05-Oct-07	3370		
2863-014	03-Dec-05	3380	J	
2873-002	12-Dec-05	3400		
3675-004	06-Oct-07	3400		
2863-015	03-Dec-05	3410	J	
3271-003	09-Oct-06	3410		
3339-046	09-Jan-07	3410		
3534-002-FD	27-Jun-07	3420		
2863-004	03-Dec-05	3430	J	
3449-007	NA	3430	J	
3675-002-FD	05-Oct-07	3430		
2823-028	27-Oct-05	3450		
3053-036	10-Jun-06	3460		
2863-005	02-Dec-05	3470	J	
3359-013	10-Feb-07	3470	J	
3271-008	03-Nov-06	3480		
2863-023	07-Dec-05	3520	J	
2882-018	09-Jan-06	3520		
2915-025	06-Feb-06	3520		
2915-033	07-Feb-06	3550		
2823-004	24-Oct-05	3560		
3339-015	08-Jan-07	3560		
3053-016	14-Jun-06	3570		
3534-004	27-Jun-07	3580		
2873-001	12-Dec-05	3590		
2873-006	13-Dec-05	3600		
3449-015	NA	3600	J	

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
2801-026	19-Oct-05	3610	J	
2873-010	19-Dec-05	3620		
3521-007	NA	3620		
3575-013	21-Jul-07	3630		
2823-033	27-Oct-05	3640		
2915-008	24-Jan-06	3640	J	
2823-026	27-Oct-05	3650		
3359-008	09-Feb-07	3650	J	
3339-071	22-Jan-07	3660		
2863-008	03-Dec-05	3670	J	
3271-001	03-Nov-06	3670		
3422-004	NA	3670		
3534-011-FD	01-Jul-07	3680		
3422-002	NA	3700		
3298-003	07-Dec-06	3710		
3534-018	02-Jul-07	3710		
3298-006	05-Dec-06	3720		
3449-013	NA	3720	J	
2915-006	24-Jan-06	3760	J	
3227-003	13-Sep-06	3770		
2823-034	27-Oct-05	3790		
3359-011	10-Feb-07	3820	J	
3271-009	03-Nov-06	3830		
3534-011	01-Jul-07	3830		
2730-021	18-Aug-05	3850	J	
2915-028	06-Feb-06	3890		
2823-021	22-Oct-05	3900		
3449-006	NA	3910	J	
2801-028	19-Oct-05	3920	J	
3534-015	02-Jul-07	3920		
2882-006	04-Jan-06	3930		
2801-029	19-Oct-05	3940	J	
3575-001	18-Jul-07	3940		
3575-010	20-Jul-07	3940		
3691-002	19-Oct-07	3940	J	
2801-018	12-Oct-05	3950	J	
2873-007	17-Dec-05	3950		
3575-018	26-Jul-07	3960		
2823-032	27-Oct-05	3970		
3521-014	NA	3970		
2882-024	06-Jan-06	4000		
3422-006	NA	4000		
2882-033	10-Jan-06	4010		
2882-025	10-Jan-06	4020		
2882-022	09-Jan-06	4040		
3449-003	NA	4040	J	
3422-009	NA	4050		
2915-026	30-Jan-06	4060		
3053-022	14-Jun-06	4070		
3271-005	03-Nov-06	4070		
3575-009	19-Jul-07	4100		
3359-012	10-Feb-07	4120	J	

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
3227-001	27-Sep-06	4140		
3575-002	28-Jul-07	4140		
2915-022	25-Jan-06	4170		
2873-009	19-Dec-05	4200		
3422-001	NA	4200		
3575-019	31-Jul-07	4200		
2801-016	13-Oct-05	4250	J	
2863-016	06-Dec-05	4250	J	
3575-011	20-Jul-07	4280		
3750-021	17-Jan-08	4290	J	
2863-017	05-Dec-05	4300	J	
2882-016	09-Jan-06	4320		
2823-014	24-Oct-05	4350		
2873-005	12-Dec-05	4350		
3359-022	13-Feb-07	4350		
3521-011	NA	4350		
3449-003-FD	NA	4370	J	
2823-009	21-Oct-05	4380		
2823-035	27-Oct-05	4390		
2863-028	07-Dec-05	4390	J	
2863-003	22-Nov-05	4410	J	
2915-003	25-Jan-06	4420	J	
2882-009	06-Jan-06	4440		
3575-001-FD	18-Jul-07	4440		
3359-023	13-Feb-07	4470		
3298-009	07-Dec-06	4480		
3575-022	05-Aug-07	4480		
2801-020	13-Oct-05	4530	J	
2915-019	25-Jan-06	4550	J	
3359-010	10-Feb-07	4570	J	
3575-002-FD	18-Jul-07	4600		
2823-030	27-Oct-05	4640		
2863-011	03-Dec-05	4670	J	
2863-001	29-Dec-05	4680	J	
3298-008	07-Dec-06	4680		
2882-008	05-Jan-06	4690		
3359-007	09-Feb-07	4710	J	
2823-029	27-Oct-05	4720		
3575-008	19-Jul-07	4720		
2863-029	07-Dec-05	4740	J	
2863-030	07-Dec-05	4750	J	
2801-015	08-Oct-05	4790	J	
3359-005	09-Feb-07	4830	J	
3359-019	13-Feb-07	4830	J	
2801-004	13-Oct-05	4870	J	
2863-013	03-Dec-05	4880	J	
2801-007	13-Oct-05	4900	J	
2915-010	24-Jan-06	5040	J	
2863-026	07-Dec-05	5050	J	
2915-024	06-Feb-06	5170		
3521-001-FD	NA	5180		
2915-009	24-Jan-06	5200	J	

Table 4-6
Analytical Results for Barium in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Barium (15,000 mg/kg)
2863-025	06-Dec-05	5240	J	
2823-025	27-Oct-05	5270		
2863-019	05-Dec-05	5320	J	
2823-007	24-Oct-05	5340		
2801-011	12-Oct-05	5360	J	
2823-005	24-Oct-05	5380		
3377-027	12-Mar-07	5390		
2915-040	08-Feb-06	5480		
3521-006	NA	5520		
3449-011	NA	5590	J	
2823-015	20-Oct-05	5600		
2823-016	21-Oct-05	5630		
2915-002	24-Jan-06	5760	J	
2915-001	29-Jan-06	5790	J	
2823-006	24-Oct-05	5850		
3521-001	NA	5860		
2801-023	12-Oct-05	5880	J	
3521-008	NA	5910		
2801-009	13-Oct-05	6050	J	
2915-014	25-Jan-06	6050	J	
3359-015	13-Feb-07	6150	J	
2915-005	25-Jan-06	6320	J	
3521-010	NA	6360		
3521-019	NA	6380	J	
2915-039	08-Feb-06	6420		
2801-003	13-Oct-05	6560	J	
2801-005	13-Oct-05	6630	J	
2801-030	19-Oct-05	6660	J	
2801-001	13-Oct-05	6670	J	
2801-006	13-Oct-05	6750	J	
3359-002	09-Feb-07	6960	J	
3521-015	NA	7590		
2915-038	08-Feb-06	7900		
2823-001	26-Oct-05	8050		
3521-018	NA	11000	J	

Notes:

U=not detected

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2730-021	18-Aug-05	0.548	UJ	
2730-023	20-Aug-05	0.511	UJ	
2801-021	08-Oct-05	0.512	UJ	
2801-017	08-Oct-05	0.514	U	
2801-010	08-Oct-05	0.517	U	
2801-013	08-Oct-05	0.517	J	
2801-014	08-Oct-05	0.964	J	
2801-015	08-Oct-05	6.17		
2801-019	08-Oct-05	66.6		
2801-012	12-Oct-05	0.523	U	
2801-011	12-Oct-05	0.596	J	
2801-018	12-Oct-05	0.598	J	
2801-022	12-Oct-05	0.951	J	
2801-023	12-Oct-05	1.98	J	
2801-024	12-Oct-05	6.62	J	
2801-009	13-Oct-05	0.524	U	
2801-006	13-Oct-05	0.598	J	
2801-002	13-Oct-05	0.742	J	
2801-007	13-Oct-05	0.765	J	
2801-004	13-Oct-05	0.942	J	
2801-008	13-Oct-05	1.11	J	
2801-025	13-Oct-05	1.33	J	
2801-020	13-Oct-05	1.43	J	
2801-005	13-Oct-05	2.05	J	
2801-016	13-Oct-05	2.48	J	
2801-001	13-Oct-05	2.54	J	
2801-003	13-Oct-05	3.39	J	
2801-029	19-Oct-05	0.541	UJ	
2801-028	19-Oct-05	0.721	J	
2801-026	19-Oct-05	0.959	J	
2801-027	19-Oct-05	1.46	J	
2801-030	19-Oct-05	2.35	J	
2823-010	20-Oct-05	1.09	J	
2823-015	20-Oct-05	1.83	J	
2823-009	21-Oct-05	2.82	J	
2823-016	21-Oct-05	4.66	J	
2823-022	22-Oct-05	0.515	U	
2823-020	22-Oct-05	0.566	U	
2823-018	22-Oct-05	0.745	U	
2823-008	22-Oct-05	0.809	J	
2823-019	22-Oct-05	1.46	J	
2823-017	22-Oct-05	1.9	J	
2823-021	22-Oct-05	2.8	J	
2823-012	24-Oct-05	1.17	J	
2823-011	24-Oct-05	1.23	J	
2823-013	24-Oct-05	1.39	J	
2823-005	24-Oct-05	1.61	J	
2823-007	24-Oct-05	3.16	J	
2823-014	24-Oct-05	4.44	J	
2823-004	24-Oct-05	5.34	J	
2823-006	24-Oct-05	8.71	J	
2823-024	25-Oct-05	9.36		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2823-003	26-Oct-05	0.618	U	
2823-023	26-Oct-05	1.07	J	
2823-002	26-Oct-05	1.19	J	
2823-001	26-Oct-05	2.17	J	
2823-031	27-Oct-05	0.759	J	
2823-027	27-Oct-05	0.76	J	
2823-033	27-Oct-05	0.999	J	
2823-030	27-Oct-05	1.21	J	
2823-026	27-Oct-05	1.33	J	
2823-034	27-Oct-05	2.52	J	
2823-029	27-Oct-05	3.22	J	
2823-025	27-Oct-05	4.53	J	
2823-032	27-Oct-05	5.16	J	
2832-008	27-Oct-05	5.25		
2832-001	27-Oct-05	5.51		
2832-002	27-Oct-05	7.64		
2832-014	27-Oct-05	8.08		
2823-028	27-Oct-05	9.67		
2832-005	27-Oct-05	9.76		
2832-006	27-Oct-05	10.3		
2832-010	27-Oct-05	10.7		
2823-035	27-Oct-05	10.9		
2832-012	02-Nov-05	7.03		
2832-007	02-Nov-05	8.46		
2832-003	02-Nov-05	8.96		
2832-015	02-Nov-05	13.2		
2832-016	02-Nov-05	13.6		
2832-009	04-Nov-05	6.22		
2832-004	04-Nov-05	7.1		
2832-013	08-Nov-05	9.31		
2832-011	15-Nov-05	3.91		
2832-018	15-Nov-05	8.8		
2832-017	15-Nov-05	13.8		
2832-021	17-Nov-05	5.36		
2832-020	17-Nov-05	6.34		
2832-019	17-Nov-05	7.07		
2832-022	17-Nov-05	7.87		
2832-029	19-Nov-05	4.4		
2832-027	19-Nov-05	5.04		
2832-024	19-Nov-05	6.91		
2832-026	19-Nov-05	7.13		
2832-023	19-Nov-05	7.57		
2832-035	19-Nov-05	10.1		
2832-028	19-Nov-05	15.4		
2832-036	21-Nov-05	3.78		
2832-034	21-Nov-05	3.92		
2832-031	21-Nov-05	4.71		
2832-033	21-Nov-05	6.22		
2832-032	21-Nov-05	7.13		
2832-030	21-Nov-05	8.08		
2832-037	21-Nov-05	8.78		
2863-003	22-Nov-05	2.39		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2863-007	29-Nov-05	1	U	
2863-010	29-Nov-05	1.36		
2863-006	30-Nov-05	1.79		
2863-005	02-Dec-05	2.21		
2863-002	02-Dec-05	3.06		
2863-008	03-Dec-05	1.42		
2863-015	03-Dec-05	1.54		
2863-013	03-Dec-05	2.59		
2863-004	03-Dec-05	3.09		
2863-011	03-Dec-05	3.98		
2882-001	03-Dec-05	4.9	J	
2863-009	03-Dec-05	5.82		
2863-014	03-Dec-05	6.03		
2863-019	05-Dec-05	2.48		
2863-017	05-Dec-05	4.15		
2863-024	06-Dec-05	1	U	
2863-016	06-Dec-05	2.22		
2863-025	06-Dec-05	3.29		
2863-022	07-Dec-05	1.1		
2863-021	07-Dec-05	1.28		
2863-026	07-Dec-05	1.74		
2863-032	07-Dec-05	2		
2863-028	07-Dec-05	2.11		
2863-031	07-Dec-05	2.19		
2863-029	07-Dec-05	2.24		
2863-023	07-Dec-05	2.52		
2863-020	07-Dec-05	2.54		
2863-027	07-Dec-05	3.18		
2863-030	07-Dec-05	5.18		
2873-005	12-Dec-05	1.05		
2873-001	12-Dec-05	1.48		
2873-002	12-Dec-05	2.46		
2873-004	12-Dec-05	2.98		
2873-003	12-Dec-05	4.06		
2873-006	13-Dec-05	1.76		
2873-007	17-Dec-05	1.31		
2873-015	19-Dec-05	1	U	
2873-016	19-Dec-05	1	U	
2873-013	19-Dec-05	1.03		
2873-012	19-Dec-05	1.08		
2873-011	19-Dec-05	1.11		
2873-009	19-Dec-05	1.37		
2873-010	19-Dec-05	2.64		
2873-017	19-Dec-05	2.94		
2873-008	19-Dec-05	4.48		
2863-001	29-Dec-05	1.9		
2882-003	04-Jan-06	1.41		
2882-004	04-Jan-06	1.5		
2882-002	04-Jan-06	1.59		
2882-005	04-Jan-06	1.84		
2882-007	04-Jan-06	2.59		
2882-006	04-Jan-06	16.7		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2882-010	05-Jan-06	1.38		
2882-008	05-Jan-06	1.62		
2882-014	06-Jan-06	1.67		
2882-012	06-Jan-06	1.89		
2882-009	06-Jan-06	2.21		
2882-024	06-Jan-06	4.24		
2882-011	06-Jan-06	6.72		
2882-013	06-Jan-06	7.61		
2882-015	09-Jan-06	1	U	
2882-016	09-Jan-06	1.54		
2882-018	09-Jan-06	2		
2882-017	09-Jan-06	2.31		
2882-022	09-Jan-06	2.5		
2882-023	09-Jan-06	3.55		
2882-019	09-Jan-06	4.86		
2882-021	09-Jan-06	11.6		
2882-020	09-Jan-06	16.5		
2882-033	10-Jan-06	2.45		
2882-030	10-Jan-06	2.75		
2882-025	10-Jan-06	2.88		
2882-026	10-Jan-06	3.04		
2882-029	10-Jan-06	3.23		
2882-028	10-Jan-06	3.43		
2882-031	10-Jan-06	4.21		
2882-032	10-Jan-06	4.22		
2882-027	10-Jan-06	9.68		
2882-034	11-Jan-06	5.6		
2882-035	11-Jan-06	22.1		
2901-009	17-Jan-06	1.09		
2901-011	17-Jan-06	1.52		
2901-007	17-Jan-06	1.87		
2901-012	17-Jan-06	2.28		
2901-003	17-Jan-06	2.72		
2901-004	17-Jan-06	2.98		
2901-001	17-Jan-06	3.05		
2901-002	17-Jan-06	3.61		
2901-008	17-Jan-06	3.74		
2901-014	17-Jan-06	4.17		
2901-006	17-Jan-06	4.99		
2901-005	17-Jan-06	5.04		
2901-010	17-Jan-06	6.18		
2901-015	17-Jan-06	10		
2901-013	17-Jan-06	11.6		
2901-016	21-Jan-06	2.14		
2901-017	21-Jan-06	3.65		
2901-018	23-Jan-06	1.53		
2901-024	23-Jan-06	4.33		
2901-023	23-Jan-06	4.96		
2915-004	24-Jan-06	0.508	UJ	
2915-012	24-Jan-06	0.74	UJ	
2901-022	24-Jan-06	0.905		
2901-028	24-Jan-06	1.19		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2901-030	24-Jan-06	1.46		
2901-032	24-Jan-06	1.51		
2915-009	24-Jan-06	1.89	UJ	
2915-011	24-Jan-06	2.23		
2901-031	24-Jan-06	2.3		
2901-027	24-Jan-06	2.44		
2915-006	24-Jan-06	2.44		
2901-026	24-Jan-06	2.61		
2901-020	24-Jan-06	3.23		
2915-010	24-Jan-06	3.61		
2901-019	24-Jan-06	5.18		
2915-002	24-Jan-06	7.68		
2915-018	24-Jan-06	7.88		
2915-008	24-Jan-06	12.8		
2901-021	24-Jan-06	33	J	
2915-016	25-Jan-06	0.512	UJ	
2915-015	25-Jan-06	0.527	UJ	
2915-020	25-Jan-06	0.795	UJ	
2901-025	25-Jan-06	1.51		
2915-021	25-Jan-06	1.7	UJ	
2901-029	25-Jan-06	1.91		
2915-005	25-Jan-06	2.04		
2915-014	25-Jan-06	2.67		
2915-022	25-Jan-06	8.96		
2915-003	25-Jan-06	9.78		
2915-013	25-Jan-06	12.9		
2915-007	25-Jan-06	13.8		
2915-019	25-Jan-06	17.1		
2915-017	25-Jan-06	21.4		
2915-001	29-Jan-06	4.42		
2915-026	30-Jan-06	3.32		
2915-024	06-Feb-06	0.769	UJ	
2915-023	06-Feb-06	0.953	UJ	
2915-030	06-Feb-06	1.86	UJ	
2915-025	06-Feb-06	4.45		
2915-027	06-Feb-06	9.62		
2915-028	06-Feb-06	14.5		
2915-029	06-Feb-06	38.8		
2915-033	07-Feb-06	0.5	UJ	
2915-032	07-Feb-06	3.8		
2915-034	07-Feb-06	4.34		
2915-031	07-Feb-06	4.48		
2915-035	07-Feb-06	7.18		
2915-038	08-Feb-06	0.491	UJ	
2915-041	08-Feb-06	0.5	UJ	
2915-039	08-Feb-06	0.502	UJ	
2915-040	08-Feb-06	0.513	UJ	
2915-037	08-Feb-06	4.75		
2915-036	08-Feb-06	6.71		
2944-001	17-Feb-06	1.3		
2938-010	08-Mar-06	13.9		
3037-002	06-May-06	1	U	

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3037-006	06-May-06	1	U	
3037-003	06-May-06	2.46		
3037-004	06-May-06	3.04		
3037-005	06-May-06	4.08		
3037-001	06-May-06	34.5		
3037-011	10-May-06	1	U	
3037-010	10-May-06	2.41		
3037-012	10-May-06	2.95		
3037-007	11-May-06	1	U	
3037-015	11-May-06	1	U	
3037-017-FD	11-May-06	1.32		
3037-016	11-May-06	1.34		
3037-017	11-May-06	1.46		
3037-009	11-May-06	1.5		
3037-014	11-May-06	1.56		
3037-008	11-May-06	5.21		
3037-013	12-May-06	1.15		
3037-018	18-May-06	1	U	
3037-019	18-May-06	1	U	
3037-020	18-May-06	1	U	
3037-021	18-May-06	1	U	
3037-021-FD	18-May-06	1	U	
3037-022	18-May-06	1	U	
3037-025	18-May-06	1.08		
3037-024	18-May-06	1.41		
3037-027	18-May-06	1.93		
3037-026	18-May-06	2.79		
3037-028	23-May-06	1	U	
3037-023	23-May-06	1.13		
3037-031	23-May-06	1.18		
3037-030	23-May-06	1.71		
3037-029-FD	23-May-06	7.13		
3037-029	23-May-06	7.22		
3037-032	24-May-06	1	U	
3037-034	24-May-06	7.34		
3037-033	24-May-06	12.2		
3053-026	01-Jun-06	1	U	
3053-027	01-Jun-06	1.96		
3053-012	01-Jun-06	3.25		
3053-019	01-Jun-06	3.46		
3053-006	01-Jun-06	4.19		
3053-020	02-Jun-06	2.35		
3053-013	05-Jun-06	1.36		
3053-014	05-Jun-06	2.06		
3053-028	05-Jun-06	2.24		
3053-005	05-Jun-06	2.77		
3053-008	05-Jun-06	2.97		
3053-021	05-Jun-06	3.08		
3053-007	05-Jun-06	3.52		
3053-011	06-Jun-06	1.83		
3053-030	10-Jun-06	1	U	
3053-031	10-Jun-06	1	U	

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3053-032	10-Jun-06	1	U	
3053-037	10-Jun-06	1.31		
3053-040	10-Jun-06	1.31		
3053-033	10-Jun-06	1.47		
3053-036	10-Jun-06	1.49		
3053-042	10-Jun-06	2.2		
3053-041	10-Jun-06	2.42		
3053-038	11-Jun-06	1	U	
3053-034	11-Jun-06	38		
3053-039	12-Jun-06	1	U	
3053-035	12-Jun-06	2.11		
3053-029	12-Jun-06	2.73		
3053-010	13-Jun-06	2.27		
3053-004	13-Jun-06	6.14		
3053-009	13-Jun-06	9.21		
3053-023	14-Jun-06	2		
3053-003	14-Jun-06	2.03		
3053-024	14-Jun-06	2.18		
3053-015	14-Jun-06	2.83		
3053-017	14-Jun-06	2.84		
3053-001	14-Jun-06	2.98		
3053-002	14-Jun-06	3.06		
3053-022	14-Jun-06	3.17		
3053-018	14-Jun-06	4.88		
3053-016	14-Jun-06	5.51		
3165-004	22-Aug-06	6.39		
3227-004	13-Sep-06	0.512	U	
3227-003	13-Sep-06	0.525	U	
3227-002	15-Sep-06	0.907		
3227-001	27-Sep-06	0.935		
3271-003	09-Oct-06	1.46		
3271-002	02-Nov-06	4.53		
3271-007	03-Nov-06	1.81		
3271-005	03-Nov-06	1.99		
3271-009	03-Nov-06	2.35		
3271-004	03-Nov-06	2.48		
3271-010	03-Nov-06	3.38		
3271-008	03-Nov-06	3.54		
3271-001	03-Nov-06	8.48		
3271-011	04-Nov-06	2.76		
3271-012	06-Nov-06	1.31		
3271-013	06-Nov-06	2.53		
3271-006	07-Nov-06	1.2		
3298-005	05-Dec-06	1	U	
3298-007	05-Dec-06	2.33		
3298-006	05-Dec-06	7.06		
3298-004	07-Dec-06	1.67		
3298-009	07-Dec-06	1.92		
3298-002	07-Dec-06	2.61		
3298-003	07-Dec-06	5.05		
3298-008	07-Dec-06	9.01		
3339-008	20-Dec-06	3.8		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3339-017	21-Dec-06	2.3		
3339-005	21-Dec-06	5.1		
3339-012	04-Jan-07	4.3		
3339-011	04-Jan-07	6.1		
3339-001	04-Jan-07	6.4		
3339-024	04-Jan-07	7.2		
3339-014	04-Jan-07	10.2		
3339-002	04-Jan-07	12.5		
3339-023	05-Jan-07	6.4		
3339-022	08-Jan-07	2.9		
3339-021	08-Jan-07	3.6		
3339-047	08-Jan-07	3.6		
3339-004	08-Jan-07	4.3		
3339-019	08-Jan-07	4.5		
3339-016	08-Jan-07	4.8		
3339-010	08-Jan-07	5.1		
3339-006	08-Jan-07	5.7		
3339-041	08-Jan-07	5.7		
3339-007	08-Jan-07	6.4		
3339-018	08-Jan-07	7		
3339-015	08-Jan-07	7.4		
3339-009	08-Jan-07	8		
3339-003	08-Jan-07	10.6		
3339-046	09-Jan-07	3.9		
3339-040	09-Jan-07	6.5		
3339-028	10-Jan-07	2.8		
3339-034	10-Jan-07	3.1		
3339-045	10-Jan-07	3.2		
3339-031	10-Jan-07	4.1		
3339-032	10-Jan-07	5.2		
3339-030	10-Jan-07	5.5		
3339-033	10-Jan-07	5.5		
3339-038	10-Jan-07	7.1		
3339-039	10-Jan-07	8.2		
3339-027	10-Jan-07	22		
3339-029	10-Jan-07	55		
3339-026	11-Jan-07	3		
3339-043	11-Jan-07	4.3		
3339-042	11-Jan-07	5.2		
3339-036	11-Jan-07	5.6		
3339-044	11-Jan-07	5.7		
3339-037	11-Jan-07	7.1		
3339-035	11-Jan-07	11.4		
3372-001	12-Jan-07	5.9		
3339-054	15-Jan-07	2.4		
3339-048	16-Jan-07	5.4		
3339-025	16-Jan-07	10		
3339-051	17-Jan-07	3.3		
3339-060	17-Jan-07	3.7		
3339-064	17-Jan-07	4.5		
3339-053	17-Jan-07	6.5		
3339-052	17-Jan-07	7.9		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3339-059	17-Jan-07	13.5		
3339-050	18-Jan-07	2.8		
3339-049	18-Jan-07	4.3		
3339-063	19-Jan-07	3.5		
3339-055	20-Jan-07	4		
3339-069	22-Jan-07	4.5		
3339-071	22-Jan-07	6.6		
3339-072	23-Jan-07	2.2		
3339-058	23-Jan-07	2.3		
3339-067	23-Jan-07	2.4		
3339-070	23-Jan-07	2.7		
3339-057	23-Jan-07	3.2		
3339-065	23-Jan-07	6.5		
3339-062	23-Jan-07	8.2		
3339-066	23-Jan-07	14.4		
3339-068	23-Jan-07	14.8		
3339-073	24-Jan-07	3.6		
3339-061	24-Jan-07	6.2		
3339-074	24-Jan-07	6.3		
3359-001	08-Feb-07	14.3	J	
3359-004	09-Feb-07	0.555	J	
3359-007	09-Feb-07	1.33	J	
3359-008	09-Feb-07	2.59	J	
3359-003	09-Feb-07	3.17	J	
3359-005	09-Feb-07	3.3	J	
3359-002	09-Feb-07	3.91	J	
3359-014	10-Feb-07	0.859	J	
3359-012	10-Feb-07	1.62	J	
3359-011	10-Feb-07	1.91	J	
3359-006	10-Feb-07	3.23	J	
3359-013	10-Feb-07	5.26	J	
3359-010	10-Feb-07	6.88	J	
3359-020	13-Feb-07	1.11	J	
3359-017	13-Feb-07	1.49	J	
3359-018	13-Feb-07	1.55	J	
3359-021	13-Feb-07	1.81	J	
3359-016	13-Feb-07	4.55	J	
3359-022	13-Feb-07	5.69	J	
3359-015	13-Feb-07	7.59	J	
3359-023	13-Feb-07	8.39	J	
3359-019	13-Feb-07	14.2	J	
3377-027	12-Mar-07	0.464	UJ	
3483-001	28-Apr-07	9.7		
3483-001-FD	28-Apr-07	11.4		
3483-002	11-May-07	4.4		
3483-008	20-May-07	2.3		
3483-007	20-May-07	2.6		
3483-005	20-May-07	3.8		
3483-003-FD	20-May-07	4.3		
3483-003	20-May-07	4.5		
3483-006	20-May-07	4.6		
3483-004	20-May-07	5.4		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3483-009	24-May-07	2.3		
3483-010	24-May-07	3.2		
3534-008	27-Jun-07	3.16		
3534-002	27-Jun-07	3.22		
3534-007	27-Jun-07	3.41		
3534-002-FD	27-Jun-07	3.57		
3534-003-FD	27-Jun-07	3.74		
3534-001	27-Jun-07	3.81		
3534-003	27-Jun-07	3.89		
3534-001-FD	27-Jun-07	4.01		
3534-004	27-Jun-07	4.02		
3534-005	27-Jun-07	4.05		
3534-010	01-Jul-07	2.78		
3534-009	01-Jul-07	3.07		
3534-012-FD	01-Jul-07	3.8		
3534-012	01-Jul-07	4.02		
3534-011	01-Jul-07	5.49		
3534-013	01-Jul-07	5.6		
3534-011-FD	01-Jul-07	5.69		
3534-014	01-Jul-07	28.6		
3534-018	02-Jul-07	2.53		
3534-019	02-Jul-07	2.72		
3534-016	02-Jul-07	2.79		
3534-017	02-Jul-07	3.83		
3534-015	02-Jul-07	5.18		
3575-005	18-Jul-07	3.6		
3575-001-FD	18-Jul-07	4		
3575-001	18-Jul-07	4.1		
3575-003	18-Jul-07	4.5		
3575-003-FD	18-Jul-07	4.6		
3575-002-FD	18-Jul-07	5.3		
3575-007	19-Jul-07	2.5		
3575-004-FD	19-Jul-07	3.3		
3575-006	19-Jul-07	3.8		
3575-009	19-Jul-07	3.9		
3575-004	19-Jul-07	4.3		
3575-008	19-Jul-07	5.4		
3575-010	20-Jul-07	6.5		
3575-011	20-Jul-07	6.8		
3575-012	21-Jul-07	3.1		
3575-013	21-Jul-07	7		
3575-014	24-Jul-07	4		
3575-015	24-Jul-07	5.6		
3575-015-FD	24-Jul-07	6.1		
3575-016-FD	25-Jul-07	7.1		
3575-017-FD	25-Jul-07	7.5		
3575-016	25-Jul-07	7.6		
3575-017	25-Jul-07	8.1		
3575-018	26-Jul-07	4.2		
3575-002	28-Jul-07	5.9		
3575-019	31-Jul-07	5.7		
3575-020	02-Aug-07	5.5		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3575-020-FD	02-Aug-07	5.7		
3628-017	03-Aug-07	1	U	
3575-021	03-Aug-07	3.9		
3575-023	05-Aug-07	3.7		
3575-023-FD	05-Aug-07	4.1		
3575-022	05-Aug-07	5.6		
3708-007	11-Sep-07	1	U	
3675-003	05-Oct-07	1.8		
3675-002	05-Oct-07	1.9		
3675-002-FD	05-Oct-07	1.9		
3675-005	06-Oct-07	1	U	
3675-004	06-Oct-07	3.2		
3675-006	08-Oct-07	1	U	
3675-006-FD	08-Oct-07	1	U	
3675-007	08-Oct-07	1	U	
3675-008	08-Oct-07	1	U	
3675-009	10-Oct-07	1	U	
3691-001	19-Oct-07	0.508	U	
3691-002	19-Oct-07	0.509	U	
3691-003	19-Oct-07	3.14		
3691-003-FD	19-Oct-07	4.17		
3691-006	20-Oct-07	0.501	U	
3691-007	20-Oct-07	0.507	U	
3691-004	20-Oct-07	0.508	U	
3691-005	20-Oct-07	0.508	U	
3691-005-FD	20-Oct-07	0.509	U	
3691-008	20-Oct-07	0.517	U	
3691-009	20-Oct-07	0.517	U	
3691-010	20-Oct-07	0.522	U	
3691-011	22-Oct-07	0.497	U	
3691-012	22-Oct-07	0.503	U	
3691-011-FD	22-Oct-07	0.508	U	
3691-013	22-Oct-07	0.509	U	
3708-001	29-Oct-07	1	U	
3708-001-FD	29-Oct-07	1	U	
3708-002	05-Nov-07	1	U	
3708-003	05-Nov-07	1	U	
3708-004	06-Nov-07	1		
3708-006	13-Nov-07	1	U	
3708-008	13-Nov-07	1	U	
3708-010	13-Nov-07	1.4		
3708-009	13-Nov-07	2.2		
3708-005	13-Nov-07	5.2		
3750-002	12-Jan-08	0.937	J	
3750-001	12-Jan-08	1.53	J	
3750-008	14-Jan-08	0.506	UJ	
3750-014	14-Jan-08	0.531	J	
3750-013	14-Jan-08	0.533	UJ	
3750-007	14-Jan-08	0.544	J	
3750-009	14-Jan-08	0.643	J	
3750-005	14-Jan-08	0.668	J	
3750-015	14-Jan-08	0.674	UJ	

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3750-006	14-Jan-08	0.719	J	
3750-003	14-Jan-08	0.746	J	
3750-004	14-Jan-08	0.956	J	
3750-012	14-Jan-08	1.16	J	
3750-011	14-Jan-08	1.28	J	
3750-010	14-Jan-08	4.18		
3750-024	17-Jan-08	0.507	UJ	
3750-019	17-Jan-08	1.36	J	
3750-025	17-Jan-08	1.71	J	
3750-022	17-Jan-08	2.31	J	
3750-021	17-Jan-08	3.4	J	
3750-026	17-Jan-08	4.26	J	
3449-001	NA	0.475	U	
3449-012	NA	0.481	U	
3449-001-FD	NA	0.504	U	
3449-008	NA	0.508	U	
3449-010	NA	0.529	U	
3449-005	NA	0.628	U	
3521-003-FD	NA	0.644	U	
3521-012	NA	0.653	J	
3521-003	NA	0.662	U	
3449-006	NA	0.779	U	
3521-016	NA	0.836	J	
3449-015	NA	0.886		
3656-008	NA	0.9	U	
3521-005	NA	0.938	J	
3521-013	NA	0.965	J	
3521-001	NA	1.01	J	
3521-004-FD	NA	1.04	J	
3449-013	NA	1.1		
3449-007	NA	1.11		
3521-001-FD	NA	1.14		
3521-002-FD	NA	1.19		
3521-008	NA	1.19		
3449-014	NA	1.2		
3521-002	NA	1.2		
3521-004	NA	1.25		
3521-005-FD	NA	1.26		
3521-009	NA	1.28		
3521-014	NA	1.29		
3521-007	NA	1.33		
3449-016	NA	1.35		
3449-017	NA	1.36		
3521-010	NA	1.41		
3449-016-FD	NA	1.43		
3521-017	NA	1.81	J	
3521-006	NA	1.96		
3422-003	NA	2.4		
3656-008-FD	NA	2.5		
3449-004	NA	2.6		
3449-003-FD	NA	2.71		
3449-003	NA	2.73		

Table 4-7
Analytical Results for Lead in Area-Wide Residential Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3449-002	NA	2.86		
3656-009	NA	2.9		
3422-005	NA	3.3		
3422-008	NA	3.3		
3656-001	NA	3.5		
3656-006	NA	3.5		
3521-018	NA	3.65	J	
3521-019	NA	3.69	J	
3656-006-FD	NA	3.7		
3449-002-FD	NA	3.78		
3449-011	NA	3.93		
3422-004	NA	4		
3656-011	NA	4		
3521-015	NA	4.17		
3656-010	NA	4.4		
3656-010-FD	NA	4.5		
3422-002	NA	4.8		
3656-002	NA	4.8		
3422-012	NA	5.3		
3422-006	NA	5.5		
3422-011	NA	5.8		
3656-003	NA	5.8		
3422-001	NA	6	J	
3422-010	NA	6.5		
3422-007	NA	6.8		
3656-007	NA	6.8		
3656-007-FD	NA	6.9		
3656-012	NA	8.1		
3521-011	NA	8.58		
3656-013	NA	8.7		
3422-009	NA	8.9		
3656-005	NA	10		
3656-014	NA	10.7		
3656-004-FD	NA	12.8		
3656-004	NA	13.4		

Notes:

U=not detected.

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-8
Analytical Results for Lead in Mine Waste Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Quad No.	Date Collected	Concentration - Lead (mg/kg)	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for Lead
4	S3	6/6/2005	206			X
3	S2	6/6/2005	982	X		X
2	S1	6/6/2005	1723	X	X	X
809	S3	6/7/2005	166			X
807	S1	6/7/2005	180			X
404	S1	6/7/2005	352			X
12	S3	6/7/2005	686	X		X
11	S2	6/7/2005	703	X		X
808	S2	6/7/2005	934	X		X
10	S1	6/7/2005	1136	X		X
15	S1	6/7/2005	2420	X	X	X
18	S4	6/7/2005	2518	X	X	X
17	S3	6/7/2005	3409	X	X	X
16	S2	6/7/2005	3832	X	X	X
408	S1	6/8/2005	26			
412	S3	6/8/2005	39			
410	S1	6/8/2005	50			
407	S2	6/8/2005	79			
415	S1	6/8/2005	93			
411	S2	6/8/2005	156			
417	S1	6/8/2005	171			X
406	S1	6/8/2005	234			X
424	S1	6/9/2005	881	X		X
421	S2	6/9/2005	971	X		X
422	S3	6/9/2005	1116	X		X
420	S1	6/9/2005	1251	X	X	X
425	S1	6/9/2005	1339	X	X	X
29	S2	6/10/2005	277			X
436	S3	6/10/2005	353			X
31	S1	6/10/2005	399			X
431	S3	6/10/2005	611	X		X
435	S2	6/10/2005	743	X		X
32	S2	6/10/2005	1176	X		X
28	S1	6/10/2005	1344	X	X	X
429	S1	6/10/2005	1488	X	X	X
434	S1	6/10/2005	1647	X	X	X
442	S1	6/13/2005	419	X		X
1618	S1	6/13/2005	428	X		X
39	S3	6/13/2005	631	X		X
45	S1	6/13/2005	658	X		X
38	S2	6/13/2005	670	X		X
1619	S2	6/13/2005	836	X		X
37	S1	6/13/2005	843	X		X
450	S1	6/13/2005	1021	X		X

Table 4-8
Analytical Results for Lead in Mine Waste Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Quad No.	Date Collected	Concentration - Lead (mg/kg)	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for Lead
1620	S3	6/13/2005	1091	X		X
43	S1	6/13/2005	1233	X	X	X
34	S1	6/13/2005	1242	X	X	X
445	S2	6/13/2005	1411	X	X	X
35	S2	6/13/2005	1898	X	X	X
446	S3	6/13/2005	2169	X	X	X
444	S1	6/13/2005	2308	X	X	X
451	S2	6/13/2005	2413	X	X	X
440	S1	6/13/2005	3129	X	X	X
1628	S2	6/14/2005	401	X		X
1624	S1	6/14/2005	657	X		X
462	S1	6/14/2005	734	X		X
48	S1	6/14/2005	752	X		X
467	S1	6/14/2005	764	X		X
464	S3	6/14/2005	871	X		X
1627	S1	6/14/2005	960	X		X
463	S2	6/14/2005	1108	X		X
1625	S2	6/14/2005	1190	X		X
54	S1	6/14/2005	1235	X	X	X
456	S1	6/14/2005	1287	X	X	X
52	S1	6/14/2005	1381	X	X	X
457	S2	6/14/2005	1764	X	X	X
61	S1	6/14/2005	1778	X	X	X
62	S2	6/14/2005	1925	X	X	X
50	S1	6/14/2005	2032	X	X	X
460	S1	6/14/2005	2754	X	X	X
1631	S2	6/15/2005	290			X
77	S1	6/15/2005	541	X		X
474	S1	6/15/2005	701	X		X
68	S1	6/15/2005	761	X		X
477	S1	6/15/2005	838	X		X
66	S2	6/15/2005	893	X		X
65	S1	6/15/2005	2889	X	X	X
1630	S1	6/15/2005	3042	X	X	X
85	S1	6/16/2005	64			
1638	S1	6/16/2005	119			
1639	S2	6/16/2005	120			
79	S1	6/16/2005	131			
88	S1	6/16/2005	145			
1641	S1	6/16/2005	472	X		X
482	S1	6/16/2005	596	X		X
89	S2	6/16/2005	738	X		X
1642	S2	6/16/2005	976	X		X
1635	S1	6/16/2005	2166	X	X	X

Table 4-8
Analytical Results for Lead in Mine Waste Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Quad No.	Date Collected	Concentration - Lead (mg/kg)	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for Lead
1669	S4	6/28/2005	555	X		X
563	S2	6/28/2005	667	X		X
1669	S7	6/28/2005	676	X		X
556	S1	6/28/2005	766	X		X
1669	S1	6/28/2005	797	X		X
1669	S3	6/28/2005	861	X		X
560	S5	6/28/2005	897	X		X
564	S3	6/28/2005	992	X		X
1669	S2	6/28/2005	1253	X	X	X
561	S6	6/28/2005	1329	X	X	X
562	S1	6/28/2005	1761	X	X	X
1669	S5	6/28/2005	3121	X	X	X
1685	S2	6/29/2005	225			X
1686	S3	6/29/2005	240			X
574	S3	6/29/2005	290			X
1679	S3	6/29/2005	431	X		X
571	S1	6/29/2005	662	X		X
1681	S5	6/29/2005	692	X		X
1684	S1	6/29/2005	743	X		X
1678	S2	6/29/2005	787	X		X
1680	S4	6/29/2005	791	X		X
573	S2	6/29/2005	823	X		X
572	S1	6/29/2005	925	X		X
855	S3	6/29/2005	1066	X		X
1677	S1	6/29/2005	1076	X		X
129	S1	6/29/2005	1084	X		X
130	S2	6/29/2005	1091	X		X
132	S4	6/29/2005	1286	X	X	X
1682	S6	6/29/2005	1287	X	X	X
137	S4	6/29/2005	1365	X	X	X
861	S1	6/29/2005	1463	X	X	X
853	S1	6/29/2005	1488	X	X	X
134	S1	6/29/2005	1555	X	X	X
862	S2	6/29/2005	1694	X	X	X
856	S4	6/29/2005	1991	X	X	X
135	S2	6/29/2005	2017	X	X	X
136	S3	6/29/2005	2187	X	X	X
854	S2	6/29/2005	3363	X	X	X
131	S3	6/29/2005	4120	X	X	X
870	S3	6/30/2005	75			
147	S2	6/30/2005	83			
148	S3	6/30/2005	85			
1696	S1	6/30/2005	98			
866	S4	6/30/2005	107			

Table 4-8
Analytical Results for Lead in Mine Waste Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Quad No.	Date Collected	Concentration - Lead (mg/kg)	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for Lead
1636	S2	6/16/2005	3518	X	X	X
493	S2	6/17/2005	462	X		X
490	S2	6/17/2005	511	X		X
93	S2	6/17/2005	628	X		X
94	S3	6/17/2005	648	X		X
92	S1	6/17/2005	784	X		X
489	S1	6/17/2005	1331	X	X	X
494	S3	6/17/2005	1465	X	X	X
492	S1	6/17/2005	2488	X	X	X
502	S1	6/20/2005	104			
504	S1	6/20/2005	111			
101	S1	6/20/2005	471	X		X
102	S2	6/20/2005	542	X		X
108	S1	6/20/2005	649	X		X
500	S1	6/20/2005	738	X		X
497	S1	6/20/2005	813	X		X
105	S1	6/20/2005	823	X		X
109	S2	6/20/2005	837	X		X
1644	S1	6/20/2005	984	X		X
1645	S2	6/20/2005	1302	X	X	X
498	S2	6/20/2005	1339	X	X	X
106	S2	6/20/2005	1725	X	X	X
118	S1	6/21/2005	287			X
1648	S1	6/21/2005	463	X		X
1650	S3	6/21/2005	668	X		X
1649	S2	6/21/2005	1392	X	X	X
1660	S2	6/22/2005	504	X		X
518	S1	6/22/2005	646	X		X
1659	S1	6/22/2005	995	X		X
520	S3	6/22/2005	1262	X	X	X
519	S2	6/22/2005	3021	X	X	X
521	S4	6/22/2005	3079	X	X	X
547	S1	6/24/2005	110			
840	S1	6/24/2005	2319	X	X	X
841	S1	6/24/2005	2961	X	X	X
552	S1	6/27/2005	623	X		X
553	S2	6/27/2005	1209	X	X	X
1672	S1	6/28/2005	107			
1676	S2	6/28/2005	152			
1675	S1	6/28/2005	247			X
1669	S6	6/28/2005	317			X
1673	S2	6/28/2005	383			X
559	S4	6/28/2005	418	X		X
557	S2	6/28/2005	447	X		X

Table 4-8
Analytical Results for Lead in Mine Waste Soil – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Quad No.	Date Collected	Concentration - Lead (mg/kg)	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for Lead
1703	S1	6/30/2005	123			
139	S6	6/30/2005	144			
1692	S1	6/30/2005	174			X
1698	S1	6/30/2005	176			X
140	S7	6/30/2005	185			X
1697	S1	6/30/2005	202			X
869	S2	6/30/2005	208			X
149	S4	6/30/2005	221			X
1697	S2	6/30/2005	227			X
871	S4	6/30/2005	263			X
141	S8	6/30/2005	353			X
872	S5	6/30/2005	410	X		X
1701	S1	6/30/2005	510	X		X
143	S10	6/30/2005	513	X		X
142	S9	6/30/2005	533	X		X
1702	S1	6/30/2005	624	X		X
1700	S1	6/30/2005	636	X		X
1693	S3	6/30/2005	637	X		X
1695	S1	6/30/2005	793	X		X
865	S3	6/30/2005	831	X		X
1694	S3	6/30/2005	886	X		X
146	S1	6/30/2005	978	X		X
1699	S1	6/30/2005	1003	X		X
144	S11	6/30/2005	1008	X		X
868	S1	6/30/2005	1039	X		X
1694	S1	6/30/2005	1058	X		X
1694	S2	6/30/2005	1079	X		X
1693	S1	6/30/2005	1091	X		X
1693	S2	6/30/2005	1184	X		X
863	S1	6/30/2005	1267	X	X	X
864	S2	6/30/2005	2398	X	X	X
138	S5	6/30/2005	4215	X	X	X
154	S9	7/1/2005	60			
156	S11	7/1/2005	691	X		X
153	S8	7/1/2005	885	X		X
155	S10	7/1/2005	1085	X		X
20154.2	S-2	8/6/2005	834	X		X
20154.3	S-3	8/8/2005	1103	X		X
20154.1	S-1	8/8/2005	1447	X	X	X

Table 4-9
Analytical Results for Lead in Wipe Samples – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	B&V Sample No.	Composite Description	Date Collected	Lead Concentration (ug/cm2)	Q	Site
204	20758	IWGPLZZ-20758	Living Room	07/16/2008	0.005	U	Potosi
205		ZWGPLZZ-20758	Kitchen	07/16/2008	0.005	U	
206		JWGPLZZ-20758	Bedroom	07/16/2008	0.005	U	
210	8	IWGPLZZ-8	Family Room	07/18/2008	0.005	U	Potosi
211		ZWGPLZZ-8	Kitchen	07/18/2008	0.005	U	
212		JWGPLZZ-8	Bedroom	07/18/2008	0.005	U	
213	23575	IWGPLZZ-23575	Living Room	07/22/2008	0.005	U	Potosi
214		ZWGPLZZ-23575	Kitchen	07/22/2008	0.005	U	
215		JWGPLZZ-23575	Bedroom	07/22/2008	0.005	U	
219	5007	IWGPLZZ-5007	Family Room	07/23/2008	0.011		Potosi
220		ZWGPLZZ-5007	Living Room	07/23/2008	0.006		
221		JWGPLZZ-5007	Bedroom	07/23/2008	0.011		
222	20437	IWGPLZZ-20437	Living Room	07/24/2008	0.005	U	Potosi
223		ZWGPLZZ-20437	Kitchen	07/24/2008	0.005	U	
224		JWGPLZZ-20437	Bedroom	07/24/2008	0.005	U	
225	23378	IWGPLZZ-23378	Living Room	07/25/2008	0.01		Potosi
226		ZWGPLZZ-23378	Kitchen	07/25/2008	0.005	U	
227		JWGPLZZ-23378	Bedroom	07/25/2008	0.005	U	
234	1653	IWGPLZZ-1653	Living Room	07/24/2008	0.005	U	Potosi
235		ZWGPLZZ-1653	Kitchen	07/24/2008	0.005	U	
236		JWGPLZZ-1653	Bedroom	07/24/2008	0.005	U	
237	20767	IWGPLZZ-20767	Living Room	07/29/2008	0.005	U	Potosi
238		ZWGPLZZ-20767	Kitchen	07/29/2008	0.005	U	
239		JWGPLZZ-20767	Bedroom	07/29/2008	0.005	U	
240	20918	IWGPLZZ-20918	Living Room	07/30/2008	0.005	U	Potosi
241		ZWGPLZZ-20918	Kitchen	07/30/2008	0.011		
242		JWGPLZZ-20918	Bedroom	07/30/2008	0.007		
252	5003	IWGPLZZ-5003	Living Room	08/07/2008	0.014		Potosi
253		HWGPLZZ-5003	Dining Room	08/07/2008	0.008		
254		ZWGPLZZ-5003	Kitchen	08/07/2008	0.005	U	
264	438	IWGPLZZ-438	Living Room	08/12/2008	0.045		Potosi
265		ZWGPLZZ-438	Kitchen	08/12/2008	0.06		

Table 4-9
Analytical Results for Lead in Wipe Samples – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	B&V Sample No.	Composite Description	Date Collected	Lead Concentration (ug/cm2)	Q	Site
266		JWGPLZZ-438	Bedroom	08/12/2008	0.188		
267	1612	IWGPLZZ-1612	Living Room	08/11/2008	0.035		Potosi
268		ZWGPLZZ-1612	Kitchen	08/11/2008	0.01		
269		JWGPLZZ-1612	Bedroom	08/11/2008	0.008		
282	486	IWGPLZZ-486	Living Room	08/13/2008	0.005	U	Potosi
283		ZWGPLZZ-486	Kitchen	08/13/2008	0.005	U	
284		JWGPLZZ-486	Bedroom	08/13/2008	0.005	U	
288	5008	IWGPLZZ-5008	Living Room	08/19/2008	0.005	U	Potosi
289		ZWGPLZZ-5008	Kitchen	08/19/2008	0.005	U	
290		JWGPLZZ-5008	Bedroom	08/19/2008	0.005	U	
291	20331	IWGPLZZ-20331	Living Room	08/15/2008	0.009		Potosi
292		ZWGPLZZ-20331	Kitchen	08/15/2008	0.005	U	
293		JWGPLZZ-20331	Bedroom	08/15/2008	0.005	U	
297	5013	IWGPLZZ-5013	Living Room	08/20/2008	0.005	U	Potosi
298		ZWGPLZZ-5013	Kitchen	08/20/2008	0.005	U	
299		JWGPLZZ-5013	Bedroom	08/20/2008	0.005	U	
300	20349	IWGPLZZ-20349	Living Room	08/20/2008	0.005	U	Potosi
301		ZWGPLZZ-20349	Kitchen	08/20/2008	0.011	U	
302		JWGPLZZ-20349	Bedroom	08/20/2008	0.005	U	
309	20428	IWGPLZZ-20428	Living Room	08/22/2008	0.005	U	Potosi
310		ZWGPLZZ-20428	Kitchen	08/22/2008	0.005	U	
311		JWGPLZZ-20428	Bedroom	08/22/2008	0.005	U	
324	20397	ZWGPLZZ-20397	Kitchen	08/25/2008	0.005	U	Potosi
325		IWGPLZZ-20397	Living Room	08/25/2008	0.005	U	
326		JWGPLZZ-20397	Bedroom	08/25/2008	0.005	U	
333	1643	IWGPLZZ-1643	Living Room	08/27/2008	0.005	U	Potosi
334		ZWGPLZZ-1643	Kitchen	08/27/2008	0.005	U	
335		JWGPLZZ-1643	Bedroom	08/27/2008	0.005	U	

Notes:
U=not detected
J=Analyte present. Reported value may be estimated.

Minimum Concentration: ND
Maximum Concentration: 0.188

Table 4-10
Analytical Results for Lead in Vacuum Samples – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	BV Sample No.	Composite Sample Description	Date Collected	Lead Concentration (mg/kg)	Q	Site
104	8	MDCPLZZ-8	Family room, kitchen and bedroom floors	07/18/2008	79.1		Potosi
122	438	MDCPLZZ-438	Living room, kitchen and bedroom floors	08/12/2008	15		Potosi
128	486	MDCPLZZ-486	Living room, kitchen and bedroom floors	08/13/2008	65.2		Potosi
102	510	MDCPLZZ-510	Living room, kitchen and bedroom floors	07/15/2008	20.8		Potosi
123	1612	MDCPLZZ-1612	Living room, kitchen and bedroom floors	08/11/2008	64		Potosi
145	1643	MDCPLZZ-1643	Living room, kitchen and bedroom floors	08/27/2008	134		Potosi
111	1653	MDCPLZXZ-1653	Living room, kitchen and bedroom floors	07/24/2008	13.2		Potosi
118	5003	MDCPLZZ-5003	Dining room, living room, and kitchen floors	08/07/2008	126		Potosi
107	5007	LDCPLZZ-5007	Living room, kitchen and bedroom floors	07/23/2008	336		Potosi
130	5008	MDCPLZZ-5008	Living room, family room, and kitchen floors	08/19/2008	230		Potosi
133	5013	MDCPLZZ-5013	Living room, kitchen and bedroom floors	08/20/2008	22.6		Potosi
131	20331	MDCPLZZ-20331	Living room, kitchen and bedroom floors	08/15/2008	20.4		Potosi
134	20349	MDCPLZZ-20349	Living room, kitchen and bedroom floors	08/20/2008	25.1		Potosi
142	20397	MDCPLZZ-20397	Living room, kitchen and bedroom floors	08/25/2008	21	J	Potosi
137	20428	MDCPLZZ-20428	Living room, kitchen and bedroom floors	08/22/2008	110		Potosi
108	20437	MDCPLZZ-20437	Family room, living room and bedroom floors	07/25/2008	58.5		Potosi
101	20758	MDCPLZZ-20758	Dining room, living room, and bedroom floors	07/16/2008	64.9		Potosi
113	20767	MDCPLZZ-20767	Living room, kitchen and bedroom floors	07/29/2008	113		Potosi
114	20918	MDCPLZZ-20918	Living room, kitchen and bedroom floors	07/30/2008	578		Potosi
103	23264	MDCPLZZ-23264	Living room, kitchen and bedroom floors	07/21/2008	53.5		Potosi
109	23378	MDCPLZZ-23378	Living room, kitchen and bedroom floors	07/25/2008	581		Potosi
105	23575	ZDCPLZZ-23575	Living room, kitchen and bedroom floors	07/22/2008	138		Potosi
				Minimum Concentration	13.2		
				Maximum Concentration	581		

Notes:

J=Analyte present. Reported value may be estimated.

Table 4-11
Analytical Results for Lead in Paint Surfaces – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Property	Site	Component	Substrate	Side	Condition	Color	Floor	Room	Lead Concentration (mg/cm²)	Result
438	Potosi	WALL	WOOD	A	FAIR	RED	FIRST	OUTSIDE	0	Negative
		COLUMN	WOOD	A	INTACT	WHITE	FIRST	OUTSIDE	0	Negative
		WALL	MINIBLIND	B	INTACT	WHITE	FIRST	KITCHEN	0.05	Negative
		WALL	DRYWALL	B	INTACT	WHITE	SECOND	BEDROOM	0.05	Negative
1612	Potosi	WALL	DRYWALL	B	INTACT	WHITE	FIRST	BATHROOM	0.03	Negative
		CEILING	WOOD	C	INTACT	WHITE	FIRST	OUTSIDE	0.05	Negative
		WALL	DRYWALL	C	INTACT	WHITE	FIRST	LIVING ROOM	0.05	Negative
		WALL	WOOD	A	INTACT	WHITE	FIRST	OUTSIDE	0.14	Negative
5007	Potosi	WALL	CONCRETE	D	FAIR	TAN	FIRST	OUTSIDE	0	Negative
		WALL	PLASTER	A	FAIR	WHITE	FIRST	KITCHEN	0	Negative
		WALL	PLASTER	A	FAIR	WHITE	FIRST	BATHROOM	0	Negative
		CABINET	WOOD	A	CHALKING	WHITE	FIRST	OUTSIDE	2.25	Positive
20437	Potosi	WINDOW	DRYWALL	A	INTACT	GREEN	FIRST	LIVING ROOM	0	Negative
		CABINET	DRYWALL	C	INTACT	GREEN	FIRST	LIVING ROOM	0.04	Negative
		WALL	WOOD	A	CRACKED	WHITE	FIRST	OUTSIDE	0.05	Negative
		DOOR	WOOD	B	CRACKED	WHITE	FIRST	OUTSIDE	0.12	Negative
20918	Potosi	WALL	PLASTER	A	INTACT	WHITE	FIRST	OFFICE	0	Negative
		WALL	PLASTER	A	INTACT	WHITE	FIRST	KITCHEN	0	Negative
		WALL	WOOD	A	INTACT	BEIGE	FIRST	OFFICE	0.02	Negative
		WINDOW	WOOD	D	POOR	WHITE	FIRST	OFFICE	5.25	Positive
23264	Potosi	DOOR	WOOD	B	INTACT	WHITE	FIRST	HALL	0	Negative
		WALL	WOOD	A	INTACT	WHITE	FIRST	HALL	0.04	Negative
		WINDOW	WOOD	B	PEELING	WHITE	FIRST	OUTSIDE	0.11	Negative
		WALL	WOOD	A	FAIR		FIRST	OUTSIDE	1.66	Positive

Table 4-11
Analytical Results for Lead in Paint Surfaces – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Property	Site	Component	Substrate	Side	Condition	Color	Floor	Room	Lead Concentration (mg/cm^2)	Result
23567	Potosi	WALL	PLASTER	A	INTACT	TAN	FIRST	LIVING ROOM	0	Negative
		WALL	DRYWALL	C	INTACT	WHITE	FIRST	KITCHEN	0	Negative
		WALL	WOOD	A	INTACT	TAN	SECOND	OUTSIDE	0.03	Negative
		WINDOW	WOOD	B	INTACT	WHITE	FIRST	OUTSIDE	1.78	Positive
23715	Potosi	WALL	PLASTER	A	INTACT	BLUE	FIRST	BATHROOM	0.01	Negative
		WALL	PLASTER	A	INTACT	WHITE	FIRST	LIVING ROOM	0.1	Negative
		WINDOW	WOOD	B	INTACT	WHITE	FIRST	OUTSIDE	4.6	Positive
40045	Potosi	WALL	WOOD	A	FAIR	WHITE	FIRST	BATHROOM	0.05	Negative
		WALL	WOOD	A	FAIR	WHITE	FIRST	LIVING ROOM	0.06	Negative
		WALL	WOOD	A	FAIR	WHITE	FIRST	OUTSIDE	0.1	Negative
		WINDOW	WOOD	A	FAIR	BLUE	FIRST	OUTSIDE	2.59	Positive

Table 4-12
Analytical Results for Lead in Potable (Residential) Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	BV Sample No.	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)	Site
8	ZPGPLZZ-8	7/18/2008	1.2		Potosi
438	ZPGPLZZ-438	8/12/2008	1.0		Potosi
1612	ZPGGPLZZ-1612	8/11/2008	1.0		Potosi
1653	ZPGPLZZ-1653	7/28/2008	28	X	Potosi
5007	ZPGPLZZ-5007	7/23/2008	2.2		Potosi
20437	ZPGPLZZ-20437	7/24/2008	6.8		Potosi
20767	ZPGPLZZ-20767	8/7/2008	1.0		Potosi
23264	ZPGPLZZ-23264	7/21/2008	5.7		Potosi
23378	ZPGPLZZ-23378	7/25/2008	1.0		Potosi
23575	ZPGPLZZ-23575	7/22/2008	12.0	X	Potosi

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
0503999	21-May-05	1	
0504000	21-May-05	34.6	X
0504791	24-May-05	3.57	
0503843	06-Jun-05	1	
0503906	06-Jun-05	1	
0503953	06-Jun-05	1	
0503905	06-Jun-05	1.23	
0503904	06-Jun-05	17.1	X
0503903	06-Jun-05	27.2	X
0503846	07-Jun-05	1	
0503847	07-Jun-05	1	
0503848	07-Jun-05	1	
0503954	07-Jun-05	1	
0503845	07-Jun-05	1.49	
0503844	07-Jun-05	7.56	
0503907	07-Jun-05	27.6	X
0503956	08-Jun-05	1	
0503958	08-Jun-05	1	
0503959	08-Jun-05	1	
0503955	08-Jun-05	1.1	
0503862	08-Jun-05	2.49	
0503957	08-Jun-05	14.6	
0503853	09-Jun-05	1	
0503960	09-Jun-05	4.48	
0503983	09-Jun-05	7.32	
0503961	09-Jun-05	20.1	X
0503964	10-Jun-05	1	
0503982	10-Jun-05	1	
0503962	10-Jun-05	1.24	
0503908	10-Jun-05	2.76	
0503909	10-Jun-05	5.84	
0503963	10-Jun-05	28.2	X
0503918	13-Jun-05	1	
0503920	13-Jun-05	1	
0503925	13-Jun-05	1.46	
0503910	13-Jun-05	1.5	
0503924	13-Jun-05	3.45	
0503919	13-Jun-05	4.5	
0503922	13-Jun-05	16.5	X
0503923	13-Jun-05	16.9	X
0503968	13-Jun-05	24.2	X
0503967	13-Jun-05	34.9	X
0503966	13-Jun-05	38.9	X
0503921	13-Jun-05	39.3	X
0503965	13-Jun-05	43.5	X
0503911	14-Jun-05	1	
0503928	14-Jun-05	1	
0503933	14-Jun-05	1	
0503934	14-Jun-05	1	
0503970	14-Jun-05	1	
0503984	14-Jun-05	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
0503932	14-Jun-05	1.16	
0503926	14-Jun-05	1.92	
0503912	14-Jun-05	2	
0503931	14-Jun-05	2.03	
0503927	14-Jun-05	2.63	
0503972	14-Jun-05	2.71	
0503973	14-Jun-05	2.81	
0503935	14-Jun-05	6.32	
0503969	14-Jun-05	10.7	
0503930	14-Jun-05	11.3	
0503929	14-Jun-05	12.1	
0504002	14-Jun-05	14.7	
0503971	14-Jun-05	19	X
0503981	14-Jun-05	21.7	X
0503976	15-Jun-05	1.02	
0503914	15-Jun-05	1.77	
0503915	15-Jun-05	2.3	
0503937	15-Jun-05	8.41	
0503849	15-Jun-05	12.3	
0503975	15-Jun-05	12.7	
0503913	15-Jun-05	13	
0503941	15-Jun-05	13.1	
0503974	15-Jun-05	16.4	X
0503940	15-Jun-05	21.1	X
0503936	15-Jun-05	25.7	X
0503985	15-Jun-05	44.3	X
0503947	16-Jun-05	1	
0503994	16-Jun-05	1	
0503944	16-Jun-05	1.24	
0503945	16-Jun-05	1.33	
0503946	16-Jun-05	1.43	
0503943	16-Jun-05	1.87	
0503995	16-Jun-05	2.01	
0503851	16-Jun-05	2.61	
0503917	16-Jun-05	3.29	
0503948	16-Jun-05	3.61	
0503951	16-Jun-05	3.88	
0503986	16-Jun-05	4.19	
0503987	16-Jun-05	5.13	
0503850	16-Jun-05	7.74	
0503942	16-Jun-05	8.45	
0503977	16-Jun-05	13.7	
0503949	16-Jun-05	16.5	X
0503950	16-Jun-05	30.5	X
0503916	16-Jun-05	44.5	X
0503978	17-Jun-05	1.7	
0503979	17-Jun-05	6.81	
0503980	17-Jun-05	25.9	X
0503855	20-Jun-05	1	
0503858	20-Jun-05	1	
0503861	20-Jun-05	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
0504773	20-Jun-05	1	
0503952	20-Jun-05	2.11	
0503854	20-Jun-05	3.26	
0504772	20-Jun-05	5.43	
0503996	20-Jun-05	5.92	
0503990	20-Jun-05	6.08	
0503989	20-Jun-05	6.29	
0504770	20-Jun-05	7.96	
0504771	20-Jun-05	8.52	
0503997	20-Jun-05	40.3	X
0503859	21-Jun-05	1	
0504001	21-Jun-05	1.07	
0504774	21-Jun-05	1.2	
0504778	21-Jun-05	4.34	
0504775	21-Jun-05	6.83	
0503860	21-Jun-05	9.32	
0504779	21-Jun-05	26.8	X
0504777	21-Jun-05	41.4	X
0504776	21-Jun-05	50.3	X
0503856	22-Jun-05	1	
0503991	22-Jun-05	1	
0504781	22-Jun-05	1	
0504782	22-Jun-05	1	
0504793	22-Jun-05	1	
0504792	22-Jun-05	1.16	
0504784	22-Jun-05	1.65	
0504783	22-Jun-05	4.6	
0504794	22-Jun-05	6.62	
0504785	22-Jun-05	15.1	X
0503863	22-Jun-05	25.4	X
0504780	22-Jun-05	43.7	X
0503992	22-Jun-05	46.6	X
0503993	22-Jun-05	48.6	X
0503857	22-Jun-05	49.7	X
0504786	23-Jun-05	1	
0504788	23-Jun-05	1	
0504789	23-Jun-05	1	
0504796	23-Jun-05	1.3	
0503864	23-Jun-05	2.17	
0504795	23-Jun-05	24	X
0504787	23-Jun-05	58.8	X
0504803	24-Jun-05	1.22	
0503865	24-Jun-05	1.4	
0504800	24-Jun-05	1.62	
0504798	24-Jun-05	1.71	
0503866	24-Jun-05	3.25	
0504804	24-Jun-05	5.43	
0503867	24-Jun-05	6.99	
0504032	27-Jun-05	1	
0504037	27-Jun-05	1	
0504801	27-Jun-05	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
0504802	27-Jun-05	3.6	
0504799	27-Jun-05	3.98	
0504797	27-Jun-05	10.2	
0503869	28-Jun-05	1.75	
0503870	28-Jun-05	1.8	
0504041	28-Jun-05	2.62	
0504034	28-Jun-05	4.02	
0504033	28-Jun-05	24.6	X
0503868	28-Jun-05	92.8	X
0503883	29-Jun-05	1	
0504035	29-Jun-05	1	
0504036	29-Jun-05	1	
0503882	29-Jun-05	1.94	
0504038	29-Jun-05	5.46	
0504805	01-Jul-05	1	
0504858	01-Jul-05	4.56	
2730-103	17-Aug-05	10	
2774-145	15-Sep-05	2.58	
2774-144	15-Sep-05	3.35	
0504644	19-Sep-05	1	
0504645	19-Sep-05	1	
0504646	20-Sep-05	1	
0505127	20-Sep-05	2.42	
0504647	20-Sep-05	4.55	
0505126	20-Sep-05	27	X
0504809	22-Sep-05	2.33	
0504810	22-Sep-05	15.4	X
2801-104	06-Oct-05	1	
2801-104-	06-Oct-05	1	
2801-105	06-Oct-05	1	
2801-204	06-Oct-05	1	
2801-204-	06-Oct-05	1	
2801-240	06-Oct-05	1	
2801-230	06-Oct-05	1	
2801-231	06-Oct-05	1	
2801-242	06-Oct-05	1	
2801-246	06-Oct-05	1.3	
2801-239	06-Oct-05	1.36	
2801-237	06-Oct-05	1.58	
2801-243	06-Oct-05	2.02	
2801-113	07-Oct-05	1	
2801-228	07-Oct-05	1	
2801-234	07-Oct-05	1	
2801-247	07-Oct-05	1	
2801-249	07-Oct-05	1	
2801-235	07-Oct-05	1.49	
2801-248	07-Oct-05	4.01	
2801-256	07-Oct-05	5.92	
2801-120	07-Oct-05	12.8	
2801-114	10-Oct-05	1	
2801-118	10-Oct-05	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2801-233	10-Oct-05	1	
2801-241	10-Oct-05	1	
2801-252	10-Oct-05	1	
2801-109	10-Oct-05	1.11	
2801-254	10-Oct-05	1.49	
2801-253	10-Oct-05	2.24	
2801-236	10-Oct-05	3.37	
2801-232	10-Oct-05	4.91	
2801-201-	10-Oct-05	6.32	
2801-101	10-Oct-05	6.4	
2801-101-	10-Oct-05	6.54	
2801-201	10-Oct-05	6.54	
2801-245	10-Oct-05	6.72	
2801-251	10-Oct-05	7.1	
2801-110	10-Oct-05	8.17	
2801-250	10-Oct-05	8.23	
2801-255	10-Oct-05	8.89	
2801-238	10-Oct-05	9.51	
2801-119	11-Oct-05	1	
2801-207	11-Oct-05	1	
2801-117	11-Oct-05	17.3	X
2801-220	11-Oct-05	17.5	X
2801-213	11-Oct-05	19	X
2801-108	11-Oct-05	21.5	X
2801-111	11-Oct-05	22.1	X
2823-113	11-Oct-05	23	X
2801-211	11-Oct-05	24.1	X
2801-112	12-Oct-05	1	
2801-205	12-Oct-05	1	
2801-219	12-Oct-05	1	
2801-221	12-Oct-05	1	
2801-222	12-Oct-05	1	
2801-206	12-Oct-05	1.04	
2801-244	12-Oct-05	1.66	
2801-102	12-Oct-05	1.85	
2801-102-	12-Oct-05	2.5	
2801-106	12-Oct-05	2.53	
2801-223	12-Oct-05	2.86	
2801-116	12-Oct-05	5.7	
2801-218	12-Oct-05	6.89	
2801-203-	12-Oct-05	7.9	
2801-203	12-Oct-05	12.6	
2801-216	12-Oct-05	14.8	
2801-209	12-Oct-05	17.2	X
2801-224	12-Oct-05	18.6	X
2801-115	12-Oct-05	18.8	X
2801-229	12-Oct-05	18.8	X
2801-217	12-Oct-05	22.2	X
2801-208	12-Oct-05	24.7	X
2801-226	12-Oct-05	36.8	X
2801-103-	12-Oct-05	46.7	X

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2801-202-	12-Oct-05	47	X
2801-103	12-Oct-05	47.2	X
2801-212	12-Oct-05	47.2	X
2801-202	12-Oct-05	48.3	X
2801-210	12-Oct-05	58.8	X
2801-107	13-Oct-05	1	
2801-214	13-Oct-05	1	
2801-215	13-Oct-05	1	
2801-227	13-Oct-05	8.18	
0504653	18-Oct-05	1	
0504654	18-Oct-05	1	
0504657	18-Oct-05	1	
0504658	18-Oct-05	1	
0504660	18-Oct-05	1	
0504659	18-Oct-05	1.71	
0504656	18-Oct-05	10.9	
0504655	18-Oct-05	11.5	
2801-122	20-Oct-05	1.33	
2823-115	20-Oct-05	1.92	
2823-114	20-Oct-05	3.5	
2823-122	20-Oct-05	3.82	
2823-120	20-Oct-05	6.06	
2801-269	20-Oct-05	6.07	
2801-123	20-Oct-05	8.65	
2823-119	20-Oct-05	9.14	
2823-123	20-Oct-05	11.9	
2801-272	20-Oct-05	12.6	
2823-109	20-Oct-05	15.9	X
2801-268	20-Oct-05	16.4	X
2801-271	20-Oct-05	16.9	X
2801-121	20-Oct-05	20.9	X
2823-118	20-Oct-05	22	X
2823-117	20-Oct-05	31.3	X
2823-116	20-Oct-05	38.2	X
2801-270	20-Oct-05	43	X
2823-121	21-Oct-05	1	
2823-112	21-Oct-05	2.98	
2823-107	21-Oct-05	3.11	
2823-106	21-Oct-05	3.97	
2823-110	21-Oct-05	5.59	
2823-108	21-Oct-05	6.83	
2823-201	21-Oct-05	9.4	
2823-111	21-Oct-05	11.8	
2823-202	21-Oct-05	174	X
2801-261	22-Oct-05	1.57	
2801-263	22-Oct-05	2.77	
2801-262	22-Oct-05	8.84	
2801-267	22-Oct-05	28	X
2801-264	22-Oct-05	37.7	X
2801-266	22-Oct-05	39.5	X
2801-265	22-Oct-05	57.6	X

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2823-203	24-Oct-05	1	
2823-102	24-Oct-05	1.91	
2823-105	24-Oct-05	3.2	
2823-103	24-Oct-05	3.57	
2823-101	24-Oct-05	21.5	X
2823-104	24-Oct-05	30.9	X
2823-128	25-Oct-05	1	
2823-129	25-Oct-05	1	
2823-131	25-Oct-05	1	
2823-132	25-Oct-05	1	
2823-204	25-Oct-05	1	
2823-205	25-Oct-05	1	
2823-207	25-Oct-05	1.33	
2823-134	25-Oct-05	1.73	
2823-208	25-Oct-05	3.08	
2823-125	25-Oct-05	3.49	
2823-126	25-Oct-05	8.67	
2823-130	25-Oct-05	12.1	
2823-206	25-Oct-05	12.1	
2823-127	25-Oct-05	13	
2823-124	25-Oct-05	15.4	X
2823-133	25-Oct-05	21.2	X
2823-137	25-Oct-05	26.8	X
2823-143	26-Oct-05	1	
2823-146	26-Oct-05	1	
2823-209	26-Oct-05	1.34	
2823-139	26-Oct-05	2.05	
2823-145	26-Oct-05	4.22	
2823-210	26-Oct-05	5.75	
2823-136	26-Oct-05	6.97	
2823-142	26-Oct-05	8.06	
2823-140	26-Oct-05	21.7	X
2823-144	26-Oct-05	34.6	X
2823-141	26-Oct-05	35.7	X
2823-138	26-Oct-05	44.2	X
2823-135	27-Oct-05	1	
2832-101	03-Nov-05	1	
2832-102	03-Nov-05	1	
2832-103	03-Nov-05	1	
2832-106	03-Nov-05	1	
2832-107	03-Nov-05	1.06	
2832-108	03-Nov-05	1.15	
2832-105	03-Nov-05	1.21	
2832-109	03-Nov-05	22.5	X
2832-104	08-Nov-05	1	
2832-124	16-Nov-05	1	
2832-121	16-Nov-05	1.32	
2832-114	16-Nov-05	1.93	
2832-123	16-Nov-05	2.5	
2832-118	16-Nov-05	2.63	
2832-111	16-Nov-05	3.13	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2832-117	16-Nov-05	5.16	
2832-122	16-Nov-05	5.52	
2832-113	16-Nov-05	6.18	
2832-115	16-Nov-05	6.8	
2832-116	16-Nov-05	10.2	
2832-112	16-Nov-05	11.8	
2832-120	16-Nov-05	21.5	X
2832-119	16-Nov-05	21.8	X
2832-131	17-Nov-05	1	
2832-136	17-Nov-05	9.9	
2832-132	18-Nov-05	1	
2832-133	18-Nov-05	1	
2832-134	18-Nov-05	1	
2832-139	18-Nov-05	1	
2832-125	18-Nov-05	1.05	
2832-126	18-Nov-05	1.25	
2832-127	18-Nov-05	1.52	
2832-135	18-Nov-05	2	
2832-128	18-Nov-05	2.07	
2832-137	18-Nov-05	2.3	
2832-129	18-Nov-05	2.76	
2832-130	18-Nov-05	13.5	
2832-143	19-Nov-05	1.2	
2832-145	19-Nov-05	2	
2832-146	19-Nov-05	2.2	
2832-144	19-Nov-05	2.6	
2832-141	19-Nov-05	3.5	
2832-142	19-Nov-05	6.4	
2832-140	19-Nov-05	19.5	X
2832-151	21-Nov-05	1	
2832-153	21-Nov-05	1	
2832-148	21-Nov-05	1.02	
2832-149	21-Nov-05	1.79	
2832-147	21-Nov-05	1.87	
2832-154	21-Nov-05	2.19	
2832-152	21-Nov-05	3.93	
2832-150	21-Nov-05	7.43	
2832-156	21-Nov-05	7.54	
2832-155	21-Nov-05	9.15	
2832-160	22-Nov-05	1	
2832-164	22-Nov-05	1	
2882-162	22-Nov-05	1	
2832-163	22-Nov-05	1.87	
2832-162	22-Nov-05	11.2	
2832-161	22-Nov-05	14.3	
2832-166	22-Nov-05	18.3	X
2863-101	29-Nov-05	1	
2863-112	29-Nov-05	1	
2863-125	29-Nov-05	1	
2863-122	29-Nov-05	1.01	
2863-123	29-Nov-05	1.5	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2863-110	29-Nov-05	4.58	
2863-102	29-Nov-05	13.9	
2863-124	01-Dec-05	1.27	
2863-119	01-Dec-05	2.12	
2863-113	01-Dec-05	3.34	
2863-115	01-Dec-05	7.82	
2863-114	01-Dec-05	10.2	
2863-111	01-Dec-05	39	X
2863-116	01-Dec-05	50.2	X
2863-104	02-Dec-05	1	
2863-109	02-Dec-05	1	
2863-120	02-Dec-05	1	
2863-106	02-Dec-05	1.07	
2863-121	02-Dec-05	1.32	
2863-105	02-Dec-05	1.35	
2863-107	02-Dec-05	1.92	
2863-103	02-Dec-05	5.07	
2863-108	03-Dec-05	1	
2863-131	03-Dec-05	1	
2863-135	03-Dec-05	1.09	
2863-137	03-Dec-05	18.9	X
2863-117	05-Dec-05	1	
2863-118	05-Dec-05	1	
2863-130	05-Dec-05	1	
2863-136	05-Dec-05	1	
2863-138	05-Dec-05	1	
2863-133	05-Dec-05	1.52	
2863-140	05-Dec-05	1.8	
2863-129	05-Dec-05	2.99	
2863-128	05-Dec-05	3.8	
2863-126	05-Dec-05	6.69	
2863-127	05-Dec-05	10.3	
2863-132	05-Dec-05	10.8	
2863-134	05-Dec-05	41.3	X
2863-139	05-Dec-05	41.8	X
2863-141	06-Dec-05	1	
2863-143	06-Dec-05	1	
2863-144	06-Dec-05	1	
2863-145	06-Dec-05	1	
2863-148	06-Dec-05	1	
2863-149	06-Dec-05	1	
2863-151	06-Dec-05	1	
2863-154	06-Dec-05	1	
2863-153	06-Dec-05	2.09	
2863-142	06-Dec-05	2.21	
2863-152	06-Dec-05	2.26	
2863-146	06-Dec-05	6.54	
2863-150	06-Dec-05	45.9	X
2863-155	06-Dec-05	73.7	X
2863-163	07-Dec-05	1	
2863-164	07-Dec-05	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2863-167	07-Dec-05	1	
2863-169	07-Dec-05	1	
2863-159	07-Dec-05	1.03	
2863-156	07-Dec-05	2.7	
2863-166	07-Dec-05	2.92	
2863-162	07-Dec-05	3.8	
2863-161	07-Dec-05	3.89	
2863-168	07-Dec-05	4.15	
2863-165	07-Dec-05	13.8	
2863-158	07-Dec-05	41.3	X
2863-157	07-Dec-05	83.9	X
2873-115	08-Dec-05	13.5	
2873-118	14-Dec-05	5.28	
2873-103	14-Dec-05	110	X
2873-112	15-Dec-05	1	
2873-114	15-Dec-05	1	
2873-106	15-Dec-05	1.25	
2873-120	15-Dec-05	1.46	
2873-121	15-Dec-05	2.58	
2873-104	15-Dec-05	4.62	
2873-102	16-Dec-05	1	
2873-122	16-Dec-05	1	
2873-105	16-Dec-05	3.8	
2873-108	16-Dec-05	4.37	
2873-113	16-Dec-05	6.77	
2873-119	16-Dec-05	7.08	
2873-101	16-Dec-05	13.6	
2873-107	16-Dec-05	34.5	X
2873-123	17-Dec-05	1	
2873-128	17-Dec-05	2.32	
2873-125	17-Dec-05	4.13	
2873-124	17-Dec-05	5.03	
2873-126	17-Dec-05	15	X
2873-127	17-Dec-05	32.4	X
2873-133	19-Dec-05	1	
2873-137	19-Dec-05	1.02	
2873-131	19-Dec-05	1.45	
2873-130	19-Dec-05	4.02	
2873-135	19-Dec-05	4.13	
2873-136	19-Dec-05	5.42	
2873-129	19-Dec-05	6.12	
2873-132	19-Dec-05	16.7	X
2873-134	19-Dec-05	18.4	X
2873-142	20-Dec-05	1	
2873-143	20-Dec-05	2.67	
2873-139	20-Dec-05	3.78	
2873-144	20-Dec-05	8.72	
2873-140	20-Dec-05	22.3	X
2873-141	20-Dec-05	25.2	X
2873-138	20-Dec-05	31.9	X
2873-146	21-Dec-05	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2873-147	21-Dec-05	1	
2873-149	21-Dec-05	1	
2873-150	21-Dec-05	1	
2873-151	21-Dec-05	1	
2873-152	21-Dec-05	1	
2873-145	21-Dec-05	1.1	
2873-153	21-Dec-05	1.1	
2882-101	04-Jan-06	1	
2882-102	04-Jan-06	1	
2882-103	04-Jan-06	1	
2882-105	04-Jan-06	1	
2882-106	04-Jan-06	1	
2882-110	04-Jan-06	1	
2882-112	04-Jan-06	1.03	
2882-108	04-Jan-06	1.07	
2882-109	04-Jan-06	1.53	
2882-104	04-Jan-06	1.62	
2882-107	04-Jan-06	1.96	
2882-111	04-Jan-06	1.97	
2882-115	04-Jan-06	4.07	
2882-114	05-Jan-06	1	
2882-117	05-Jan-06	1	
2882-119	05-Jan-06	1	
2882-122	05-Jan-06	1	
2882-124	05-Jan-06	1	
2882-125	05-Jan-06	1	
2882-113	05-Jan-06	1.04	
2882-120	05-Jan-06	1.36	
2882-123	05-Jan-06	3.31	
2882-121	05-Jan-06	6.08	
2882-116	05-Jan-06	7.7	
2882-126	05-Jan-06	17.5	X
2882-118	05-Jan-06	42.6	X
2882-129	06-Jan-06	1	
2882-131	06-Jan-06	1	
2882-135	06-Jan-06	1	
2882-136	06-Jan-06	1	
2882-137	06-Jan-06	1	
2882-138	06-Jan-06	1	
2882-134	06-Jan-06	1.4	
2882-127	06-Jan-06	1.93	
2882-133	06-Jan-06	2.39	
2882-132	06-Jan-06	2.76	
2882-130	06-Jan-06	4.47	
2882-128	06-Jan-06	7.29	
2882-139	07-Jan-06	1	
2882-140	07-Jan-06	1	
2882-141	07-Jan-06	1	
2882-142	07-Jan-06	1	
2882-144	07-Jan-06	1	
2882-147	07-Jan-06	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2882-148	07-Jan-06	1	
2882-150	07-Jan-06	1	
2882-151	07-Jan-06	1	
2882-153	07-Jan-06	1	
2882-154	07-Jan-06	1	
2882-155	07-Jan-06	1.35	
2882-146	07-Jan-06	2.01	
2882-143	07-Jan-06	2.07	
2882-149	07-Jan-06	3.72	
2882-145	07-Jan-06	6.66	
2882-157	09-Jan-06	1	
2882-159	09-Jan-06	1	
2882-163	09-Jan-06	1	
2882-164	09-Jan-06	1	
2882-165	09-Jan-06	1	
2882-167	09-Jan-06	1	
2882-166	09-Jan-06	1.1	
2882-158	09-Jan-06	1.28	
2882-161	09-Jan-06	1.33	
2882-156	09-Jan-06	5.48	
2882-160	09-Jan-06	11.3	
2882-168	10-Jan-06	1	
2882-170	10-Jan-06	1.05	
2882-174	10-Jan-06	1.11	
2882-169	10-Jan-06	1.79	
2882-173	10-Jan-06	2.17	
2882-171	10-Jan-06	5.24	
2882-175	10-Jan-06	6.61	
2882-172	10-Jan-06	11.9	
2901-111	19-Jan-06	1	
2901-114	19-Jan-06	1	
2901-115	19-Jan-06	16.2	X
2901-102	20-Jan-06	1	
2901-105	20-Jan-06	1	
2901-106	20-Jan-06	1	
2901-107	20-Jan-06	1	
2901-112	20-Jan-06	1	
2901-113	20-Jan-06	1	
2901-116	20-Jan-06	1	
2901-110	20-Jan-06	2.01	
2901-109	20-Jan-06	9.66	
2901-108	20-Jan-06	19.9	X
2901-101	21-Jan-06	1	
2901-104	21-Jan-06	1	
2901-117	21-Jan-06	1	
2901-118	21-Jan-06	1	
2901-103	21-Jan-06	7.32	
2915-108	01-Feb-06	1	
2915-112	01-Feb-06	1	
2915-115	01-Feb-06	1.09	
2915-116	01-Feb-06	1.42	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
2915-111	01-Feb-06	2.07	
2915-107	01-Feb-06	6.57	
2915-103	01-Feb-06	10.3	
2915-101	02-Feb-06	1	
2915-105	02-Feb-06	1	
2915-113	02-Feb-06	1	
2915-109	02-Feb-06	1.13	
2915-102	02-Feb-06	1.47	
2915-106	02-Feb-06	2.95	
2915-110	02-Feb-06	5.47	
2915-104	02-Feb-06	8.66	
2915-117	03-Feb-06	1	
2915-118	03-Feb-06	2.52	
2915-114	03-Feb-06	3.42	
2915-119	06-Feb-06	1	
2915-121	06-Feb-06	1	
2915-120	06-Feb-06	2.1	
2915-122	07-Feb-06	1	
2944-118	15-Feb-06	1	
2944-104	15-Feb-06	2.03	
2944-103	20-Feb-06	1	
2944-105	20-Feb-06	1	
2944-108	20-Feb-06	1	
2944-109	20-Feb-06	1	
2944-110	20-Feb-06	1	
2944-111	20-Feb-06	1	
2944-113	20-Feb-06	1	
2944-114	20-Feb-06	1	
2944-117	20-Feb-06	1	
2944-119	20-Feb-06	1	
2944-112	20-Feb-06	1.2	
2944-101	20-Feb-06	1.81	
2944-116	20-Feb-06	3.07	
2944-115	20-Feb-06	3.68	
2944-102	21-Feb-06	1	
2944-106	22-Feb-06	1	
2944-107	22-Feb-06	1	
2938-121	03-Mar-06	1.2	
2938-121	03-Mar-06	1.34	
3037-102	19-May-06	1	
3037-106	19-May-06	1	
3037-101	19-May-06	1.14	
3037-104	19-May-06	1.14	
3037-103	19-May-06	96.7	X
3037-105	23-May-06	1	
3037-108	23-May-06	1	
3037-109	23-May-06	10.3	
3149-002	21-Aug-06	1	
3149-009	21-Aug-06	1	
3149-012	21-Aug-06	1	
3149-014	21-Aug-06	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3149-016	21-Aug-06	1	
3149-017	21-Aug-06	1	
3149-017-	21-Aug-06	1	
3149-015	21-Aug-06	1.17	
3149-005	21-Aug-06	1.2	
3149-001	21-Aug-06	1.25	
3149-006	21-Aug-06	1.49	
3149-011	21-Aug-06	1.56	
3149-013	21-Aug-06	2	
3149-003	21-Aug-06	2.43	
3149-004	21-Aug-06	2.49	
3149-004-	21-Aug-06	2.64	
3149-010	21-Aug-06	8.58	
3149-007	21-Aug-06	14.3	
3149-024	22-Aug-06	1.29	
3149-020	22-Aug-06	9.89	
3149-023	22-Aug-06	42.9	X
3149-021	22-Aug-06	60.5	X
3227-103	12-Sep-06	24	X
3227-107	15-Sep-06	1	
3227-101	19-Sep-06	1	
3227-104	19-Sep-06	22.4	X
3227-115	20-Sep-06	1	
3227-109	20-Sep-06	1.5	
3227-105	20-Sep-06	1.9	
3227-114	20-Sep-06	9.7	
3227-106	20-Sep-06	11.3	
3227-108	20-Sep-06	13	
3227-112	20-Sep-06	20.9	X
3227-110	21-Sep-06	4.2	
3227-113	21-Sep-06	41.5	X
3227-111	22-Sep-06	39.7	X
3271-103	03-Oct-06	15.5	X
3271-101	06-Oct-06	1	
3271-102	06-Oct-06	1	
3271-104	07-Oct-06	23.1	X
3271-105	07-Oct-06	59.1	X
3298-103	29-Nov-06	1	
3298-106	05-Dec-06	10.9	
3298-107	06-Dec-06	1.23	
3298-101-	06-Dec-06	3.09	
3298-101	06-Dec-06	3.19	
3298-108	08-Dec-06	1	
3298-109	08-Dec-06	1	
3339-107	02-Jan-07	1	
3339-108	05-Jan-07	16.8	X
3339-102	06-Jan-07	1	
3339-103	08-Jan-07	7.62	
3339-104	09-Jan-07	1	
3339-105	09-Jan-07	1	
3339-109	09-Jan-07	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3339-110	09-Jan-07	1	
3339-111	09-Jan-07	1	
3339-113	09-Jan-07	1	
3339-115	09-Jan-07	1	
3339-117	09-Jan-07	1	
3339-112	09-Jan-07	1.31	
3339-114	09-Jan-07	1.65	
3339-119	09-Jan-07	3.85	
3339-118	09-Jan-07	25	X
3339-106	09-Jan-07	35.3	X
3339-123	10-Jan-07	1	
3339-124	10-Jan-07	1	
3339-122	10-Jan-07	2.9	
3339-121	10-Jan-07	5.39	
3339-120	10-Jan-07	49.3	X
3339-126	11-Jan-07	1	
3339-127	11-Jan-07	1	
3339-128	11-Jan-07	1	
3339-129	11-Jan-07	1.18	
3339-125	11-Jan-07	2.07	
3339-132	11-Jan-07	5.15	
3339-130	11-Jan-07	13	
3339-131	11-Jan-07	13.7	
3339-134	16-Jan-07	1	
3339-134-	16-Jan-07	1	
3339-137	16-Jan-07	1	
3339-138	16-Jan-07	1	
3339-141	16-Jan-07	1	
3339-136	16-Jan-07	1.23	
3339-139	16-Jan-07	1.23	
3339-139-	16-Jan-07	1.26	
3339-133-	16-Jan-07	3.45	
3339-133	16-Jan-07	3.52	
3339-140	16-Jan-07	5.41	
3339-135-	16-Jan-07	5.43	
3339-135	16-Jan-07	5.51	
3339-144	17-Jan-07	1	
3339-142	17-Jan-07	2.16	
3339-143-	17-Jan-07	29.9	X
3339-143	17-Jan-07	30.5	X
3339-148	18-Jan-07	1	
3339-150	18-Jan-07	1	
3339-152	18-Jan-07	1	
3339-153	18-Jan-07	1	
3339-155	18-Jan-07	1	
3339-149	18-Jan-07	1.11	
3339-146	18-Jan-07	1.37	
3339-151	18-Jan-07	1.82	
3339-147	18-Jan-07	2.82	
3339-157	18-Jan-07	3.77	
3339-145	18-Jan-07	9.05	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3339-154	18-Jan-07	63.9	X
3339-156	19-Jan-07	1	
3339-158	19-Jan-07	1	
3339-160	19-Jan-07	1	
3339-162	19-Jan-07	1	
3339-165	19-Jan-07	1	
3339-159	19-Jan-07	1.59	
3339-163	19-Jan-07	3.58	
3339-164	19-Jan-07	4.25	
3339-161	19-Jan-07	28.9	X
3339-166	20-Jan-07	1	
3339-168	20-Jan-07	1	
3339-169	20-Jan-07	1.66	
3339-167	20-Jan-07	39.6	X
3339-173	23-Jan-07	1	
3339-171	23-Jan-07	3.75	
3339-170	23-Jan-07	10.9	
3339-172	23-Jan-07	12.9	
3339-172-	23-Jan-07	13	
3359-101	06-Feb-07	1	
3359-103	06-Feb-07	1	
3359-105	06-Feb-07	1	
3359-102	06-Feb-07	1.62	
3359-104	06-Feb-07	11.3	
3359-107	07-Feb-07	13	
3359-108	07-Feb-07	47.2	X
3359-109	08-Feb-07	1	
3359-110	09-Feb-07	1	
3359-112	09-Feb-07	1	
3359-111	09-Feb-07	2.48	
3359-114	10-Feb-07	1	
3359-113	10-Feb-07	18.5	X
3359-119	12-Feb-07	1	
3359-120	12-Feb-07	1	
3359-121	12-Feb-07	1	
3359-116	12-Feb-07	2.65	
3359-115	12-Feb-07	4.54	
3359-122	12-Feb-07	11.8	
3359-118	12-Feb-07	13.7	
3359-117	12-Feb-07	14	
3377-142	05-Mar-07	1.4	
3483-105	05-May-07	1.21	
3483-107	19-May-07	1	
3483-106	19-May-07	32.3	X
3483-103	21-May-07	1	
3483-103-	21-May-07	1	
3483-101	22-May-07	1	
3483-101-	22-May-07	1	
3483-104	22-May-07	3	
3483-108	22-May-07	6.18	
3483-102	23-May-07	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3534-101	29-Jun-07	1	
3534-101-	29-Jun-07	1	
3534-102	29-Jun-07	1	
3534-107	29-Jun-07	8.2	
3534-106-	29-Jun-07	13.2	
3534-106	29-Jun-07	13.6	
3534-104-	29-Jun-07	15.2	X
3534-104	29-Jun-07	15.4	X
3534-103-	30-Jun-07	2.8	
3534-103	30-Jun-07	3	
3534-108	30-Jun-07	10.2	
3534-105-	30-Jun-07	37.4	X
3534-105	30-Jun-07	37.5	X
3534-109	03-Jul-07	1	
3534-109-	03-Jul-07	1	
3575-107	23-Jul-07	8.5	
3575-107-	23-Jul-07	8.5	
3575-106	24-Jul-07	1	
3575-106-	24-Jul-07	1	
3575-105	01-Aug-07	3.6	
3575-105-	01-Aug-07	3.7	
3575-108-	03-Aug-07	1.3	
3575-108	03-Aug-07	1.8	
3575-101	04-Aug-07	20.6	X
3575-102-	04-Aug-07	20.7	X
3575-102	04-Aug-07	20.9	X
3575-103	06-Aug-07	1	
3575-104	06-Aug-07	1.1	
3675-106	01-Oct-07	2.9	
3675-108	01-Oct-07	3.4	
3675-105	01-Oct-07	3.7	
3675-101	01-Oct-07	6.3	
3675-107	01-Oct-07	9.3	
3675-103	01-Oct-07	10.1	
3675-104	01-Oct-07	10.3	
3675-102	01-Oct-07	12	
3675-113	02-Oct-07	1	
3675-114	02-Oct-07	1	
3675-116	02-Oct-07	1	
3675-117	02-Oct-07	1	
3675-118	02-Oct-07	1	
3675-119	02-Oct-07	1	
3675-120	02-Oct-07	1	
3675-109	02-Oct-07	1.5	
3675-111	02-Oct-07	1.5	
3675-112	02-Oct-07	1.5	
3675-115	02-Oct-07	2.4	
3675-110	02-Oct-07	4.7	
3675-121	03-Oct-07	1	
3675-123	03-Oct-07	1	
3675-123-	03-Oct-07	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3675-124	03-Oct-07	1	
3675-121-	03-Oct-07	1	
3675-122	03-Oct-07	1	
3675-122-	03-Oct-07	1	
3675-124-	03-Oct-07	1	
3675-126	04-Oct-07	1	
3675-127	04-Oct-07	1	
3675-126-	04-Oct-07	1.1	
3675-128	04-Oct-07	1.1	
3675-125	04-Oct-07	1.5	
3675-128-	04-Oct-07	11.8	
3675-130	05-Oct-07	10.5	
3675-132	05-Oct-07	11.1	
3675-129	05-Oct-07	14.5	
3675-131	05-Oct-07	16.5	X
3675-133	08-Oct-07	16.4	X
3675-136	08-Oct-07	24.3	X
3675-134	08-Oct-07	31.6	X
3675-135	08-Oct-07	41.1	X
3691-101	19-Oct-07	1	
3691-102	19-Oct-07	1	
3691-104	19-Oct-07	1	
3691-104-	19-Oct-07	1	
3691-106	19-Oct-07	1	
3691-107	19-Oct-07	1	
3691-108	19-Oct-07	1	
3691-110	19-Oct-07	1	
3691-103	19-Oct-07	4.23	
3691-109	19-Oct-07	6.55	
3691-105	19-Oct-07	22.4	X
3691-114	20-Oct-07	1	
3691-116	20-Oct-07	1	
3691-119	20-Oct-07	1	
3691-120	20-Oct-07	1	
3691-122-	20-Oct-07	1.15	
3691-122	20-Oct-07	1.17	
3691-113	20-Oct-07	1.81	
3691-121	20-Oct-07	3.58	
3691-117	20-Oct-07	7.32	
3691-118-	20-Oct-07	7.68	
3691-118	20-Oct-07	7.72	
3691-115	20-Oct-07	7.91	
3691-111	20-Oct-07	55.7	X
3691-112	20-Oct-07	57.7	X
3691-123	23-Oct-07	1	
3691-124	23-Oct-07	1	
3691-127	23-Oct-07	1	
3691-128	23-Oct-07	1	
3691-128-	23-Oct-07	1	
3691-130	23-Oct-07	1	
3691-126	23-Oct-07	1.34	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3691-129	23-Oct-07	4.56	
3691-125	23-Oct-07	4.85	
3691-133	24-Oct-07	1	
3691-134	24-Oct-07	1	
3691-136	24-Oct-07	1	
3691-132	24-Oct-07	4.72	
3691-131	24-Oct-07	5.19	
3691-135	24-Oct-07	8.04	
3691-138-	24-Oct-07	52.6	X
3691-138	24-Oct-07	52.8	X
3691-137	24-Oct-07	55.6	X
3708-101	25-Oct-07	1	
3708-102	25-Oct-07	1	
3708-104	25-Oct-07	1	
3708-106	25-Oct-07	1.06	
3708-105	25-Oct-07	1.2	
3708-103	25-Oct-07	4.32	
3708-111	03-Nov-07	11.6	
3708-112	03-Nov-07	13.8	
3708-112-	03-Nov-07	13.8	
3708-108	03-Nov-07	14.2	
3708-108-	03-Nov-07	14.3	
3708-107	03-Nov-07	15.4	X
3708-110	03-Nov-07	17.3	X
3708-110-	03-Nov-07	17.8	X
3708-109	03-Nov-07	370	X
3708-118	12-Nov-07	1	
3708-118-	12-Nov-07	1	
3708-120	12-Nov-07	1.13	
3708-117	12-Nov-07	1.38	
3708-119	12-Nov-07	228	X
3750-125	13-Dec-07	1	
3750-125-	13-Dec-07	1	
3750-126	13-Dec-07	1	
3750-126-	13-Dec-07	1	
3750-108	18-Dec-07	1.19	
3750-107-	18-Dec-07	1.8	
3750-107	18-Dec-07	25.7	X
3750-127	10-Jan-08	1.64	
3750-111	11-Jan-08	3.89	
3750-112-	11-Jan-08	4.02	
3750-112	11-Jan-08	4.22	
3750-105	11-Jan-08	11	
3750-106	11-Jan-08	11.2	
3750-101	12-Jan-08	19.8	X
3750-104	12-Jan-08	23.2	X
3750-102	12-Jan-08	23.9	X
3750-103	12-Jan-08	69	X
3750-132	15-Jan-08	1	
3750-133	15-Jan-08	1	
3750-135	15-Jan-08	1	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3750-134	15-Jan-08	1.38	
3750-120	16-Jan-08	1	
3750-122	16-Jan-08	1	
3750-119	16-Jan-08	1.41	
3750-120-	16-Jan-08	1.44	
3750-121	16-Jan-08	2.39	
3750-129	16-Jan-08	6	
3750-131	16-Jan-08	13.8	
3750-130	16-Jan-08	15.6	X
3772-104	14-Feb-08	1.99	
3772-104-	14-Feb-08	2.16	
3772-103	14-Feb-08	2.32	
3772-102	14-Feb-08	9.23	
3772-101	14-Feb-08	26.6	X
3785-107	26-Feb-08	1	
3785-108	26-Feb-08	1	
3785-110	26-Feb-08	1.12	
3785-109	26-Feb-08	11.1	
3785-112	28-Feb-08	1	
3785-114	28-Feb-08	1	
3785-116	28-Feb-08	1	
3785-111	28-Feb-08	7.66	
3785-113	28-Feb-08	13	
3785-115	28-Feb-08	16.4	X
3785-118	29-Feb-08	1	
3785-119	29-Feb-08	1	
3785-122	29-Feb-08	1	
3785-123	29-Feb-08	1	
3785-124	29-Feb-08	1	
3785-124-	29-Feb-08	1	
3785-127	29-Feb-08	1	
3785-128	29-Feb-08	1	
3785-129	29-Feb-08	1	
3785-130	29-Feb-08	1	
3785-132	29-Feb-08	1	
3785-133	29-Feb-08	1	
3785-134	29-Feb-08	1	
3785-120	29-Feb-08	1.41	
3785-117	29-Feb-08	2.07	
3785-126	29-Feb-08	76.4	X
3785-131	29-Feb-08	350	X
3785-125	29-Feb-08	808	X
3785-147	01-Mar-08	1	
3785-149	01-Mar-08	1	
3785-151	01-Mar-08	1	
3785-152	01-Mar-08	1	
3785-153	01-Mar-08	1	
3785-155	01-Mar-08	1.1	
3785-150	01-Mar-08	1.83	
3785-148	01-Mar-08	4.37	
3785-154	01-Mar-08	19	X

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3785-146	01-Mar-08	26.3	X
3866-002	16-Apr-08	1.1	
3866-004	16-Apr-08	1.1	
3866-003	16-Apr-08	1.9	
3866-001	16-Apr-08	2.3	
3053-101		1	
3053-103		1	
3073-102		1	
3134-004		1	
3422-102		1	
3449-101		1	
3449-102		1	
3449-103		1	
3521-102		1	
3521-102-		1	
3521-103		1	
3521-103-		1	
3521-105		1	
3521-105-		1	
3521-106		1	
3521-106-		1	
3521-107		1	
3521-108		1	
3521-109		1	
3656-108		1	
3656-116		1	
3656-119		1	
3656-120		1	
3656-121		1	
3656-122		1	
3656-124		1	
3656-125		1	
3656-126		1	
3656-110		1.1	
3656-107		1.2	
3656-123		1.2	
3053-106		1.44	
3419-205		2.17	
3656-102		2.2	
3053-102		2.66	
3656-101		2.7	
3656-117		2.7	
3656-109		2.8	
3419-215		2.83	
3419-149		2.88	
3656-103		2.9	
3656-104		3.2	
3656-118		3.7	
3656-106		5.8	
3656-112		6.6	
3656-111		7.3	

Table 4-13
Analytical Results for Lead in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)
3521-101-		7.75	
3521-101		7.84	
3656-113		7.9	
3656-115		8.2	
3656-114		9.3	
3419-139		11	
3656-105		11	
3656-127		11.2	
3656-129		11.9	
3656-128		12	
3422-101-		13.2	
3134-001		13.6	
3134-001		13.7	
3422-101		14	
3656-130		14.6	
3053-104		19.3	X
3073-104		19.7	X
3422-103-		26.3	X
3134-002		29.5	X
3134-002		29.5	X
3422-103		29.6	X
3422-104		37.9	X
3134-005		41.6	X
3521-104-		47.4	X
3521-104		47.7	X
3449-104		120	X

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
0503843	06-Jun-05	1.39	
0503844	07-Jun-05	3.82	
0503845	07-Jun-05	1	
0503846	07-Jun-05	1	
0503847	07-Jun-05	1	
0503848	07-Jun-05	1	
0503853	09-Jun-05	1	
0503862	08-Jun-05	1	
0503903	06-Jun-05	1.84	
0503904	06-Jun-05	2.19	
0503905	06-Jun-05	1.33	
0503906	06-Jun-05	2.39	
0503907	07-Jun-05	1	
0503908	10-Jun-05	1	
0503909	10-Jun-05	1	
0503953	06-Jun-05	1	
0503954	07-Jun-05	1	
0503955	08-Jun-05	1	
0503956	08-Jun-05	1	
0503957	08-Jun-05	1	
0503958	08-Jun-05	1	
0503959	08-Jun-05	1	
0503960	09-Jun-05	1	
0503961	09-Jun-05	1	
0503962	10-Jun-05	1	
0503963	10-Jun-05	1	
0503964	10-Jun-05	1	
0503982	10-Jun-05	1	
0503983	09-Jun-05	1	
2730-103	17-Aug-05	10	X
2774-144	15-Sep-05	4.69	
2774-145	15-Sep-05	1	
2801-101	10-Oct-05	1	
2801-101-	10-Oct-05	1	
2801-102	12-Oct-05	1	
2801-102-	12-Oct-05	1	
2801-103	12-Oct-05	1	
2801-103-	12-Oct-05	1	
2801-104	06-Oct-05	1	
2801-104-	06-Oct-05	1	
2801-105	06-Oct-05	1	
2801-106	12-Oct-05	1	
2801-107	13-Oct-05	1	
2801-108	11-Oct-05	1	
2801-109	10-Oct-05	1	
2801-110	10-Oct-05	1	
2801-111	11-Oct-05	1	
2801-112	12-Oct-05	1	
2801-113	07-Oct-05	1	
2801-114	10-Oct-05	1	

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2801-115	12-Oct-05	1	
2801-116	12-Oct-05	1	
2801-117	11-Oct-05	1	
2801-118	10-Oct-05	1	
2801-119	11-Oct-05	1	
2801-120	07-Oct-05	1	
2801-121	20-Oct-05	1	
2801-122	20-Oct-05	1	
2801-123	20-Oct-05	1	
2801-202	12-Oct-05	1	
2801-202-	12-Oct-05	1	
2801-203	12-Oct-05	1	
2801-203-	12-Oct-05	1	
2801-204	06-Oct-05	1	
2801-204-	06-Oct-05	1	
2801-205	12-Oct-05	1	
2801-206	12-Oct-05	1	
2801-207	11-Oct-05	1	
2801-208	12-Oct-05	1	
2801-209	12-Oct-05	1	
2801-210	12-Oct-05	1	
2801-211	11-Oct-05	1	
2801-201	10-Oct-05	1	
2801-201-	10-Oct-05	1	
2801-239	06-Oct-05	1	
2801-240	06-Oct-05	1	
2801-241	10-Oct-05	1	
2801-257	19-Oct-05	1.11	
2801-262	22-Oct-05	1	
2801-263	22-Oct-05	1	
2801-267	22-Oct-05	1	
2801-268	20-Oct-05	1	
2801-269	20-Oct-05	1	
2801-270	20-Oct-05	1	
2801-271	20-Oct-05	1	
2801-212	12-Oct-05	1	
2801-213	11-Oct-05	1	
2801-214	13-Oct-05	1	
2801-215	13-Oct-05	1	
2801-216	12-Oct-05	1	
2801-217	12-Oct-05	1	
2801-218	12-Oct-05	1	
2801-219	12-Oct-05	1	
2801-220	11-Oct-05	1	
2801-221	12-Oct-05	1	
2801-222	12-Oct-05	1	
2801-223	12-Oct-05	1	
2801-224	12-Oct-05	1	
2801-226	12-Oct-05	1	
2801-227	13-Oct-05	1	

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2801-228	07-Oct-05	1	
2801-229	12-Oct-05	1	
2801-230	06-Oct-05	1	
2801-231	06-Oct-05	1	
2801-232	10-Oct-05	1	
2801-233	10-Oct-05	1	
2801-234	07-Oct-05	1	
2801-235	07-Oct-05	1	
2801-236	10-Oct-05	1	
2801-237	06-Oct-05	1	
2801-238	10-Oct-05	1	
2801-242	06-Oct-05	1	
2801-243	06-Oct-05	1	
2801-244	12-Oct-05	1	
2801-245	10-Oct-05	1	
2801-246	06-Oct-05	1	
2801-247	07-Oct-05	1	
2801-248	07-Oct-05	1	
2801-249	07-Oct-05	1	
2801-250	10-Oct-05	1	
2801-251	10-Oct-05	1	
2801-252	10-Oct-05	1	
2801-253	10-Oct-05	1	
2801-254	10-Oct-05	1	
2801-255	10-Oct-05	1	
2801-256	07-Oct-05	1	
2801-261	22-Oct-05	1	
2801-264	22-Oct-05	1	
2801-265	22-Oct-05	1	
2801-266	22-Oct-05	1	
2801-272	20-Oct-05	1	
2823-101	24-Oct-05	1	
2823-102	24-Oct-05	1	
2823-103	24-Oct-05	1	
2823-104	24-Oct-05	1	
2823-105	24-Oct-05	1	
2823-106	21-Oct-05	1	
2823-107	21-Oct-05	1	
2823-108	21-Oct-05	1	
2823-109	20-Oct-05	1	
2823-110	21-Oct-05	1	
2823-111	21-Oct-05	1	
2823-112	21-Oct-05	1	
2823-113	11-Oct-05	1	
2823-114	20-Oct-05	1	
2823-115	20-Oct-05	1	
2823-116	20-Oct-05	1	
2823-117	20-Oct-05	1	
2823-118	20-Oct-05	1	
2823-119	20-Oct-05	1	

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2823-120	20-Oct-05	1	
2823-121	21-Oct-05	1	
2823-122	20-Oct-05	1	
2823-123	20-Oct-05	1	
2823-124	25-Oct-05	1	
2823-125	25-Oct-05	1	
2823-126	25-Oct-05	1	
2823-127	25-Oct-05	1	
2823-128	25-Oct-05	1	
2823-129	25-Oct-05	1	
2823-130	25-Oct-05	1	
2823-131	25-Oct-05	1	
2823-132	25-Oct-05	1	
2823-133	25-Oct-05	1	
2823-134	25-Oct-05	1	
2823-135	27-Oct-05	1	
2823-136	26-Oct-05	1	
2823-137	25-Oct-05	1	
2823-138	26-Oct-05	1	
2823-139	26-Oct-05	1	
2823-140	26-Oct-05	1	
2823-141	26-Oct-05	1	
2823-142	26-Oct-05	1	
2823-143	26-Oct-05	1	
2823-144	26-Oct-05	1	
2823-145	26-Oct-05	1	
2823-146	26-Oct-05	1	
2823-201	21-Oct-05	1	
2823-202	21-Oct-05	1	
2823-203	24-Oct-05	1	
2823-204	25-Oct-05	1	
2823-205	25-Oct-05	1	
2823-206	25-Oct-05	1	
2823-207	25-Oct-05	1	
2823-208	25-Oct-05	1	
2823-209	26-Oct-05	1	
2823-210	26-Oct-05	1	
2832-101	03-Nov-05	1	
2832-102	03-Nov-05	1	
2832-103	03-Nov-05	1	
2832-104	08-Nov-05	1.08	
2832-105	03-Nov-05	1	
2832-106	03-Nov-05	1	
2832-107	03-Nov-05	1	
2832-108	03-Nov-05	1	
2832-109	03-Nov-05	1	
2832-111	16-Nov-05	1	
2832-112	16-Nov-05	2	
2832-113	16-Nov-05	1	
2832-114	16-Nov-05	2	

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2832-115	16-Nov-05	2	
2832-116	16-Nov-05	1	
2832-117	16-Nov-05	1	
2832-118	16-Nov-05	1	
2832-119	16-Nov-05	1	
2832-120	16-Nov-05	1	
2832-121	16-Nov-05	1	
2832-122	16-Nov-05	1	
2832-123	16-Nov-05	1	
2832-124	16-Nov-05	1	
2832-125	18-Nov-05	1	
2832-126	18-Nov-05	1	
2832-127	18-Nov-05	1	
2832-128	18-Nov-05	1	
2832-129	18-Nov-05	1	
2832-130	18-Nov-05	1	
2832-131	17-Nov-05	1	
2832-132	18-Nov-05	1	
2832-133	18-Nov-05	1	
2832-134	18-Nov-05	1	
2832-135	18-Nov-05	2	
2832-136	17-Nov-05	2	
2832-137	18-Nov-05	2	
2832-139	18-Nov-05	1	
2832-140	19-Nov-05	2	
2832-141	19-Nov-05	2	
2832-142	19-Nov-05	2	
2832-143	19-Nov-05	1	
2832-144	19-Nov-05	2	
2832-145	19-Nov-05	2	
2832-146	19-Nov-05	2	
2832-147	21-Nov-05	1	
2832-148	21-Nov-05	1	
2832-149	21-Nov-05	1	
2832-150	21-Nov-05	1	
2832-151	21-Nov-05	1	
2832-152	21-Nov-05	1	
2832-153	21-Nov-05	1	
2832-154	21-Nov-05	1	
2832-155	21-Nov-05	1	
2832-156	21-Nov-05	1	
2832-160	22-Nov-05	1	
2832-161	22-Nov-05	1	
2832-162	22-Nov-05	1.3	
2832-163	22-Nov-05	1	
2832-164	22-Nov-05	1	
2832-166	22-Nov-05	1	
2863-101	29-Nov-05	1	
2863-102	29-Nov-05	1	
2863-103	02-Dec-05	1	

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2863-104	02-Dec-05	1	
2863-105	02-Dec-05	1	
2863-106	02-Dec-05	1	
2863-107	02-Dec-05	1	
2863-108	03-Dec-05	1	
2863-109	02-Dec-05	1	
2863-110	29-Nov-05	1	
2863-111	01-Dec-05	2	
2863-112	29-Nov-05	1	
2863-113	01-Dec-05	1	
2863-114	01-Dec-05	1	
2863-115	01-Dec-05	1	
2863-116	01-Dec-05	1.6	
2863-117	05-Dec-05	1	
2863-118	05-Dec-05	1	
2863-119	01-Dec-05	1.92	
2863-120	02-Dec-05	1	
2863-121	02-Dec-05	1	
2863-122	29-Nov-05	1	
2863-123	29-Nov-05	1	
2863-124	01-Dec-05	1	
2863-125	29-Nov-05	1	
2863-126	05-Dec-05	1	
2863-127	05-Dec-05	1	
2863-128	05-Dec-05	1	
2863-129	05-Dec-05	1	
2863-130	05-Dec-05	1	
2863-131	03-Dec-05	1	
2863-132	05-Dec-05	1	
2863-133	05-Dec-05	1	
2863-134	05-Dec-05	1	
2863-135	03-Dec-05	1	
2863-136	05-Dec-05	1	
2863-137	03-Dec-05	1	
2863-138	05-Dec-05	1	
2863-139	05-Dec-05	1	
2863-140	05-Dec-05	1	
2863-141	06-Dec-05	1	
2863-142	06-Dec-05	1	
2863-143	06-Dec-05	1	
2863-144	06-Dec-05	1	
2863-145	06-Dec-05	1	
2863-146	06-Dec-05	1	
2863-148	06-Dec-05	1	
2863-149	06-Dec-05	1	
2863-150	06-Dec-05	1	
2863-151	06-Dec-05	1	
2863-152	06-Dec-05	1	
2863-153	06-Dec-05	1	
2863-154	06-Dec-05	1	

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2863-155	06-Dec-05	1	
2863-156	07-Dec-05	1	
2863-157	07-Dec-05	1	
2863-158	07-Dec-05	1	
2863-159	07-Dec-05	1	
2863-161	07-Dec-05	1	
2863-162	07-Dec-05	1	
2863-163	07-Dec-05	1	
2863-164	07-Dec-05	1	
2863-165	07-Dec-05	1	
2863-166	07-Dec-05	1	
2863-167	07-Dec-05	1	
2863-168	07-Dec-05	1	
2863-169	07-Dec-05	1	
2873-101	16-Dec-05	1	
2873-102	16-Dec-05	1	
2873-103	14-Dec-05	1	
2873-104	15-Dec-05	1	
2873-105	16-Dec-05	1	
2873-106	15-Dec-05	1	
2873-107	16-Dec-05	1	
2873-108	16-Dec-05	1	
2873-112	15-Dec-05	1	
2873-113	16-Dec-05	1	
2873-114	15-Dec-05	1	
2873-115	08-Dec-05	1	
2873-118	14-Dec-05	1	
2873-119	16-Dec-05	1	
2873-120	15-Dec-05	1	
2873-121	15-Dec-05	1	
2873-122	16-Dec-05	1	
2873-123	17-Dec-05	1	
2873-124	17-Dec-05	1	
2873-125	17-Dec-05	1	
2873-126	17-Dec-05	1	
2873-127	17-Dec-05	1	
2873-128	17-Dec-05	1	
2873-129	19-Dec-05	1	
2873-130	19-Dec-05	1	
2873-131	19-Dec-05	1	
2873-132	19-Dec-05	1	
2873-133	19-Dec-05	1	
2873-134	19-Dec-05	1	
2873-135	19-Dec-05	1	
2873-136	19-Dec-05	1	
2873-137	19-Dec-05	1	
2873-138	20-Dec-05	1	
2873-139	20-Dec-05	1	
2873-140	20-Dec-05	1	
2873-141	20-Dec-05	1	

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2873-142	20-Dec-05	1	
2873-143	20-Dec-05	1	
2873-144	20-Dec-05	1	
2873-145	21-Dec-05	1	
2873-146	21-Dec-05	1	
2873-147	21-Dec-05	1	
2873-149	21-Dec-05	1	
2873-150	21-Dec-05	1	
2873-151	21-Dec-05	1	
2873-152	21-Dec-05	1	
2873-153	21-Dec-05	1	
2882-101	04-Jan-06	1	
2882-102	04-Jan-06	1	
2882-103	04-Jan-06	1	
2882-104	04-Jan-06	1	
2882-105	04-Jan-06	1	
2882-106	04-Jan-06	1	
2882-107	04-Jan-06	1	
2882-108	04-Jan-06	1	
2882-109	04-Jan-06	1	
2882-110	04-Jan-06	1	
2882-111	04-Jan-06	1	
2882-112	04-Jan-06	1	
2882-113	05-Jan-06	1	
2882-114	05-Jan-06	1	
2882-115	04-Jan-06	1	
2882-116	05-Jan-06	1	
2882-117	05-Jan-06	1	
2882-118	05-Jan-06	1.09	
2882-119	05-Jan-06	1	
2882-120	05-Jan-06	1	
2882-121	05-Jan-06	1.49	
2882-122	05-Jan-06	1	
2882-123	05-Jan-06	1	
2882-124	05-Jan-06	1	
2882-125	05-Jan-06	1	
2882-126	05-Jan-06	1	
2882-127	06-Jan-06	1	
2882-128	06-Jan-06	2	
2882-129	06-Jan-06	2	
2882-130	06-Jan-06	1	
2882-131	06-Jan-06	1	
2882-132	06-Jan-06	2	
2882-133	06-Jan-06	2	
2882-134	06-Jan-06	2	
2882-135	06-Jan-06	1	
2882-136	06-Jan-06	2	
2882-137	06-Jan-06	2	
2882-138	06-Jan-06	2	
2882-139	07-Jan-06	1	

Table 4-14
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2882-140	07-Jan-06	1	
2882-141	07-Jan-06	1	
2882-142	07-Jan-06	1	
2882-143	07-Jan-06	1	
2882-144	07-Jan-06	1	
2882-145	07-Jan-06	2.16	
2882-146	07-Jan-06	1	
2882-147	07-Jan-06	1	
2882-148	07-Jan-06	1	
2882-149	07-Jan-06	1	
2882-150	07-Jan-06	1	
2882-151	07-Jan-06	1	
2882-153	07-Jan-06	1	
2882-154	07-Jan-06	1	
2882-155	07-Jan-06	1	
2882-156	09-Jan-06	1	
2882-157	09-Jan-06	1	
2882-158	09-Jan-06	1	
2882-159	09-Jan-06	1	
2882-160	09-Jan-06	1	
2882-161	09-Jan-06	1	
2882-162	22-Nov-05	1	
2882-163	09-Jan-06	1	
2882-164	09-Jan-06	1	
2882-165	09-Jan-06	1	
2882-166	09-Jan-06	1	
2882-167	09-Jan-06	1	
2882-168	10-Jan-06	1	
2882-169	10-Jan-06	1	
2882-170	10-Jan-06	1	
2882-171	10-Jan-06	1	
2882-172	10-Jan-06	1	
2882-173	10-Jan-06	1	
2882-174	10-Jan-06	1	
2882-175	10-Jan-06	1	
2938-121	03-Mar-06	1	
2938-121	03-Mar-06	1	
3377-142	05-Mar-07	1	
3419-139		1	
3419-149		1	
3419-205		1	
3419-215		1	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
0503843	06-Jun-05	11.3	
0503844	07-Jun-05	10.3	
0503845	07-Jun-05	602	
0503846	07-Jun-05	40.1	
0503847	07-Jun-05	30.9	
0503848	07-Jun-05	1040	
0503849	15-Jun-05	626	
0503850	16-Jun-05	886	
0503851	16-Jun-05	1520	
0503853	09-Jun-05	1430	
0503854	20-Jun-05	251	
0503855	20-Jun-05	1430	
0503856	22-Jun-05	150	
0503857	22-Jun-05	254	
0503858	20-Jun-05	110	
0503859	21-Jun-05	192	
0503860	21-Jun-05	110	
0503861	20-Jun-05	48.3	
0503862	08-Jun-05	197	
0503863	22-Jun-05	1080	
0503864	23-Jun-05	481	
0503865	24-Jun-05	688	
0503866	24-Jun-05	1370	
0503867	24-Jun-05	600	
0503868	28-Jun-05	1400	
0503869	28-Jun-05	109	
0503870	28-Jun-05	81.5	
0503882	29-Jun-05	68.8	
0503883	29-Jun-05	391	
0503903	06-Jun-05	282	
0503904	06-Jun-05	254	
0503905	06-Jun-05	264	
0503906	06-Jun-05	1.65	
0503907	07-Jun-05	851	
0503908	10-Jun-05	967	
0503909	10-Jun-05	762	
0503910	13-Jun-05	1620	
0503911	14-Jun-05	41.4	
0503912	14-Jun-05	57.6	
0503913	15-Jun-05	123	
0503914	15-Jun-05	114	
0503915	15-Jun-05	210	
0503916	16-Jun-05	247	
0503917	16-Jun-05	529	
0503918	13-Jun-05	1040	
0503919	13-Jun-05	789	
0503920	13-Jun-05	544	
0503921	13-Jun-05	1250	
0503922	13-Jun-05	846	
0503923	13-Jun-05	805	
0503924	13-Jun-05	615	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
0503925	13-Jun-05	754	
503926	14-Jun-05	2220	X
0503927	14-Jun-05	1620	
0503928	14-Jun-05	41.7	
0503929	14-Jun-05	309	
0503930	14-Jun-05	240	
0503931	14-Jun-05	777	
0503932	14-Jun-05	339	
0503933	14-Jun-05	1000	
0503934	14-Jun-05	1	
0503935	14-Jun-05	116	
0503936	15-Jun-05	1270	
0503937	15-Jun-05	831	
0503940	15-Jun-05	73.7	
0503941	15-Jun-05	75.9	
0503942	16-Jun-05	875	
0503943	16-Jun-05	741	
0503944	16-Jun-05	786	
0503945	16-Jun-05	800	
0503946	16-Jun-05	1050	
0503947	16-Jun-05	1010	
0503948	16-Jun-05	342	
0503949	16-Jun-05	805	
0503950	16-Jun-05	29.4	
0503951	16-Jun-05	865	
0503952	20-Jun-05	114	
0503953	06-Jun-05	613	
0503953	06-Jun-05	613	
0503954	07-Jun-05	60.8	
0503955	08-Jun-05	837	
0503956	08-Jun-05	1120	
0503957	08-Jun-05	135	
0503958	08-Jun-05	90.5	
0503959	08-Jun-05	322	
0503960	09-Jun-05	327	
0503961	09-Jun-05	168	
0503962	10-Jun-05	141	
0503963	10-Jun-05	117	
0503964	10-Jun-05	1170	
0503965	13-Jun-05	771	
0503966	13-Jun-05	1210	
0503967	13-Jun-05	1060	
0503968	13-Jun-05	1020	
0503969	14-Jun-05	1130	
0503970	14-Jun-05	1170	
0503971	14-Jun-05	1540	
0503972	14-Jun-05	1070	
0503973	14-Jun-05	1210	
0503974	15-Jun-05	765	
0503975	15-Jun-05	246	
0503976	15-Jun-05	144	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
0503977	16-Jun-05	290	
0503978	17-Jun-05	1150	
0503979	17-Jun-05	1080	
0503980	17-Jun-05	999	
0503981	14-Jun-05	806	
0503982	10-Jun-05	149	
0503983	09-Jun-05	203	
0503984	14-Jun-05	958	
0503985	15-Jun-05	1550	
0503986	16-Jun-05	1280	
0503987	16-Jun-05	900	
0503989	20-Jun-05	1160	
0503990	20-Jun-05	924	
0503991	22-Jun-05	84.4	
0503992	22-Jun-05	774	
0503993	22-Jun-05	484	
0503994	16-Jun-05	2.09	
0503995	16-Jun-05	1130	
0503996	20-Jun-05	447	
0503997	20-Jun-05	152	
0503999	21-May-05	30	
0504000	21-May-05	666	
0504001	21-Jun-05	152	
0504002	14-Jun-05	940	
0504032	27-Jun-05	84.2	
0504033	28-Jun-05	50.7	
0504034	28-Jun-05	139	
0504035	29-Jun-05	72.7	
0504036	29-Jun-05	1160	
0504037	27-Jun-05	65.3	
0504038	29-Jun-05	464	
0504041	28-Jun-05	964	
0504644	19-Sep-05	1	
0504645	19-Sep-05	1	
0504646	20-Sep-05	76.4	
0504647	20-Sep-05	96.9	
0504653	18-Oct-05	3.45	
0504654	18-Oct-05	4.47	
0504655	18-Oct-05	967	
0504656	18-Oct-05	996	
0504657	18-Oct-05	1	
0504658	18-Oct-05	57.1	
0504659	18-Oct-05	218	
0504660	18-Oct-05	2.03	
0504770	20-Jun-05	759	
0504771	20-Jun-05	609	
0504772	20-Jun-05	667	
0504773	20-Jun-05	3.98	
0504774	21-Jun-05	44.8	
0504775	21-Jun-05	130	
0504776	21-Jun-05	646	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
0504777	21-Jun-05	647	
0504778	21-Jun-05	470	
0504779	21-Jun-05	143	
0504780	22-Jun-05	442	
0504781	22-Jun-05	678	
0504782	22-Jun-05	8.67	
0504783	22-Jun-05	6.43	
0504784	22-Jun-05	211	
0504785	22-Jun-05	106	
0504786	23-Jun-05	422	
0504787	23-Jun-05	1100	
0504788	23-Jun-05	1860	
0504789	23-Jun-05	933	
0504791	24-May-05	97.1	
0504792	22-Jun-05	782	
0504793	22-Jun-05	181	
0504794	22-Jun-05	172	
0504795	23-Jun-05	107	
0504796	23-Jun-05	67.5	
0504797	27-Jun-05	2090	X
0504798	24-Jun-05	577	
0504799	27-Jun-05	631	
0504800	24-Jun-05	645	
0504801	27-Jun-05	974	
0504802	27-Jun-05	767	
0504803	24-Jun-05	746	
0504804	24-Jun-05	1440	
0504805	01-Jul-05	339	
0504809	22-Sep-05	47	
0504810	22-Sep-05	153	
0504858	01-Jul-05	36.2	
0505127	20-Sep-05	28.7	
0505126	20-Sep-05	820	
2730-103	17-Aug-05	425	
2774-144	15-Sep-05	10	
2774-145	15-Sep-05	59.4	
2801-101	10-Oct-05	894	
2801-101-	10-Oct-05	925	
2801-102	12-Oct-05	38	
2801-102-	12-Oct-05	40.9	
2801-103	12-Oct-05	328	
2801-103-	12-Oct-05	328	
2801-104	06-Oct-05	240	
2801-104-	06-Oct-05	243	
2801-105	06-Oct-05	1030	
2801-106	12-Oct-05	99.2	
2801-107	13-Oct-05	801	
2801-108	11-Oct-05	347	
2801-109	10-Oct-05	558	
2801-110	10-Oct-05	362	
2801-111	11-Oct-05	253	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2801-112	12-Oct-05	709	
2801-113	07-Oct-05	635	
2801-114	10-Oct-05	863	
2801-115	12-Oct-05	1240	
2801-116	12-Oct-05	675	
2801-117	11-Oct-05	989	
2801-118	10-Oct-05	888	
2801-119	11-Oct-05	62.3	
2801-120	07-Oct-05	804	
2801-121	20-Oct-05	226	
2801-122	20-Oct-05	112	
2801-123	20-Oct-05	26.5	
2801-202	12-Oct-05	341	
2801-202-	12-Oct-05	329	
2801-203	12-Oct-05	36.9	
2801-203-	12-Oct-05	36.3	
2801-204	06-Oct-05	243	
2801-204-	06-Oct-05	244	
2801-205	12-Oct-05	679	
2801-206	12-Oct-05	591	
2801-207	11-Oct-05	61.5	
2801-208	12-Oct-05	1450	
2801-209	12-Oct-05	887	
2801-210	12-Oct-05	522	
2801-201	10-Oct-05	941	
2801-201-	10-Oct-05	905	
2801-239	06-Oct-05	1150	
2801-240	06-Oct-05	791	
2801-256	07-Oct-05	637	
2801-261	22-Oct-05	387	
2801-262	22-Oct-05	1410	
2801-263	22-Oct-05	580	
2801-266	22-Oct-05	659	
2801-267	22-Oct-05	924	
2801-268	20-Oct-05	26.8	
2801-269	20-Oct-05	412	
2801-270	20-Oct-05	661	
2801-211	11-Oct-05	471	
2801-212	12-Oct-05	1950	
2801-213	11-Oct-05	250	
2801-214	13-Oct-05	785	
2801-215	13-Oct-05	777	
2801-216	12-Oct-05	103	
2801-217	12-Oct-05	817	
2801-218	12-Oct-05	635	
2801-219	12-Oct-05	1470	
2801-220	11-Oct-05	973	
2801-221	12-Oct-05	87.4	
2801-222	12-Oct-05	154	
2801-223	12-Oct-05	859	
2801-224	12-Oct-05	1180	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2801-226	12-Oct-05	162	
2801-227	13-Oct-05	452	
2801-228	07-Oct-05	1080	
2801-229	12-Oct-05	1210	
2801-230	06-Oct-05	584	
2801-231	06-Oct-05	1010	
2801-232	10-Oct-05	1200	
2801-233	10-Oct-05	585	
2801-234	07-Oct-05	500	
2801-235	07-Oct-05	657	
2801-236	10-Oct-05	597	
2801-237	06-Oct-05	190	
2801-238	10-Oct-05	739	
2801-241	10-Oct-05	815	
2801-242	06-Oct-05	419	
2801-243	06-Oct-05	666	
2801-244	12-Oct-05	248	
2801-245	10-Oct-05	1030	
2801-246	06-Oct-05	629	
2801-247	07-Oct-05	760	
2801-248	07-Oct-05	713	
2801-249	07-Oct-05	531	
2801-250	10-Oct-05	183	
2801-251	10-Oct-05	140	
2801-252	10-Oct-05	833	
2801-253	10-Oct-05	1120	
2801-254	10-Oct-05	554	
2801-255	10-Oct-05	353	
2801-264	22-Oct-05	610	
2801-265	22-Oct-05	1190	
2801-271	20-Oct-05	486	
2801-272	20-Oct-05	233	
2823-101	24-Oct-05	197	
2823-102	24-Oct-05	205	
2823-103	24-Oct-05	443	
2823-104	24-Oct-05	646	
2823-105	24-Oct-05	300	
2823-106	21-Oct-05	684	
2823-107	21-Oct-05	154	
2823-108	21-Oct-05	168	
2823-109	20-Oct-05	232	
2823-110	21-Oct-05	640	
2823-111	21-Oct-05	111	
2823-112	21-Oct-05	846	
2823-113	11-Oct-05	349	
2823-114	20-Oct-05	117	
2823-115	20-Oct-05	693	
2823-116	20-Oct-05	118	
2823-117	20-Oct-05	89.1	
2823-118	20-Oct-05	204	
2823-119	20-Oct-05	507	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2823-120	20-Oct-05	310	
2823-121	21-Oct-05	40.1	
2823-122	20-Oct-05	243	
2823-123	20-Oct-05	299	
2823-124	25-Oct-05	458	
2823-125	25-Oct-05	792	
2823-126	25-Oct-05	156	
2823-127	25-Oct-05	180	
2823-128	25-Oct-05	329	
2823-129	25-Oct-05	229	
2823-130	25-Oct-05	180	
2823-131	25-Oct-05	313	
2823-132	25-Oct-05	157	
2823-133	25-Oct-05	109	
2823-134	25-Oct-05	160	
2823-135	27-Oct-05	17.6	
2823-136	26-Oct-05	132	
2823-137	25-Oct-05	533	
2823-138	26-Oct-05	265	
2823-139	26-Oct-05	232	
2823-140	26-Oct-05	120	
2823-141	26-Oct-05	176	
2823-142	26-Oct-05	360	
2823-143	26-Oct-05	15.4	
2823-144	26-Oct-05	583	
2823-145	26-Oct-05	119	
2823-146	26-Oct-05	358	
2823-201	21-Oct-05	98.3	
2823-202	21-Oct-05	811	
2823-203	24-Oct-05	436	
2823-204	25-Oct-05	227	
2823-205	25-Oct-05	152	
2823-206	25-Oct-05	182	
2823-207	25-Oct-05	160	
2823-208	25-Oct-05	787	
2823-209	26-Oct-05	372	
2823-210	26-Oct-05	130	
2832-101	03-Nov-05	90.7	
2832-102	03-Nov-05	73.6	
2832-103	03-Nov-05	92	
2832-104	08-Nov-05	51.6	
2832-105	03-Nov-05	2100	X
2832-106	03-Nov-05	96.9	
2832-107	03-Nov-05	160	
2832-108	03-Nov-05	66.8	
2832-109	03-Nov-05	1160	
2832-111	16-Nov-05	725	
2832-112	16-Nov-05	563	
2832-113	16-Nov-05	826	
2832-114	16-Nov-05	119	
2832-115	16-Nov-05	763	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2832-116	16-Nov-05	184	
2832-117	16-Nov-05	529	
2832-118	16-Nov-05	144	
2832-119	16-Nov-05	192	
2832-120	16-Nov-05	415	
2832-121	16-Nov-05	806	
2832-122	16-Nov-05	1050	
2832-123	16-Nov-05	63.5	
2832-124	16-Nov-05	416	
2832-125	18-Nov-05	808	
2832-126	18-Nov-05	1030	
2832-127	18-Nov-05	1180	
2832-128	18-Nov-05	1040	
2832-129	18-Nov-05	1380	
2832-130	18-Nov-05	1000	
2832-131	17-Nov-05	608	
2832-132	18-Nov-05	671	
2832-133	18-Nov-05	746	
2832-134	18-Nov-05	10	
2832-135	18-Nov-05	1140	
2832-136	17-Nov-05	1850	
2832-137	18-Nov-05	532	
2832-139	18-Nov-05	10	
2832-140	19-Nov-05	1270	
2832-141	19-Nov-05	923	
2832-142	19-Nov-05	974	
2832-143	19-Nov-05	678	
2832-144	19-Nov-05	1340	
2832-145	19-Nov-05	768	
2832-146	19-Nov-05	226	
2832-147	21-Nov-05	843	
2832-148	21-Nov-05	860	
2832-149	21-Nov-05	797	
2832-150	21-Nov-05	538	
2832-151	21-Nov-05	612	
2832-152	21-Nov-05	219	
2832-153	21-Nov-05	566	
2832-154	21-Nov-05	1020	
2832-155	21-Nov-05	1080	
2832-156	21-Nov-05	863	
2832-160	22-Nov-05	11	
2832-161	22-Nov-05	10.7	
2832-162	22-Nov-05	36.3	
2832-163	22-Nov-05	10	
2832-164	22-Nov-05	17.3	
2832-166	22-Nov-05	26.3	
2863-101	29-Nov-05	177	
2863-102	29-Nov-05	514	
2863-103	02-Dec-05	1120	
2863-104	02-Dec-05	977	
2863-105	02-Dec-05	1190	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2863-106	02-Dec-05	1190	
2863-107	02-Dec-05	1060	
2863-108	03-Dec-05	363	
2863-109	02-Dec-05	656	
2863-110	29-Nov-05	198	
2863-111	01-Dec-05	16.7	
2863-112	29-Nov-05	309	
2863-113	01-Dec-05	10	
2863-114	01-Dec-05	10.7	
2863-115	01-Dec-05	196	
2863-116	01-Dec-05	42	
2863-117	05-Dec-05	926	
2863-118	05-Dec-05	555	
2863-119	01-Dec-05	10	
2863-120	02-Dec-05	682	
2863-121	02-Dec-05	496	
2863-122	29-Nov-05	282	
2863-123	29-Nov-05	552	
2863-124	01-Dec-05	10	
2863-125	29-Nov-05	477	
2863-126	05-Dec-05	53.1	
2863-127	05-Dec-05	80.8	
2863-128	05-Dec-05	231	
2863-129	05-Dec-05	154	
2863-130	05-Dec-05	498	
2863-131	03-Dec-05	456	
2863-132	05-Dec-05	243	
2863-133	05-Dec-05	63.5	
2863-134	05-Dec-05	76.6	
2863-135	03-Dec-05	568	
2863-136	05-Dec-05	765	
2863-137	03-Dec-05	667	
2863-138	05-Dec-05	10	
2863-139	05-Dec-05	823	
2863-140	05-Dec-05	742	
2863-141	06-Dec-05	121	
2863-142	06-Dec-05	10	
2863-143	06-Dec-05	159	
2863-144	06-Dec-05	217	
2863-145	06-Dec-05	763	
2863-146	06-Dec-05	79.8	
2863-148	06-Dec-05	83.5	
2863-149	06-Dec-05	286	
2863-150	06-Dec-05	414	
2863-151	06-Dec-05	1720	
2863-152	06-Dec-05	533	
2863-153	06-Dec-05	147	
2863-154	06-Dec-05	443	
2863-155	06-Dec-05	30	
2863-156	07-Dec-05	596	
2863-157	07-Dec-05	650	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2863-158	07-Dec-05	839	
2863-159	07-Dec-05	658	
2863-161	07-Dec-05	325	
2863-162	07-Dec-05	185	
2863-163	07-Dec-05	970	
2863-164	07-Dec-05	847	
2863-165	07-Dec-05	578	
2863-166	07-Dec-05	716	
2863-167	07-Dec-05	93.8	
2863-168	07-Dec-05	204	
2863-169	07-Dec-05	990	
2873-101	16-Dec-05	72.5	
2873-102	16-Dec-05	79	
2873-103	14-Dec-05	511	
2873-104	15-Dec-05	512	
2873-105	16-Dec-05	25	
2873-106	15-Dec-05	801	
2873-107	16-Dec-05	1100	
2873-108	16-Dec-05	197	
2873-112	15-Dec-05	1060	
2873-113	16-Dec-05	843	
2873-114	15-Dec-05	1060	
2873-115	08-Dec-05	169	
2873-118	14-Dec-05	587	
2873-119	16-Dec-05	777	
2873-120	15-Dec-05	862	
2873-121	15-Dec-05	590	
2873-122	16-Dec-05	757	
2873-123	17-Dec-05	921	
2873-124	17-Dec-05	413	
2873-125	17-Dec-05	941	
2873-126	17-Dec-05	731	
2873-127	17-Dec-05	516	
2873-128	17-Dec-05	729	
2873-129	19-Dec-05	320	
2873-130	19-Dec-05	45.4	
2873-131	19-Dec-05	447	
2873-132	19-Dec-05	453	
2873-133	19-Dec-05	480	
2873-134	19-Dec-05	300	
2873-135	19-Dec-05	598	
2873-136	19-Dec-05	350	
2873-137	19-Dec-05	712	
2873-138	20-Dec-05	337	
2873-139	20-Dec-05	96.2	
2873-140	20-Dec-05	233	
2873-141	20-Dec-05	80.8	
2873-142	20-Dec-05	853	
2873-143	20-Dec-05	46	
2873-144	20-Dec-05	39.5	
2873-145	21-Dec-05	94.9	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2873-146	21-Dec-05	33.9	
2873-147	21-Dec-05	73.6	
2873-149	21-Dec-05	1070	
2873-150	21-Dec-05	762	
2873-151	21-Dec-05	633	
2873-152	21-Dec-05	10	
2873-153	21-Dec-05	75.3	
2882-101	04-Jan-06	111	
2882-102	04-Jan-06	1110	
2882-103	04-Jan-06	789	
2882-104	04-Jan-06	697	
2882-105	04-Jan-06	697	
2882-106	04-Jan-06	613	
2882-107	04-Jan-06	854	
2882-108	04-Jan-06	1180	
2882-109	04-Jan-06	655	
2882-110	04-Jan-06	726	
2882-111	04-Jan-06	841	
2882-112	04-Jan-06	1170	
2882-113	05-Jan-06	413	
2882-114	05-Jan-06	534	
2882-115	04-Jan-06	531	
2882-116	05-Jan-06	1390	
2882-117	05-Jan-06	70	
2882-118	05-Jan-06	727	
2882-119	05-Jan-06	458	
2882-120	05-Jan-06	64.4	
2882-121	05-Jan-06	696	
2882-122	05-Jan-06	1610	
2882-123	05-Jan-06	883	
2882-124	05-Jan-06	785	
2882-125	05-Jan-06	84.6	
2882-126	05-Jan-06	789	
2882-127	06-Jan-06	59.9	
2882-128	06-Jan-06	51.5	
2882-129	06-Jan-06	54.9	
2882-130	06-Jan-06	382	
2882-131	06-Jan-06	56.7	
2882-132	06-Jan-06	58.9	
2882-133	06-Jan-06	315	
2882-134	06-Jan-06	49.6	
2882-135	06-Jan-06	74	
2882-136	06-Jan-06	88.1	
2882-137	06-Jan-06	72.3	
2882-138	06-Jan-06	88.9	
2882-139	07-Jan-06	47.9	
2882-140	07-Jan-06	57.8	
2882-141	07-Jan-06	68.6	
2882-142	07-Jan-06	57.4	
2882-143	07-Jan-06	43	
2882-144	07-Jan-06	61.7	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2882-145	07-Jan-06	43.6	
2882-146	07-Jan-06	654	
2882-147	07-Jan-06	56.4	
2882-148	07-Jan-06	67.1	
2882-149	07-Jan-06	58.7	
2882-150	07-Jan-06	64.2	
2882-151	07-Jan-06	53	
2882-153	07-Jan-06	27.8	
2882-154	07-Jan-06	53.1	
2882-155	07-Jan-06	40.4	
2882-156	09-Jan-06	199	
2882-157	09-Jan-06	1420	
2882-158	09-Jan-06	283	
2882-159	09-Jan-06	51.5	
2882-160	09-Jan-06	81.2	
2882-161	09-Jan-06	45.6	
2882-162	22-Nov-05	70.4	
2882-163	09-Jan-06	63.2	
2882-164	09-Jan-06	249	
2882-165	09-Jan-06	74.3	
2882-166	09-Jan-06	539	
2882-167	09-Jan-06	753	
2882-168	10-Jan-06	41.2	
2882-169	10-Jan-06	40.5	
2882-170	10-Jan-06	38.7	
2882-171	10-Jan-06	38.8	
2882-172	10-Jan-06	277	
2882-173	10-Jan-06	273	
2882-174	10-Jan-06	289	
2882-175	10-Jan-06	265	
2901-101	21-Jan-06	146	
2901-102	20-Jan-06	10	
2901-103	21-Jan-06	487	
2901-104	21-Jan-06	74.6	
2901-105	20-Jan-06	169	
2901-106	20-Jan-06	185	
2901-107	20-Jan-06	157	
2901-108	20-Jan-06	261	
2901-109	20-Jan-06	400	
2901-110	20-Jan-06	62.1	
2901-111	19-Jan-06	445	
2901-112	20-Jan-06	10	
2901-113	20-Jan-06	187	
2901-114	19-Jan-06	53.8	
2901-115	19-Jan-06	190	
2901-116	20-Jan-06	205	
2901-117	21-Jan-06	41.4	
2901-118	21-Jan-06	61.3	
2915-101	02-Feb-06	81.2	
2915-102	02-Feb-06	104	
2915-103	01-Feb-06	269	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2915-104	02-Feb-06	114	
2915-105	02-Feb-06	72.7	
2915-106	02-Feb-06	78.1	
2915-107	01-Feb-06	549	
2915-108	01-Feb-06	103	
2915-109	02-Feb-06	116	
2915-110	02-Feb-06	10	
2915-111	01-Feb-06	63.9	
2915-112	01-Feb-06	10	
2915-113	02-Feb-06	147	
2915-114	03-Feb-06	84.5	
2915-115	01-Feb-06	96.9	
2915-116	01-Feb-06	73.4	
2915-117	03-Feb-06	41.6	
2915-118	03-Feb-06	67.5	
2915-119	06-Feb-06	10	
2915-120	06-Feb-06	156	
2915-121	06-Feb-06	44	
2915-122	07-Feb-06	51	
2938-121	03-Mar-06	92.5	
2938-121	03-Mar-06	86	
2944-101	20-Feb-06	785	
2944-102	21-Feb-06	400	
2944-103	20-Feb-06	167	
2944-104	15-Feb-06	104	
2944-105	20-Feb-06	113	
2944-106	22-Feb-06	10	
2944-107	22-Feb-06	600	
2944-108	20-Feb-06	255	
2944-109	20-Feb-06	550	
2944-110	20-Feb-06	713	
2944-111	20-Feb-06	556	
2944-112	20-Feb-06	669	
2944-113	20-Feb-06	605	
2944-114	20-Feb-06	1060	
2944-115	20-Feb-06	1150	
2944-116	20-Feb-06	970	
2944-117	20-Feb-06	516	
2944-118	15-Feb-06	72.2	
2944-119	20-Feb-06	574	
3037-101	19-May-06	10	
3037-102	19-May-06	760	
3037-103	19-May-06	878	
3037-104	19-May-06	1050	
3037-105	23-May-06	75.4	
3037-106	19-May-06	75.4	
3037-108	23-May-06	75.1	
3037-109	23-May-06	184	
3053-101		81.3	
3053-102		969	
3053-103		10	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3053-104		224	
3053-106		1060	
3073-102		75.7	
3073-104		611	
3134-001		227	
3134-001		227	
3134-002		1340	
3134-002		1260	
3134-004		401	
3134-005		596	
3149-001	21-Aug-06	1180	
3149-002	21-Aug-06	784	
3149-003	21-Aug-06	1390	
3149-004	21-Aug-06	1340	
3149-004-	21-Aug-06	1390	
3149-005	21-Aug-06	1020	
3149-006	21-Aug-06	1230	
3149-007	21-Aug-06	1120	
3149-008	21-Aug-06	1750	
3149-009	21-Aug-06	1130	
3149-010	21-Aug-06	1110	
3149-011	21-Aug-06	1140	
3149-012	21-Aug-06	1240	
3149-013	21-Aug-06	1090	
3149-014	21-Aug-06	1180	
3149-015	21-Aug-06	1590	
3149-016	21-Aug-06	977	
3149-017	21-Aug-06	991	
3149-017-	21-Aug-06	994	
3149-018	22-Aug-06	10	
3149-019	22-Aug-06	1440	
3149-020	22-Aug-06	1430	
3149-021	22-Aug-06	1140	
3149-022	22-Aug-06	53	
3149-023	22-Aug-06	1380	
3149-024	22-Aug-06	2220	X
3227-101	19-Sep-06	143	
3227-103	12-Sep-06	1190	
3227-104	19-Sep-06	114	
3227-105	20-Sep-06	51.6	
3227-106	20-Sep-06	164	
3227-107	15-Sep-06	732	
3227-108	20-Sep-06	146	
3227-109	20-Sep-06	105	
3227-110	21-Sep-06	109	
3227-111	22-Sep-06	629	
3227-112	20-Sep-06	144	
3227-113	21-Sep-06	628	
3227-114	20-Sep-06	149	
3227-115	20-Sep-06	43.2	
3271-101	06-Oct-06	974	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3271-102	06-Oct-06	533	
3271-103	03-Oct-06	1500	
3271-104	07-Oct-06	1100	
3271-105	07-Oct-06	570	
3298-101	06-Dec-06	290	
3298-101-	06-Dec-06	302	
3298-103	29-Nov-06	113	
3298-106	05-Dec-06	1340	
3298-107	06-Dec-06	191	
3298-108	08-Dec-06	844	
3298-109	08-Dec-06	500	
3339-102	06-Jan-07	52.9	
3339-103	08-Jan-07	848	
3339-104	09-Jan-07	448	
3339-105	09-Jan-07	194	
3339-106	09-Jan-07	228	
3339-107	02-Jan-07	1540	
3339-108	05-Jan-07	673	
3339-109	09-Jan-07	64.9	
3339-110	09-Jan-07	571	
3339-111	09-Jan-07	301	
3339-112	09-Jan-07	12.7	
3339-113	09-Jan-07	234	
3339-114	09-Jan-07	288	
3339-115	09-Jan-07	1070	
3339-117	09-Jan-07	18.5	
3339-118	09-Jan-07	455	
3339-119	09-Jan-07	15.1	
3339-120	10-Jan-07	871	
3339-121	10-Jan-07	260	
3339-122	10-Jan-07	1170	
3339-123	10-Jan-07	164	
3339-124	10-Jan-07	523	
3339-125	11-Jan-07	55.3	
3339-126	11-Jan-07	75.6	
3339-127	11-Jan-07	1440	
3339-128	11-Jan-07	767	
3339-129	11-Jan-07	319	
3339-130	11-Jan-07	350	
3339-131	11-Jan-07	849	
3339-132	11-Jan-07	156	
3339-133	16-Jan-07	762	
3339-133-	16-Jan-07	757	
3339-134	16-Jan-07	538	
3339-134-	16-Jan-07	535	
3339-135	16-Jan-07	546	
3339-135-	16-Jan-07	536	
3339-136	16-Jan-07	1100	
3339-137	16-Jan-07	1090	
3339-138	16-Jan-07	182	
3339-139	16-Jan-07	1310	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3339-139-	16-Jan-07	1310	
3339-140	16-Jan-07	178	
3339-141	16-Jan-07	181	
3339-142	17-Jan-07	408	
3339-143	17-Jan-07	303	
3339-143-	17-Jan-07	297	
3339-144	17-Jan-07	37.1	
3339-145	18-Jan-07	696	
3339-146	18-Jan-07	856	
3339-147	18-Jan-07	865	
3339-148	18-Jan-07	57.3	
3339-149	18-Jan-07	59.3	
3339-150	18-Jan-07	87.9	
3339-151	18-Jan-07	73.7	
3339-152	18-Jan-07	48.4	
3339-153	18-Jan-07	53.6	
3339-154	18-Jan-07	10	
3339-155	18-Jan-07	67.3	
3339-156	19-Jan-07	10	
3339-157	18-Jan-07	1020	
3339-158	19-Jan-07	10	
3339-159	19-Jan-07	1530	
3339-160	19-Jan-07	10	
3339-161	19-Jan-07	25.4	
3339-162	19-Jan-07	54.9	
3339-163	19-Jan-07	213	
3339-164	19-Jan-07	30.4	
3339-165	19-Jan-07	66.8	
3339-166	20-Jan-07	1220	
3339-167	20-Jan-07	728	
3339-168	20-Jan-07	170	
3339-169	20-Jan-07	31.7	
3339-170	23-Jan-07	118	
3339-171	23-Jan-07	906	
3339-172	23-Jan-07	149	
3339-172-	23-Jan-07	151	
3339-173	23-Jan-07	914	
3359-101	06-Feb-07	81.2	
3359-102	06-Feb-07	162	
3359-103	06-Feb-07	796	
3359-104	06-Feb-07	45.7	
3359-105	06-Feb-07	1010	
3359-107	07-Feb-07	354	
3359-108	07-Feb-07	1150	
3359-109	08-Feb-07	156	
3359-110	09-Feb-07	835	
3359-111	09-Feb-07	119	
3359-112	09-Feb-07	236	
3359-113	10-Feb-07	61.3	
3359-114	10-Feb-07	182	
3359-115	12-Feb-07	101	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3359-116	12-Feb-07	967	
3359-117	12-Feb-07	649	
3359-118	12-Feb-07	101	
3359-119	12-Feb-07	172	
3359-120	12-Feb-07	41.4	
3359-121	12-Feb-07	74.9	
3359-122	12-Feb-07	60.3	
3377-142	05-Mar-07	94	
3419-139		88.3	
3419-149		189	
3419-205		88.2	
3419-215		196	
3422-101		119	
3422-101-		115	
3422-102		403	
3422-103		1250	
3422-103-		1130	
3422-104		1210	
3449-101		486	
3449-102		458	
3449-103		75.7	
3449-104		38.1	
3483-101	22-May-07	1190	
3483-101-	22-May-07	1180	
3483-102	23-May-07	55.2	
3483-103	21-May-07	54.9	
3483-103-	21-May-07	56.6	
3483-104	22-May-07	39.6	
3483-105	05-May-07	1120	
3483-106	19-May-07	1190	
3483-107	19-May-07	55.6	
3483-108	22-May-07	277	
3521-101		796	
3521-101-		787	
3521-102		808	
3521-102-		785	
3521-103		1240	
3521-103-		1240	
3521-104		1100	
3521-104-		1090	
3521-105		564	
3521-105-		567	
3521-106		809	
3521-106-		824	
3521-107		21.1	
3521-108		49.5	
3521-109		736	
3534-101	29-Jun-07	55.6	
3534-101-	29-Jun-07	55.2	
3534-102	29-Jun-07	55.5	
3534-103	30-Jun-07	80.8	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3534-103-	30-Jun-07	78.2	
3534-104	29-Jun-07	543	
3534-104-	29-Jun-07	545	
3534-105	30-Jun-07	69.7	
3534-105-	30-Jun-07	69.7	
3534-106	29-Jun-07	307	
3534-106-	29-Jun-07	302	
3534-107	29-Jun-07	515	
3534-108	30-Jun-07	48.1	
3534-109	03-Jul-07	39.4	
3534-109-	03-Jul-07	39.5	
3575-101	04-Aug-07	148	
3575-102	04-Aug-07	201	
3575-102-	04-Aug-07	205	
3575-103	06-Aug-07	5	
3575-104	06-Aug-07	51.5	
3575-105	01-Aug-07	459	
3575-105-	01-Aug-07	458	
3575-106	24-Jul-07	797	
3575-106-	24-Jul-07	783	
3575-107	23-Jul-07	87.4	
3575-107-	23-Jul-07	86.8	
3575-108	03-Aug-07	61.3	
3575-108-	03-Aug-07	54.1	
3656-101		175	
3656-102		174	
3656-103		172	
3656-104		188	
3656-105		281	
3656-106		224	
3656-107		199	
3656-108		199	
3656-109		231	
3656-110		212	
3656-111		741	
3656-112		759	
3656-113		739	
3656-114		764	
3656-115		962	
3656-116		921	
3656-117		921	
3656-118		931	
3656-119		314	
3656-120		308	
3656-121		312	
3656-122		315	
3656-123		79.7	
3656-124		77.4	
3656-125		79.9	
3656-126		77.3	
3656-127		213	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3656-128		192	
3656-129		198	
3656-130		221	
3675-101	01-Oct-07	37.4	
3675-102	01-Oct-07	39.6	
3675-103	01-Oct-07	37.5	
3675-104	01-Oct-07	40.2	
3675-105	01-Oct-07	296	
3675-106	01-Oct-07	328	
3675-107	01-Oct-07	335	
3675-108	01-Oct-07	453	
3675-109	02-Oct-07	31.7	
3675-110	02-Oct-07	38.4	
3675-111	02-Oct-07	27.3	
3675-112	02-Oct-07	27.7	
3675-113	02-Oct-07	63	
3675-114	02-Oct-07	60.7	
3675-115	02-Oct-07	63.8	
3675-116	02-Oct-07	61.3	
3675-117	02-Oct-07	58.6	
3675-118	02-Oct-07	60.8	
3675-119	02-Oct-07	6.3	
3675-120	02-Oct-07	63.8	
3675-121	03-Oct-07	67.2	
3675-121-	03-Oct-07	68.1	
3675-123-	03-Oct-07	69.1	
3675-124	03-Oct-07	67.2	
3675-124-	03-Oct-07	67	
3675-122	03-Oct-07	67.7	
3675-122-	03-Oct-07	67.5	
3675-123	03-Oct-07	67.3	
3675-125	04-Oct-07	739	
3675-126	04-Oct-07	771	
3675-126-	04-Oct-07	819	
3675-127	04-Oct-07	808	
3675-128	04-Oct-07	789	
3675-128-	04-Oct-07	803	
3675-129	05-Oct-07	635	
3675-130	05-Oct-07	599	
3675-131	05-Oct-07	638	
3675-132	05-Oct-07	600	
3675-133	08-Oct-07	448	
3675-134	08-Oct-07	448	
3675-135	08-Oct-07	457	
3675-136	08-Oct-07	442	
3691-101	19-Oct-07	48.2	
3691-102	19-Oct-07	47.3	
3691-103	19-Oct-07	58.6	
3691-104	19-Oct-07	47.6	
3691-104-	19-Oct-07	48	
3691-105	19-Oct-07	39.4	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3691-106	19-Oct-07	49.3	
3691-107	19-Oct-07	50	
3691-108	19-Oct-07	49.8	
3691-109	19-Oct-07	48.9	
3691-110	19-Oct-07	47.6	
3691-111	20-Oct-07	1000	
3691-112	20-Oct-07	994	
3691-113	20-Oct-07	594	
3691-114	20-Oct-07	630	
3691-115	20-Oct-07	632	
3691-116	20-Oct-07	631	
3691-117	20-Oct-07	876	
3691-118	20-Oct-07	889	
3691-118-	20-Oct-07	876	
3691-119	20-Oct-07	434	
3691-120	20-Oct-07	442	
3691-121	20-Oct-07	435	
3691-122	20-Oct-07	434	
3691-122-	20-Oct-07	433	
3691-123	23-Oct-07	76.4	
3691-124	23-Oct-07	74.8	
3691-125	23-Oct-07	76.7	
3691-126	23-Oct-07	72.3	
3691-127	23-Oct-07	70.8	
3691-128	23-Oct-07	70.4	
3691-128-	23-Oct-07	71.8	
3691-129	23-Oct-07	68.7	
3691-130	23-Oct-07	68.8	
3691-131	24-Oct-07	757	
3691-132	24-Oct-07	761	
3691-133	24-Oct-07	745	
3691-134	24-Oct-07	714	
3691-135	24-Oct-07	739	
3691-136	24-Oct-07	711	
3691-137	24-Oct-07	524	
3691-138	24-Oct-07	505	
3691-138-	24-Oct-07	508	
3708-101	25-Oct-07	76.8	
3708-102	25-Oct-07	80.3	
3708-103	25-Oct-07	73.5	
3708-104	25-Oct-07	77.3	
3708-105	25-Oct-07	117	
3708-106	25-Oct-07	113	
3708-107	03-Nov-07	449	
3708-108	03-Nov-07	471	
3708-108-	03-Nov-07	470	
3708-109	03-Nov-07	415	
3708-110	03-Nov-07	500	
3708-110-	03-Nov-07	512	
3708-111	03-Nov-07	465	
3708-112	03-Nov-07	449	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3708-112-	03-Nov-07	456	
3708-117	12-Nov-07	766	
3708-118	12-Nov-07	752	
3708-118-	12-Nov-07	764	
3708-119	12-Nov-07	725	
3708-120	12-Nov-07	744	
3750-101	12-Jan-08	186	
3750-102	12-Jan-08	192	
3750-103	12-Jan-08	192	
3750-104	12-Jan-08	166	
3750-105	11-Jan-08	174	
3750-106	11-Jan-08	166	
3750-107	18-Dec-07	692	
3750-107-	18-Dec-07	680	
3750-108	18-Dec-07	679	
3750-111	11-Jan-08	116	
3750-112	11-Jan-08	113	
3750-112-	11-Jan-08	113	
3750-119	16-Jan-08	10	
3750-120	16-Jan-08	84.6	
3750-120-	16-Jan-08	91.7	
3750-121	16-Jan-08	88	
3750-122	16-Jan-08	86	
3750-125	13-Dec-07	46.1	
3750-125-	13-Dec-07	46.7	
3750-126	13-Dec-07	49.3	
3750-126-	13-Dec-07	47.1	
3750-127	10-Jan-08	594	
3750-129	16-Jan-08	389	
3750-130	16-Jan-08	446	
3750-131	16-Jan-08	466	
3750-132	15-Jan-08	947	
3750-133	15-Jan-08	1020	
3750-134	15-Jan-08	960	
3750-135	15-Jan-08	999	
3772-101	14-Feb-08	289	
3772-102	14-Feb-08	215	
3772-103	14-Feb-08	267	
3772-104	14-Feb-08	282	
3772-104-	14-Feb-08	302	
3785-107	26-Feb-08	62	
3785-108	26-Feb-08	56.1	
3785-109	26-Feb-08	112	
3785-110	26-Feb-08	101	
3785-111	28-Feb-08	482	
3785-112	28-Feb-08	498	
3785-113	28-Feb-08	482	
3785-114	28-Feb-08	458	
3785-115	28-Feb-08	907	
3785-116	28-Feb-08	832	
3785-117	29-Feb-08	1730	

Table 4-15
Analytical Results for Barium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3785-118	29-Feb-08	1720	
3785-119	29-Feb-08	1650	
3785-120	29-Feb-08	1880	
3785-122	29-Feb-08	941	
3785-123	29-Feb-08	1020	
3785-124	29-Feb-08	985	
3785-124-	29-Feb-08	951	
3785-125	29-Feb-08	10.1	
3785-126	29-Feb-08	10	
3785-127	29-Feb-08	992	
3785-128	29-Feb-08	1000	
3785-129	29-Feb-08	101	
3785-130	29-Feb-08	90.3	
3785-131	29-Feb-08	94.8	
3785-132	29-Feb-08	104	
3785-133	29-Feb-08	982	
3785-134	29-Feb-08	957	
3785-146	01-Mar-08	393	
3785-147	01-Mar-08	398	
3785-148	01-Mar-08	1100	
3785-149	01-Mar-08	1170	
3785-150	01-Mar-08	181	
3785-151	01-Mar-08	176	
3785-152	01-Mar-08	2140	X
3785-153	01-Mar-08	1890	
3785-154	01-Mar-08	1850	
3785-155	01-Mar-08	2050	X
3866-001	16-Apr-08	373	
3866-002	16-Apr-08	420	
3866-003	16-Apr-08	397	
3866-004	16-Apr-08	486	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2774-144	15-Sep-05	1	
2774-145	15-Sep-05	1	
2801-101	10-Oct-05	1	
2801-101-	10-Oct-05	1	
2801-103	12-Oct-05	1	
2801-103-	12-Oct-05	1	
2801-104	06-Oct-05	1	
2801-104-	06-Oct-05	1	
2801-105	06-Oct-05	1	
2801-106	12-Oct-05	1	
2801-107	13-Oct-05	1	
2801-108	11-Oct-05	1	
2801-109	10-Oct-05	1	
2801-110	10-Oct-05	1	
2801-111	11-Oct-05	1	
2801-112	12-Oct-05	1	
2801-113	07-Oct-05	1	
2801-114	10-Oct-05	1	
2801-115	12-Oct-05	1	
2801-116	12-Oct-05	1	
2801-117	11-Oct-05	1	
2801-118	10-Oct-05	1	
2801-119	11-Oct-05	1	
2801-120	07-Oct-05	1	
2801-122	20-Oct-05	1	
2801-123	20-Oct-05	1	
2801-202	12-Oct-05	1	
2801-202-	12-Oct-05	1	
2801-204	06-Oct-05	1	
2801-204-	06-Oct-05	1	
2801-205	12-Oct-05	1	
2801-207	11-Oct-05	1	
2801-208	12-Oct-05	1	
2801-209	12-Oct-05	1	
2801-210	12-Oct-05	1	
2801-201	10-Oct-05	1	
2801-201-	10-Oct-05	1	
2801-239	06-Oct-05	1	
2801-256	07-Oct-05	1	
2801-261	22-Oct-05	1	
2801-263	22-Oct-05	1	
2801-266	22-Oct-05	1	
2801-267	22-Oct-05	1	
2801-268	20-Oct-05	1	
2801-211	11-Oct-05	1	
2801-212	12-Oct-05	1	
2801-213	11-Oct-05	1	
2801-214	13-Oct-05	1	
2801-215	13-Oct-05	1	
2801-216	12-Oct-05	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2801-217	12-Oct-05	1	
2801-218	12-Oct-05	1	
2801-219	12-Oct-05	1	
2801-220	11-Oct-05	1	
2801-221	12-Oct-05	1	
2801-222	12-Oct-05	1	
2801-223	12-Oct-05	1	
2801-224	12-Oct-05	1	
2801-226	12-Oct-05	1	
2801-227	13-Oct-05	1	
2801-228	07-Oct-05	1	
2801-229	12-Oct-05	1	
2801-231	06-Oct-05	1	
2801-232	10-Oct-05	1	
2801-233	10-Oct-05	1	
2801-235	07-Oct-05	1	
2801-236	10-Oct-05	1	
2801-237	06-Oct-05	1	
2801-238	10-Oct-05	1	
2801-241	10-Oct-05	1	
2801-243	06-Oct-05	1	
2801-244	12-Oct-05	1	
2801-245	10-Oct-05	1	
2801-246	06-Oct-05	1	
2801-247	07-Oct-05	1	
2801-249	07-Oct-05	1	
2801-250	10-Oct-05	1	
2801-251	10-Oct-05	1	
2801-252	10-Oct-05	1	
2801-253	10-Oct-05	1	
2801-254	10-Oct-05	1	
2801-255	10-Oct-05	1	
2801-264	22-Oct-05	1	
2801-265	22-Oct-05	1	
2801-271	20-Oct-05	1	
2801-272	20-Oct-05	1	
2823-101	24-Oct-05	1	
2823-102	24-Oct-05	1	
2823-103	24-Oct-05	1	
2823-104	24-Oct-05	1	
2823-105	24-Oct-05	1	
2823-107	21-Oct-05	1	
2823-108	21-Oct-05	1	
2823-111	21-Oct-05	1	
2823-112	21-Oct-05	1	
2823-113	11-Oct-05	1	
2823-114	20-Oct-05	1	
2823-115	20-Oct-05	1	
2823-117	20-Oct-05	1	
2823-118	20-Oct-05	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2823-119	20-Oct-05	1	
2823-120	20-Oct-05	1	
2823-121	21-Oct-05	1	
2823-124	25-Oct-05	1	
2823-125	25-Oct-05	1	
2823-126	25-Oct-05	1	
2823-127	25-Oct-05	1	
2823-128	25-Oct-05	1	
2823-129	25-Oct-05	1	
2823-130	25-Oct-05	1	
2823-131	25-Oct-05	1	
2823-132	25-Oct-05	1	
2823-133	25-Oct-05	1	
2823-134	25-Oct-05	1	
2823-135	27-Oct-05	1	
2823-136	26-Oct-05	1	
2823-140	26-Oct-05	1	
2823-143	26-Oct-05	1	
2823-145	26-Oct-05	1	
2823-201	21-Oct-05	1	
2823-202	21-Oct-05	1	
2823-203	24-Oct-05	1	
2823-204	25-Oct-05	1	
2823-205	25-Oct-05	1	
2823-206	25-Oct-05	1	
2823-207	25-Oct-05	1	
2823-208	25-Oct-05	1	
2823-210	26-Oct-05	1	
2832-101	03-Nov-05	1	
2832-102	03-Nov-05	1	
2832-103	03-Nov-05	1	
2832-104	08-Nov-05	1	
2832-106	03-Nov-05	1	
2832-107	03-Nov-05	1	
2832-108	03-Nov-05	1	
2832-111	16-Nov-05	1	
2832-114	16-Nov-05	1	
2832-117	16-Nov-05	1	
2832-118	16-Nov-05	1	
2832-119	16-Nov-05	1	
2832-121	16-Nov-05	1	
2832-122	16-Nov-05	1	
2832-124	16-Nov-05	1	
2832-125	18-Nov-05	1	
2832-126	18-Nov-05	1	
2832-127	18-Nov-05	1	
2832-128	18-Nov-05	1	
2832-130	18-Nov-05	1	
2832-131	17-Nov-05	1	
2832-132	18-Nov-05	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2832-133	18-Nov-05	1	
2832-134	18-Nov-05	1	
2832-139	18-Nov-05	1	
2832-143	19-Nov-05	1	
2832-147	21-Nov-05	1	
2832-148	21-Nov-05	1	
2832-149	21-Nov-05	1	
2832-151	21-Nov-05	1	
2832-152	21-Nov-05	1	
2832-153	21-Nov-05	1	
2832-154	21-Nov-05	1	
2832-155	21-Nov-05	1	
2832-160	22-Nov-05	1	
2832-161	22-Nov-05	1	
2832-162	22-Nov-05	1	
2832-163	22-Nov-05	1	
2832-164	22-Nov-05	1	
2863-102	29-Nov-05	1	
2863-104	02-Dec-05	1	
2863-105	02-Dec-05	1	
2863-106	02-Dec-05	1	
2863-107	02-Dec-05	1	
2863-108	03-Dec-05	1	
2863-109	02-Dec-05	1	
2863-111	01-Dec-05	1	
2863-113	01-Dec-05	1	
2863-116	01-Dec-05	1	
2863-117	05-Dec-05	1	
2863-118	05-Dec-05	1	
2863-119	01-Dec-05	1	
2863-121	02-Dec-05	1	
2863-122	29-Nov-05	1	
2863-123	29-Nov-05	1	
2863-124	01-Dec-05	1	
2863-125	29-Nov-05	1	
2863-126	05-Dec-05	1	
2863-127	05-Dec-05	1	
2863-128	05-Dec-05	1	
2863-129	05-Dec-05	1	
2863-130	05-Dec-05	1	
2863-131	03-Dec-05	1	
2863-135	03-Dec-05	1	
2863-136	05-Dec-05	1	
2863-137	03-Dec-05	1	
2863-138	05-Dec-05	1	
2863-139	05-Dec-05	1	
2863-140	05-Dec-05	1	
2863-141	06-Dec-05	1	
2863-142	06-Dec-05	1	
2863-143	06-Dec-05	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2863-144	06-Dec-05	1	
2863-145	06-Dec-05	1	
2863-146	06-Dec-05	1	
2863-149	06-Dec-05	1	
2863-150	06-Dec-05	1	
2863-152	06-Dec-05	1	
2863-153	06-Dec-05	1	
2863-154	06-Dec-05	1	
2863-155	06-Dec-05	1	
2863-156	07-Dec-05	1	
2863-159	07-Dec-05	1	
2863-161	07-Dec-05	1	
2863-162	07-Dec-05	1	
2863-163	07-Dec-05	1	
2863-165	07-Dec-05	1	
2863-166	07-Dec-05	1	
2863-167	07-Dec-05	1	
2863-168	07-Dec-05	1	
2863-169	07-Dec-05	1	
2873-101	16-Dec-05	1	
2873-102	16-Dec-05	1	
2873-103	14-Dec-05	1	
2873-104	15-Dec-05	1	
2873-105	16-Dec-05	1	
2873-106	15-Dec-05	1	
2873-108	16-Dec-05	1	
2873-112	15-Dec-05	1	
2873-113	16-Dec-05	1	
2873-114	15-Dec-05	1	
2873-115	08-Dec-05	1	
2873-118	14-Dec-05	1	
2873-120	15-Dec-05	1	
2873-122	16-Dec-05	1	
2873-123	17-Dec-05	1	
2873-126	17-Dec-05	1	
2873-127	17-Dec-05	1	
2873-128	17-Dec-05	1	
2873-131	19-Dec-05	1	
2873-132	19-Dec-05	1	
2873-133	19-Dec-05	1	
2873-134	19-Dec-05	1	
2873-135	19-Dec-05	1	
2873-136	19-Dec-05	1	
2873-138	20-Dec-05	1	
2873-139	20-Dec-05	1	
2873-140	20-Dec-05	1	
2873-141	20-Dec-05	1	
2873-142	20-Dec-05	1	
2873-143	20-Dec-05	1	
2873-144	20-Dec-05	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2873-145	21-Dec-05	1	
2873-146	21-Dec-05	1	
2873-147	21-Dec-05	1	
2873-149	21-Dec-05	1	
2873-150	21-Dec-05	1	
2873-152	21-Dec-05	1	
2873-153	21-Dec-05	1	
2882-101	04-Jan-06	1	
2882-102	04-Jan-06	1	
2882-103	04-Jan-06	1	
2882-104	04-Jan-06	1	
2882-105	04-Jan-06	1	
2882-106	04-Jan-06	1	
2882-107	04-Jan-06	1	
2882-108	04-Jan-06	1	
2882-109	04-Jan-06	1	
2882-110	04-Jan-06	1	
2882-111	04-Jan-06	1	
2882-112	04-Jan-06	1	
2882-113	05-Jan-06	1	
2882-114	05-Jan-06	1	
2882-115	04-Jan-06	1	
2882-116	05-Jan-06	1	
2882-117	05-Jan-06	1	
2882-119	05-Jan-06	1	
2882-121	05-Jan-06	1	
2882-122	05-Jan-06	1	
2882-124	05-Jan-06	1	
2882-125	05-Jan-06	1	
2882-126	05-Jan-06	1	
2882-127	06-Jan-06	1	
2882-129	06-Jan-06	1	
2882-131	06-Jan-06	1	
2882-132	06-Jan-06	1	
2882-133	06-Jan-06	1	
2882-134	06-Jan-06	1	
2882-135	06-Jan-06	1	
2882-136	06-Jan-06	1	
2882-137	06-Jan-06	1	
2882-138	06-Jan-06	1	
2882-139	07-Jan-06	1	
2882-140	07-Jan-06	1	
2882-141	07-Jan-06	1	
2882-142	07-Jan-06	1	
2882-143	07-Jan-06	1	
2882-144	07-Jan-06	1	
2882-145	07-Jan-06	1	
2882-146	07-Jan-06	1	
2882-147	07-Jan-06	1	
2882-148	07-Jan-06	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2882-149	07-Jan-06	1	
2882-150	07-Jan-06	1	
2882-151	07-Jan-06	1	
2882-153	07-Jan-06	1	
2882-154	07-Jan-06	1	
2882-155	07-Jan-06	1	
2882-156	09-Jan-06	1	
2882-158	09-Jan-06	1	
2882-159	09-Jan-06	1	
2882-160	09-Jan-06	1	
2882-161	09-Jan-06	1	
2882-162	22-Nov-05	1	
2882-163	09-Jan-06	1	
2882-164	09-Jan-06	1	
2882-165	09-Jan-06	1	
2882-166	09-Jan-06	1	
2882-167	09-Jan-06	1	
2882-168	10-Jan-06	1	
2882-169	10-Jan-06	1	
2882-170	10-Jan-06	1	
2882-171	10-Jan-06	1	
2882-172	10-Jan-06	1	
2882-173	10-Jan-06	1	
2901-101	21-Jan-06	1	
2901-102	20-Jan-06	1	
2901-104	21-Jan-06	1	
2901-105	20-Jan-06	1	
2901-106	20-Jan-06	1	
2901-108	20-Jan-06	1	
2901-109	20-Jan-06	1	
2901-110	20-Jan-06	1	
2901-111	19-Jan-06	1	
2901-112	20-Jan-06	1	
2901-113	20-Jan-06	1	
2901-114	19-Jan-06	1	
2901-116	20-Jan-06	1	
2901-117	21-Jan-06	1	
2901-118	21-Jan-06	1	
2915-101	02-Feb-06	1	
2915-102	02-Feb-06	1	
2915-103	01-Feb-06	1	
2915-104	02-Feb-06	1	
2915-105	02-Feb-06	1	
2915-106	02-Feb-06	1	
2915-107	01-Feb-06	1	
2915-108	01-Feb-06	1	
2915-109	02-Feb-06	1	
2915-110	02-Feb-06	1	
2915-111	01-Feb-06	1	
2915-112	01-Feb-06	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2915-113	02-Feb-06	1	
2915-114	03-Feb-06	1	
2915-115	01-Feb-06	1	
2915-116	01-Feb-06	1	
2915-117	03-Feb-06	1	
2915-118	03-Feb-06	1	
2915-119	06-Feb-06	1	
2915-120	06-Feb-06	1	
2915-121	06-Feb-06	1	
2915-122	07-Feb-06	1	
2938-121	03-Mar-06	1	
2938-121	03-Mar-06	1	
2944-102	21-Feb-06	1	
2944-103	20-Feb-06	1	
2944-104	15-Feb-06	1	
2944-105	20-Feb-06	1	
2944-106	22-Feb-06	1	
2944-107	22-Feb-06	1	
2944-108	20-Feb-06	1	
2944-109	20-Feb-06	1	
2944-110	20-Feb-06	1	
2944-111	20-Feb-06	1	
2944-112	20-Feb-06	1	
2944-114	20-Feb-06	1	
2944-115	20-Feb-06	1	
2944-117	20-Feb-06	1	
2944-118	15-Feb-06	1	
2944-119	20-Feb-06	1	
3037-101	19-May-06	1	
3037-102	19-May-06	1	
3037-105	23-May-06	1	
3037-106	19-May-06	1	
3037-108	23-May-06	1	
3037-109	23-May-06	1	
3053-101		1	
3053-103		1	
3053-104		1	
3053-106		1	
3073-102		1	
3073-104		1	
3134-002		1	
3134-002		1	
3134-004		1	
3134-005		1	
3149-001	21-Aug-06	1	
3149-002	21-Aug-06	1	
3149-004	21-Aug-06	1	
3149-004-	21-Aug-06	1	
3149-005	21-Aug-06	1	
3149-006	21-Aug-06	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3149-009	21-Aug-06	1	
3149-010	21-Aug-06	1	
3149-011	21-Aug-06	1	
3149-012	21-Aug-06	1	
3149-014	21-Aug-06	1	
3149-015	21-Aug-06	1	
3149-016	21-Aug-06	1	
3149-017	21-Aug-06	1	
3149-017-	21-Aug-06	1	
3149-018	22-Aug-06	1	
3149-019	22-Aug-06	1	
3149-021	22-Aug-06	1	
3149-022	22-Aug-06	1	
3149-023	22-Aug-06	1	
3149-024	22-Aug-06	1	
3227-104	19-Sep-06	1	
3227-105	20-Sep-06	1	
3227-106	20-Sep-06	1	
3227-107	15-Sep-06	1	
3227-109	20-Sep-06	1	
3227-110	21-Sep-06	1	
3227-111	22-Sep-06	1	
3227-112	20-Sep-06	1	
3227-113	21-Sep-06	1	
3227-114	20-Sep-06	1	
3271-101	06-Oct-06	1	
3271-102	06-Oct-06	1	
3271-104	07-Oct-06	1	
3298-101	06-Dec-06	1	
3298-101-	06-Dec-06	1	
3298-103	29-Nov-06	1	
3298-107	06-Dec-06	1	
3298-108	08-Dec-06	1	
3298-109	08-Dec-06	1	
3339-102	06-Jan-07	1	
3339-103	08-Jan-07	1	
3339-104	09-Jan-07	1	
3339-105	09-Jan-07	1	
3339-106	09-Jan-07	1	
3339-107	02-Jan-07	1	
3339-108	05-Jan-07	1	
3339-109	09-Jan-07	1	
3339-110	09-Jan-07	1	
3339-111	09-Jan-07	1	
3339-112	09-Jan-07	1	
3339-114	09-Jan-07	1	
3339-115	09-Jan-07	1	
3339-117	09-Jan-07	1	
3339-119	09-Jan-07	1	
3339-123	10-Jan-07	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3339-124	10-Jan-07	1	
3339-125	11-Jan-07	1	
3339-126	11-Jan-07	1	
3339-127	11-Jan-07	1	
3339-128	11-Jan-07	1	
3339-129	11-Jan-07	1	
3339-130	11-Jan-07	1	
3339-131	11-Jan-07	1	
3339-132	11-Jan-07	1	
3339-136	16-Jan-07	1	
3339-140	16-Jan-07	1	
3339-141	16-Jan-07	1	
3339-142	17-Jan-07	1	
3339-144	17-Jan-07	1	
3339-145	18-Jan-07	1	
3339-147	18-Jan-07	1	
3339-148	18-Jan-07	1	
3339-149	18-Jan-07	1	
3339-150	18-Jan-07	1	
3339-151	18-Jan-07	1	
3339-152	18-Jan-07	1	
3339-153	18-Jan-07	1	
3339-154	18-Jan-07	1	
3339-155	18-Jan-07	1	
3339-156	19-Jan-07	1	
3339-157	18-Jan-07	1	
3339-158	19-Jan-07	1	
3339-159	19-Jan-07	1	
3339-160	19-Jan-07	1	
3339-161	19-Jan-07	1	
3339-162	19-Jan-07	1	
3339-163	19-Jan-07	1	
3339-165	19-Jan-07	1	
3339-166	20-Jan-07	1	
3339-167	20-Jan-07	1	
3339-168	20-Jan-07	1	
3339-169	20-Jan-07	1	
3339-170	23-Jan-07	1	
3339-171	23-Jan-07	1	
3339-173	23-Jan-07	1	
3359-101	06-Feb-07	1	
3359-102	06-Feb-07	1	
3359-103	06-Feb-07	1	
3359-105	06-Feb-07	1	
3359-108	07-Feb-07	1	
3359-109	08-Feb-07	1	
3359-110	09-Feb-07	1	
3359-111	09-Feb-07	1	
3359-112	09-Feb-07	1	
3359-113	10-Feb-07	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3359-114	10-Feb-07	1	
3359-115	12-Feb-07	1	
3359-116	12-Feb-07	1	
3359-118	12-Feb-07	1	
3359-119	12-Feb-07	1	
3359-120	12-Feb-07	1	
3359-121	12-Feb-07	1	
3359-122	12-Feb-07	1	
3377-142	05-Mar-07	1	
3419-139		1	
3419-205		1	
3422-101		1	
3422-101-		1	
3422-102		1	
3449-101		1	
3449-102		1	
3449-103		1	
3449-104		1	
3483-102	23-May-07	1	
3483-103	21-May-07	1	
3483-103-	21-May-07	1	
3483-104	22-May-07	1	
3483-105	05-May-07	1	
3483-107	19-May-07	1	
3483-108	22-May-07	1	
3521-101		1	
3521-101-		1	
3521-102		1	
3521-102-		1	
3521-103		1	
3521-103-		1	
3521-104		1	
3521-104-		1	
3521-105		1	
3521-105-		1	
3521-109		1	
3534-101	29-Jun-07	1	
3534-101-	29-Jun-07	1	
3534-102	29-Jun-07	1	
3534-103	30-Jun-07	1	
3534-103-	30-Jun-07	1	
3534-104	29-Jun-07	1	
3534-104-	29-Jun-07	1	
3534-105	30-Jun-07	1	
3534-105-	30-Jun-07	1	
3534-106	29-Jun-07	1	
3534-106-	29-Jun-07	1	
3534-107	29-Jun-07	1	
3534-108	30-Jun-07	1	
3534-109	03-Jul-07	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3534-109-	03-Jul-07	1	
3575-101	04-Aug-07	1	
3575-102	04-Aug-07	1	
3575-102-	04-Aug-07	1	
3575-103	06-Aug-07	1	
3575-104	06-Aug-07	1	
3575-106	24-Jul-07	1	
3575-106-	24-Jul-07	1	
3575-107	23-Jul-07	1	
3575-107-	23-Jul-07	1	
3575-108	03-Aug-07	1	
3575-108-	03-Aug-07	1	
3656-101		1	
3656-102		1	
3656-103		1	
3656-104		1	
3656-105		1	
3656-106		1	
3656-107		1	
3656-108		1	
3656-109		1	
3656-110		1	
3656-111		1	
3656-112		1	
3656-113		1	
3656-114		1	
3656-115		1	
3656-116		1	
3656-117		1	
3656-118		1	
3656-119		1	
3656-120		1	
3656-121		1	
3656-122		1	
3656-123		1	
3656-124		1	
3656-125		1	
3656-126		1	
3656-127		1	
3656-128		1	
3656-129		1	
3675-101	01-Oct-07	1	
3675-102	01-Oct-07	1	
3675-103	01-Oct-07	1	
3675-104	01-Oct-07	1	
3675-105	01-Oct-07	1	
3675-106	01-Oct-07	1	
3675-107	01-Oct-07	1	
3675-109	02-Oct-07	1	
3675-110	02-Oct-07	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3675-111	02-Oct-07	1	
3675-112	02-Oct-07	1	
3675-113	02-Oct-07	1	
3675-114	02-Oct-07	1	
3675-115	02-Oct-07	1	
3675-116	02-Oct-07	1	
3675-117	02-Oct-07	1	
3675-118	02-Oct-07	1	
3675-119	02-Oct-07	1	
3675-120	02-Oct-07	1	
3675-121	03-Oct-07	1	
3675-123	03-Oct-07	1	
3675-123-	03-Oct-07	1	
3675-124	03-Oct-07	1	
3675-121-	03-Oct-07	1	
3675-122	03-Oct-07	1	
3675-122-	03-Oct-07	1	
3675-124-	03-Oct-07	1	
3675-125	04-Oct-07	1	
3675-126	04-Oct-07	1	
3675-126-	04-Oct-07	1	
3675-127	04-Oct-07	1	
3675-128	04-Oct-07	1	
3675-128-	04-Oct-07	1	
3675-129	05-Oct-07	1	
3675-130	05-Oct-07	1	
3675-131	05-Oct-07	1	
3675-132	05-Oct-07	1	
3675-134	08-Oct-07	1	
3691-101	19-Oct-07	1	
3691-102	19-Oct-07	1	
3691-103	19-Oct-07	1	
3691-104	19-Oct-07	1	
3691-104-	19-Oct-07	1	
3691-105	19-Oct-07	1	
3691-106	19-Oct-07	1	
3691-107	19-Oct-07	1	
3691-108	19-Oct-07	1	
3691-109	19-Oct-07	1	
3691-110	19-Oct-07	1	
3691-111	20-Oct-07	1	
3691-112	20-Oct-07	1	
3691-117	20-Oct-07	1	
3691-118	20-Oct-07	1	
3691-118-	20-Oct-07	1	
3691-119	20-Oct-07	1	
3691-120	20-Oct-07	1	
3691-121	20-Oct-07	1	
3691-122	20-Oct-07	1	
3691-122-	20-Oct-07	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3691-123	23-Oct-07	1	
3691-124	23-Oct-07	1	
3691-125	23-Oct-07	1	
3691-126	23-Oct-07	1	
3691-127	23-Oct-07	1	
3691-128	23-Oct-07	1	
3691-128-	23-Oct-07	1	
3691-129	23-Oct-07	1	
3691-130	23-Oct-07	1	
3691-133	24-Oct-07	1	
3691-134	24-Oct-07	1	
3691-135	24-Oct-07	1	
3691-136	24-Oct-07	1	
3708-101	25-Oct-07	1	
3708-102	25-Oct-07	1	
3708-103	25-Oct-07	1	
3708-104	25-Oct-07	1	
3708-105	25-Oct-07	1	
3708-106	25-Oct-07	1	
3708-107	03-Nov-07	1	
3708-108	03-Nov-07	1	
3708-108-	03-Nov-07	1	
3708-110	03-Nov-07	1	
3708-110-	03-Nov-07	1	
3708-111	03-Nov-07	1	
3708-112	03-Nov-07	1	
3708-112-	03-Nov-07	1	
3708-117	12-Nov-07	1	
3708-118	12-Nov-07	1	
3708-118-	12-Nov-07	1	
3708-119	12-Nov-07	1	
3708-120	12-Nov-07	1	
3750-101	12-Jan-08	1	
3750-102	12-Jan-08	1	
3750-103	12-Jan-08	1	
3750-104	12-Jan-08	1	
3750-107	18-Dec-07	1	
3750-107-	18-Dec-07	1	
3750-108	18-Dec-07	1	
3750-111	11-Jan-08	1	
3750-112	11-Jan-08	1	
3750-112-	11-Jan-08	1	
3750-119	16-Jan-08	1	
3750-120	16-Jan-08	1	
3750-120-	16-Jan-08	1	
3750-121	16-Jan-08	1	
3750-122	16-Jan-08	1	
3750-125	13-Dec-07	1	
3750-125-	13-Dec-07	1	
3750-126	13-Dec-07	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3750-126-	13-Dec-07	1	
3750-127	10-Jan-08	1	
3750-130	16-Jan-08	1	
3750-131	16-Jan-08	1	
3750-132	15-Jan-08	1	
3750-133	15-Jan-08	1	
3750-134	15-Jan-08	1	
3750-135	15-Jan-08	1	
3772-101	14-Feb-08	1	
3772-102	14-Feb-08	1	
3772-103	14-Feb-08	1	
3772-104	14-Feb-08	1	
3772-104-	14-Feb-08	1	
3785-107	26-Feb-08	1	
3785-108	26-Feb-08	1	
3785-109	26-Feb-08	1	
3785-110	26-Feb-08	1	
3785-111	28-Feb-08	1	
3785-112	28-Feb-08	1	
3785-113	28-Feb-08	1	
3785-114	28-Feb-08	1	
3785-115	28-Feb-08	1	
3785-116	28-Feb-08	1	
3785-117	29-Feb-08	1	
3785-118	29-Feb-08	1	
3785-119	29-Feb-08	1	
3785-120	29-Feb-08	1	
3785-122	29-Feb-08	1	
3785-123	29-Feb-08	1	
3785-124	29-Feb-08	1	
3785-124-	29-Feb-08	1	
3785-125	29-Feb-08	1	
3785-126	29-Feb-08	1	
3785-127	29-Feb-08	1	
3785-128	29-Feb-08	1	
3785-129	29-Feb-08	1	
3785-130	29-Feb-08	1	
3785-131	29-Feb-08	1	
3785-132	29-Feb-08	1	
3785-133	29-Feb-08	1	
3785-134	29-Feb-08	1	
3785-146	01-Mar-08	1	
3785-147	01-Mar-08	1	
3785-148	01-Mar-08	1	
3785-149	01-Mar-08	1	
3785-150	01-Mar-08	1	
3785-151	01-Mar-08	1	
3785-152	01-Mar-08	1	
3785-153	01-Mar-08	1	
3785-154	01-Mar-08	1	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3785-155	01-Mar-08	1	
3866-001	16-Apr-08	1	
3866-002	16-Apr-08	1	
3866-003	16-Apr-08	1	
3866-004	16-Apr-08	1	
2832-115	16-Nov-05	1.01	
3419-149		1.01	
2823-122	20-Oct-05	1.02	
2863-120	02-Dec-05	1.02	
2863-132	05-Dec-05	1.03	
2882-174	10-Jan-06	1.03	
3339-113	09-Jan-07	1.03	
3339-118	09-Jan-07	1.03	
3134-001		1.04	
3750-106	11-Jan-08	1.04	
3037-104	19-May-06	1.05	
2832-156	21-Nov-05	1.06	
2944-101	20-Feb-06	1.06	
3483-106	19-May-07	1.06	
2882-118	05-Jan-06	1.08	
3339-139-	16-Jan-07	1.08	
3419-215		1.08	
3521-108		1.08	
3750-129	16-Jan-08	1.08	
2863-112	29-Nov-05	1.09	
3339-134	16-Jan-07	1.09	
3339-139	16-Jan-07	1.09	
3359-104	06-Feb-07	1.1	
3656-130		1.1	
3675-108	01-Oct-07	1.1	
3675-133	08-Oct-07	1.1	
3675-135	08-Oct-07	1.1	
2832-112	16-Nov-05	1.11	
2863-164	07-Dec-05	1.11	
2801-240	06-Oct-05	1.13	
3339-134-	16-Jan-07	1.13	
3521-106-		1.14	
2863-103	02-Dec-05	1.15	
2863-148	06-Dec-05	1.15	
2882-123	05-Jan-06	1.15	
3339-122	10-Jan-07	1.15	
3521-106		1.15	
3750-105	11-Jan-08	1.15	
2832-113	16-Nov-05	1.16	
3521-107		1.17	
3691-131	24-Oct-07	1.17	
3708-109	03-Nov-07	1.17	
3691-113	20-Oct-07	1.19	
2801-269	20-Oct-05	1.21	
3134-001		1.21	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3691-137	24-Oct-07	1.21	
3149-020	22-Aug-06	1.22	
3691-138-	24-Oct-07	1.22	
3691-114	20-Oct-07	1.23	
2801-270	20-Oct-05	1.24	
2873-121	15-Dec-05	1.24	
2873-151	21-Dec-05	1.24	
3149-003	21-Aug-06	1.24	
3691-116	20-Oct-07	1.24	
2823-137	25-Oct-05	1.25	
2832-116	16-Nov-05	1.25	
2873-130	19-Dec-05	1.26	
3053-102		1.26	
2832-166	22-Nov-05	1.27	
2873-137	19-Dec-05	1.27	
3339-138	16-Jan-07	1.27	
2944-113	20-Feb-06	1.28	
3359-107	07-Feb-07	1.3	
3339-133-	16-Jan-07	1.31	
2801-230	06-Oct-05	1.32	
3339-133	16-Jan-07	1.32	
3691-132	24-Oct-07	1.32	
2801-248	07-Oct-05	1.33	
2801-206	12-Oct-05	1.34	
2832-120	16-Nov-05	1.34	
2944-116	20-Feb-06	1.34	
3037-103	19-May-06	1.34	
2823-109	20-Oct-05	1.36	
2823-123	20-Oct-05	1.37	
2832-109	03-Nov-05	1.37	
2863-133	05-Dec-05	1.37	
3691-138	24-Oct-07	1.37	
2873-125	17-Dec-05	1.38	
2863-115	01-Dec-05	1.41	
3422-103-		1.41	
2801-234	07-Oct-05	1.42	
2801-262	22-Oct-05	1.43	
3359-117	12-Feb-07	1.43	
2823-106	21-Oct-05	1.45	
2873-129	19-Dec-05	1.45	
2882-130	06-Jan-06	1.45	
3271-105	07-Oct-06	1.45	
3483-101	22-May-07	1.47	
2801-121	20-Oct-05	1.48	
2832-105	03-Nov-05	1.48	
3339-135-	16-Jan-07	1.48	
2832-129	18-Nov-05	1.49	
2882-128	06-Jan-06	1.49	
3339-135	16-Jan-07	1.51	
3483-101-	22-May-07	1.51	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3339-137	16-Jan-07	1.52	
2863-101	29-Nov-05	1.53	
2873-124	17-Dec-05	1.54	
3422-103		1.54	
2901-103	21-Jan-06	1.57	
2801-242	06-Oct-05	1.58	
3271-103	03-Oct-06	1.58	
3227-103	12-Sep-06	1.6	
2823-110	21-Oct-05	1.62	
2823-139	26-Oct-05	1.67	
3339-121	10-Jan-07	1.71	
2863-158	07-Dec-05	1.75	
3227-101	19-Sep-06	1.8	
3675-136	08-Oct-07	1.8	
3691-115	20-Oct-07	1.83	
2863-110	29-Nov-05	1.86	
3339-120	10-Jan-07	1.86	
2882-120	05-Jan-06	1.88	
3575-105	01-Aug-07	1.9	
3575-105-	01-Aug-07	1.9	
2863-151	06-Dec-05	1.93	
2823-142	26-Oct-05	1.97	
2832-135	18-Nov-05	2	
2832-136	17-Nov-05	2	
2832-137	18-Nov-05	2	
2832-140	19-Nov-05	2	
2832-141	19-Nov-05	2	
2832-142	19-Nov-05	2	
2832-144	19-Nov-05	2	
2832-145	19-Nov-05	2	
2832-146	19-Nov-05	2	
3149-007	21-Aug-06	2	
3149-008	21-Aug-06	2	
3149-013	21-Aug-06	2	
2882-175	10-Jan-06	2.06	
3339-164	19-Jan-07	2.06	
3339-146	18-Jan-07	2.09	
2823-209	26-Oct-05	2.1	
2882-157	09-Jan-06	2.1	
2823-144	26-Oct-05	2.14	
2863-114	01-Dec-05	2.21	
2823-141	26-Oct-05	2.22	
2832-150	21-Nov-05	2.24	
2801-203	12-Oct-05	2.31	
2801-102	12-Oct-05	2.33	
2901-107	20-Jan-06	2.38	
2801-203-	12-Oct-05	2.41	
2863-157	07-Dec-05	2.42	
3339-172-	23-Jan-07	2.47	
2801-102-	12-Oct-05	2.49	

Table 4-16
Analytical Results for Cadmium in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2901-115	19-Jan-06	2.5	
3227-108	20-Sep-06	2.5	
3339-172	23-Jan-07	2.52	
3339-143-	17-Jan-07	2.63	
2873-107	16-Dec-05	2.65	
2823-138	26-Oct-05	2.69	
3339-143	17-Jan-07	2.69	
3298-106	05-Dec-06	2.7	
3422-104	NA	2.98	
2873-119	16-Dec-05	3.13	
2823-146	26-Oct-05	3.98	
2730-103	17-Aug-05	5	X
3227-115	20-Sep-06	5.4	X
2832-123	16-Nov-05	5.43	X
2823-116	20-Oct-05	7.58	X
2863-134	05-Dec-05	8.11	X

Notes:

NA=Not Available.

Table 4-17
Analytical Results for Surface Water – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Concentration - Lead (ug/L)	Q	Exceeds NAWQC - Lead
SD01 - Hornsey lake (tailings pond)	7		X
SD02 - Big Quarry Lake	1	U	
SD04 - East Branch Mill Creek	1	U	
SD06 - Mill Creek at Hwy 47 water sample	1	U	
SD08 - Mill Creek water sample	1	U	
SD09 - Mill Creek water sample	1	U	
SD10 - Mill Creek water sample	1	U	
SD11 - Powder Springs (tailings pond)	1	U	
SD13 - Bates Creek water sample (tributary to Mine A Breton Creek)	1	U	
SD14 - Small Quarry Lake	1	U	
SD15 - Keyes Branch (tributary to Fountain Farm Branch)	1	U	
SD16 - Long Hollow Brach (tributary to Fountain Farm Branch)	1	U	
SD18 - Shibboleth Branch (tributary to Mill Creek)	1	U	
SD19 - Shibboleth Branch Sediment	1	U	
SD20 - Apex Lake Sediment (tailings pond)	1	U	
SD22 - Fountain Farm Branch at Cimbar (tributary to Mill Creek)	9.1		X

Notes:

U=not detected

J=Analyte present. Reported value may be estimated.

Table 4-18
Analytical Results for Sediment – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Concentration - Lead (ug/L)	Q	Exceeds SQG - Barium	Exceeds SQG - Cadmium	Exceeds SQG - Lead	Exceeds SQG - Zinc
SD01 - Hornsey lake (tailings pond)	4040	J		X	X	X
SD02 - Big Quarry Lake	2550		X	X	X	X
SD03 - Sediment	266			X	X	X
SD04 - East Branch Mill Creek	140					
SD06 - Mill Creek at Hwy 47	99.4					
SD09 - Mill Creek at Tiff (Center of Creek)	37.5					
SD10 - Mill Creek	38.7					
SD11 - Powder Springs (tailings pond)	70.8					
SD12 - Mine A Breton Creek sieved sediment	614				X	
SD14 - Small Quarry Lake Sediment	228				X	
SD15 - Keyes Branch (tributary to Fountain Farm Branch)	703			X	X	X
SD16 - Long Hollow Brach (tributary to Fountain Farm Branch)	397			X	X	X
SD17 - Big River Sediment	490			X	X	X
SD18 - Shibboleth Branch (tributary to Mill Creek)	113					
SD19 - Shibboleth Branch	251			X	X	X
SD20 - Apex Lake (tailings pond)	167		X	X	X	X
SD22 - Fountain Farm Branch at Cimbar (tributary to Mill Creek)	513			X	X	X

Notes:

J=Analyte present. Reported value may be estimated.

Table 4-19
Analytical Results for Lead in Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)	Site
20008	1651		X	X	X	Richwoods
20027	1482		X	X	X	Richwoods
20028	759		X		X	Richwoods
20070	646		X		X	Richwoods
20108	1860		X	X	X	Richwoods
30182	871		X		X	Richwoods

Table 4-20
Analytical Results for Lead in Soil Confirmation Samples – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Property #/Sample ID	Site	ASR#	Quad	XRF Result (mg/kg)	Confirmation Result (mg/kg)	Relative % Difference
20028	Richwoods	3902-8	F2	759	682	10.7
20070	Richwoods	3902-12	PZ	646	611	5.6
30182	Richwoods	3902-9	GZ	154	447	97.5

Table 4-22
Analytical Results for Lead Bioavailability in Soil - Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Property	Lab ID	B&V Sample No.	Date Collected	XRF Lead Concentration (mg/kg)	IVBA (%)	RBA (%)	Site
20008	605	CSGRLA3-20008	07/31/2008	1291	60.4	53.0	Richwoods

IVBA = *In vitro* bioaccessibility

RBA = Relative bioavailability (*In vivo*)

RBA = 0.878*[IVBA] - 0.028

Table 4-22
Analytical Results for Lead in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2691-002	28-Jul-05	370				X
2691-023	28-Jul-05	375				X
2691-001	28-Jul-05	445		X		X
2691-004	01-Aug-05	81.5				
2691-022	01-Aug-05	239				X
2691-008	01-Aug-05	312				X
2691-009	01-Aug-05	6770		X	X	X
2691-007	02-Aug-05	114				
2691-013	02-Aug-05	154				
2691-019	02-Aug-05	229				X
2691-014	02-Aug-05	434		X		X
2691-003	03-Aug-05	369				X
2691-010	03-Aug-05	585		X		X
2691-015	03-Aug-05	635		X		X
2691-034	04-Aug-05	22.6				
2691-020	04-Aug-05	66.5				
2691-021	04-Aug-05	69.2				
2691-016	04-Aug-05	314				X
2691-017	04-Aug-05	1160		X		X
2691-031	05-Aug-05	32.8				
2691-026	05-Aug-05	73.2				
2691-027	05-Aug-05	208				X
2691-012	08-Aug-05	30.5				
2691-030	08-Aug-05	36.9				
2691-033	08-Aug-05	40.2				
2691-036	08-Aug-05	49.9				
2691-018	08-Aug-05	373				X
2691-024	08-Aug-05	385				X
2691-005	08-Aug-05	559		X		X
2691-011	08-Aug-05	1280		X	X	X
2691-029	09-Aug-05	561		X		X
2691-006	10-Aug-05	43.8				
2730-007	10-Aug-05	120				
2730-006	10-Aug-05	359				X
2691-032	10-Aug-05	411		X		X
2691-025	10-Aug-05	684		X		X
2730-004	10-Aug-05	1210		X	X	X
2691-028	10-Aug-05	1790		X	X	X
2730-001	12-Aug-05	455		X		X
2730-008	12-Aug-05	506		X		X
2730-005	12-Aug-05	527		X		X
2730-003	15-Aug-05	259				X
2730-002	15-Aug-05	267				X
2730-020	18-Aug-05	163				
2730-011	18-Aug-05	276				X
2730-019	18-Aug-05	410		X		X
2730-013	18-Aug-05	464		X		X
2730-033	23-Aug-05	85.3				
2730-028	23-Aug-05	129				

Table 4-22
Analytical Results for Lead in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2730-029	23-Aug-05	185				X
2730-027	23-Aug-05	404		X		X
2937-010	09-Mar-06	26.2				
2937-009	13-Mar-06	50.6				
2937-007	13-Mar-06	123				
2937-006	14-Mar-06	30.7				
2937-008	14-Mar-06	49.5				
2937-011	14-Mar-06	107				
2937-013	17-Mar-06	85.3				
2937-014	17-Mar-06	88.4				
2937-003	17-Mar-06	153				
2937-005	17-Mar-06	173				X
2937-017	17-Mar-06	204				X
2937-001	17-Mar-06	401		X		X
2937-012	17-Mar-06	619		X		X
2937-002	17-Mar-06	1070		X		X
2937-015	17-Mar-06	1100		X		X
2937-016	17-Mar-06	1260		X	X	X
2937-004	17-Mar-06	2530		X	X	X
2937-028	21-Mar-06	2.97				
2937-025	21-Mar-06	28.2				
2937-020	21-Mar-06	41.5				
2937-022	21-Mar-06	73.5				
2937-023	21-Mar-06	90.5				
2937-029	21-Mar-06	95.9				
2937-019	21-Mar-06	108				
2937-031	21-Mar-06	254				X
2937-024	21-Mar-06	309				X
2937-018	21-Mar-06	365				X
2937-021	21-Mar-06	366				X
2937-027	22-Mar-06	31				
2937-030	22-Mar-06	32				
2937-026	22-Mar-06	110				
2959-002	27-Mar-06	23.7				
2959-001	27-Mar-06	51				
2959-005	03-Apr-06	122				
2959-004	03-Apr-06	178				X
2959-023	04-Apr-06	22.2				
2959-011	04-Apr-06	26.1				
2959-014	04-Apr-06	28.4				
2959-024	04-Apr-06	34.6				
2959-013	04-Apr-06	35.3				
2959-008	04-Apr-06	36.5				
2959-010	04-Apr-06	44.3				
2959-015	04-Apr-06	44.6				
2959-020	04-Apr-06	49.5				
2959-019	04-Apr-06	54.3				
2959-007	04-Apr-06	57				
2959-017	04-Apr-06	58				

Table 4-22
Analytical Results for Lead in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2959-009	04-Apr-06	72.8				
2959-018	04-Apr-06	92				
2959-012	04-Apr-06	93.9				
2959-021	04-Apr-06	102				
2959-006	04-Apr-06	182				X
2959-016	04-Apr-06	391				X
2959-022	04-Apr-06	2950		X	X	X
2991-003	15-Apr-06	77.3				
2991-001	15-Apr-06	101				
2991-002	15-Apr-06	101				
2991-004	15-Apr-06	201				X
2991-014	17-Apr-06	37.8				
2991-012	17-Apr-06	45				
2991-013	17-Apr-06	65.2				
2991-006	17-Apr-06	88.5				
2991-008	17-Apr-06	113				
2991-015	17-Apr-06	115				
2991-005	17-Apr-06	284				X
2991-010	17-Apr-06	502		X		X
2991-007	17-Apr-06	514		X		X
2991-011	17-Apr-06	563		X		X
2991-009	17-Apr-06	1060		X		X
3169-004	28-Aug-06	762		X		X
3169-010	28-Aug-06	968		X		X
3169-008	28-Aug-06	1390		X	X	X
3169-005	28-Aug-06	4610		X	X	X
3169-016	30-Aug-06	409		X		X
3169-017	30-Aug-06	1130		X		X
3169-013	30-Aug-06	1230		X	X	X
3169-012	30-Aug-06	1320		X	X	X
3169-015	30-Aug-06	1400		X	X	X
3169-017-	30-Aug-06	1740		X	X	X
3169-018	30-Aug-06	1740		X	X	X
3169-026	31-Aug-06	544		X		X
3169-021	31-Aug-06	856		X		X
3169-020	31-Aug-06	5410		X	X	X
3316-005	05-Dec-06	552		X		X
3316-004	05-Dec-06	1080		X		X
3316-001	20-Dec-06	548		X		X
3316-003	20-Dec-06	1890		X	X	X
3316-002	20-Dec-06	2730		X	X	X
3551-001	03-Jul-07	116				
3542-002	03-Jul-07	256				X
3542-004	03-Jul-07	471		X		X
3542-001	03-Jul-07	730		X		X
3542-003	03-Jul-07	1100		X		X
3551-003	11-Jul-07	98.7				
3551-002	11-Jul-07	305				X
3551-004	11-Jul-07	4620		X	X	X

Table 4-22
Analytical Results for Lead in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3627-005	23-Aug-07	95.6				
3627-002	23-Aug-07	150				
3627-008	23-Aug-07	554		X		X
3627-001	24-Aug-07	26.6				
3627-007	24-Aug-07	200				X
3627-003	24-Aug-07	224				X
3627-004	24-Aug-07	1560		X	X	X
3627-006	29-Aug-07	144				
3684-003	09-Oct-07	155				
3684-005	09-Oct-07	180				X
3684-001	09-Oct-07	268				X
3684-002	09-Oct-07	278				X
2690-002	NA	21.8				
2690-006	NA	27.4				
2690-025	NA	66	J			
2690-030	NA	93	J			
2690-018	NA	101				
2690-027	NA	104	J			
2690-031	NA	117	J			
2690-003	NA	119				
2690-017	NA	120				
2690-023	NA	136	J			
2690-011	NA	164				
2690-009	NA	169				X
2690-001	NA	232				X
2690-014	NA	241				X
2690-024	NA	257	J			X
2690-028	NA	357	J			X
2690-026	NA	436	J	X		X
2690-008	NA	451		X		X
2690-021	NA	454	J	X		X
2690-022	NA	466	J	X		X
2690-005	NA	481		X		X
2690-013	NA	481		X		X
2690-007	NA	482		X		X
2690-032	NA	552	J	X		X
2690-004	NA	604		X		X
2690-016	NA	719		X		X
2690-012	NA	727		X		X
2690-019	NA	795		X		X
2690-015	NA	974		X		X
2690-020	NA	1110		X		X
2690-029	NA	1110	J	X		X
2690-010	NA	3210		X	X	X

Notes:

J=Analyte Present. Value may be an estimate.

NA=Not Available.

Table 4-23
Analytical Results for Arsenic in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2937-028	21-Mar-06	1.25	U	X
2937-014	17-Mar-06	1.88		X
2691-036	08-Aug-05	1.98	UJ	X
2690-014		2.12		X
2690-011		2.21		X
2690-028		2.69	U	X
2730-011	18-Aug-05	2.83	J	X
2690-025		2.97	U	X
2690-022		3	U	X
2690-027		3.17	U	X
2937-001	17-Mar-06	3.19		X
2691-012	08-Aug-05	3.6	J	X
2691-026	05-Aug-05	3.61	UJ	X
2690-004		3.7		X
2937-010	09-Mar-06	3.89		X
2937-026	22-Mar-06	3.89		X
2691-034	04-Aug-05	4.03	UJ	X
2937-013	17-Mar-06	4.48		X
2730-004	10-Aug-05	4.49	J	X
2691-020	04-Aug-05	4.59	J	X
2937-027	22-Mar-06	4.59		X
2691-010	03-Aug-05	4.6	J	X
2730-020	18-Aug-05	4.7	J	X
2690-030		4.75	U	X
2937-022	21-Mar-06	4.89		X
3551-004	11-Jul-07	4.9	U	X
2690-008		4.93		X
2937-011	14-Mar-06	4.94		X
2937-008	14-Mar-06	4.97		X
2959-001	27-Mar-06	5	U	X
2959-002	27-Mar-06	5	U	X
2959-004	03-Apr-06	5	U	X
2959-005	03-Apr-06	5	U	X
2959-006	04-Apr-06	5	U	X
2959-007	04-Apr-06	5	U	X
2959-008	04-Apr-06	5	U	X
2959-009	04-Apr-06	5	U	X
2959-010	04-Apr-06	5	U	X
2959-011	04-Apr-06	5	U	X
2959-012	04-Apr-06	5	U	X
2959-013	04-Apr-06	5	U	X
2959-014	04-Apr-06	5	U	X
2959-015	04-Apr-06	5	U	X
2959-016	04-Apr-06	5	U	X
2959-017	04-Apr-06	5	U	X
2959-018	04-Apr-06	5	U	X
2959-019	04-Apr-06	5	U	X
2959-020	04-Apr-06	5	U	X
2959-021	04-Apr-06	5	U	X

Table 4-23
Analytical Results for Arsenic in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2959-022	04-Apr-06	5	U	X
2959-023	04-Apr-06	5	U	X
2959-024	04-Apr-06	5	U	X
2991-008	17-Apr-06	5	U	X
2991-014	17-Apr-06	5		X
2991-015	17-Apr-06	5	U	X
3551-003	11-Jul-07	5	U	X
2690-015		5.01		X
2991-004	15-Apr-06	5.07		X
2690-032		5.08	U	X
2937-030	22-Mar-06	5.09		X
3542-004	03-Jul-07	5.1	U	X
3542-001	03-Jul-07	5.1	U	X
2690-021		5.14	U	X
2691-022	01-Aug-05	5.16	UJ	X
2730-013	18-Aug-05	5.28	J	X
2730-019	18-Aug-05	5.29	J	X
2937-021	21-Mar-06	5.3		X
3542-002	03-Jul-07	5.3	U	X
3551-001	03-Jul-07	5.3	U	X
2937-025	21-Mar-06	5.39		X
2730-003	15-Aug-05	5.4	J	X
2690-002		5.59		X
2690-006		5.61		X
2690-019		5.62		X
2991-002	15-Apr-06	5.65		X
2730-002	15-Aug-05	5.66	J	X
2691-018	08-Aug-05	5.69	J	X
2937-007	13-Mar-06	5.71		X
3316-001	20-Dec-06	5.79		X
2690-026		5.8	U	X
2937-020	21-Mar-06	5.84		X
2690-009		5.96		X
2991-006	17-Apr-06	5.98		X
2691-027	05-Aug-05	6.02	UJ	X
2690-007		6.06		X
2690-020		6.13		X
2730-027	23-Aug-05	6.13	J	X
2991-001	15-Apr-06	6.15		X
2690-013		6.17		X
2991-012	17-Apr-06	6.17		X
2690-010		6.23		X
2691-030	08-Aug-05	6.23	UJ	X
2937-024	21-Mar-06	6.23		X
2691-009	01-Aug-05	6.26	J	X
2991-003	15-Apr-06	6.3		X
2690-024		6.33	U	X
2730-007	10-Aug-05	6.39	J	X
2937-004	17-Mar-06	6.47		X

Table 4-23
Analytical Results for Arsenic in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2991-009	17-Apr-06	6.53		X
2691-032	10-Aug-05	6.58	UJ	X
2937-029	21-Mar-06	6.58		X
2690-023		6.6	U	X
3551-002	11-Jul-07	6.6		X
2937-019	21-Mar-06	6.63		X
2937-006	14-Mar-06	6.74		X
2690-003		6.85		X
2691-003	03-Aug-05	6.88		X
2690-029		6.96	U	X
2991-013	17-Apr-06	6.96		X
2937-003	17-Mar-06	6.97		X
2937-005	17-Mar-06	6.97		X
2691-019	02-Aug-05	7.05		X
2937-009	13-Mar-06	7.07		X
2991-010	17-Apr-06	7.11		X
2690-012		7.15		X
2691-029	09-Aug-05	7.21	UJ	X
2690-018		7.24		X
2937-023	21-Mar-06	7.36		X
2691-033	08-Aug-05	7.39	UJ	X
3316-005	05-Dec-06	7.42		X
2691-014	02-Aug-05	7.58		X
2691-007	02-Aug-05	7.63		X
2691-031	05-Aug-05	7.79	UJ	X
2730-005	12-Aug-05	7.87	J	X
2690-005		7.92		X
2937-017	17-Mar-06	7.97		X
2730-008	12-Aug-05	8.04	J	X
2691-023	28-Jul-05	8.12	UJ	X
2730-028	23-Aug-05	8.17	J	X
2937-002	17-Mar-06	8.19		X
2991-005	17-Apr-06	8.42		X
3316-004	05-Dec-06	8.46		X
3316-002	20-Dec-06	8.63		X
2937-016	17-Mar-06	8.71		X
2691-021	04-Aug-05	8.72	UJ	X
2730-033	23-Aug-05	8.78	J	X
2991-011	17-Apr-06	8.79		X
2691-006	10-Aug-05	8.81		X
2691-028	10-Aug-05	8.82	UJ	X
3316-003	20-Dec-06	8.91		X
2690-031		9.06	U	X
3169-016	30-Aug-06	9.2	J	X
2730-001	12-Aug-05	9.27	J	X
2691-002	28-Jul-05	9.36		X
2691-008	01-Aug-05	9.56		X
3169-008	28-Aug-06	9.61	J	X
2691-017	04-Aug-05	9.8		X

Table 4-23
Analytical Results for Arsenic in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2691-005	08-Aug-05	9.81		X
2690-016		10.1		X
3169-020	31-Aug-06	10.1	J	X
2691-016	04-Aug-05	10.2		X
2730-006	10-Aug-05	10.2	J	X
2991-007	17-Apr-06	10.2		X
2690-001		10.3		X
3542-003	03-Jul-07	10.3		X
2691-001	28-Jul-05	10.4		X
2691-024	08-Aug-05	10.4	UJ	X
2937-012	17-Mar-06	10.8		X
3169-004	28-Aug-06	10.8	J	X
2937-031	21-Mar-06	10.9		X
3169-005	28-Aug-06	11.1	J	X
3169-018	30-Aug-06	11.2	J	X
2691-004	01-Aug-05	11.5		X
2937-018	21-Mar-06	11.6		X
3169-013	30-Aug-06	11.9	J	X
3169-015	30-Aug-06	12.7	J	X
3169-017-	30-Aug-06	13.1	J	X
2937-015	17-Mar-06	13.3		X
3169-017	30-Aug-06	13.7	J	X
3169-010	28-Aug-06	14.2	J	X
2691-015	03-Aug-05	14.4		X
3169-026	31-Aug-06	14.4	J	X
2690-017	NA	14.9		X
2691-013	02-Aug-05	15.6		X
3169-012	30-Aug-06	16.4	J	X
3169-021	31-Aug-06	16.7	J	X
2691-025	10-Aug-05	17	J	X
2691-011	08-Aug-05	19.6		X
2730-029	23-Aug-05	25.2	J	X

Notes:

U=not detected.

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-24
Analytical Results for Barium in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (22 mg/kg)
2690-1-__	NA	1570	J	
2690-2-__	NA	480	J	
2690-3-__	NA	488	J	
2690-4-__	NA	6660	J	
2690-5-__	NA	3530	J	
2690-6-__	NA	1240	J	
2690-7-__	NA	1940	J	
2690-8-__	NA	6460	J	
2690-9-__	NA	2290	J	
2690-10-__	NA	884	J	
2690-11-__	NA	896	J	
2690-12-__	NA	1110	J	
2690-13-__	NA	6170	J	
2690-14-__	NA	3210	J	
2690-15-__	NA	520	J	
2690-16-__	NA	1260	J	
2690-17-__	NA	1390	J	
2690-18-__	NA	3060	J	
2690-19-__	NA	568	J	
2690-20-__	NA	712	J	
2690-21-__	NA	6470		
2690-22-__	NA	5810		
2690-23-__	NA	6690		
2690-24-__	NA	3820		
2690-25-__	NA	1630		
2690-26-__	NA	3740		
2690-27-__	NA	3410		
2690-28-__	NA	3380		
2690-29-__	NA	6130		
2690-30-__	NA	1760		
2690-31-__	NA	690		
2690-32-__	NA	4250		
2691-1-__	28-Jul-05	5430		
2691-2-__	28-Jul-05	2240		
2691-3-__	03-Aug-05	968		
2691-4-__	01-Aug-05	4320		
2691-5-__	08-Aug-05	3440		
2691-6-__	10-Aug-05	1110		
2691-7-__	02-Aug-05	789		
2691-8-__	01-Aug-05	1750		
2691-9-__	01-Aug-05	5480		
2691-10-__	03-Aug-05	5090		
2691-11-__	08-Aug-05	6970		
2691-12-__	08-Aug-05	362		
2691-13-__	02-Aug-05	1530		
2691-14-__	02-Aug-05	2480		
2691-15-__	03-Aug-05	5030		
2691-16-__	04-Aug-05	4790		
2691-17-__	04-Aug-05	4220		
2691-18-__	08-Aug-05	5940		

Table 4-24
Analytical Results for Barium in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (22 mg/kg)
2691-19-__	02-Aug-05	6180		
2691-20-__	04-Aug-05	1900		
2691-21-__	04-Aug-05	1050	J	
2691-22-__	01-Aug-05	910	J	
2691-23-__	28-Jul-05	3940	J	
2691-24-__	08-Aug-05	1710	J	
2691-25-__	10-Aug-05	6150	J	
2691-26-__	05-Aug-05	4430	J	
2691-27-__	05-Aug-05	6610	J	
2691-28-__	10-Aug-05	3390	J	
2691-29-__	09-Aug-05	6540	J	
2691-30-__	08-Aug-05	352	J	
2691-31-__	05-Aug-05	665	J	
2691-32-__	10-Aug-05	5960	J	
2691-33-__	08-Aug-05	399	J	
2691-34-__	04-Aug-05	268	J	
2691-36-__	08-Aug-05	4910	J	
2730-1-__	12-Aug-05	3860		
2730-2-__	15-Aug-05	629		
2730-3-__	15-Aug-05	557		
2730-4-__	10-Aug-05	2810		
2730-5-__	12-Aug-05	829		
2730-6-__	10-Aug-05	3430		
2730-7-__	10-Aug-05	2710		
2730-8-__	12-Aug-05	5140		
2730-11-__	18-Aug-05	6740		
2730-13-__	18-Aug-05	5580		
2730-19-__	18-Aug-05	1700		
2730-20-__	18-Aug-05	2130		
2730-27-__	23-Aug-05	6090	J	
2730-28-__	23-Aug-05	1140	J	
2730-29-__	23-Aug-05	5140	J	
2730-33-__	23-Aug-05	1300	J	
2937-1-__	17-Mar-06	5690	J	
2937-2-__	17-Mar-06	673	J	
2937-3-__	17-Mar-06	6420	J	
2937-4-__	17-Mar-06	930	J	
2937-5-__	17-Mar-06	3100	J	
2937-6-__	14-Mar-06	374	J	
2937-7-__	13-Mar-06	7540	J	
2937-8-__	14-Mar-06	283	J	
2937-9-__	13-Mar-06	587	J	
2937-10-__	09-Mar-06	196	J	
2937-11-__	14-Mar-06	3050	J	
2937-12-__	17-Mar-06	866	J	
2937-13-__	17-Mar-06	2210	J	
2937-14-__	17-Mar-06	7310	J	
2937-15-__	17-Mar-06	8300	J	
2937-16-__	17-Mar-06	7130	J	
2937-17-__	17-Mar-06	6390	J	

Table 4-24
Analytical Results for Barium in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (22 mg/kg)
2937-18-__	21-Mar-06	6950	J	
2937-19-__	21-Mar-06	4010	J	
2937-20-__	21-Mar-06	409	J	
2937-21-__	21-Mar-06	4210	J	
2937-22-__	21-Mar-06	2590	J	
2937-23-__	21-Mar-06	675	J	
2937-24-__	21-Mar-06	2370	J	
2937-25-__	21-Mar-06	1740	J	
2937-26-__	22-Mar-06	1300	J	
2937-27-__	22-Mar-06	320	J	
2937-28-__	21-Mar-06	482	J	
2937-29-__	21-Mar-06	3570	J	
2937-30-__	22-Mar-06	1880	J	
2937-31-__	21-Mar-06	4710	J	
2959-1-__	27-Mar-06	1110		
2959-2-__	27-Mar-06	315		
2959-4-__	03-Apr-06	1540		
2959-5-__	03-Apr-06	693		
2959-6-__	04-Apr-06	1980		
2959-7-__	04-Apr-06	1010		
2959-8-__	04-Apr-06	735		
2959-9-__	04-Apr-06	1040		
2959-10-__	04-Apr-06	351		
2959-11-__	04-Apr-06	248		
2959-12-__	04-Apr-06	2240		
2959-13-__	04-Apr-06	411		
2959-14-__	04-Apr-06	325		
2959-15-__	04-Apr-06	2070		
2959-16-__	04-Apr-06	1070		
2959-17-__	04-Apr-06	946		
2959-18-__	04-Apr-06	782		
2959-19-__	04-Apr-06	1160		
2959-20-__	04-Apr-06	2720	J	
2959-21-__	04-Apr-06	902	J	
2959-22-__	04-Apr-06	942	J	
2959-23-__	04-Apr-06	473	J	
2959-24-__	04-Apr-06	472	J	
2991-1-__	15-Apr-06	258		
2991-2-__	15-Apr-06	850		
2991-3-__	15-Apr-06	2060		
2991-4-__	15-Apr-06	2210		
2991-5-__	17-Apr-06	2490		
2991-6-__	17-Apr-06	3770		
2991-7-__	17-Apr-06	1530		
2991-8-__	17-Apr-06	901		
2991-9-__	17-Apr-06	1450		
2991-10-__	17-Apr-06	3740		
2991-11-__	17-Apr-06	1780		
2991-12-__	17-Apr-06	199		
2991-13-__	17-Apr-06	1970		

Table 4-24
Analytical Results for Barium in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (22 mg/kg)
2991-14-__	17-Apr-06	371		
2991-15-__	17-Apr-06	611		
3169-4-__	28-Aug-06	4580		
3169-5-__	28-Aug-06	6860		
3169-8-__	28-Aug-06	7020		
3169-10-__	28-Aug-06	10300		
3169-12-__	30-Aug-06	7880		
3169-13-__	30-Aug-06	8480		
3169-15-__	30-Aug-06	9530		
3169-16-__	30-Aug-06	7910		
3169-17-__	30-Aug-06	4240		
3169-17-FD	30-Aug-06	4100		
3169-18-__	30-Aug-06	5990		
3169-20-__	31-Aug-06	3820		
3169-21-__	31-Aug-06	763		
3169-26-__	31-Aug-06	5830		
3316-1-__	20-Dec-06	1930		
3316-2-__	20-Dec-06	2280		
3316-3-__	20-Dec-06	3740		
3316-4-__	05-Dec-06	3890		
3316-5-__	05-Dec-06	4390		
3542-2-__	03-Jul-07	620		
3542-3-__	03-Jul-07	2340		
3542-4-__	03-Jul-07	3010		
3542-1-__	03-Jul-07	1930		
3551-1-__	03-Jul-07	908		
3551-2-__	11-Jul-07	3800		
3551-3-__	11-Jul-07	415		
3551-4-__	11-Jul-07	794		

Notes:

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-25
Analytical Results for Cadmium in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2690-001	NA	0.518	U	
2690-002	NA	0.511	U	
2690-003	NA	0.506	U	
2690-004	NA	4.87	J	
2690-005	NA	0.51	U	
2690-006	NA	0.506	U	
2690-007	NA	0.52	J	
2690-008	NA	0.508	U	
2690-009	NA	1.9	J	
2690-010	NA	4.56	J	
2690-011	NA	0.838	J	
2690-012	NA	0.522	U	
2690-013	NA	0.66	J	
2690-014	NA	2.1	J	
2690-015	NA	1.63	J	
2690-016	NA	8.89		
2690-017	NA	0.73	J	
2690-018	NA	0.574	U	
2690-019	NA	1.44	J	
2690-020	NA	1.79	J	
2690-021	NA	0.512	U	
2690-022	NA	2.32	J	
2690-023	NA	0.497	U	
2690-024	NA	0.704	J	
2690-025	NA	0.51	U	
2690-026	NA	0.552	J	
2690-027	NA	0.506	U	
2690-028	NA	2.59	J	
2690-029	NA	2.37	J	
2690-030	NA	0.496	U	
2690-031	NA	0.508	U	
2690-032	NA	1.82	J	
2691-001	28-Jul-05	0.518	U	
2691-002	28-Jul-05	0.52	U	
2691-003	03-Aug-05	0.511	U	
2691-004	01-Aug-05	3.54	J	
2691-005	08-Aug-05	0.519	U	
2691-006	10-Aug-05	0.513	U	
2691-007	02-Aug-05	0.508	U	
2691-008	01-Aug-05	1.02	J	
2691-009	01-Aug-05	1.42	J	
2691-010	03-Aug-05	5.89		
2691-011	08-Aug-05	0.559	U	
2691-012	08-Aug-05	0.686	U	
2691-013	02-Aug-05	0.56	U	
2691-014	02-Aug-05	9.86		
2691-015	03-Aug-05	0.575	U	
2691-016	04-Aug-05	0.894	J	
2691-017	04-Aug-05	0.515	U	
2691-018	08-Aug-05	0.721	U	
2691-019	02-Aug-05	0.517	U	

Table 4-25
Analytical Results for Cadmium in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2691-020	04-Aug-05	1.06	J	
2691-021	04-Aug-05	0.509	U	
2691-022	01-Aug-05	0.554	U	
2691-023	28-Jul-05	0.664	U	
2691-024	08-Aug-05	0.521	U	
2691-025	10-Aug-05	0.891	U	
2691-026	05-Aug-05	0.819	U	
2691-027	05-Aug-05	0.505	U	
2691-028	10-Aug-05	0.514	U	
2691-029	09-Aug-05	0.514	U	
2691-030	08-Aug-05	0.513	U	
2691-031	05-Aug-05	0.512	U	
2691-032	10-Aug-05	0.503	U	
2691-033	08-Aug-05	0.507	U	
2691-034	04-Aug-05	0.51	U	
2691-036	08-Aug-05	0.508	U	
2730-001	12-Aug-05	1.51	J	
2730-002	15-Aug-05	0.518	UJ	
2730-003	15-Aug-05	0.512	UJ	
2730-004	10-Aug-05	1.09	J	
2730-005	12-Aug-05	0.519	UJ	
2730-006	10-Aug-05	0.522	UJ	
2730-007	10-Aug-05	0.515	UJ	
2730-008	12-Aug-05	0.565	UJ	
2730-011	18-Aug-05	0.924	J	
2730-013	18-Aug-05	0.514	UJ	
2730-019	18-Aug-05	0.511	UJ	
2730-020	18-Aug-05	0.524	UJ	
2730-027	23-Aug-05	0.505	UJ	
2730-028	23-Aug-05	0.516	UJ	
2730-029	23-Aug-05	0.513	UJ	
2730-033	23-Aug-05	0.523	UJ	
2937-001	17-Mar-06	4.08		
2937-002	17-Mar-06	4.03		
2937-003	17-Mar-06	0.661		
2937-004	17-Mar-06	3.98		
2937-005	17-Mar-06	0.668		
2937-006	14-Mar-06	0.512	U	
2937-007	13-Mar-06	0.503	U	
2937-008	14-Mar-06	0.566		
2937-009	13-Mar-06	0.512	U	
2937-010	09-Mar-06	0.548	U	
2937-011	14-Mar-06	0.756	U	
2937-012	17-Mar-06	1.55		
2937-013	17-Mar-06	0.508	U	
2937-014	17-Mar-06	0.566	U	
2937-015	17-Mar-06	0.855	U	
2937-016	17-Mar-06	1.78		
2937-017	17-Mar-06	0.665	U	
2937-018	21-Mar-06	1.27		
2937-019	21-Mar-06	0.688	U	

Table 4-25
Analytical Results for Cadmium in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2937-020	21-Mar-06	0.507	U	
2937-021	21-Mar-06	0.779	U	
2937-022	21-Mar-06	0.737	U	
2937-023	21-Mar-06	0.523	U	
2937-024	21-Mar-06	0.558		
2937-025	21-Mar-06	0.55	U	
2937-026	22-Mar-06	0.644	U	
2937-027	22-Mar-06	0.609	U	
2937-028	21-Mar-06	0.625	U	
2937-029	21-Mar-06	0.526	U	
2937-030	22-Mar-06	0.611	U	
2937-031	21-Mar-06	0.523	U	
2959-001	27-Mar-06	2.9		
2959-002	27-Mar-06	2.93		
2959-004	03-Apr-06	4.57		
2959-005	03-Apr-06	5.13		
2959-006	04-Apr-06	4.1		
2959-007	04-Apr-06	3.4		
2959-008	04-Apr-06	3.13		
2959-009	04-Apr-06	3.92		
2959-010	04-Apr-06	6.34		
2959-011	04-Apr-06	3.05		
2959-012	04-Apr-06	5.01		
2959-013	04-Apr-06	3.37		
2959-014	04-Apr-06	5.65		
2959-015	04-Apr-06	2.1		
2959-016	04-Apr-06	6.83		
2959-017	04-Apr-06	3.6		
2959-018	04-Apr-06	7.37		
2959-019	04-Apr-06	2.85		
2959-020	04-Apr-06	1.95		
2959-021	04-Apr-06	5.66		
2959-022	04-Apr-06	5.79		
2959-023	04-Apr-06	2.69		
2959-024	04-Apr-06	2.66		
2991-001	15-Apr-06	1.5		
2991-002	15-Apr-06	1.36		
2991-003	15-Apr-06	1.02		
2991-004	15-Apr-06	1	U	
2991-005	17-Apr-06	1.72		
2991-006	17-Apr-06	1	U	
2991-007	17-Apr-06	1.79		
2991-008	17-Apr-06	1.42		
2991-009	17-Apr-06	2.77		
2991-010	17-Apr-06	1.11		
2991-011	17-Apr-06	1.36		
2991-012	17-Apr-06	1.18		
2991-013	17-Apr-06	1.69		
2991-014	17-Apr-06	1.17		
2991-015	17-Apr-06	1	U	
3169-004	28-Aug-06	0.628	U	

Table 4-25
Analytical Results for Cadmium in Area-Wide Residential Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3169-005	28-Aug-06	0.595	U	
3169-008	28-Aug-06	0.599	U	
3169-010	28-Aug-06	0.806	J	
3169-012	30-Aug-06	0.997	J	
3169-013	30-Aug-06	0.742	J	
3169-015	30-Aug-06	0.626	U	
3169-016	30-Aug-06	0.62	U	
3169-017	30-Aug-06	1.03	J	
3169-017-FD	30-Aug-06	1.01	J	
3169-018	30-Aug-06	0.849	J	
3169-020	31-Aug-06	0.69	UJ	
3169-021	31-Aug-06	0.65	UJ	
3169-026	31-Aug-06	0.861	J	
3316-001	20-Dec-06	1		
3316-002	20-Dec-06	1.95		
3316-003	20-Dec-06	2.02		
3316-004	05-Dec-06	3.29		
3316-005	05-Dec-06	3.01		
3542-002	03-Jul-07	3.1		
3542-003	03-Jul-07	6.9		
3542-004	03-Jul-07	3.1		
3542-001	03-Jul-07	2.8		
3551-001	03-Jul-07	2.9		
3551-002	11-Jul-07	2		
3551-003	11-Jul-07	3.6		
3551-004	11-Jul-07	11.4		

Notes:

U=not detected

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-26
Analytical Results for Lead in Mine Waste Soil – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Quad No.	Date Collected	Concentration - Lead (mg/kg)	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for Lead
20071.1	S-1	7/8/2005	519	X		X
20150.2	S-2	7/23/2005	878	X		X
20150.3	S-3	7/23/2005	1617	X	X	X
20087.2	S-2	8/5/2005	924	X		X
20087.3	S-3	8/5/2005	896	X		X
20087.1	S-1	8/5/2005	845	X		X
20164.1	S-1	8/9/2005	693	X		X
20164.2	S-2	8/9/2005	565	X		X
20164.3	S-3	8/9/2005	479	X		X
20015.1	S-1	7/26/2005	473	X		X
20008.1	S-1	7/27/2005	4406	X	X	X
20006.1	S-1	8/19/2005	925	X		X
20006.2	S-2	8/19/2005	711	X		X
20006.3	S-3	8/19/2005	412	X		X
20126.1	S-1	7/26/2005	947	X		X

Table 4-27
Analytical Results for Lead in Wipe Samples– Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	B&V Sample No.	Composite Description	Date Collected	Lead Concentration (ug/cm2)	Q	Site
228	20008	IWGPLZZ-20008	Living Room	07/31/2008	0.011		Richwoods
229		ZWGPLZZ-20008	Kitchen	07/31/2008	0.111		
230		JWGPLZZ-20008	Bedroom	07/31/2008	0.007		
243	20027	IWGPLZZ-20027	Living Room	08/04/2008	0.005	U	Richwoods
244		ZWGPLZZ-20027	Kitchen	08/04/2008	0.005	U	
245		JWGPLZZ-20027	Bedroom	08/04/2008	0.006		
258	20028	IWGPLZZ-20028	Living Room	08/08/2008	0.005	U	Richwoods
259		ZWGPLZZ-20028	Kitchen	08/08/2008	0.005	U	
260		JWGPLZZ-20028	Bedroom	08/08/2008	0.005	U	
261	30182	IWGPLZZ-30182	Living Room	08/11/2008	0.051	J	Richwoods
262		ZWGPLZZ-30182	Kitchen	08/11/2008	0.095		
263		JWGPLZZ-30182	Bedroom	08/11/2008	0.09		
270	20070	IWGPLZZ-20070	Living Room	08/12/2008	0.018		Richwoods
271		ZWGPLZZ-20070	Kitchen	08/12/2008	0.163		
272		JWGPLZZ-20070	Bedroom	08/12/2008	0.026		
336	20108	IWGPLZZ-20108	Living Room	08/28/2008	0.005	U	Richwoods
337		ZWGPLZZ-20108	Kitchen	08/28/2008	0.005	U	
338		JWGPLZZ-20108	Bedroom	08/28/2008	0.005	U	

Notes:
U=not detected
J=Analyte present. Reported value may be estimated.

Minimum Concentration ND
Maximum Concentration 0.163

Table 4-28
Analytical Results for Lead in Vacuum Samples– Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	BV Sample No.	Composite Sample Description	Date Collected	Lead Concentration (mg/kg)	Q	Site
110	20008	MDCPLZZ-20008	Living room, kitchen and bedroom floors	07/31/2008	419		Richwoods
120	20028	MDCPLZZ-20028	Living room, kitchen and bedroom floors	08/08/2008	25.2		Richwoods
124	20070	MDCPLZZ-20070	Living room, kitchen and bedroom floors	08/12/2008	82.5		Richwoods
146	20108	MDCPLZZ-20108	Living room, kitchen and bedroom floors	08/28/2008	24.8		Richwoods
121	30182	MDCPLZZ-30182	Living room, kitchen and bedroom floors	08/11/2008	4.8	U	Richwoods

Notes:
U=not detected

Minimum Concentration ND
Maximum Concentration 419

Table 4-29
Analytical Results for Lead in Paint Surface Samples– Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Property	Site	Component	Substrate	Side	Condition	Color	Floor	Room	Misc.	Lead Concentration (mg/cm²)	Result
20019	Richwoods	WALL	DRYWALL	C	INTACT	GREEN	FIRST	KITCHEN		0	Negative
		WALL	DRYWALL	D	INTACT	WHITE	FIRST	HALL		2.08	Positive
		CEILING	WOOD	A	CHALKING	WHITE	FIRST	OUTSIDE	Porch	2.53	Positive
		WINDOW	WOOD	B	CRACKED	WHITE	FIRST	OUTSIDE		3.12	Positive
20027	Richwoods	WALL	WOOD	D	INTACT	GREEN	FIRST	KITCHEN		0	Negative
		WINDOW	WOOD	D	INTACT	WHITE	FIRST	OUTSIDE		0.32	Negative
		WALL	WOOD	D	INTACT	WHITE	FIRST	OUTSIDE		1.27	Positive
		WINDOW	WOOD	B	INTACT	WHITE	FIRST	KITCHEN		4.05	Positive
20028	Richwoods	WALL	PLASTER	A	INTACT	WHITE	FIRST	LIVING ROOM		0	Negative
		WALL	PLASTER	B	INTACT	YELLOW	FIRST	HALL		0	Negative
		COLUMN	WOOD	A	INTACT	WHITE	FIRST	OUTSIDE	Porch	1.75	Positive
		CEILING	WOOD	A	INTACT	WHITE	FIRST	OUTSIDE	Porch	2.49	Positive

Table 4-30
Analytical Results for Lead in Potable (Residential) Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	BV Sample No.	Date Sampled	Concentration - Lead (ug/L)	Exceed MCL - Lead (15 ug/L)	Site
20008	ZPGPLZZ-20008	7/31/2008	14.9	X	Richwoods
20027	ZPGPLZZ-20027	8/4/2008	1.0		Richwoods
30182	ZPGPLZZ-30182	8/11/2008	6.7		Richwoods

Table 4-31
Analytical Results for Lead in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Q	Exceed MCL - Lead (15 ug/L)
2690-149	19-Jul-05	10	U	
2690-150	19-Jul-05	10	U	
2690-101	20-Jul-05	10	U	
2690-110	20-Jul-05	10	U	
2690-135	20-Jul-05	10	U	
2690-137	20-Jul-05	10	U	
2690-139	20-Jul-05	10	U	
2690-140	20-Jul-05	10	U	
2690-141	20-Jul-05	10	U	
2690-142	20-Jul-05	10	U	
2690-143	20-Jul-05	10	U	
2690-144	20-Jul-05	10	U	
2690-145	20-Jul-05	10	U	
2690-146	20-Jul-05	10	U	
2690-148	20-Jul-05	10	U	
2690-147	20-Jul-05	26.6		X
2690-109	21-Jul-05	10	U	
2690-114	21-Jul-05	10	U	
2690-118	21-Jul-05	10	U	
2690-121	21-Jul-05	10	U	
2690-122	21-Jul-05	10	U	
2690-123	21-Jul-05	10	U	
2690-125	21-Jul-05	10	U	
2690-126	21-Jul-05	10	U	
2690-127	21-Jul-05	10	U	
2690-136	21-Jul-05	10	U	
2690-134	21-Jul-05	10.1		
2690-102	22-Jul-05	10	U	
2690-108	22-Jul-05	10	U	
2690-112	22-Jul-05	10	U	
2690-138	22-Jul-05	10	U	
2690-105	23-Jul-05	10	U	
2690-107	23-Jul-05	10	U	
2690-115	23-Jul-05	10	U	
2690-117	23-Jul-05	10	U	
2690-119	23-Jul-05	10	U	
2690-124	23-Jul-05	10	U	
2690-106	25-Jul-05	10	U	
2690-113	25-Jul-05	10	U	
2690-120	25-Jul-05	10	U	
2690-116	25-Jul-05	10.5		
2690-104	25-Jul-05	13.7		
2690-103	25-Jul-05	15.1		X
2690-111	25-Jul-05	20.8		X
2690-129	26-Jul-05	10	U	
2690-131	26-Jul-05	10	U	
2690-132	26-Jul-05	10	U	
2690-167	26-Jul-05	10	U	
2690-168	26-Jul-05	10	U	
2690-171	26-Jul-05	10	U	
2690-130	26-Jul-05	14.6		

Table 4-31
Analytical Results for Lead in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Q	Exceed MCL - Lead (15 ug/L)
2690-169	26-Jul-05	20.7		X
2690-172	26-Jul-05	24.2		X
2690-170	26-Jul-05	35.5		X
2690-128	27-Jul-05	10	U	
2690-174	27-Jul-05	10	U	
2690-133	27-Jul-05	11.3		
2690-166	27-Jul-05	13.7		
2691-111	02-Aug-05	10	U	
2691-112	02-Aug-05	10	U	
2691-114	02-Aug-05	10	U	
2691-116	02-Aug-05	10	U	
2691-118	02-Aug-05	10	U	
2691-113	02-Aug-05	10.4	U	
2691-117	02-Aug-05	12.6	U	
2691-129	03-Aug-05	10	U	
2691-133	03-Aug-05	10	U	
2691-135	03-Aug-05	10	U	
2691-136	03-Aug-05	10	U	
2691-137	03-Aug-05	10	U	
2691-127	03-Aug-05	14.6	U	
2691-134	03-Aug-05	17.4	U	
2691-128	03-Aug-05	18.5	U	
2691-126	03-Aug-05	29.3	U	
2691-104	04-Aug-05	10	U	
2691-105	04-Aug-05	10	U	
2691-108	04-Aug-05	10	U	
2691-121	04-Aug-05	10	U	
2691-122	04-Aug-05	10	U	
2691-123	04-Aug-05	10	U	
2691-124	04-Aug-05	10	U	
2691-125	04-Aug-05	10	U	
2691-131	04-Aug-05	10	U	
2691-109	04-Aug-05	12.5	U	
2691-110	04-Aug-05	17.9	U	
2691-102	05-Aug-05	10	U	
2691-103	05-Aug-05	10	U	
2691-106	05-Aug-05	10	U	
2691-132	05-Aug-05	10	U	
2691-130	05-Aug-05	11	U	
2691-138	05-Aug-05	28.4	U	
2691-107	05-Aug-05	33.6	U	
2691-101	05-Aug-05	45.2	U	
2691-145	08-Aug-05	31.8	U	
2691-144	08-Aug-05	32.6	U	
2691-142	09-Aug-05	10	U	
2691-143	09-Aug-05	10	U	
2691-146	09-Aug-05	10	U	
2691-149	09-Aug-05	10	U	
2691-150	09-Aug-05	10	U	
2691-151	09-Aug-05	10	U	
2691-153	09-Aug-05	10	U	

Table 4-31
Analytical Results for Lead in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Q	Exceed MCL - Lead (15 ug/L)
2691-154	09-Aug-05	10	U	
2691-152	09-Aug-05	31.6	U	
2730-116	16-Aug-05	10	U	
2730-114	16-Aug-05	46.5	U	
2730-112	17-Aug-05	10	U	
2730-104	18-Aug-05	64.7	U	
2730-130	19-Aug-05	10	U	
2774-128	13-Sep-05	30.1		X
2937-108	07-Mar-06	1	U	
2937-109	07-Mar-06	1	U	
2937-109	07-Mar-06	1	U	
2937-126	07-Mar-06	1	U	
2937-138	07-Mar-06	1	U	
2937-139	07-Mar-06	1	U	
2937-142	07-Mar-06	1	U	
2937-108	07-Mar-06	1.43		
2937-140	07-Mar-06	2.6		
2937-136	07-Mar-06	35.8		X
2937-134	08-Mar-06	1	U	
2937-135	08-Mar-06	1	U	
2937-132	08-Mar-06	1	U	
2937-137	08-Mar-06	7.53		
2937-129	09-Mar-06	1	U	
2937-127	09-Mar-06	1	U	
2937-128	09-Mar-06	1	U	
2937-130	09-Mar-06	1	U	
2937-123	09-Mar-06	2.13		
2937-107	10-Mar-06	1	U	
2937-107	10-Mar-06	2.1		
2937-125	10-Mar-06	3.19		
2937-141	10-Mar-06	36.8		X
2937-106	13-Mar-06	1.05		
2937-106	13-Mar-06	1.67		
2937-101	14-Mar-06	1	U	
2937-101	14-Mar-06	1	U	
2937-110	14-Mar-06	1	U	
2937-110	14-Mar-06	1	U	
2937-111	14-Mar-06	1	U	
2937-113	14-Mar-06	1	U	
2937-119	14-Mar-06	1	U	
2937-124	14-Mar-06	1	U	
2937-131	14-Mar-06	1	U	
2937-133	14-Mar-06	1	U	
2937-111	14-Mar-06	2.42		
2937-102	15-Mar-06	1	U	
2937-112	15-Mar-06	1	U	
2937-116	15-Mar-06	1	U	
2937-117	15-Mar-06	1	U	
2937-102	15-Mar-06	1.53		
2937-103	16-Mar-06	1	U	
2937-104	16-Mar-06	1	U	

Table 4-31
Analytical Results for Lead in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Q	Exceed MCL - Lead (15 ug/L)
2937-114	16-Mar-06	1	U	
2937-118	16-Mar-06	1	U	
2937-120	16-Mar-06	1	U	
2937-121	16-Mar-06	1	U	
2937-104	16-Mar-06	1.08		
2937-122	16-Mar-06	2.06		
2937-115	16-Mar-06	2.15		
2937-103	16-Mar-06	2.7		
2937-105	16-Mar-06	3.03		
2937-105	16-Mar-06	5.27		
2937-145	17-Mar-06	1.77		
2937-146	17-Mar-06	3.03		
2937-147	17-Mar-06	3.51		
2937-145	17-Mar-06	10.4		
2937-143	17-Mar-06	10.6		
2937-143	17-Mar-06	10.9		
2937-159	18-Mar-06	9.62		
2937-148	18-Mar-06	10.3		
2937-154	18-Mar-06	13.6		
2937-151	18-Mar-06	14.8		
2937-149	18-Mar-06	18.3		X
2937-152	18-Mar-06	30.2		X
2937-148	18-Mar-06	32.8		X
2937-150	18-Mar-06	45.2		X
2937-149	18-Mar-06	150		X
2937-156	20-Mar-06	1.94		
2937-166	20-Mar-06	2.78		
2937-165	20-Mar-06	3.9		
2937-164	20-Mar-06	7.27		
2937-156	20-Mar-06	10.5		
2937-161	20-Mar-06	15.4		X
2937-160	20-Mar-06	22.6		X
2937-155	20-Mar-06	28.2		X
2937-155	20-Mar-06	28.8		X
2937-167	20-Mar-06	30.8		X
2937-158	20-Mar-06	31.2		X
2937-158	20-Mar-06	33.3		X
2937-157	20-Mar-06	47.1		X
2937-157	20-Mar-06	48.4		X
2937-162	20-Mar-06	50.5		X
2937-163	20-Mar-06	50.8		X
2959-104	22-Mar-06	1	U	
2959-105	22-Mar-06	1	U	
2959-106	22-Mar-06	1	U	
2959-107	22-Mar-06	1	U	
2959-115	22-Mar-06	1	U	
2959-115	22-Mar-06	1.62	U	
2959-101	22-Mar-06	3.07	U	
2959-116	28-Mar-06	1	U	
2959-116	28-Mar-06	1	U	
2959-117	28-Mar-06	1	U	

Table 4-31
Analytical Results for Lead in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Q	Exceed MCL - Lead (15 ug/L)
2959-117	28-Mar-06	1	U	
2959-102	28-Mar-06	2.17	U	
2959-103	28-Mar-06	4.22		
2959-109	29-Mar-06	1	U	
2959-112	29-Mar-06	1	U	
2959-127	29-Mar-06	1	U	
2959-114	29-Mar-06	1.28		
2959-114	29-Mar-06	1.8	U	
2959-131	29-Mar-06	1.82		
2959-112	29-Mar-06	2.24	U	
2959-111	29-Mar-06	13.7		
2959-128	30-Mar-06	1	U	
2959-129	30-Mar-06	1	U	
2959-126	30-Mar-06	1	U	
2959-126	30-Mar-06	1.31		
2959-120	30-Mar-06	2.84		
2959-130	30-Mar-06	3.27		
2959-132	30-Mar-06	3.54		
2959-120	30-Mar-06	9.2		
2959-123	30-Mar-06	9.87		
2959-123	30-Mar-06	11		
2959-121	30-Mar-06	12.4		
2959-121	30-Mar-06	13		
2959-118	30-Mar-06	25		X
2959-118	30-Mar-06	26.7		X
2959-122	30-Mar-06	27.8		X
2959-122	30-Mar-06	28.2		X
2959-125	30-Mar-06	40.1		X
2959-119	30-Mar-06	40.2		X
2959-125	30-Mar-06	42		X
2959-124	30-Mar-06	45.1		X
2959-119	30-Mar-06	46.6		X
2959-124	30-Mar-06	47.8		X
2959-134	31-Mar-06	1	U	
2959-136	31-Mar-06	1	U	
2959-137	31-Mar-06	1	U	
2959-138	31-Mar-06	1	U	
2959-133	31-Mar-06	1.35		
2959-135	31-Mar-06	2.4		
2959-139	31-Mar-06	12.3		
2959-144	01-Apr-06	1	UJ	
2959-154	01-Apr-06	1	U	
2959-154	01-Apr-06	1	UJ	
2959-151	01-Apr-06	1	U	
2959-151	01-Apr-06	1	UJ	
2959-141	01-Apr-06	5.32	J	
2959-140	01-Apr-06	12.2		
2959-142	01-Apr-06	21.2	J	X
2959-143	01-Apr-06	55.8	J	X
2959-147	03-Apr-06	1	UJ	
2959-148	03-Apr-06	1	UJ	

Table 4-31
Analytical Results for Lead in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Q	Exceed MCL - Lead (15 ug/L)
2959-152	03-Apr-06	1	U	
2959-153	03-Apr-06	1	U	
2959-145	03-Apr-06	1.06	J	
2959-152	03-Apr-06	1.06	J	
2959-146	03-Apr-06	1.67	J	
2959-153	03-Apr-06	1.72	J	
2959-150	03-Apr-06	2.36	J	
2959-149	03-Apr-06	4.57	J	
2991-106	05-Apr-06	1	U	
2991-108	05-Apr-06	1	U	
2991-110	05-Apr-06	1	U	
2991-105	05-Apr-06	1.54		
2991-111	05-Apr-06	5.96		
2991-112	05-Apr-06	23.4		X
2991-116	05-Apr-06	102		X
2992-129	10-Apr-06	13.6		
2991-101	11-Apr-06	1.05		
2991-109	11-Apr-06	2.84		
2991-118	11-Apr-06	3.59		
2991-115	11-Apr-06	3.71		
2991-104	11-Apr-06	3.95		
2991-101	11-Apr-06	10.1		
2991-113	11-Apr-06	11.1		
2991-114	11-Apr-06	37		X
2991-102	11-Apr-06	44.6		X
2991-102	11-Apr-06	49.1		X
2991-107	11-Apr-06	52.9		X
2991-117	12-Apr-06	8.22		
2991-119	13-Apr-06	1.5		
2991-119	13-Apr-06	1.82		
2991-134	13-Apr-06	2.8		
2991-121	13-Apr-06	3.32		
2991-129	13-Apr-06	5.18		
2991-131	13-Apr-06	5.53		
2991-122	13-Apr-06	5.93		
2991-128	13-Apr-06	7.94		
2991-122	13-Apr-06	8.02		
2991-121	13-Apr-06	13.2		
2991-127	13-Apr-06	20.5		X
2991-133	13-Apr-06	25.2		X
2991-132	13-Apr-06	30.8		X
2991-120	13-Apr-06	38.5		X
2991-120	13-Apr-06	42.8		X
2991-123	14-Apr-06	1	U	
2991-126	14-Apr-06	1.24		
2991-124	14-Apr-06	1.54		
2991-123	14-Apr-06	2.13		
2991-124	14-Apr-06	2.82		
2991-125	14-Apr-06	7.71		
2991-125	14-Apr-06	9.04		
2991-126	14-Apr-06	14		

Table 4-31
Analytical Results for Lead in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Q	Exceed MCL - Lead (15 ug/L)
2991-130	14-Apr-06	39.6		X
3133-002	21-Jul-06	14.5		
3133-001	21-Jul-06	16		X
3244-107	27-Sep-06	1	U	
3270-111	01-Nov-06	1	U	
3270-104	01-Nov-06	4.23		
3270-113	02-Nov-06	1	U	
3270-112	02-Nov-06	7.84		
3270-106	02-Nov-06	12		
3270-105	02-Nov-06	12.3		
3295-108	07-Nov-06	5.58		
3270-107	08-Nov-06	1	U	
3270-114	14-Nov-06	3.36		
3270-115	16-Nov-06	9.79		
3270-108	16-Nov-06	15.1		X
3270-109	17-Nov-06	26.8		X
3270-103	18-Nov-06	1	U	
3270-102	18-Nov-06	27		X
3316-108	21-Nov-06	4.23		
3316-104	21-Nov-06	4.76		
3316-103	21-Nov-06	10.1		
3316-109	21-Nov-06	13.2		
3316-113	28-Nov-06	10.1		
3316-114	29-Nov-06	26.4		X
3316-110	13-Dec-06	1	U	
3316-115	13-Dec-06	8.77		
3316-101	13-Dec-06	278		X
3316-107	14-Dec-06	1.53	U	
3316-106	14-Dec-06	3.73		
3316-112	14-Dec-06	6.91		
3542-105	03-Jul-07	1.1		
3542-104	03-Jul-07	2.5		
3542-103	03-Jul-07	2.8		
3542-102	03-Jul-07	4.9		
3542-106	03-Jul-07	14.2		
3542-101	03-Jul-07	32.7		X
3542-109	11-Jul-07	1		
3542-108	11-Jul-07	2.1		
3542-107	11-Jul-07	24.4		X
3605-003	23-Aug-07	1	U	
3605-004	23-Aug-07	1	U	
3605-005	23-Aug-07	1	U	
3605-009	23-Aug-07	1	U	
3605-011	23-Aug-07	1	U	
3605-017	23-Aug-07	1	U	
3605-016	23-Aug-07	4.7		
3605-002	24-Aug-07	1	U	
3605-006	24-Aug-07	1	U	
3605-007	24-Aug-07	1	U	
3605-013	24-Aug-07	1	U	
3605-014	24-Aug-07	1	U	

Table 4-31
Analytical Results for Lead in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Q	Exceed MCL - Lead (15 ug/L)
3605-008	24-Aug-07	1.9		
3605-018	27-Aug-07	1	U	
3605-010	27-Aug-07	15.6		X
3605-015	27-Aug-07	19.6		X
3605-012	29-Aug-07	1.7		
3605-001	29-Aug-07	33.8		X
3684-105	09-Oct-07	1	U	
3684-106	09-Oct-07	1	U	
3684-110	09-Oct-07	1	U	
3684-108	09-Oct-07	2.24		
3684-107	09-Oct-07	3.8		
3684-112	09-Oct-07	13.8		
3684-109	09-Oct-07	19.9		X
3703-001	07-Nov-07	24.1		X
3703-002	07-Nov-07	24.8		X
3732-001	05-Dec-07	5.8		
3732-002	05-Dec-07	6		
3754-002	09-Jan-08	1	UJ	
3754-004	09-Jan-08	1	UJ	
3754-003	09-Jan-08	1.45	UJ	
3754-001	09-Jan-08	1.78	UJ	
3754-006	15-Jan-08	12.8	J	
3754-005	15-Jan-08	25.4	J	X
2690-151	NA	10	U	
2690-152	NA	10	U	
2690-153	NA	10	U	
2690-154	NA	10	U	
2690-155	NA	10	U	
2690-156	NA	10	U	
2690-157	NA	10	U	
2690-160	NA	10	U	
2690-161	NA	10	U	
2690-162	NA	10	U	
2690-164	NA	10	U	
2690-165	NA	10	U	
2690-163	NA	21.7		X
2690-158	NA	22.3		X
2690-159	NA	26.8		X

Notes:

U=not detected.

J=Analyte present. Reported value may be estimated.

NA=Not Available

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
0503843	06-Jun-05	1.39	
0503844	07-Jun-05	3.82	
0503845	07-Jun-05	1	
0503846	07-Jun-05	1	
0503847	07-Jun-05	1	
0503848	07-Jun-05	1	
0503853	09-Jun-05	1	
0503862	08-Jun-05	1	
0503903	06-Jun-05	1.84	
0503904	06-Jun-05	2.19	
0503905	06-Jun-05	1.33	
0503906	06-Jun-05	2.39	
0503907	07-Jun-05	1	
0503908	10-Jun-05	1	
0503909	10-Jun-05	1	
0503953	06-Jun-05	1	
0503954	07-Jun-05	1	
0503955	08-Jun-05	1	
0503956	08-Jun-05	1	
0503957	08-Jun-05	1	
0503958	08-Jun-05	1	
0503959	08-Jun-05	1	
0503960	09-Jun-05	1	
0503961	09-Jun-05	1	
0503962	10-Jun-05	1	
0503963	10-Jun-05	1	
0503964	10-Jun-05	1	
0503982	10-Jun-05	1	
0503983	09-Jun-05	1	
2730-103	17-Aug-05	10	X
2774-144	15-Sep-05	4.69	
2774-145	15-Sep-05	1	
2801-101	10-Oct-05	1	
2801-101-	10-Oct-05	1	
2801-102	12-Oct-05	1	
2801-102-	12-Oct-05	1	
2801-103	12-Oct-05	1	
2801-103-	12-Oct-05	1	
2801-104	06-Oct-05	1	
2801-104-	06-Oct-05	1	
2801-105	06-Oct-05	1	
2801-106	12-Oct-05	1	
2801-107	13-Oct-05	1	
2801-108	11-Oct-05	1	
2801-109	10-Oct-05	1	
2801-110	10-Oct-05	1	
2801-111	11-Oct-05	1	
2801-112	12-Oct-05	1	
2801-113	07-Oct-05	1	
2801-114	10-Oct-05	1	

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2801-115	12-Oct-05	1	
2801-116	12-Oct-05	1	
2801-117	11-Oct-05	1	
2801-118	10-Oct-05	1	
2801-119	11-Oct-05	1	
2801-120	07-Oct-05	1	
2801-121	20-Oct-05	1	
2801-122	20-Oct-05	1	
2801-123	20-Oct-05	1	
2801-202	12-Oct-05	1	
2801-202-	12-Oct-05	1	
2801-203	12-Oct-05	1	
2801-203-	12-Oct-05	1	
2801-204	06-Oct-05	1	
2801-204-	06-Oct-05	1	
2801-205	12-Oct-05	1	
2801-206	12-Oct-05	1	
2801-207	11-Oct-05	1	
2801-208	12-Oct-05	1	
2801-209	12-Oct-05	1	
2801-210	12-Oct-05	1	
2801-211	11-Oct-05	1	
2801-201	10-Oct-05	1	
2801-201-	10-Oct-05	1	
2801-239	06-Oct-05	1	
2801-240	06-Oct-05	1	
2801-241	10-Oct-05	1	
2801-257	19-Oct-05	1.11	
2801-262	22-Oct-05	1	
2801-263	22-Oct-05	1	
2801-267	22-Oct-05	1	
2801-268	20-Oct-05	1	
2801-269	20-Oct-05	1	
2801-270	20-Oct-05	1	
2801-271	20-Oct-05	1	
2801-212	12-Oct-05	1	
2801-213	11-Oct-05	1	
2801-214	13-Oct-05	1	
2801-215	13-Oct-05	1	
2801-216	12-Oct-05	1	
2801-217	12-Oct-05	1	
2801-218	12-Oct-05	1	
2801-219	12-Oct-05	1	
2801-220	11-Oct-05	1	
2801-221	12-Oct-05	1	
2801-222	12-Oct-05	1	
2801-223	12-Oct-05	1	
2801-224	12-Oct-05	1	
2801-226	12-Oct-05	1	
2801-227	13-Oct-05	1	

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2801-228	07-Oct-05	1	
2801-229	12-Oct-05	1	
2801-230	06-Oct-05	1	
2801-231	06-Oct-05	1	
2801-232	10-Oct-05	1	
2801-233	10-Oct-05	1	
2801-234	07-Oct-05	1	
2801-235	07-Oct-05	1	
2801-236	10-Oct-05	1	
2801-237	06-Oct-05	1	
2801-238	10-Oct-05	1	
2801-242	06-Oct-05	1	
2801-243	06-Oct-05	1	
2801-244	12-Oct-05	1	
2801-245	10-Oct-05	1	
2801-246	06-Oct-05	1	
2801-247	07-Oct-05	1	
2801-248	07-Oct-05	1	
2801-249	07-Oct-05	1	
2801-250	10-Oct-05	1	
2801-251	10-Oct-05	1	
2801-252	10-Oct-05	1	
2801-253	10-Oct-05	1	
2801-254	10-Oct-05	1	
2801-255	10-Oct-05	1	
2801-256	07-Oct-05	1	
2801-261	22-Oct-05	1	
2801-264	22-Oct-05	1	
2801-265	22-Oct-05	1	
2801-266	22-Oct-05	1	
2801-272	20-Oct-05	1	
2823-101	24-Oct-05	1	
2823-102	24-Oct-05	1	
2823-103	24-Oct-05	1	
2823-104	24-Oct-05	1	
2823-105	24-Oct-05	1	
2823-106	21-Oct-05	1	
2823-107	21-Oct-05	1	
2823-108	21-Oct-05	1	
2823-109	20-Oct-05	1	
2823-110	21-Oct-05	1	
2823-111	21-Oct-05	1	
2823-112	21-Oct-05	1	
2823-113	11-Oct-05	1	
2823-114	20-Oct-05	1	
2823-115	20-Oct-05	1	
2823-116	20-Oct-05	1	
2823-117	20-Oct-05	1	
2823-118	20-Oct-05	1	
2823-119	20-Oct-05	1	

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2823-120	20-Oct-05	1	
2823-121	21-Oct-05	1	
2823-122	20-Oct-05	1	
2823-123	20-Oct-05	1	
2823-124	25-Oct-05	1	
2823-125	25-Oct-05	1	
2823-126	25-Oct-05	1	
2823-127	25-Oct-05	1	
2823-128	25-Oct-05	1	
2823-129	25-Oct-05	1	
2823-130	25-Oct-05	1	
2823-131	25-Oct-05	1	
2823-132	25-Oct-05	1	
2823-133	25-Oct-05	1	
2823-134	25-Oct-05	1	
2823-135	27-Oct-05	1	
2823-136	26-Oct-05	1	
2823-137	25-Oct-05	1	
2823-138	26-Oct-05	1	
2823-139	26-Oct-05	1	
2823-140	26-Oct-05	1	
2823-141	26-Oct-05	1	
2823-142	26-Oct-05	1	
2823-143	26-Oct-05	1	
2823-144	26-Oct-05	1	
2823-145	26-Oct-05	1	
2823-146	26-Oct-05	1	
2823-201	21-Oct-05	1	
2823-202	21-Oct-05	1	
2823-203	24-Oct-05	1	
2823-204	25-Oct-05	1	
2823-205	25-Oct-05	1	
2823-206	25-Oct-05	1	
2823-207	25-Oct-05	1	
2823-208	25-Oct-05	1	
2823-209	26-Oct-05	1	
2823-210	26-Oct-05	1	
2832-101	03-Nov-05	1	
2832-102	03-Nov-05	1	
2832-103	03-Nov-05	1	
2832-104	08-Nov-05	1.08	
2832-105	03-Nov-05	1	
2832-106	03-Nov-05	1	
2832-107	03-Nov-05	1	
2832-108	03-Nov-05	1	
2832-109	03-Nov-05	1	
2832-111	16-Nov-05	1	
2832-112	16-Nov-05	2	
2832-113	16-Nov-05	1	
2832-114	16-Nov-05	2	

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2832-115	16-Nov-05	2	
2832-116	16-Nov-05	1	
2832-117	16-Nov-05	1	
2832-118	16-Nov-05	1	
2832-119	16-Nov-05	1	
2832-120	16-Nov-05	1	
2832-121	16-Nov-05	1	
2832-122	16-Nov-05	1	
2832-123	16-Nov-05	1	
2832-124	16-Nov-05	1	
2832-125	18-Nov-05	1	
2832-126	18-Nov-05	1	
2832-127	18-Nov-05	1	
2832-128	18-Nov-05	1	
2832-129	18-Nov-05	1	
2832-130	18-Nov-05	1	
2832-131	17-Nov-05	1	
2832-132	18-Nov-05	1	
2832-133	18-Nov-05	1	
2832-134	18-Nov-05	1	
2832-135	18-Nov-05	2	
2832-136	17-Nov-05	2	
2832-137	18-Nov-05	2	
2832-139	18-Nov-05	1	
2832-140	19-Nov-05	2	
2832-141	19-Nov-05	2	
2832-142	19-Nov-05	2	
2832-143	19-Nov-05	1	
2832-144	19-Nov-05	2	
2832-145	19-Nov-05	2	
2832-146	19-Nov-05	2	
2832-147	21-Nov-05	1	
2832-148	21-Nov-05	1	
2832-149	21-Nov-05	1	
2832-150	21-Nov-05	1	
2832-151	21-Nov-05	1	
2832-152	21-Nov-05	1	
2832-153	21-Nov-05	1	
2832-154	21-Nov-05	1	
2832-155	21-Nov-05	1	
2832-156	21-Nov-05	1	
2832-160	22-Nov-05	1	
2832-161	22-Nov-05	1	
2832-162	22-Nov-05	1.3	
2832-163	22-Nov-05	1	
2832-164	22-Nov-05	1	
2832-166	22-Nov-05	1	
2863-101	29-Nov-05	1	
2863-102	29-Nov-05	1	
2863-103	02-Dec-05	1	

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2863-104	02-Dec-05	1	
2863-105	02-Dec-05	1	
2863-106	02-Dec-05	1	
2863-107	02-Dec-05	1	
2863-108	03-Dec-05	1	
2863-109	02-Dec-05	1	
2863-110	29-Nov-05	1	
2863-111	01-Dec-05	2	
2863-112	29-Nov-05	1	
2863-113	01-Dec-05	1	
2863-114	01-Dec-05	1	
2863-115	01-Dec-05	1	
2863-116	01-Dec-05	1.6	
2863-117	05-Dec-05	1	
2863-118	05-Dec-05	1	
2863-119	01-Dec-05	1.92	
2863-120	02-Dec-05	1	
2863-121	02-Dec-05	1	
2863-122	29-Nov-05	1	
2863-123	29-Nov-05	1	
2863-124	01-Dec-05	1	
2863-125	29-Nov-05	1	
2863-126	05-Dec-05	1	
2863-127	05-Dec-05	1	
2863-128	05-Dec-05	1	
2863-129	05-Dec-05	1	
2863-130	05-Dec-05	1	
2863-131	03-Dec-05	1	
2863-132	05-Dec-05	1	
2863-133	05-Dec-05	1	
2863-134	05-Dec-05	1	
2863-135	03-Dec-05	1	
2863-136	05-Dec-05	1	
2863-137	03-Dec-05	1	
2863-138	05-Dec-05	1	
2863-139	05-Dec-05	1	
2863-140	05-Dec-05	1	
2863-141	06-Dec-05	1	
2863-142	06-Dec-05	1	
2863-143	06-Dec-05	1	
2863-144	06-Dec-05	1	
2863-145	06-Dec-05	1	
2863-146	06-Dec-05	1	
2863-148	06-Dec-05	1	
2863-149	06-Dec-05	1	
2863-150	06-Dec-05	1	
2863-151	06-Dec-05	1	
2863-152	06-Dec-05	1	
2863-153	06-Dec-05	1	
2863-154	06-Dec-05	1	

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2863-155	06-Dec-05	1	
2863-156	07-Dec-05	1	
2863-157	07-Dec-05	1	
2863-158	07-Dec-05	1	
2863-159	07-Dec-05	1	
2863-161	07-Dec-05	1	
2863-162	07-Dec-05	1	
2863-163	07-Dec-05	1	
2863-164	07-Dec-05	1	
2863-165	07-Dec-05	1	
2863-166	07-Dec-05	1	
2863-167	07-Dec-05	1	
2863-168	07-Dec-05	1	
2863-169	07-Dec-05	1	
2873-101	16-Dec-05	1	
2873-102	16-Dec-05	1	
2873-103	14-Dec-05	1	
2873-104	15-Dec-05	1	
2873-105	16-Dec-05	1	
2873-106	15-Dec-05	1	
2873-107	16-Dec-05	1	
2873-108	16-Dec-05	1	
2873-112	15-Dec-05	1	
2873-113	16-Dec-05	1	
2873-114	15-Dec-05	1	
2873-115	08-Dec-05	1	
2873-118	14-Dec-05	1	
2873-119	16-Dec-05	1	
2873-120	15-Dec-05	1	
2873-121	15-Dec-05	1	
2873-122	16-Dec-05	1	
2873-123	17-Dec-05	1	
2873-124	17-Dec-05	1	
2873-125	17-Dec-05	1	
2873-126	17-Dec-05	1	
2873-127	17-Dec-05	1	
2873-128	17-Dec-05	1	
2873-129	19-Dec-05	1	
2873-130	19-Dec-05	1	
2873-131	19-Dec-05	1	
2873-132	19-Dec-05	1	
2873-133	19-Dec-05	1	
2873-134	19-Dec-05	1	
2873-135	19-Dec-05	1	
2873-136	19-Dec-05	1	
2873-137	19-Dec-05	1	
2873-138	20-Dec-05	1	
2873-139	20-Dec-05	1	
2873-140	20-Dec-05	1	
2873-141	20-Dec-05	1	

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2873-142	20-Dec-05	1	
2873-143	20-Dec-05	1	
2873-144	20-Dec-05	1	
2873-145	21-Dec-05	1	
2873-146	21-Dec-05	1	
2873-147	21-Dec-05	1	
2873-149	21-Dec-05	1	
2873-150	21-Dec-05	1	
2873-151	21-Dec-05	1	
2873-152	21-Dec-05	1	
2873-153	21-Dec-05	1	
2882-101	04-Jan-06	1	
2882-102	04-Jan-06	1	
2882-103	04-Jan-06	1	
2882-104	04-Jan-06	1	
2882-105	04-Jan-06	1	
2882-106	04-Jan-06	1	
2882-107	04-Jan-06	1	
2882-108	04-Jan-06	1	
2882-109	04-Jan-06	1	
2882-110	04-Jan-06	1	
2882-111	04-Jan-06	1	
2882-112	04-Jan-06	1	
2882-113	05-Jan-06	1	
2882-114	05-Jan-06	1	
2882-115	04-Jan-06	1	
2882-116	05-Jan-06	1	
2882-117	05-Jan-06	1	
2882-118	05-Jan-06	1.09	
2882-119	05-Jan-06	1	
2882-120	05-Jan-06	1	
2882-121	05-Jan-06	1.49	
2882-122	05-Jan-06	1	
2882-123	05-Jan-06	1	
2882-124	05-Jan-06	1	
2882-125	05-Jan-06	1	
2882-126	05-Jan-06	1	
2882-127	06-Jan-06	1	
2882-128	06-Jan-06	2	
2882-129	06-Jan-06	2	
2882-130	06-Jan-06	1	
2882-131	06-Jan-06	1	
2882-132	06-Jan-06	2	
2882-133	06-Jan-06	2	
2882-134	06-Jan-06	2	
2882-135	06-Jan-06	1	
2882-136	06-Jan-06	2	
2882-137	06-Jan-06	2	
2882-138	06-Jan-06	2	
2882-139	07-Jan-06	1	

Table 4-32
Analytical Results for Arsenic in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceed MCL - Arsenic (1 ug/L)
2882-140	07-Jan-06	1	
2882-141	07-Jan-06	1	
2882-142	07-Jan-06	1	
2882-143	07-Jan-06	1	
2882-144	07-Jan-06	1	
2882-145	07-Jan-06	2.16	
2882-146	07-Jan-06	1	
2882-147	07-Jan-06	1	
2882-148	07-Jan-06	1	
2882-149	07-Jan-06	1	
2882-150	07-Jan-06	1	
2882-151	07-Jan-06	1	
2882-153	07-Jan-06	1	
2882-154	07-Jan-06	1	
2882-155	07-Jan-06	1	
2882-156	09-Jan-06	1	
2882-157	09-Jan-06	1	
2882-158	09-Jan-06	1	
2882-159	09-Jan-06	1	
2882-160	09-Jan-06	1	
2882-161	09-Jan-06	1	
2882-162	22-Nov-05	1	
2882-163	09-Jan-06	1	
2882-164	09-Jan-06	1	
2882-165	09-Jan-06	1	
2882-166	09-Jan-06	1	
2882-167	09-Jan-06	1	
2882-168	10-Jan-06	1	
2882-169	10-Jan-06	1	
2882-170	10-Jan-06	1	
2882-171	10-Jan-06	1	
2882-172	10-Jan-06	1	
2882-173	10-Jan-06	1	
2882-174	10-Jan-06	1	
2882-175	10-Jan-06	1	
2938-121	03-Mar-06	1	
2938-121	03-Mar-06	1	
3377-142	05-Mar-07	1	
3419-139	NA	1	
3419-149	NA	1	
3419-205	NA	1	
3419-215	NA	1	

Notes:

NA=Not Available

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
0503843	06-Jun-05	11.3	
0503844	07-Jun-05	10.3	
0503845	07-Jun-05	602	
0503846	07-Jun-05	40.1	
0503847	07-Jun-05	30.9	
0503848	07-Jun-05	1040	
0503849	15-Jun-05	626	
0503850	16-Jun-05	886	
0503851	16-Jun-05	1520	
0503853	09-Jun-05	1430	
0503854	20-Jun-05	251	
0503855	20-Jun-05	1430	
0503856	22-Jun-05	150	
0503857	22-Jun-05	254	
0503858	20-Jun-05	110	
0503859	21-Jun-05	192	
0503860	21-Jun-05	110	
0503861	20-Jun-05	48.3	
0503862	08-Jun-05	197	
0503863	22-Jun-05	1080	
0503864	23-Jun-05	481	
0503865	24-Jun-05	688	
0503866	24-Jun-05	1370	
0503867	24-Jun-05	600	
0503868	28-Jun-05	1400	
0503869	28-Jun-05	109	
0503870	28-Jun-05	81.5	
0503882	29-Jun-05	68.8	
0503883	29-Jun-05	391	
0503903	06-Jun-05	282	
0503904	06-Jun-05	254	
0503905	06-Jun-05	264	
0503906	06-Jun-05	1.65	
0503907	07-Jun-05	851	
0503908	10-Jun-05	967	
0503909	10-Jun-05	762	
0503910	13-Jun-05	1620	
0503911	14-Jun-05	41.4	
0503912	14-Jun-05	57.6	
0503913	15-Jun-05	123	
0503914	15-Jun-05	114	
0503915	15-Jun-05	210	
0503916	16-Jun-05	247	
0503917	16-Jun-05	529	
0503918	13-Jun-05	1040	
0503919	13-Jun-05	789	
0503920	13-Jun-05	544	
0503921	13-Jun-05	1250	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
0503922	13-Jun-05	846	
0503923	13-Jun-05	805	
0503924	13-Jun-05	615	
0503925	13-Jun-05	754	
503926	14-Jun-05	2220	X
0503927	14-Jun-05	1620	
0503928	14-Jun-05	41.7	
0503929	14-Jun-05	309	
0503930	14-Jun-05	240	
0503931	14-Jun-05	777	
0503932	14-Jun-05	339	
0503933	14-Jun-05	1000	
0503934	14-Jun-05	1	
0503935	14-Jun-05	116	
0503936	15-Jun-05	1270	
0503937	15-Jun-05	831	
0503940	15-Jun-05	73.7	
0503941	15-Jun-05	75.9	
0503942	16-Jun-05	875	
0503943	16-Jun-05	741	
0503944	16-Jun-05	786	
0503945	16-Jun-05	800	
0503946	16-Jun-05	1050	
0503947	16-Jun-05	1010	
0503948	16-Jun-05	342	
0503949	16-Jun-05	805	
0503950	16-Jun-05	29.4	
0503951	16-Jun-05	865	
0503952	20-Jun-05	114	
0503953	06-Jun-05	613	
0503953	06-Jun-05	613	
0503954	07-Jun-05	60.8	
0503955	08-Jun-05	837	
0503956	08-Jun-05	1120	
0503957	08-Jun-05	135	
0503958	08-Jun-05	90.5	
0503959	08-Jun-05	322	
0503960	09-Jun-05	327	
0503961	09-Jun-05	168	
0503962	10-Jun-05	141	
0503963	10-Jun-05	117	
0503964	10-Jun-05	1170	
0503965	13-Jun-05	771	
0503966	13-Jun-05	1210	
0503967	13-Jun-05	1060	
0503968	13-Jun-05	1020	
0503969	14-Jun-05	1130	
0503970	14-Jun-05	1170	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
0503971	14-Jun-05	1540	
0503972	14-Jun-05	1070	
0503973	14-Jun-05	1210	
0503974	15-Jun-05	765	
0503975	15-Jun-05	246	
0503976	15-Jun-05	144	
0503977	16-Jun-05	290	
0503978	17-Jun-05	1150	
0503979	17-Jun-05	1080	
0503980	17-Jun-05	999	
0503981	14-Jun-05	806	
0503982	10-Jun-05	149	
0503983	09-Jun-05	203	
0503984	14-Jun-05	958	
0503985	15-Jun-05	1550	
0503986	16-Jun-05	1280	
0503987	16-Jun-05	900	
0503989	20-Jun-05	1160	
0503990	20-Jun-05	924	
0503991	22-Jun-05	84.4	
0503992	22-Jun-05	774	
0503993	22-Jun-05	484	
0503994	16-Jun-05	2.09	
0503995	16-Jun-05	1130	
0503996	20-Jun-05	447	
0503997	20-Jun-05	152	
0503999	21-May-05	30	
0504000	21-May-05	666	
0504001	21-Jun-05	152	
0504002	14-Jun-05	940	
0504032	27-Jun-05	84.2	
0504033	28-Jun-05	50.7	
0504034	28-Jun-05	139	
0504035	29-Jun-05	72.7	
0504036	29-Jun-05	1160	
0504037	27-Jun-05	65.3	
0504038	29-Jun-05	464	
0504041	28-Jun-05	964	
0504644	19-Sep-05	1	
0504645	19-Sep-05	1	
0504646	20-Sep-05	76.4	
0504647	20-Sep-05	96.9	
0504653	18-Oct-05	3.45	
0504654	18-Oct-05	4.47	
0504655	18-Oct-05	967	
0504656	18-Oct-05	996	
0504657	18-Oct-05	1	
0504658	18-Oct-05	57.1	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
0504659	18-Oct-05	218	
0504660	18-Oct-05	2.03	
0504770	20-Jun-05	759	
0504771	20-Jun-05	609	
0504772	20-Jun-05	667	
0504773	20-Jun-05	3.98	
0504774	21-Jun-05	44.8	
0504775	21-Jun-05	130	
0504776	21-Jun-05	646	
0504777	21-Jun-05	647	
0504778	21-Jun-05	470	
0504779	21-Jun-05	143	
0504780	22-Jun-05	442	
0504781	22-Jun-05	678	
0504782	22-Jun-05	8.67	
0504783	22-Jun-05	6.43	
0504784	22-Jun-05	211	
0504785	22-Jun-05	106	
0504786	23-Jun-05	422	
0504787	23-Jun-05	1100	
0504788	23-Jun-05	1860	
0504789	23-Jun-05	933	
0504791	24-May-05	97.1	
0504792	22-Jun-05	782	
0504793	22-Jun-05	181	
0504794	22-Jun-05	172	
0504795	23-Jun-05	107	
0504796	23-Jun-05	67.5	
0504797	27-Jun-05	2090	X
0504798	24-Jun-05	577	
0504799	27-Jun-05	631	
0504800	24-Jun-05	645	
0504801	27-Jun-05	974	
0504802	27-Jun-05	767	
0504803	24-Jun-05	746	
0504804	24-Jun-05	1440	
0504805	01-Jul-05	339	
0504809	22-Sep-05	47	
0504810	22-Sep-05	153	
0504858	01-Jul-05	36.2	
0505127	20-Sep-05	28.7	
0505126	20-Sep-05	820	
2730-103	17-Aug-05	425	
2774-144	15-Sep-05	10	
2774-145	15-Sep-05	59.4	
2801-101	10-Oct-05	894	
2801-101-	10-Oct-05	925	
2801-102	12-Oct-05	38	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2801-102-	12-Oct-05	40.9	
2801-103	12-Oct-05	328	
2801-103-	12-Oct-05	328	
2801-104	06-Oct-05	240	
2801-104-	06-Oct-05	243	
2801-105	06-Oct-05	1030	
2801-106	12-Oct-05	99.2	
2801-107	13-Oct-05	801	
2801-108	11-Oct-05	347	
2801-109	10-Oct-05	558	
2801-110	10-Oct-05	362	
2801-111	11-Oct-05	253	
2801-112	12-Oct-05	709	
2801-113	07-Oct-05	635	
2801-114	10-Oct-05	863	
2801-115	12-Oct-05	1240	
2801-116	12-Oct-05	675	
2801-117	11-Oct-05	989	
2801-118	10-Oct-05	888	
2801-119	11-Oct-05	62.3	
2801-120	07-Oct-05	804	
2801-121	20-Oct-05	226	
2801-122	20-Oct-05	112	
2801-123	20-Oct-05	26.5	
2801-202	12-Oct-05	341	
2801-202-	12-Oct-05	329	
2801-203	12-Oct-05	36.9	
2801-203-	12-Oct-05	36.3	
2801-204	06-Oct-05	243	
2801-204-	06-Oct-05	244	
2801-205	12-Oct-05	679	
2801-206	12-Oct-05	591	
2801-207	11-Oct-05	61.5	
2801-208	12-Oct-05	1450	
2801-209	12-Oct-05	887	
2801-210	12-Oct-05	522	
2801-201	10-Oct-05	941	
2801-201-	10-Oct-05	905	
2801-239	06-Oct-05	1150	
2801-240	06-Oct-05	791	
2801-256	07-Oct-05	637	
2801-261	22-Oct-05	387	
2801-262	22-Oct-05	1410	
2801-263	22-Oct-05	580	
2801-266	22-Oct-05	659	
2801-267	22-Oct-05	924	
2801-268	20-Oct-05	26.8	
2801-269	20-Oct-05	412	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2801-270	20-Oct-05	661	
2801-211	11-Oct-05	471	
2801-212	12-Oct-05	1950	
2801-213	11-Oct-05	250	
2801-214	13-Oct-05	785	
2801-215	13-Oct-05	777	
2801-216	12-Oct-05	103	
2801-217	12-Oct-05	817	
2801-218	12-Oct-05	635	
2801-219	12-Oct-05	1470	
2801-220	11-Oct-05	973	
2801-221	12-Oct-05	87.4	
2801-222	12-Oct-05	154	
2801-223	12-Oct-05	859	
2801-224	12-Oct-05	1180	
2801-226	12-Oct-05	162	
2801-227	13-Oct-05	452	
2801-228	07-Oct-05	1080	
2801-229	12-Oct-05	1210	
2801-230	06-Oct-05	584	
2801-231	06-Oct-05	1010	
2801-232	10-Oct-05	1200	
2801-233	10-Oct-05	585	
2801-234	07-Oct-05	500	
2801-235	07-Oct-05	657	
2801-236	10-Oct-05	597	
2801-237	06-Oct-05	190	
2801-238	10-Oct-05	739	
2801-241	10-Oct-05	815	
2801-242	06-Oct-05	419	
2801-243	06-Oct-05	666	
2801-244	12-Oct-05	248	
2801-245	10-Oct-05	1030	
2801-246	06-Oct-05	629	
2801-247	07-Oct-05	760	
2801-248	07-Oct-05	713	
2801-249	07-Oct-05	531	
2801-250	10-Oct-05	183	
2801-251	10-Oct-05	140	
2801-252	10-Oct-05	833	
2801-253	10-Oct-05	1120	
2801-254	10-Oct-05	554	
2801-255	10-Oct-05	353	
2801-264	22-Oct-05	610	
2801-265	22-Oct-05	1190	
2801-271	20-Oct-05	486	
2801-272	20-Oct-05	233	
2823-101	24-Oct-05	197	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2823-102	24-Oct-05	205	
2823-103	24-Oct-05	443	
2823-104	24-Oct-05	646	
2823-105	24-Oct-05	300	
2823-106	21-Oct-05	684	
2823-107	21-Oct-05	154	
2823-108	21-Oct-05	168	
2823-109	20-Oct-05	232	
2823-110	21-Oct-05	640	
2823-111	21-Oct-05	111	
2823-112	21-Oct-05	846	
2823-113	11-Oct-05	349	
2823-114	20-Oct-05	117	
2823-115	20-Oct-05	693	
2823-116	20-Oct-05	118	
2823-117	20-Oct-05	89.1	
2823-118	20-Oct-05	204	
2823-119	20-Oct-05	507	
2823-120	20-Oct-05	310	
2823-121	21-Oct-05	40.1	
2823-122	20-Oct-05	243	
2823-123	20-Oct-05	299	
2823-124	25-Oct-05	458	
2823-125	25-Oct-05	792	
2823-126	25-Oct-05	156	
2823-127	25-Oct-05	180	
2823-128	25-Oct-05	329	
2823-129	25-Oct-05	229	
2823-130	25-Oct-05	180	
2823-131	25-Oct-05	313	
2823-132	25-Oct-05	157	
2823-133	25-Oct-05	109	
2823-134	25-Oct-05	160	
2823-135	27-Oct-05	17.6	
2823-136	26-Oct-05	132	
2823-137	25-Oct-05	533	
2823-138	26-Oct-05	265	
2823-139	26-Oct-05	232	
2823-140	26-Oct-05	120	
2823-141	26-Oct-05	176	
2823-142	26-Oct-05	360	
2823-143	26-Oct-05	15.4	
2823-144	26-Oct-05	583	
2823-145	26-Oct-05	119	
2823-146	26-Oct-05	358	
2823-201	21-Oct-05	98.3	
2823-202	21-Oct-05	811	
2823-203	24-Oct-05	436	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2823-204	25-Oct-05	227	
2823-205	25-Oct-05	152	
2823-206	25-Oct-05	182	
2823-207	25-Oct-05	160	
2823-208	25-Oct-05	787	
2823-209	26-Oct-05	372	
2823-210	26-Oct-05	130	
2832-101	03-Nov-05	90.7	
2832-102	03-Nov-05	73.6	
2832-103	03-Nov-05	92	
2832-104	08-Nov-05	51.6	
2832-105	03-Nov-05	2100	X
2832-106	03-Nov-05	96.9	
2832-107	03-Nov-05	160	
2832-108	03-Nov-05	66.8	
2832-109	03-Nov-05	1160	
2832-111	16-Nov-05	725	
2832-112	16-Nov-05	563	
2832-113	16-Nov-05	826	
2832-114	16-Nov-05	119	
2832-115	16-Nov-05	763	
2832-116	16-Nov-05	184	
2832-117	16-Nov-05	529	
2832-118	16-Nov-05	144	
2832-119	16-Nov-05	192	
2832-120	16-Nov-05	415	
2832-121	16-Nov-05	806	
2832-122	16-Nov-05	1050	
2832-123	16-Nov-05	63.5	
2832-124	16-Nov-05	416	
2832-125	18-Nov-05	808	
2832-126	18-Nov-05	1030	
2832-127	18-Nov-05	1180	
2832-128	18-Nov-05	1040	
2832-129	18-Nov-05	1380	
2832-130	18-Nov-05	1000	
2832-131	17-Nov-05	608	
2832-132	18-Nov-05	671	
2832-133	18-Nov-05	746	
2832-134	18-Nov-05	10	
2832-135	18-Nov-05	1140	
2832-136	17-Nov-05	1850	
2832-137	18-Nov-05	532	
2832-139	18-Nov-05	10	
2832-140	19-Nov-05	1270	
2832-141	19-Nov-05	923	
2832-142	19-Nov-05	974	
2832-143	19-Nov-05	678	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2832-144	19-Nov-05	1340	
2832-145	19-Nov-05	768	
2832-146	19-Nov-05	226	
2832-147	21-Nov-05	843	
2832-148	21-Nov-05	860	
2832-149	21-Nov-05	797	
2832-150	21-Nov-05	538	
2832-151	21-Nov-05	612	
2832-152	21-Nov-05	219	
2832-153	21-Nov-05	566	
2832-154	21-Nov-05	1020	
2832-155	21-Nov-05	1080	
2832-156	21-Nov-05	863	
2832-160	22-Nov-05	11	
2832-161	22-Nov-05	10.7	
2832-162	22-Nov-05	36.3	
2832-163	22-Nov-05	10	
2832-164	22-Nov-05	17.3	
2832-166	22-Nov-05	26.3	
2863-101	29-Nov-05	177	
2863-102	29-Nov-05	514	
2863-103	02-Dec-05	1120	
2863-104	02-Dec-05	977	
2863-105	02-Dec-05	1190	
2863-106	02-Dec-05	1190	
2863-107	02-Dec-05	1060	
2863-108	03-Dec-05	363	
2863-109	02-Dec-05	656	
2863-110	29-Nov-05	198	
2863-111	01-Dec-05	16.7	
2863-112	29-Nov-05	309	
2863-113	01-Dec-05	10	
2863-114	01-Dec-05	10.7	
2863-115	01-Dec-05	196	
2863-116	01-Dec-05	42	
2863-117	05-Dec-05	926	
2863-118	05-Dec-05	555	
2863-119	01-Dec-05	10	
2863-120	02-Dec-05	682	
2863-121	02-Dec-05	496	
2863-122	29-Nov-05	282	
2863-123	29-Nov-05	552	
2863-124	01-Dec-05	10	
2863-125	29-Nov-05	477	
2863-126	05-Dec-05	53.1	
2863-127	05-Dec-05	80.8	
2863-128	05-Dec-05	231	
2863-129	05-Dec-05	154	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2863-130	05-Dec-05	498	
2863-131	03-Dec-05	456	
2863-132	05-Dec-05	243	
2863-133	05-Dec-05	63.5	
2863-134	05-Dec-05	76.6	
2863-135	03-Dec-05	568	
2863-136	05-Dec-05	765	
2863-137	03-Dec-05	667	
2863-138	05-Dec-05	10	
2863-139	05-Dec-05	823	
2863-140	05-Dec-05	742	
2863-141	06-Dec-05	121	
2863-142	06-Dec-05	10	
2863-143	06-Dec-05	159	
2863-144	06-Dec-05	217	
2863-145	06-Dec-05	763	
2863-146	06-Dec-05	79.8	
2863-148	06-Dec-05	83.5	
2863-149	06-Dec-05	286	
2863-150	06-Dec-05	414	
2863-151	06-Dec-05	1720	
2863-152	06-Dec-05	533	
2863-153	06-Dec-05	147	
2863-154	06-Dec-05	443	
2863-155	06-Dec-05	30	
2863-156	07-Dec-05	596	
2863-157	07-Dec-05	650	
2863-158	07-Dec-05	839	
2863-159	07-Dec-05	658	
2863-161	07-Dec-05	325	
2863-162	07-Dec-05	185	
2863-163	07-Dec-05	970	
2863-164	07-Dec-05	847	
2863-165	07-Dec-05	578	
2863-166	07-Dec-05	716	
2863-167	07-Dec-05	93.8	
2863-168	07-Dec-05	204	
2863-169	07-Dec-05	990	
2873-101	16-Dec-05	72.5	
2873-102	16-Dec-05	79	
2873-103	14-Dec-05	511	
2873-104	15-Dec-05	512	
2873-105	16-Dec-05	25	
2873-106	15-Dec-05	801	
2873-107	16-Dec-05	1100	
2873-108	16-Dec-05	197	
2873-112	15-Dec-05	1060	
2873-113	16-Dec-05	843	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2873-114	15-Dec-05	1060	
2873-115	08-Dec-05	169	
2873-118	14-Dec-05	587	
2873-119	16-Dec-05	777	
2873-120	15-Dec-05	862	
2873-121	15-Dec-05	590	
2873-122	16-Dec-05	757	
2873-123	17-Dec-05	921	
2873-124	17-Dec-05	413	
2873-125	17-Dec-05	941	
2873-126	17-Dec-05	731	
2873-127	17-Dec-05	516	
2873-128	17-Dec-05	729	
2873-129	19-Dec-05	320	
2873-130	19-Dec-05	45.4	
2873-131	19-Dec-05	447	
2873-132	19-Dec-05	453	
2873-133	19-Dec-05	480	
2873-134	19-Dec-05	300	
2873-135	19-Dec-05	598	
2873-136	19-Dec-05	350	
2873-137	19-Dec-05	712	
2873-138	20-Dec-05	337	
2873-139	20-Dec-05	96.2	
2873-140	20-Dec-05	233	
2873-141	20-Dec-05	80.8	
2873-142	20-Dec-05	853	
2873-143	20-Dec-05	46	
2873-144	20-Dec-05	39.5	
2873-145	21-Dec-05	94.9	
2873-146	21-Dec-05	33.9	
2873-147	21-Dec-05	73.6	
2873-149	21-Dec-05	1070	
2873-150	21-Dec-05	762	
2873-151	21-Dec-05	633	
2873-152	21-Dec-05	10	
2873-153	21-Dec-05	75.3	
2882-101	04-Jan-06	111	
2882-102	04-Jan-06	1110	
2882-103	04-Jan-06	789	
2882-104	04-Jan-06	697	
2882-105	04-Jan-06	697	
2882-106	04-Jan-06	613	
2882-107	04-Jan-06	854	
2882-108	04-Jan-06	1180	
2882-109	04-Jan-06	655	
2882-110	04-Jan-06	726	
2882-111	04-Jan-06	841	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2882-112	04-Jan-06	1170	
2882-113	05-Jan-06	413	
2882-114	05-Jan-06	534	
2882-115	04-Jan-06	531	
2882-116	05-Jan-06	1390	
2882-117	05-Jan-06	70	
2882-118	05-Jan-06	727	
2882-119	05-Jan-06	458	
2882-120	05-Jan-06	64.4	
2882-121	05-Jan-06	696	
2882-122	05-Jan-06	1610	
2882-123	05-Jan-06	883	
2882-124	05-Jan-06	785	
2882-125	05-Jan-06	84.6	
2882-126	05-Jan-06	789	
2882-127	06-Jan-06	59.9	
2882-128	06-Jan-06	51.5	
2882-129	06-Jan-06	54.9	
2882-130	06-Jan-06	382	
2882-131	06-Jan-06	56.7	
2882-132	06-Jan-06	58.9	
2882-133	06-Jan-06	315	
2882-134	06-Jan-06	49.6	
2882-135	06-Jan-06	74	
2882-136	06-Jan-06	88.1	
2882-137	06-Jan-06	72.3	
2882-138	06-Jan-06	88.9	
2882-139	07-Jan-06	47.9	
2882-140	07-Jan-06	57.8	
2882-141	07-Jan-06	68.6	
2882-142	07-Jan-06	57.4	
2882-143	07-Jan-06	43	
2882-144	07-Jan-06	61.7	
2882-145	07-Jan-06	43.6	
2882-146	07-Jan-06	654	
2882-147	07-Jan-06	56.4	
2882-148	07-Jan-06	67.1	
2882-149	07-Jan-06	58.7	
2882-150	07-Jan-06	64.2	
2882-151	07-Jan-06	53	
2882-153	07-Jan-06	27.8	
2882-154	07-Jan-06	53.1	
2882-155	07-Jan-06	40.4	
2882-156	09-Jan-06	199	
2882-157	09-Jan-06	1420	
2882-158	09-Jan-06	283	
2882-159	09-Jan-06	51.5	
2882-160	09-Jan-06	81.2	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2882-161	09-Jan-06	45.6	
2882-162	22-Nov-05	70.4	
2882-163	09-Jan-06	63.2	
2882-164	09-Jan-06	249	
2882-165	09-Jan-06	74.3	
2882-166	09-Jan-06	539	
2882-167	09-Jan-06	753	
2882-168	10-Jan-06	41.2	
2882-169	10-Jan-06	40.5	
2882-170	10-Jan-06	38.7	
2882-171	10-Jan-06	38.8	
2882-172	10-Jan-06	277	
2882-173	10-Jan-06	273	
2882-174	10-Jan-06	289	
2882-175	10-Jan-06	265	
2901-101	21-Jan-06	146	
2901-102	20-Jan-06	10	
2901-103	21-Jan-06	487	
2901-104	21-Jan-06	74.6	
2901-105	20-Jan-06	169	
2901-106	20-Jan-06	185	
2901-107	20-Jan-06	157	
2901-108	20-Jan-06	261	
2901-109	20-Jan-06	400	
2901-110	20-Jan-06	62.1	
2901-111	19-Jan-06	445	
2901-112	20-Jan-06	10	
2901-113	20-Jan-06	187	
2901-114	19-Jan-06	53.8	
2901-115	19-Jan-06	190	
2901-116	20-Jan-06	205	
2901-117	21-Jan-06	41.4	
2901-118	21-Jan-06	61.3	
2915-101	02-Feb-06	81.2	
2915-102	02-Feb-06	104	
2915-103	01-Feb-06	269	
2915-104	02-Feb-06	114	
2915-105	02-Feb-06	72.7	
2915-106	02-Feb-06	78.1	
2915-107	01-Feb-06	549	
2915-108	01-Feb-06	103	
2915-109	02-Feb-06	116	
2915-110	02-Feb-06	10	
2915-111	01-Feb-06	63.9	
2915-112	01-Feb-06	10	
2915-113	02-Feb-06	147	
2915-114	03-Feb-06	84.5	
2915-115	01-Feb-06	96.9	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
2915-116	01-Feb-06	73.4	
2915-117	03-Feb-06	41.6	
2915-118	03-Feb-06	67.5	
2915-119	06-Feb-06	10	
2915-120	06-Feb-06	156	
2915-121	06-Feb-06	44	
2915-122	07-Feb-06	51	
2938-121	03-Mar-06	92.5	
2938-121	03-Mar-06	86	
2944-101	20-Feb-06	785	
2944-102	21-Feb-06	400	
2944-103	20-Feb-06	167	
2944-104	15-Feb-06	104	
2944-105	20-Feb-06	113	
2944-106	22-Feb-06	10	
2944-107	22-Feb-06	600	
2944-108	20-Feb-06	255	
2944-109	20-Feb-06	550	
2944-110	20-Feb-06	713	
2944-111	20-Feb-06	556	
2944-112	20-Feb-06	669	
2944-113	20-Feb-06	605	
2944-114	20-Feb-06	1060	
2944-115	20-Feb-06	1150	
2944-116	20-Feb-06	970	
2944-117	20-Feb-06	516	
2944-118	15-Feb-06	72.2	
2944-119	20-Feb-06	574	
3037-101	19-May-06	10	
3037-102	19-May-06	760	
3037-103	19-May-06	878	
3037-104	19-May-06	1050	
3037-105	23-May-06	75.4	
3037-106	19-May-06	75.4	
3037-108	23-May-06	75.1	
3037-109	23-May-06	184	
3053-101		81.3	
3053-102		969	
3053-103		10	
3053-104		224	
3053-106		1060	
3073-102		75.7	
3073-104		611	
3134-001		227	
3134-001		227	
3134-002		1340	
3134-002		1260	
3134-004		401	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3134-005		596	
3149-001	21-Aug-06	1180	
3149-002	21-Aug-06	784	
3149-003	21-Aug-06	1390	
3149-004	21-Aug-06	1340	
3149-004-	21-Aug-06	1390	
3149-005	21-Aug-06	1020	
3149-006	21-Aug-06	1230	
3149-007	21-Aug-06	1120	
3149-008	21-Aug-06	1750	
3149-009	21-Aug-06	1130	
3149-010	21-Aug-06	1110	
3149-011	21-Aug-06	1140	
3149-012	21-Aug-06	1240	
3149-013	21-Aug-06	1090	
3149-014	21-Aug-06	1180	
3149-015	21-Aug-06	1590	
3149-016	21-Aug-06	977	
3149-017	21-Aug-06	991	
3149-017-	21-Aug-06	994	
3149-018	22-Aug-06	10	
3149-019	22-Aug-06	1440	
3149-020	22-Aug-06	1430	
3149-021	22-Aug-06	1140	
3149-022	22-Aug-06	53	
3149-023	22-Aug-06	1380	
3149-024	22-Aug-06	2220	X
3227-101	19-Sep-06	143	
3227-103	12-Sep-06	1190	
3227-104	19-Sep-06	114	
3227-105	20-Sep-06	51.6	
3227-106	20-Sep-06	164	
3227-107	15-Sep-06	732	
3227-108	20-Sep-06	146	
3227-109	20-Sep-06	105	
3227-110	21-Sep-06	109	
3227-111	22-Sep-06	629	
3227-112	20-Sep-06	144	
3227-113	21-Sep-06	628	
3227-114	20-Sep-06	149	
3227-115	20-Sep-06	43.2	
3271-101	06-Oct-06	974	
3271-102	06-Oct-06	533	
3271-103	03-Oct-06	1500	
3271-104	07-Oct-06	1100	
3271-105	07-Oct-06	570	
3298-101	06-Dec-06	290	
3298-101-	06-Dec-06	302	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3298-103	29-Nov-06	113	
3298-106	05-Dec-06	1340	
3298-107	06-Dec-06	191	
3298-108	08-Dec-06	844	
3298-109	08-Dec-06	500	
3339-102	06-Jan-07	52.9	
3339-103	08-Jan-07	848	
3339-104	09-Jan-07	448	
3339-105	09-Jan-07	194	
3339-106	09-Jan-07	228	
3339-107	02-Jan-07	1540	
3339-108	05-Jan-07	673	
3339-109	09-Jan-07	64.9	
3339-110	09-Jan-07	571	
3339-111	09-Jan-07	301	
3339-112	09-Jan-07	12.7	
3339-113	09-Jan-07	234	
3339-114	09-Jan-07	288	
3339-115	09-Jan-07	1070	
3339-117	09-Jan-07	18.5	
3339-118	09-Jan-07	455	
3339-119	09-Jan-07	15.1	
3339-120	10-Jan-07	871	
3339-121	10-Jan-07	260	
3339-122	10-Jan-07	1170	
3339-123	10-Jan-07	164	
3339-124	10-Jan-07	523	
3339-125	11-Jan-07	55.3	
3339-126	11-Jan-07	75.6	
3339-127	11-Jan-07	1440	
3339-128	11-Jan-07	767	
3339-129	11-Jan-07	319	
3339-130	11-Jan-07	350	
3339-131	11-Jan-07	849	
3339-132	11-Jan-07	156	
3339-133	16-Jan-07	762	
3339-133-	16-Jan-07	757	
3339-134	16-Jan-07	538	
3339-134-	16-Jan-07	535	
3339-135	16-Jan-07	546	
3339-135-	16-Jan-07	536	
3339-136	16-Jan-07	1100	
3339-137	16-Jan-07	1090	
3339-138	16-Jan-07	182	
3339-139	16-Jan-07	1310	
3339-139-	16-Jan-07	1310	
3339-140	16-Jan-07	178	
3339-141	16-Jan-07	181	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3339-142	17-Jan-07	408	
3339-143	17-Jan-07	303	
3339-143-	17-Jan-07	297	
3339-144	17-Jan-07	37.1	
3339-145	18-Jan-07	696	
3339-146	18-Jan-07	856	
3339-147	18-Jan-07	865	
3339-148	18-Jan-07	57.3	
3339-149	18-Jan-07	59.3	
3339-150	18-Jan-07	87.9	
3339-151	18-Jan-07	73.7	
3339-152	18-Jan-07	48.4	
3339-153	18-Jan-07	53.6	
3339-154	18-Jan-07	10	
3339-155	18-Jan-07	67.3	
3339-156	19-Jan-07	10	
3339-157	18-Jan-07	1020	
3339-158	19-Jan-07	10	
3339-159	19-Jan-07	1530	
3339-160	19-Jan-07	10	
3339-161	19-Jan-07	25.4	
3339-162	19-Jan-07	54.9	
3339-163	19-Jan-07	213	
3339-164	19-Jan-07	30.4	
3339-165	19-Jan-07	66.8	
3339-166	20-Jan-07	1220	
3339-167	20-Jan-07	728	
3339-168	20-Jan-07	170	
3339-169	20-Jan-07	31.7	
3339-170	23-Jan-07	118	
3339-171	23-Jan-07	906	
3339-172	23-Jan-07	149	
3339-172-	23-Jan-07	151	
3339-173	23-Jan-07	914	
3359-101	06-Feb-07	81.2	
3359-102	06-Feb-07	162	
3359-103	06-Feb-07	796	
3359-104	06-Feb-07	45.7	
3359-105	06-Feb-07	1010	
3359-107	07-Feb-07	354	
3359-108	07-Feb-07	1150	
3359-109	08-Feb-07	156	
3359-110	09-Feb-07	835	
3359-111	09-Feb-07	119	
3359-112	09-Feb-07	236	
3359-113	10-Feb-07	61.3	
3359-114	10-Feb-07	182	
3359-115	12-Feb-07	101	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3359-116	12-Feb-07	967	
3359-117	12-Feb-07	649	
3359-118	12-Feb-07	101	
3359-119	12-Feb-07	172	
3359-120	12-Feb-07	41.4	
3359-121	12-Feb-07	74.9	
3359-122	12-Feb-07	60.3	
3377-142	05-Mar-07	94	
3419-139		88.3	
3419-149		189	
3419-205		88.2	
3419-215		196	
3422-101		119	
3422-101-		115	
3422-102		403	
3422-103		1250	
3422-103-		1130	
3422-104		1210	
3449-101		486	
3449-102		458	
3449-103		75.7	
3449-104		38.1	
3483-101	22-May-07	1190	
3483-101-	22-May-07	1180	
3483-102	23-May-07	55.2	
3483-103	21-May-07	54.9	
3483-103-	21-May-07	56.6	
3483-104	22-May-07	39.6	
3483-105	05-May-07	1120	
3483-106	19-May-07	1190	
3483-107	19-May-07	55.6	
3483-108	22-May-07	277	
3521-101		796	
3521-101-		787	
3521-102		808	
3521-102-		785	
3521-103		1240	
3521-103-		1240	
3521-104		1100	
3521-104-		1090	
3521-105		564	
3521-105-		567	
3521-106		809	
3521-106-		824	
3521-107		21.1	
3521-108		49.5	
3521-109		736	
3534-101	29-Jun-07	55.6	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3534-101-	29-Jun-07	55.2	
3534-102	29-Jun-07	55.5	
3534-103	30-Jun-07	80.8	
3534-103-	30-Jun-07	78.2	
3534-104	29-Jun-07	543	
3534-104-	29-Jun-07	545	
3534-105	30-Jun-07	69.7	
3534-105-	30-Jun-07	69.7	
3534-106	29-Jun-07	307	
3534-106-	29-Jun-07	302	
3534-107	29-Jun-07	515	
3534-108	30-Jun-07	48.1	
3534-109	03-Jul-07	39.4	
3534-109-	03-Jul-07	39.5	
3575-101	04-Aug-07	148	
3575-102	04-Aug-07	201	
3575-102-	04-Aug-07	205	
3575-103	06-Aug-07	5	
3575-104	06-Aug-07	51.5	
3575-105	01-Aug-07	459	
3575-105-	01-Aug-07	458	
3575-106	24-Jul-07	797	
3575-106-	24-Jul-07	783	
3575-107	23-Jul-07	87.4	
3575-107-	23-Jul-07	86.8	
3575-108	03-Aug-07	61.3	
3575-108-	03-Aug-07	54.1	
3656-101		175	
3656-102		174	
3656-103		172	
3656-104		188	
3656-105		281	
3656-106		224	
3656-107		199	
3656-108		199	
3656-109		231	
3656-110		212	
3656-111		741	
3656-112		759	
3656-113		739	
3656-114		764	
3656-115		962	
3656-116		921	
3656-117		921	
3656-118		931	
3656-119		314	
3656-120		308	
3656-121		312	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3656-122		315	
3656-123		79.7	
3656-124		77.4	
3656-125		79.9	
3656-126		77.3	
3656-127		213	
3656-128		192	
3656-129		198	
3656-130		221	
3675-101	01-Oct-07	37.4	
3675-102	01-Oct-07	39.6	
3675-103	01-Oct-07	37.5	
3675-104	01-Oct-07	40.2	
3675-105	01-Oct-07	296	
3675-106	01-Oct-07	328	
3675-107	01-Oct-07	335	
3675-108	01-Oct-07	453	
3675-109	02-Oct-07	31.7	
3675-110	02-Oct-07	38.4	
3675-111	02-Oct-07	27.3	
3675-112	02-Oct-07	27.7	
3675-113	02-Oct-07	63	
3675-114	02-Oct-07	60.7	
3675-115	02-Oct-07	63.8	
3675-116	02-Oct-07	61.3	
3675-117	02-Oct-07	58.6	
3675-118	02-Oct-07	60.8	
3675-119	02-Oct-07	6.3	
3675-120	02-Oct-07	63.8	
3675-121	03-Oct-07	67.2	
3675-121-	03-Oct-07	68.1	
3675-123-	03-Oct-07	69.1	
3675-124	03-Oct-07	67.2	
3675-124-	03-Oct-07	67	
3675-122	03-Oct-07	67.7	
3675-122-	03-Oct-07	67.5	
3675-123	03-Oct-07	67.3	
3675-125	04-Oct-07	739	
3675-126	04-Oct-07	771	
3675-126-	04-Oct-07	819	
3675-127	04-Oct-07	808	
3675-128	04-Oct-07	789	
3675-128-	04-Oct-07	803	
3675-129	05-Oct-07	635	
3675-130	05-Oct-07	599	
3675-131	05-Oct-07	638	
3675-132	05-Oct-07	600	
3675-133	08-Oct-07	448	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3675-134	08-Oct-07	448	
3675-135	08-Oct-07	457	
3675-136	08-Oct-07	442	
3691-101	19-Oct-07	48.2	
3691-102	19-Oct-07	47.3	
3691-103	19-Oct-07	58.6	
3691-104	19-Oct-07	47.6	
3691-104-	19-Oct-07	48	
3691-105	19-Oct-07	39.4	
3691-106	19-Oct-07	49.3	
3691-107	19-Oct-07	50	
3691-108	19-Oct-07	49.8	
3691-109	19-Oct-07	48.9	
3691-110	19-Oct-07	47.6	
3691-111	20-Oct-07	1000	
3691-112	20-Oct-07	994	
3691-113	20-Oct-07	594	
3691-114	20-Oct-07	630	
3691-115	20-Oct-07	632	
3691-116	20-Oct-07	631	
3691-117	20-Oct-07	876	
3691-118	20-Oct-07	889	
3691-118-	20-Oct-07	876	
3691-119	20-Oct-07	434	
3691-120	20-Oct-07	442	
3691-121	20-Oct-07	435	
3691-122	20-Oct-07	434	
3691-122-	20-Oct-07	433	
3691-123	23-Oct-07	76.4	
3691-124	23-Oct-07	74.8	
3691-125	23-Oct-07	76.7	
3691-126	23-Oct-07	72.3	
3691-127	23-Oct-07	70.8	
3691-128	23-Oct-07	70.4	
3691-128-	23-Oct-07	71.8	
3691-129	23-Oct-07	68.7	
3691-130	23-Oct-07	68.8	
3691-131	24-Oct-07	757	
3691-132	24-Oct-07	761	
3691-133	24-Oct-07	745	
3691-134	24-Oct-07	714	
3691-135	24-Oct-07	739	
3691-136	24-Oct-07	711	
3691-137	24-Oct-07	524	
3691-138	24-Oct-07	505	
3691-138-	24-Oct-07	508	
3708-101	25-Oct-07	76.8	
3708-102	25-Oct-07	80.3	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3708-103	25-Oct-07	73.5	
3708-104	25-Oct-07	77.3	
3708-105	25-Oct-07	117	
3708-106	25-Oct-07	113	
3708-107	03-Nov-07	449	
3708-108	03-Nov-07	471	
3708-108-	03-Nov-07	470	
3708-109	03-Nov-07	415	
3708-110	03-Nov-07	500	
3708-110-	03-Nov-07	512	
3708-111	03-Nov-07	465	
3708-112	03-Nov-07	449	
3708-112-	03-Nov-07	456	
3708-117	12-Nov-07	766	
3708-118	12-Nov-07	752	
3708-118-	12-Nov-07	764	
3708-119	12-Nov-07	725	
3708-120	12-Nov-07	744	
3750-101	12-Jan-08	186	
3750-102	12-Jan-08	192	
3750-103	12-Jan-08	192	
3750-104	12-Jan-08	166	
3750-105	11-Jan-08	174	
3750-106	11-Jan-08	166	
3750-107	18-Dec-07	692	
3750-107-	18-Dec-07	680	
3750-108	18-Dec-07	679	
3750-111	11-Jan-08	116	
3750-112	11-Jan-08	113	
3750-112-	11-Jan-08	113	
3750-119	16-Jan-08	10	
3750-120	16-Jan-08	84.6	
3750-120-	16-Jan-08	91.7	
3750-121	16-Jan-08	88	
3750-122	16-Jan-08	86	
3750-125	13-Dec-07	46.1	
3750-125-	13-Dec-07	46.7	
3750-126	13-Dec-07	49.3	
3750-126-	13-Dec-07	47.1	
3750-127	10-Jan-08	594	
3750-129	16-Jan-08	389	
3750-130	16-Jan-08	446	
3750-131	16-Jan-08	466	
3750-132	15-Jan-08	947	
3750-133	15-Jan-08	1020	
3750-134	15-Jan-08	960	
3750-135	15-Jan-08	999	
3772-101	14-Feb-08	289	

Table 4-33
Analytical Results for Barium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceed MCL - Barium (2,000 ug/L)
3772-102	14-Feb-08	215	
3772-103	14-Feb-08	267	
3772-104	14-Feb-08	282	
3772-104-	14-Feb-08	302	
3785-107	26-Feb-08	62	
3785-108	26-Feb-08	56.1	
3785-109	26-Feb-08	112	
3785-110	26-Feb-08	101	
3785-111	28-Feb-08	482	
3785-112	28-Feb-08	498	
3785-113	28-Feb-08	482	
3785-114	28-Feb-08	458	
3785-115	28-Feb-08	907	
3785-116	28-Feb-08	832	
3785-117	29-Feb-08	1730	
3785-118	29-Feb-08	1720	
3785-119	29-Feb-08	1650	
3785-120	29-Feb-08	1880	
3785-122	29-Feb-08	941	
3785-123	29-Feb-08	1020	
3785-124	29-Feb-08	985	
3785-124-	29-Feb-08	951	
3785-125	29-Feb-08	10.1	
3785-126	29-Feb-08	10	
3785-127	29-Feb-08	992	
3785-128	29-Feb-08	1000	
3785-129	29-Feb-08	101	
3785-130	29-Feb-08	90.3	
3785-131	29-Feb-08	94.8	
3785-132	29-Feb-08	104	
3785-133	29-Feb-08	982	
3785-134	29-Feb-08	957	
3785-146	01-Mar-08	393	
3785-147	01-Mar-08	398	
3785-148	01-Mar-08	1100	
3785-149	01-Mar-08	1170	
3785-150	01-Mar-08	181	
3785-151	01-Mar-08	176	
3785-152	01-Mar-08	2140	X
3785-153	01-Mar-08	1890	
3785-154	01-Mar-08	1850	
3785-155	01-Mar-08	2050	X
3866-001	16-Apr-08	373	
3866-002	16-Apr-08	420	
3866-003	16-Apr-08	397	
3866-004	16-Apr-08	486	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2774-144	15-Sep-05	1	
2774-145	15-Sep-05	1	
2801-101	10-Oct-05	1	
2801-101-	10-Oct-05	1	
2801-103	12-Oct-05	1	
2801-103-	12-Oct-05	1	
2801-104	06-Oct-05	1	
2801-104-	06-Oct-05	1	
2801-105	06-Oct-05	1	
2801-106	12-Oct-05	1	
2801-107	13-Oct-05	1	
2801-108	11-Oct-05	1	
2801-109	10-Oct-05	1	
2801-110	10-Oct-05	1	
2801-111	11-Oct-05	1	
2801-112	12-Oct-05	1	
2801-113	07-Oct-05	1	
2801-114	10-Oct-05	1	
2801-115	12-Oct-05	1	
2801-116	12-Oct-05	1	
2801-117	11-Oct-05	1	
2801-118	10-Oct-05	1	
2801-119	11-Oct-05	1	
2801-120	07-Oct-05	1	
2801-122	20-Oct-05	1	
2801-123	20-Oct-05	1	
2801-202	12-Oct-05	1	
2801-202-	12-Oct-05	1	
2801-204	06-Oct-05	1	
2801-204-	06-Oct-05	1	
2801-205	12-Oct-05	1	
2801-207	11-Oct-05	1	
2801-208	12-Oct-05	1	
2801-209	12-Oct-05	1	
2801-210	12-Oct-05	1	
2801-201	10-Oct-05	1	
2801-201-	10-Oct-05	1	
2801-239	06-Oct-05	1	
2801-256	07-Oct-05	1	
2801-261	22-Oct-05	1	
2801-263	22-Oct-05	1	
2801-266	22-Oct-05	1	
2801-267	22-Oct-05	1	
2801-268	20-Oct-05	1	
2801-211	11-Oct-05	1	
2801-212	12-Oct-05	1	
2801-213	11-Oct-05	1	
2801-214	13-Oct-05	1	
2801-215	13-Oct-05	1	
2801-216	12-Oct-05	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2801-217	12-Oct-05	1	
2801-218	12-Oct-05	1	
2801-219	12-Oct-05	1	
2801-220	11-Oct-05	1	
2801-221	12-Oct-05	1	
2801-222	12-Oct-05	1	
2801-223	12-Oct-05	1	
2801-224	12-Oct-05	1	
2801-226	12-Oct-05	1	
2801-227	13-Oct-05	1	
2801-228	07-Oct-05	1	
2801-229	12-Oct-05	1	
2801-231	06-Oct-05	1	
2801-232	10-Oct-05	1	
2801-233	10-Oct-05	1	
2801-235	07-Oct-05	1	
2801-236	10-Oct-05	1	
2801-237	06-Oct-05	1	
2801-238	10-Oct-05	1	
2801-241	10-Oct-05	1	
2801-243	06-Oct-05	1	
2801-244	12-Oct-05	1	
2801-245	10-Oct-05	1	
2801-246	06-Oct-05	1	
2801-247	07-Oct-05	1	
2801-249	07-Oct-05	1	
2801-250	10-Oct-05	1	
2801-251	10-Oct-05	1	
2801-252	10-Oct-05	1	
2801-253	10-Oct-05	1	
2801-254	10-Oct-05	1	
2801-255	10-Oct-05	1	
2801-264	22-Oct-05	1	
2801-265	22-Oct-05	1	
2801-271	20-Oct-05	1	
2801-272	20-Oct-05	1	
2823-101	24-Oct-05	1	
2823-102	24-Oct-05	1	
2823-103	24-Oct-05	1	
2823-104	24-Oct-05	1	
2823-105	24-Oct-05	1	
2823-107	21-Oct-05	1	
2823-108	21-Oct-05	1	
2823-111	21-Oct-05	1	
2823-112	21-Oct-05	1	
2823-113	11-Oct-05	1	
2823-114	20-Oct-05	1	
2823-115	20-Oct-05	1	
2823-117	20-Oct-05	1	
2823-118	20-Oct-05	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2823-119	20-Oct-05	1	
2823-120	20-Oct-05	1	
2823-121	21-Oct-05	1	
2823-124	25-Oct-05	1	
2823-125	25-Oct-05	1	
2823-126	25-Oct-05	1	
2823-127	25-Oct-05	1	
2823-128	25-Oct-05	1	
2823-129	25-Oct-05	1	
2823-130	25-Oct-05	1	
2823-131	25-Oct-05	1	
2823-132	25-Oct-05	1	
2823-133	25-Oct-05	1	
2823-134	25-Oct-05	1	
2823-135	27-Oct-05	1	
2823-136	26-Oct-05	1	
2823-140	26-Oct-05	1	
2823-143	26-Oct-05	1	
2823-145	26-Oct-05	1	
2823-201	21-Oct-05	1	
2823-202	21-Oct-05	1	
2823-203	24-Oct-05	1	
2823-204	25-Oct-05	1	
2823-205	25-Oct-05	1	
2823-206	25-Oct-05	1	
2823-207	25-Oct-05	1	
2823-208	25-Oct-05	1	
2823-210	26-Oct-05	1	
2832-101	03-Nov-05	1	
2832-102	03-Nov-05	1	
2832-103	03-Nov-05	1	
2832-104	08-Nov-05	1	
2832-106	03-Nov-05	1	
2832-107	03-Nov-05	1	
2832-108	03-Nov-05	1	
2832-111	16-Nov-05	1	
2832-114	16-Nov-05	1	
2832-117	16-Nov-05	1	
2832-118	16-Nov-05	1	
2832-119	16-Nov-05	1	
2832-121	16-Nov-05	1	
2832-122	16-Nov-05	1	
2832-124	16-Nov-05	1	
2832-125	18-Nov-05	1	
2832-126	18-Nov-05	1	
2832-127	18-Nov-05	1	
2832-128	18-Nov-05	1	
2832-130	18-Nov-05	1	
2832-131	17-Nov-05	1	
2832-132	18-Nov-05	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2832-133	18-Nov-05	1	
2832-134	18-Nov-05	1	
2832-139	18-Nov-05	1	
2832-143	19-Nov-05	1	
2832-147	21-Nov-05	1	
2832-148	21-Nov-05	1	
2832-149	21-Nov-05	1	
2832-151	21-Nov-05	1	
2832-152	21-Nov-05	1	
2832-153	21-Nov-05	1	
2832-154	21-Nov-05	1	
2832-155	21-Nov-05	1	
2832-160	22-Nov-05	1	
2832-161	22-Nov-05	1	
2832-162	22-Nov-05	1	
2832-163	22-Nov-05	1	
2832-164	22-Nov-05	1	
2863-102	29-Nov-05	1	
2863-104	02-Dec-05	1	
2863-105	02-Dec-05	1	
2863-106	02-Dec-05	1	
2863-107	02-Dec-05	1	
2863-108	03-Dec-05	1	
2863-109	02-Dec-05	1	
2863-111	01-Dec-05	1	
2863-113	01-Dec-05	1	
2863-116	01-Dec-05	1	
2863-117	05-Dec-05	1	
2863-118	05-Dec-05	1	
2863-119	01-Dec-05	1	
2863-121	02-Dec-05	1	
2863-122	29-Nov-05	1	
2863-123	29-Nov-05	1	
2863-124	01-Dec-05	1	
2863-125	29-Nov-05	1	
2863-126	05-Dec-05	1	
2863-127	05-Dec-05	1	
2863-128	05-Dec-05	1	
2863-129	05-Dec-05	1	
2863-130	05-Dec-05	1	
2863-131	03-Dec-05	1	
2863-135	03-Dec-05	1	
2863-136	05-Dec-05	1	
2863-137	03-Dec-05	1	
2863-138	05-Dec-05	1	
2863-139	05-Dec-05	1	
2863-140	05-Dec-05	1	
2863-141	06-Dec-05	1	
2863-142	06-Dec-05	1	
2863-143	06-Dec-05	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2863-144	06-Dec-05	1	
2863-145	06-Dec-05	1	
2863-146	06-Dec-05	1	
2863-149	06-Dec-05	1	
2863-150	06-Dec-05	1	
2863-152	06-Dec-05	1	
2863-153	06-Dec-05	1	
2863-154	06-Dec-05	1	
2863-155	06-Dec-05	1	
2863-156	07-Dec-05	1	
2863-159	07-Dec-05	1	
2863-161	07-Dec-05	1	
2863-162	07-Dec-05	1	
2863-163	07-Dec-05	1	
2863-165	07-Dec-05	1	
2863-166	07-Dec-05	1	
2863-167	07-Dec-05	1	
2863-168	07-Dec-05	1	
2863-169	07-Dec-05	1	
2873-101	16-Dec-05	1	
2873-102	16-Dec-05	1	
2873-103	14-Dec-05	1	
2873-104	15-Dec-05	1	
2873-105	16-Dec-05	1	
2873-106	15-Dec-05	1	
2873-108	16-Dec-05	1	
2873-112	15-Dec-05	1	
2873-113	16-Dec-05	1	
2873-114	15-Dec-05	1	
2873-115	08-Dec-05	1	
2873-118	14-Dec-05	1	
2873-120	15-Dec-05	1	
2873-122	16-Dec-05	1	
2873-123	17-Dec-05	1	
2873-126	17-Dec-05	1	
2873-127	17-Dec-05	1	
2873-128	17-Dec-05	1	
2873-131	19-Dec-05	1	
2873-132	19-Dec-05	1	
2873-133	19-Dec-05	1	
2873-134	19-Dec-05	1	
2873-135	19-Dec-05	1	
2873-136	19-Dec-05	1	
2873-138	20-Dec-05	1	
2873-139	20-Dec-05	1	
2873-140	20-Dec-05	1	
2873-141	20-Dec-05	1	
2873-142	20-Dec-05	1	
2873-143	20-Dec-05	1	
2873-144	20-Dec-05	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2873-145	21-Dec-05	1	
2873-146	21-Dec-05	1	
2873-147	21-Dec-05	1	
2873-149	21-Dec-05	1	
2873-150	21-Dec-05	1	
2873-152	21-Dec-05	1	
2873-153	21-Dec-05	1	
2882-101	04-Jan-06	1	
2882-102	04-Jan-06	1	
2882-103	04-Jan-06	1	
2882-104	04-Jan-06	1	
2882-105	04-Jan-06	1	
2882-106	04-Jan-06	1	
2882-107	04-Jan-06	1	
2882-108	04-Jan-06	1	
2882-109	04-Jan-06	1	
2882-110	04-Jan-06	1	
2882-111	04-Jan-06	1	
2882-112	04-Jan-06	1	
2882-113	05-Jan-06	1	
2882-114	05-Jan-06	1	
2882-115	04-Jan-06	1	
2882-116	05-Jan-06	1	
2882-117	05-Jan-06	1	
2882-119	05-Jan-06	1	
2882-121	05-Jan-06	1	
2882-122	05-Jan-06	1	
2882-124	05-Jan-06	1	
2882-125	05-Jan-06	1	
2882-126	05-Jan-06	1	
2882-127	06-Jan-06	1	
2882-129	06-Jan-06	1	
2882-131	06-Jan-06	1	
2882-132	06-Jan-06	1	
2882-133	06-Jan-06	1	
2882-134	06-Jan-06	1	
2882-135	06-Jan-06	1	
2882-136	06-Jan-06	1	
2882-137	06-Jan-06	1	
2882-138	06-Jan-06	1	
2882-139	07-Jan-06	1	
2882-140	07-Jan-06	1	
2882-141	07-Jan-06	1	
2882-142	07-Jan-06	1	
2882-143	07-Jan-06	1	
2882-144	07-Jan-06	1	
2882-145	07-Jan-06	1	
2882-146	07-Jan-06	1	
2882-147	07-Jan-06	1	
2882-148	07-Jan-06	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2882-149	07-Jan-06	1	
2882-150	07-Jan-06	1	
2882-151	07-Jan-06	1	
2882-153	07-Jan-06	1	
2882-154	07-Jan-06	1	
2882-155	07-Jan-06	1	
2882-156	09-Jan-06	1	
2882-158	09-Jan-06	1	
2882-159	09-Jan-06	1	
2882-160	09-Jan-06	1	
2882-161	09-Jan-06	1	
2882-162	22-Nov-05	1	
2882-163	09-Jan-06	1	
2882-164	09-Jan-06	1	
2882-165	09-Jan-06	1	
2882-166	09-Jan-06	1	
2882-167	09-Jan-06	1	
2882-168	10-Jan-06	1	
2882-169	10-Jan-06	1	
2882-170	10-Jan-06	1	
2882-171	10-Jan-06	1	
2882-172	10-Jan-06	1	
2882-173	10-Jan-06	1	
2901-101	21-Jan-06	1	
2901-102	20-Jan-06	1	
2901-104	21-Jan-06	1	
2901-105	20-Jan-06	1	
2901-106	20-Jan-06	1	
2901-108	20-Jan-06	1	
2901-109	20-Jan-06	1	
2901-110	20-Jan-06	1	
2901-111	19-Jan-06	1	
2901-112	20-Jan-06	1	
2901-113	20-Jan-06	1	
2901-114	19-Jan-06	1	
2901-116	20-Jan-06	1	
2901-117	21-Jan-06	1	
2901-118	21-Jan-06	1	
2915-101	02-Feb-06	1	
2915-102	02-Feb-06	1	
2915-103	01-Feb-06	1	
2915-104	02-Feb-06	1	
2915-105	02-Feb-06	1	
2915-106	02-Feb-06	1	
2915-107	01-Feb-06	1	
2915-108	01-Feb-06	1	
2915-109	02-Feb-06	1	
2915-110	02-Feb-06	1	
2915-111	01-Feb-06	1	
2915-112	01-Feb-06	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2915-113	02-Feb-06	1	
2915-114	03-Feb-06	1	
2915-115	01-Feb-06	1	
2915-116	01-Feb-06	1	
2915-117	03-Feb-06	1	
2915-118	03-Feb-06	1	
2915-119	06-Feb-06	1	
2915-120	06-Feb-06	1	
2915-121	06-Feb-06	1	
2915-122	07-Feb-06	1	
2938-121	03-Mar-06	1	
2938-121	03-Mar-06	1	
2944-102	21-Feb-06	1	
2944-103	20-Feb-06	1	
2944-104	15-Feb-06	1	
2944-105	20-Feb-06	1	
2944-106	22-Feb-06	1	
2944-107	22-Feb-06	1	
2944-108	20-Feb-06	1	
2944-109	20-Feb-06	1	
2944-110	20-Feb-06	1	
2944-111	20-Feb-06	1	
2944-112	20-Feb-06	1	
2944-114	20-Feb-06	1	
2944-115	20-Feb-06	1	
2944-117	20-Feb-06	1	
2944-118	15-Feb-06	1	
2944-119	20-Feb-06	1	
3037-101	19-May-06	1	
3037-102	19-May-06	1	
3037-105	23-May-06	1	
3037-106	19-May-06	1	
3037-108	23-May-06	1	
3037-109	23-May-06	1	
3053-101		1	
3053-103		1	
3053-104		1	
3053-106		1	
3073-102		1	
3073-104		1	
3134-002		1	
3134-002		1	
3134-004		1	
3134-005		1	
3149-001	21-Aug-06	1	
3149-002	21-Aug-06	1	
3149-004	21-Aug-06	1	
3149-004-	21-Aug-06	1	
3149-005	21-Aug-06	1	
3149-006	21-Aug-06	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3149-009	21-Aug-06	1	
3149-010	21-Aug-06	1	
3149-011	21-Aug-06	1	
3149-012	21-Aug-06	1	
3149-014	21-Aug-06	1	
3149-015	21-Aug-06	1	
3149-016	21-Aug-06	1	
3149-017	21-Aug-06	1	
3149-017-	21-Aug-06	1	
3149-018	22-Aug-06	1	
3149-019	22-Aug-06	1	
3149-021	22-Aug-06	1	
3149-022	22-Aug-06	1	
3149-023	22-Aug-06	1	
3149-024	22-Aug-06	1	
3227-104	19-Sep-06	1	
3227-105	20-Sep-06	1	
3227-106	20-Sep-06	1	
3227-107	15-Sep-06	1	
3227-109	20-Sep-06	1	
3227-110	21-Sep-06	1	
3227-111	22-Sep-06	1	
3227-112	20-Sep-06	1	
3227-113	21-Sep-06	1	
3227-114	20-Sep-06	1	
3271-101	06-Oct-06	1	
3271-102	06-Oct-06	1	
3271-104	07-Oct-06	1	
3298-101	06-Dec-06	1	
3298-101-	06-Dec-06	1	
3298-103	29-Nov-06	1	
3298-107	06-Dec-06	1	
3298-108	08-Dec-06	1	
3298-109	08-Dec-06	1	
3339-102	06-Jan-07	1	
3339-103	08-Jan-07	1	
3339-104	09-Jan-07	1	
3339-105	09-Jan-07	1	
3339-106	09-Jan-07	1	
3339-107	02-Jan-07	1	
3339-108	05-Jan-07	1	
3339-109	09-Jan-07	1	
3339-110	09-Jan-07	1	
3339-111	09-Jan-07	1	
3339-112	09-Jan-07	1	
3339-114	09-Jan-07	1	
3339-115	09-Jan-07	1	
3339-117	09-Jan-07	1	
3339-119	09-Jan-07	1	
3339-123	10-Jan-07	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3339-124	10-Jan-07	1	
3339-125	11-Jan-07	1	
3339-126	11-Jan-07	1	
3339-127	11-Jan-07	1	
3339-128	11-Jan-07	1	
3339-129	11-Jan-07	1	
3339-130	11-Jan-07	1	
3339-131	11-Jan-07	1	
3339-132	11-Jan-07	1	
3339-136	16-Jan-07	1	
3339-140	16-Jan-07	1	
3339-141	16-Jan-07	1	
3339-142	17-Jan-07	1	
3339-144	17-Jan-07	1	
3339-145	18-Jan-07	1	
3339-147	18-Jan-07	1	
3339-148	18-Jan-07	1	
3339-149	18-Jan-07	1	
3339-150	18-Jan-07	1	
3339-151	18-Jan-07	1	
3339-152	18-Jan-07	1	
3339-153	18-Jan-07	1	
3339-154	18-Jan-07	1	
3339-155	18-Jan-07	1	
3339-156	19-Jan-07	1	
3339-157	18-Jan-07	1	
3339-158	19-Jan-07	1	
3339-159	19-Jan-07	1	
3339-160	19-Jan-07	1	
3339-161	19-Jan-07	1	
3339-162	19-Jan-07	1	
3339-163	19-Jan-07	1	
3339-165	19-Jan-07	1	
3339-166	20-Jan-07	1	
3339-167	20-Jan-07	1	
3339-168	20-Jan-07	1	
3339-169	20-Jan-07	1	
3339-170	23-Jan-07	1	
3339-171	23-Jan-07	1	
3339-173	23-Jan-07	1	
3359-101	06-Feb-07	1	
3359-102	06-Feb-07	1	
3359-103	06-Feb-07	1	
3359-105	06-Feb-07	1	
3359-108	07-Feb-07	1	
3359-109	08-Feb-07	1	
3359-110	09-Feb-07	1	
3359-111	09-Feb-07	1	
3359-112	09-Feb-07	1	
3359-113	10-Feb-07	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3359-114	10-Feb-07	1	
3359-115	12-Feb-07	1	
3359-116	12-Feb-07	1	
3359-118	12-Feb-07	1	
3359-119	12-Feb-07	1	
3359-120	12-Feb-07	1	
3359-121	12-Feb-07	1	
3359-122	12-Feb-07	1	
3377-142	05-Mar-07	1	
3419-139		1	
3419-205		1	
3422-101		1	
3422-101-		1	
3422-102		1	
3449-101		1	
3449-102		1	
3449-103		1	
3449-104		1	
3483-102	23-May-07	1	
3483-103	21-May-07	1	
3483-103-	21-May-07	1	
3483-104	22-May-07	1	
3483-105	05-May-07	1	
3483-107	19-May-07	1	
3483-108	22-May-07	1	
3521-101		1	
3521-101-		1	
3521-102		1	
3521-102-		1	
3521-103		1	
3521-103-		1	
3521-104		1	
3521-104-		1	
3521-105		1	
3521-105-		1	
3521-109		1	
3534-101	29-Jun-07	1	
3534-101-	29-Jun-07	1	
3534-102	29-Jun-07	1	
3534-103	30-Jun-07	1	
3534-103-	30-Jun-07	1	
3534-104	29-Jun-07	1	
3534-104-	29-Jun-07	1	
3534-105	30-Jun-07	1	
3534-105-	30-Jun-07	1	
3534-106	29-Jun-07	1	
3534-106-	29-Jun-07	1	
3534-107	29-Jun-07	1	
3534-108	30-Jun-07	1	
3534-109	03-Jul-07	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3534-109-	03-Jul-07	1	
3575-101	04-Aug-07	1	
3575-102	04-Aug-07	1	
3575-102-	04-Aug-07	1	
3575-103	06-Aug-07	1	
3575-104	06-Aug-07	1	
3575-106	24-Jul-07	1	
3575-106-	24-Jul-07	1	
3575-107	23-Jul-07	1	
3575-107-	23-Jul-07	1	
3575-108	03-Aug-07	1	
3575-108-	03-Aug-07	1	
3656-101		1	
3656-102		1	
3656-103		1	
3656-104		1	
3656-105		1	
3656-106		1	
3656-107		1	
3656-108		1	
3656-109		1	
3656-110		1	
3656-111		1	
3656-112		1	
3656-113		1	
3656-114		1	
3656-115		1	
3656-116		1	
3656-117		1	
3656-118		1	
3656-119		1	
3656-120		1	
3656-121		1	
3656-122		1	
3656-123		1	
3656-124		1	
3656-125		1	
3656-126		1	
3656-127		1	
3656-128		1	
3656-129		1	
3675-101	01-Oct-07	1	
3675-102	01-Oct-07	1	
3675-103	01-Oct-07	1	
3675-104	01-Oct-07	1	
3675-105	01-Oct-07	1	
3675-106	01-Oct-07	1	
3675-107	01-Oct-07	1	
3675-109	02-Oct-07	1	
3675-110	02-Oct-07	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3675-111	02-Oct-07	1	
3675-112	02-Oct-07	1	
3675-113	02-Oct-07	1	
3675-114	02-Oct-07	1	
3675-115	02-Oct-07	1	
3675-116	02-Oct-07	1	
3675-117	02-Oct-07	1	
3675-118	02-Oct-07	1	
3675-119	02-Oct-07	1	
3675-120	02-Oct-07	1	
3675-121	03-Oct-07	1	
3675-123	03-Oct-07	1	
3675-123-	03-Oct-07	1	
3675-124	03-Oct-07	1	
3675-121-	03-Oct-07	1	
3675-122	03-Oct-07	1	
3675-122-	03-Oct-07	1	
3675-124-	03-Oct-07	1	
3675-125	04-Oct-07	1	
3675-126	04-Oct-07	1	
3675-126-	04-Oct-07	1	
3675-127	04-Oct-07	1	
3675-128	04-Oct-07	1	
3675-128-	04-Oct-07	1	
3675-129	05-Oct-07	1	
3675-130	05-Oct-07	1	
3675-131	05-Oct-07	1	
3675-132	05-Oct-07	1	
3675-134	08-Oct-07	1	
3691-101	19-Oct-07	1	
3691-102	19-Oct-07	1	
3691-103	19-Oct-07	1	
3691-104	19-Oct-07	1	
3691-104-	19-Oct-07	1	
3691-105	19-Oct-07	1	
3691-106	19-Oct-07	1	
3691-107	19-Oct-07	1	
3691-108	19-Oct-07	1	
3691-109	19-Oct-07	1	
3691-110	19-Oct-07	1	
3691-111	20-Oct-07	1	
3691-112	20-Oct-07	1	
3691-117	20-Oct-07	1	
3691-118	20-Oct-07	1	
3691-118-	20-Oct-07	1	
3691-119	20-Oct-07	1	
3691-120	20-Oct-07	1	
3691-121	20-Oct-07	1	
3691-122	20-Oct-07	1	
3691-122-	20-Oct-07	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3691-123	23-Oct-07	1	
3691-124	23-Oct-07	1	
3691-125	23-Oct-07	1	
3691-126	23-Oct-07	1	
3691-127	23-Oct-07	1	
3691-128	23-Oct-07	1	
3691-128-	23-Oct-07	1	
3691-129	23-Oct-07	1	
3691-130	23-Oct-07	1	
3691-133	24-Oct-07	1	
3691-134	24-Oct-07	1	
3691-135	24-Oct-07	1	
3691-136	24-Oct-07	1	
3708-101	25-Oct-07	1	
3708-102	25-Oct-07	1	
3708-103	25-Oct-07	1	
3708-104	25-Oct-07	1	
3708-105	25-Oct-07	1	
3708-106	25-Oct-07	1	
3708-107	03-Nov-07	1	
3708-108	03-Nov-07	1	
3708-108-	03-Nov-07	1	
3708-110	03-Nov-07	1	
3708-110-	03-Nov-07	1	
3708-111	03-Nov-07	1	
3708-112	03-Nov-07	1	
3708-112-	03-Nov-07	1	
3708-117	12-Nov-07	1	
3708-118	12-Nov-07	1	
3708-118-	12-Nov-07	1	
3708-119	12-Nov-07	1	
3708-120	12-Nov-07	1	
3750-101	12-Jan-08	1	
3750-102	12-Jan-08	1	
3750-103	12-Jan-08	1	
3750-104	12-Jan-08	1	
3750-107	18-Dec-07	1	
3750-107-	18-Dec-07	1	
3750-108	18-Dec-07	1	
3750-111	11-Jan-08	1	
3750-112	11-Jan-08	1	
3750-112-	11-Jan-08	1	
3750-119	16-Jan-08	1	
3750-120	16-Jan-08	1	
3750-120-	16-Jan-08	1	
3750-121	16-Jan-08	1	
3750-122	16-Jan-08	1	
3750-125	13-Dec-07	1	
3750-125-	13-Dec-07	1	
3750-126	13-Dec-07	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3750-126-	13-Dec-07	1	
3750-127	10-Jan-08	1	
3750-130	16-Jan-08	1	
3750-131	16-Jan-08	1	
3750-132	15-Jan-08	1	
3750-133	15-Jan-08	1	
3750-134	15-Jan-08	1	
3750-135	15-Jan-08	1	
3772-101	14-Feb-08	1	
3772-102	14-Feb-08	1	
3772-103	14-Feb-08	1	
3772-104	14-Feb-08	1	
3772-104-	14-Feb-08	1	
3785-107	26-Feb-08	1	
3785-108	26-Feb-08	1	
3785-109	26-Feb-08	1	
3785-110	26-Feb-08	1	
3785-111	28-Feb-08	1	
3785-112	28-Feb-08	1	
3785-113	28-Feb-08	1	
3785-114	28-Feb-08	1	
3785-115	28-Feb-08	1	
3785-116	28-Feb-08	1	
3785-117	29-Feb-08	1	
3785-118	29-Feb-08	1	
3785-119	29-Feb-08	1	
3785-120	29-Feb-08	1	
3785-122	29-Feb-08	1	
3785-123	29-Feb-08	1	
3785-124	29-Feb-08	1	
3785-124-	29-Feb-08	1	
3785-125	29-Feb-08	1	
3785-126	29-Feb-08	1	
3785-127	29-Feb-08	1	
3785-128	29-Feb-08	1	
3785-129	29-Feb-08	1	
3785-130	29-Feb-08	1	
3785-131	29-Feb-08	1	
3785-132	29-Feb-08	1	
3785-133	29-Feb-08	1	
3785-134	29-Feb-08	1	
3785-146	01-Mar-08	1	
3785-147	01-Mar-08	1	
3785-148	01-Mar-08	1	
3785-149	01-Mar-08	1	
3785-150	01-Mar-08	1	
3785-151	01-Mar-08	1	
3785-152	01-Mar-08	1	
3785-153	01-Mar-08	1	
3785-154	01-Mar-08	1	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3785-155	01-Mar-08	1	
3866-001	16-Apr-08	1	
3866-002	16-Apr-08	1	
3866-003	16-Apr-08	1	
3866-004	16-Apr-08	1	
2832-115	16-Nov-05	1.01	
3419-149		1.01	
2823-122	20-Oct-05	1.02	
2863-120	02-Dec-05	1.02	
2863-132	05-Dec-05	1.03	
2882-174	10-Jan-06	1.03	
3339-113	09-Jan-07	1.03	
3339-118	09-Jan-07	1.03	
3134-001		1.04	
3750-106	11-Jan-08	1.04	
3037-104	19-May-06	1.05	
2832-156	21-Nov-05	1.06	
2944-101	20-Feb-06	1.06	
3483-106	19-May-07	1.06	
2882-118	05-Jan-06	1.08	
3339-139-	16-Jan-07	1.08	
3419-215		1.08	
3521-108		1.08	
3750-129	16-Jan-08	1.08	
2863-112	29-Nov-05	1.09	
3339-134	16-Jan-07	1.09	
3339-139	16-Jan-07	1.09	
3359-104	06-Feb-07	1.1	
3656-130		1.1	
3675-108	01-Oct-07	1.1	
3675-133	08-Oct-07	1.1	
3675-135	08-Oct-07	1.1	
2832-112	16-Nov-05	1.11	
2863-164	07-Dec-05	1.11	
2801-240	06-Oct-05	1.13	
3339-134-	16-Jan-07	1.13	
3521-106-		1.14	
2863-103	02-Dec-05	1.15	
2863-148	06-Dec-05	1.15	
2882-123	05-Jan-06	1.15	
3339-122	10-Jan-07	1.15	
3521-106		1.15	
3750-105	11-Jan-08	1.15	
2832-113	16-Nov-05	1.16	
3521-107		1.17	
3691-131	24-Oct-07	1.17	
3708-109	03-Nov-07	1.17	
3691-113	20-Oct-07	1.19	
2801-269	20-Oct-05	1.21	
3134-001		1.21	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3691-137	24-Oct-07	1.21	
3149-020	22-Aug-06	1.22	
3691-138-	24-Oct-07	1.22	
3691-114	20-Oct-07	1.23	
2801-270	20-Oct-05	1.24	
2873-121	15-Dec-05	1.24	
2873-151	21-Dec-05	1.24	
3149-003	21-Aug-06	1.24	
3691-116	20-Oct-07	1.24	
2823-137	25-Oct-05	1.25	
2832-116	16-Nov-05	1.25	
2873-130	19-Dec-05	1.26	
3053-102		1.26	
2832-166	22-Nov-05	1.27	
2873-137	19-Dec-05	1.27	
3339-138	16-Jan-07	1.27	
2944-113	20-Feb-06	1.28	
3359-107	07-Feb-07	1.3	
3339-133-	16-Jan-07	1.31	
2801-230	06-Oct-05	1.32	
3339-133	16-Jan-07	1.32	
3691-132	24-Oct-07	1.32	
2801-248	07-Oct-05	1.33	
2801-206	12-Oct-05	1.34	
2832-120	16-Nov-05	1.34	
2944-116	20-Feb-06	1.34	
3037-103	19-May-06	1.34	
2823-109	20-Oct-05	1.36	
2823-123	20-Oct-05	1.37	
2832-109	03-Nov-05	1.37	
2863-133	05-Dec-05	1.37	
3691-138	24-Oct-07	1.37	
2873-125	17-Dec-05	1.38	
2863-115	01-Dec-05	1.41	
3422-103-		1.41	
2801-234	07-Oct-05	1.42	
2801-262	22-Oct-05	1.43	
3359-117	12-Feb-07	1.43	
2823-106	21-Oct-05	1.45	
2873-129	19-Dec-05	1.45	
2882-130	06-Jan-06	1.45	
3271-105	07-Oct-06	1.45	
3483-101	22-May-07	1.47	
2801-121	20-Oct-05	1.48	
2832-105	03-Nov-05	1.48	
3339-135-	16-Jan-07	1.48	
2832-129	18-Nov-05	1.49	
2882-128	06-Jan-06	1.49	
3339-135	16-Jan-07	1.51	
3483-101-	22-May-07	1.51	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
3339-137	16-Jan-07	1.52	
2863-101	29-Nov-05	1.53	
2873-124	17-Dec-05	1.54	
3422-103		1.54	
2901-103	21-Jan-06	1.57	
2801-242	06-Oct-05	1.58	
3271-103	03-Oct-06	1.58	
3227-103	12-Sep-06	1.6	
2823-110	21-Oct-05	1.62	
2823-139	26-Oct-05	1.67	
3339-121	10-Jan-07	1.71	
2863-158	07-Dec-05	1.75	
3227-101	19-Sep-06	1.8	
3675-136	08-Oct-07	1.8	
3691-115	20-Oct-07	1.83	
2863-110	29-Nov-05	1.86	
3339-120	10-Jan-07	1.86	
2882-120	05-Jan-06	1.88	
3575-105	01-Aug-07	1.9	
3575-105-	01-Aug-07	1.9	
2863-151	06-Dec-05	1.93	
2823-142	26-Oct-05	1.97	
2832-135	18-Nov-05	2	
2832-136	17-Nov-05	2	
2832-137	18-Nov-05	2	
2832-140	19-Nov-05	2	
2832-141	19-Nov-05	2	
2832-142	19-Nov-05	2	
2832-144	19-Nov-05	2	
2832-145	19-Nov-05	2	
2832-146	19-Nov-05	2	
3149-007	21-Aug-06	2	
3149-008	21-Aug-06	2	
3149-013	21-Aug-06	2	
2882-175	10-Jan-06	2.06	
3339-164	19-Jan-07	2.06	
3339-146	18-Jan-07	2.09	
2823-209	26-Oct-05	2.1	
2882-157	09-Jan-06	2.1	
2823-144	26-Oct-05	2.14	
2863-114	01-Dec-05	2.21	
2823-141	26-Oct-05	2.22	
2832-150	21-Nov-05	2.24	
2801-203	12-Oct-05	2.31	
2801-102	12-Oct-05	2.33	
2901-107	20-Jan-06	2.38	
2801-203-	12-Oct-05	2.41	
2863-157	07-Dec-05	2.42	
3339-172-	23-Jan-07	2.47	
2801-102-	12-Oct-05	2.49	

Table 4-34
Analytical Results for Cadmium in Area-wide Residential Groundwater – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceed MCL - Cadmium (5 ug/L)
2901-115	19-Jan-06	2.5	
3227-108	20-Sep-06	2.5	
3339-172	23-Jan-07	2.52	
3339-143-	17-Jan-07	2.63	
2873-107	16-Dec-05	2.65	
2823-138	26-Oct-05	2.69	
3339-143	17-Jan-07	2.69	
3298-106	05-Dec-06	2.7	
3422-104		2.98	
2873-119	16-Dec-05	3.13	
2823-146	26-Oct-05	3.98	
2730-103	17-Aug-05	5	X
3227-115	20-Sep-06	5.4	X
2832-123	16-Nov-05	5.43	X
2823-116	20-Oct-05	7.58	X
2863-134	05-Dec-05	8.11	X

Table 4-35
Analytical Results for Surface Water – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Concentration - Lead (ug/L)	Q	Exceeds NAWQC - Lead
SW-6	13.8	J	X
SW-2	35	J	X
SW-3	5.25	J	
WSW-3	1	UJ	
WSW-2	16.1	J	X
WSW-1	2.19	J	
WSW-1-FD	2.24	J	
WSW-8	13.6	J	X
SW-4	3.04	J	
SW-4-FD	1.01	J	
SW-5	1.41	J	
SW-0	1	UJ	
SW-1	1.62	J	
SW-5	1	U	

Notes:

U=not detected

J=Analyte present. Reported value may be estimated.

Table 4-36
Analytical Results for Sediment – Richwoods Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Concentration - Lead (ug/L)	Q	Exceeds SQG- Lead
SED-6	1620		X
SED-2	32.8		
SED-3	42.1		X
WSS-6	1160		X
WSS-5	1080		X
WSS-3	243		X
WSS-2	639		X
WSS-1	385		X
WSS-1-FD	556		X
WSS-7	445		X
WSS-4	632		X
WSS-8	1070		X
SED-4	80		X
SED-5	22.1		
SED-0	28.7		
SED-1	31.5		

Note:

SQG= 35.8 mg/kg (TEC) and 128 mg/kg (PEC).

Table 4-37
Analytical Results for Lead in Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)	Site
69	851		X		X	Old Mines
5012	2884		X	X	X	Old Mines
5014	994		X		X	Old Mines
20171	992		X		X	Old Mines
20173	1151		X		X	Old Mines
20187	709		X		X	Old Mines
30079	286				X	Old Mines
30126	591		X		X	Old Mines
30172	1007		X		X	Old Mines
30177	1277		X	X	X	Old Mines
30271	1304		X	X	X	Old Mines
30364	1281		X	X	X	Old Mines
30417	1527		X	X	X	Old Mines
30448	1466		X	X	X	Old Mines
30553	992		X		X	Old Mines
30577	794		X		X	Old Mines
30651	1287		X	X	X	Old Mines
30911	1243		X	X	X	Old Mines
30914	2082		X	X	X	Old Mines
30965	1131		X		X	Old Mines
31016	678		X		X	Old Mines

Table 4-38
Analytical Results for Lead in Soil Confirmation Samples – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Property #/Sample ID	Site	ASR#	Quad	XRF Result (mg/kg)	Confirmation Result (mg/kg)	Relative % Difference
5012	Old Mines	3902-25	F1	2884	3100	7.2
30079	Old Mines	3902-4	B1	286	282	1.4
30126	Old Mines	3902-26	F1	504	459	9.3
30177	Old Mines	3902-23	F1	801	746	7.1
30271	Old Mines	3902-27	F2	1261	1260	0.1
30364	Old Mines	3902-24	F1	1052	970	8.1
30417	Old Mines	3902-20	F2	1527	1370	10.8
30553	Old Mines	3902-14	F2	852	849	0.4
30651	Old Mines	3902-17	B2	1246	1130	9.8
30911	Old Mines	3902-15	B2	1243	1230	1.1
30914	Old Mines	3902-13	F2	803	706	12.9
31016	Old Mines	3902-7	B2	583	574	1.6

Table 4-39
Analytical Results for Lead Bioavailability in Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Property	Lab ID	B&V Sample No.	Date Collected	XRF Lead Concentration (mg/kg)	IVBA (%)	RBA (%)	Site
30177	614	DSGRXA3-30177	08/21/2008	481	57.0	50.0	Old Mines
30417	612	ASGRXA3-30417	08/19/2008	1272	71.2	62.5	Old Mines
30448	606	BSGRLA3-30448	07/31/2008	1136	64.9	57.0	Old Mines
30553	609	ASGRXA3-30553	08/13/2008	676	57.5	50.5	Old Mines
30911	610	CSGRXA3-30911	08/13/2008	893	50.8	44.6	Old Mines
31016	607	DSGRXA3-31016	08/07/2008	606	51.8	45.5	Old Mines

IVBA = *In vitro* bioaccessibility
RBA = Relative bioavailability (*In vivo*)
RBA = 0.878*[IVBA] - 0.028

	IVBA (%)	RBA (%)
Minimum	44.6	
Maximum	62.5	
Average	50.7	

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
0504489	15-Jun-05	384				X
0504490	15-Jun-05	624		X		X
0506663	15-Jun-05	842		X		X
0505598	15-Jun-05	1540		X	X	X
0505597	15-Jun-05	3650		X	X	X
0504493	17-Jun-05	190				X
0505541	29-Jun-05	37	J			
0505542	29-Jun-05	43.1	J			
0505543	29-Jun-05	69	J			
0506757	30-Jun-05	642		X		X
0505512	30-Jun-05	662		X		X
2730-016	16-Aug-05	478		X		X
2730-017	16-Aug-05	514		X		X
2730-018	16-Aug-05	535		X		X
2730-010	16-Aug-05	1270		X	X	X
2730-015	16-Aug-05	1350		X	X	X
2730-009	16-Aug-05	1720		X	X	X
2730-014	16-Aug-05	2500		X	X	X
2730-025	20-Aug-05	70.8				
2730-022	20-Aug-05	355				X
2730-026	20-Aug-05	592		X		X
2730-034	23-Aug-05	1030		X		X
2730-032	23-Aug-05	1400		X	X	X
2774-008	07-Sep-05	924		X		X
2774-012	07-Sep-05	1200		X	X	X
2774-027	07-Sep-05	1880	J	X	X	X
2774-007	08-Sep-05	486		X		X
2774-026	10-Sep-05	209	J			X
2774-014	10-Sep-05	252				X
2774-023	10-Sep-05	268	J			X
2774-019	10-Sep-05	360				X
2774-025	10-Sep-05	400	J	X		X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2774-021	10-Sep-05	412	J	X		X
2774-022	10-Sep-05	485	J	X		X
2774-028	10-Sep-05	518	J	X		X
2774-015	10-Sep-05	564		X		X
2774-006	10-Sep-05	596		X		X
2774-018	10-Sep-05	985		X		X
2774-020	10-Sep-05	1010		X		X
2774-011	10-Sep-05	1850		X	X	X
2774-005	10-Sep-05	2710		X	X	X
2774-016	10-Sep-05	2860		X	X	X
2774-024	11-Sep-05	350	J			X
2774-010	11-Sep-05	357				X
2774-003	11-Sep-05	474		X		X
2774-001	12-Sep-05	252				X
2788-014	12-Sep-05	260	J			X
2774-002	12-Sep-05	405		X		X
2774-039	12-Sep-05	589	J	X		X
2774-037	12-Sep-05	692	J	X		X
2774-038	12-Sep-05	719	J	X		X
2774-004	12-Sep-05	827		X		X
2788-012	13-Sep-05	283	J			X
2774-036	13-Sep-05	320	J			X
2774-034	13-Sep-05	323	J			X
2788-015	13-Sep-05	496	J	X		X
2788-013	13-Sep-05	2010	J	X	X	X
2774-031	14-Sep-05	326	J			X
2774-035	14-Sep-05	361	J			X
2774-029	14-Sep-05	456	J	X		X
2774-030	14-Sep-05	540	J	X		X
2774-033	14-Sep-05	919	J	X		X
2774-032	14-Sep-05	4010	J	X	X	X
2788-002	21-Sep-05	367	J			X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2788-004	21-Sep-05	384	J			X
2788-008	21-Sep-05	394	J			X
2788-005	21-Sep-05	428	J	X		X
2788-009	21-Sep-05	494	J	X		X
2788-006	21-Sep-05	539	J	X		X
2788-007	21-Sep-05	566	J	X		X
2788-018	21-Sep-05	619	J	X		X
2788-010	21-Sep-05	626	J	X		X
2788-016	21-Sep-05	635	J	X		X
2788-019	21-Sep-05	722	J	X		X
2788-017	21-Sep-05	1110	J	X		X
2788-003	21-Sep-05	1140	J	X		X
2788-023	21-Sep-05	1890		X	X	X
2788-001	21-Sep-05	2930	J	X	X	X
2788-011	21-Sep-05	3640	J	X	X	X
2788-020	22-Sep-05	359	J			X
2788-021	22-Sep-05	451		X		X
2788-022	22-Sep-05	606		X		X
2788-026	24-Sep-05	127				
2788-024	24-Sep-05	143				
2788-034	26-Sep-05	71.7				
2788-031	26-Sep-05	311				X
2788-033	26-Sep-05	494		X		X
2788-032	26-Sep-05	780		X		X
2873-018	19-Dec-05	85.2				
2873-014	19-Dec-05	524		X		X
3333-003	04-Jan-06	330				X
2938-002	02-Mar-06	86.7				
2938-003	02-Mar-06	1170		X		X
2938-001	03-Mar-06	271				X
2938-011	08-Mar-06	44.9				
2938-012	08-Mar-06	108				

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2938-006	08-Mar-06	163				
2938-007	08-Mar-06	478		X		X
2938-009	08-Mar-06	546		X		X
2938-005	08-Mar-06	758		X		X
2938-008	08-Mar-06	1640		X	X	X
2938-004	08-Mar-06	4360		X	X	X
2955-011	16-Mar-06	130				
2955-016	16-Mar-06	205				X
2955-017	16-Mar-06	205				X
2955-014	16-Mar-06	281				X
2955-013	16-Mar-06	294				X
2955-018	16-Mar-06	371				X
2955-004	16-Mar-06	421		X		X
2955-019	16-Mar-06	446		X		X
2955-012	16-Mar-06	465		X		X
2955-009	16-Mar-06	661		X		X
2955-005	16-Mar-06	715		X		X
2955-010	16-Mar-06	730		X		X
2955-015	16-Mar-06	772		X		X
2955-008	16-Mar-06	1480		X	X	X
2955-022	17-Mar-06	111				
2955-020	17-Mar-06	115				
2955-021	17-Mar-06	203				X
2955-007	17-Mar-06	267				X
2955-006	17-Mar-06	419		X		X
2955-002	17-Mar-06	549		X		X
2955-003	17-Mar-06	555		X		X
2955-001	17-Mar-06	665		X		X
2955-023	20-Mar-06	314				X
2955-025	21-Mar-06	167				X
2955-028	21-Mar-06	300				X
2955-030	21-Mar-06	370				X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2955-027	21-Mar-06	457		X		X
2955-031	21-Mar-06	675		X		X
2955-024	21-Mar-06	923		X		X
2955-026	21-Mar-06	1190		X		X
2955-032	22-Mar-06	206				X
2955-033	22-Mar-06	313				X
2955-035	22-Mar-06	362				X
2955-034	22-Mar-06	387				X
2955-036	22-Mar-06	1080		X		X
2977-002	28-Mar-06	362				X
2977-003	29-Mar-06	425		X		X
2977-006	29-Mar-06	477		X		X
2977-005	29-Mar-06	478		X		X
2977-007	29-Mar-06	480		X		X
2977-004	29-Mar-06	651		X		X
2977-008	29-Mar-06	677		X		X
2977-001	29-Mar-06	2700		X	X	X
2977-018	31-Mar-06	188				X
2977-021	31-Mar-06	291	J			X
2977-022	31-Mar-06	312				X
2977-014	31-Mar-06	314				X
2977-012	31-Mar-06	356				X
2977-016	31-Mar-06	393				X
2977-017	31-Mar-06	420		X		X
2977-010	31-Mar-06	421		X		X
2977-011	31-Mar-06	431		X		X
2977-015	31-Mar-06	525		X		X
2977-009	31-Mar-06	743		X		X
2977-019	31-Mar-06	1310		X	X	X
2977-013	31-Mar-06	1340		X	X	X
2977-020	31-Mar-06	2490		X	X	X
2977-024	01-Apr-06	93.9				

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2977-023	01-Apr-06	771		X		X
2977-025	01-Apr-06	977		X		X
2959-003	03-Apr-06	35.7				
2977-027	03-Apr-06	260				X
2977-034	03-Apr-06	302				X
2977-033	03-Apr-06	339				X
2977-031	03-Apr-06	349				X
2977-030	03-Apr-06	394				X
2977-028	03-Apr-06	398				X
2977-032	03-Apr-06	527		X		X
2977-026	03-Apr-06	557		X		X
2977-029	03-Apr-06	667		X		X
2977-044	05-Apr-06	194				X
2977-037	05-Apr-06	277				X
2977-039	05-Apr-06	308				X
2977-041	05-Apr-06	356				X
2977-043	05-Apr-06	396				X
2977-038	05-Apr-06	449		X		X
2977-042	05-Apr-06	455		X		X
2977-036	05-Apr-06	469		X		X
2977-035	05-Apr-06	727		X		X
2977-040	05-Apr-06	871		X		X
2992-002	10-Apr-06	324				X
2992-001	10-Apr-06	690		X		X
2992-005	12-Apr-06	178				X
2992-004	12-Apr-06	382				X
2992-007	12-Apr-06	433		X		X
2992-003	12-Apr-06	457		X		X
2992-008	12-Apr-06	564		X		X
2992-006	12-Apr-06	585		X		X
2992-009	13-Apr-06	93.1				
2992-018	18-Apr-06	145				

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
2992-019	18-Apr-06	154				
2992-015	18-Apr-06	408		X		X
2992-012	18-Apr-06	440		X		X
3017-001	18-Apr-06	445		X		X
2992-017	18-Apr-06	540		X		X
2992-010	18-Apr-06	553		X		X
2992-013	18-Apr-06	576		X		X
2992-014	18-Apr-06	598		X		X
2992-011	18-Apr-06	622		X		X
2992-016	18-Apr-06	643		X		X
3017-002	18-Apr-06	1190		X		X
3017-014	22-Apr-06	139				
3017-010	22-Apr-06	146				
3017-013	22-Apr-06	185				X
3017-016	22-Apr-06	203				X
3017-011	22-Apr-06	252				X
3017-006	22-Apr-06	280				X
3017-024	22-Apr-06	329				X
3017-007	22-Apr-06	339				X
3017-018	22-Apr-06	342				X
3017-003	22-Apr-06	385				X
3017-004	22-Apr-06	392				X
3017-009	22-Apr-06	438		X		X
3017-021	22-Apr-06	484		X		X
3017-012	22-Apr-06	573		X		X
3017-022	22-Apr-06	578		X		X
3017-015	22-Apr-06	595		X		X
3017-017	22-Apr-06	639		X		X
3017-005	22-Apr-06	681		X		X
3017-020	22-Apr-06	716		X		X
3017-023	22-Apr-06	877		X		X
3017-019	22-Apr-06	891		X		X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3017-026	22-Apr-06	955		X		X
3017-025	22-Apr-06	1290		X	X	X
3017-008	22-Apr-06	1990		X	X	X
3017-027	23-Apr-06	594		X		X
3017-028	23-Apr-06	910		X		X
3017-030	26-Apr-06	90.9				
3017-044	26-Apr-06	96.9				
3017-039	26-Apr-06	102				
3017-037	26-Apr-06	108				
3017-031	26-Apr-06	127				
3017-036	26-Apr-06	142				
3017-043	26-Apr-06	175				X
3017-032	26-Apr-06	193				X
3017-042	26-Apr-06	206				X
3017-040	26-Apr-06	215				X
3017-034	26-Apr-06	245				X
3017-035	26-Apr-06	278				X
3022-001	26-Apr-06	485	J	X		X
3017-041	26-Apr-06	574		X		X
3017-045	26-Apr-06	880		X		X
3017-029	26-Apr-06	950		X		X
3017-033	26-Apr-06	1270		X	X	X
3022-002	26-Apr-06	2050	J	X	X	X
3017-038	26-Apr-06	3530		X	X	X
3022-005	05-May-06	106	J			
3022-003	05-May-06	119	J			
3022-010	05-May-06	424	J	X		X
3022-008	05-May-06	510	J	X		X
3022-007	05-May-06	580	J	X		X
3022-004	05-May-06	666	J	X		X
3022-009	05-May-06	1480	J	X	X	X
3022-006	05-May-06	1970	J	X	X	X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3022-012	10-May-06	68.5	J			
3022-014	10-May-06	225	J			X
3022-011	10-May-06	226	J			X
3022-013	10-May-06	464	J	X		X
3022-017-FD	22-May-06	46.9				
3022-017	22-May-06	47.8				
3022-015	22-May-06	102				
3022-015-FD	22-May-06	114				
3022-018	22-May-06	382				X
3022-016	22-May-06	465		X		X
3022-018-FD	22-May-06	505		X		X
3022-016-FD	22-May-06	538		X		X
3067-011	13-Jun-06	33.7				
3067-010	13-Jun-06	40.4				
3067-016	13-Jun-06	68.2				
3067-014	13-Jun-06	83				
3067-007	13-Jun-06	177				X
3067-015	13-Jun-06	266				X
3067-012	13-Jun-06	1070		X		X
3067-003	14-Jun-06	97.9				
3067-002	14-Jun-06	107				
3067-005	14-Jun-06	134				
3067-004	14-Jun-06	305				X
3067-006	14-Jun-06	470		X		X
3053-025	14-Jun-06	1380		X	X	X
3067-008	16-Jun-06	118				
3067-009	16-Jun-06	176				X
3067-013	16-Jun-06	648		X		X
3067-020	26-Jun-06	87.9				
3067-021	26-Jun-06	89.2	J			
3067-017	26-Jun-06	120				
3067-023	26-Jun-06	148				

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3067-022	26-Jun-06	175				X
3067-026	26-Jun-06	213				X
3067-028	26-Jun-06	304				X
3067-018	26-Jun-06	307				X
3067-027	26-Jun-06	325				X
3067-025	26-Jun-06	328				X
3067-019	26-Jun-06	387				X
3067-024	26-Jun-06	961		X		X
3067-035	27-Jun-06	83.3				
3067-031	27-Jun-06	194				X
3067-033	27-Jun-06	205				X
3067-032	27-Jun-06	697		X		X
3067-030	27-Jun-06	782		X		X
3067-034	27-Jun-06	1060		X		X
3067-036	27-Jun-06	2470		X	X	X
3165-006	22-Aug-06	33.8				
3165-005	22-Aug-06	75				
3165-008	22-Aug-06	83.7				
3165-007	22-Aug-06	183				X
3165-003	22-Aug-06	234	J			X
3165-002	22-Aug-06	440		X		X
3165-009	23-Aug-06	38.8				
3165-014	23-Aug-06	59.6				
3165-010	23-Aug-06	70.2				
3165-012	23-Aug-06	171				X
3165-011	23-Aug-06	265				X
3165-016	23-Aug-06	291				X
3165-018	23-Aug-06	368				X
3165-015	23-Aug-06	672		X		X
3165-013	23-Aug-06	1110		X		X
3165-017	23-Aug-06	1620		X	X	X
3165-020	24-Aug-06	398				X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3165-022	24-Aug-06	514		X		X
3165-021	24-Aug-06	1040	J	X		X
3165-019	24-Aug-06	1110		X		X
3165-026	24-Aug-06	1230		X	X	X
3165-024	24-Aug-06	1320		X	X	X
3165-023	24-Aug-06	1440		X	X	X
3165-025	24-Aug-06	1920		X	X	X
3165-029-FD	25-Aug-06	58.3				
3165-029	25-Aug-06	93.3				
3165-031-FD	25-Aug-06	103				
3165-027	25-Aug-06	239				X
3165-031	25-Aug-06	287				X
3165-028	25-Aug-06	437		X		X
3165-035	25-Aug-06	615		X		X
3165-036	25-Aug-06	859		X		X
3165-034	25-Aug-06	1150		X		X
3165-032	25-Aug-06	2490		X	X	X
3067-037	05-Sep-06	120				
3067-039	05-Sep-06	193				X
3067-038	05-Sep-06	289				X
3067-040	05-Sep-06	291				X
3067-041	08-Sep-06	764		X		X
3244-001	28-Sep-06	32000		X	X	X
3244-005	06-Oct-06	348				X
3244-003	06-Oct-06	386				X
3244-004	06-Oct-06	494		X		X
3244-002	06-Oct-06	504		X		X
3295-008	17-Oct-06	7920		X	X	X
3295-009	24-Oct-06	820		X		X
3295-002	08-Nov-06	31.7				
3295-001	08-Nov-06	233	J			X
3295-003	08-Nov-06	519		X		X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3295-004	09-Nov-06	335				X
3295-005	22-Nov-06	245				X
3295-006	22-Nov-06	387				X
3295-007	27-Nov-06	2280		X	X	X
3333-002	04-Jan-07	123				
3339-013	04-Jan-07	194				X
3333-001	04-Jan-07	318	J			X
3333-004	08-Jan-07	668		X		X
3333-005	08-Jan-07	1080		X		X
3333-007	12-Jan-07	305				X
3333-006	12-Jan-07	416		X		X
3333-012	12-Jan-07	716		X		X
3333-011	12-Jan-07	806		X		X
3333-016	12-Jan-07	870		X		X
3333-008	12-Jan-07	1020		X		X
3333-013	12-Jan-07	1060		X		X
3333-015	12-Jan-07	1250		X	X	X
3333-010	12-Jan-07	1540		X	X	X
3333-009	12-Jan-07	1630		X	X	X
3333-014	12-Jan-07	1640		X	X	X
3372-003	29-Jan-07	108				
3372-002	29-Jan-07	650		X		X
3372-005	01-Feb-07	172				X
3372-006	01-Feb-07	343				X
3372-004	01-Feb-07	1030		X		X
3372-007	02-Feb-07	369				X
3372-011	03-Feb-07	114				
3372-009	03-Feb-07	156				
3372-012	03-Feb-07	276				X
3372-013	03-Feb-07	333				X
3372-008	03-Feb-07	344				X
3372-010	03-Feb-07	748		X		X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3359-009	10-Feb-07	266	J			X
3377-008	01-Mar-07	3.6	J			
3377-012	01-Mar-07	6.63	J			
3377-005	01-Mar-07	7.24	J			
3377-006	01-Mar-07	7.37	J			
3377-010	01-Mar-07	7.57	J			
3377-011	01-Mar-07	7.86	J			
3377-013	01-Mar-07	11.1	J			
3377-004	01-Mar-07	129	J			
3377-001	01-Mar-07	310	J			X
3377-003	01-Mar-07	324	J			X
3377-002	01-Mar-07	337	J			X
3377-009	04-Mar-07	6.42	J			
3377-007	04-Mar-07	8.15	J			
3377-014	04-Mar-07	444	J	X		X
3377-017	06-Mar-07	4.98	J			
3377-019	06-Mar-07	6.36	J			
3377-018	06-Mar-07	6.63	J			
3377-016	06-Mar-07	11.8	J			
3377-015	06-Mar-07	53100	J	X	X	X
3377-021	09-Mar-07	39.3				
3377-022	09-Mar-07	62.1				
3377-030	09-Mar-07	165				X
3377-023	09-Mar-07	239				X
3377-025	09-Mar-07	438		X		X
3377-024	09-Mar-07	1580		X	X	X
3377-033	12-Mar-07	56.7				
3377-029	12-Mar-07	68.5				
3377-031	12-Mar-07	262				X
3377-037	12-Mar-07	350				X
3377-036	12-Mar-07	409		X		X
3377-026	12-Mar-07	416		X		X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3377-032	12-Mar-07	814		X		X
3377-035	13-Mar-07	148				
3377-041	13-Mar-07	168	J			X
3377-039	13-Mar-07	266				X
3377-042	13-Mar-07	304	J			X
3377-020	13-Mar-07	361				X
3377-040	13-Mar-07	733	J	X		X
3377-028	13-Mar-07	867		X		X
3377-043	14-Mar-07	121	J			
3377-044	14-Mar-07	384	J			X
3377-045	14-Mar-07	416	J	X		X
3377-034	14-Mar-07	570		X		X
3377-038	14-Mar-07	1000		X		X
3377-046	14-Mar-07	1180	J	X		X
3464-006	30-Mar-07	444		X		X
3464-001	30-Mar-07	546		X		X
3464-005	30-Mar-07	740		X		X
3464-003	30-Mar-07	1140		X		X
3464-002	30-Mar-07	1790		X	X	X
3464-004	30-Mar-07	3270		X	X	X
3464-008	02-Apr-07	415		X		X
3464-007	02-Apr-07	888		X		X
3464-009	02-Apr-07	1500		X	X	X
3464-010	02-Apr-07	2020		X	X	X
3464-012	11-Apr-07	385				X
3464-011	11-Apr-07	390				X
3464-014	13-Apr-07	172				X
3464-013	13-Apr-07	186				X
3464-016	24-Apr-07	1230		X	X	X
3464-015	24-Apr-07	1680		X	X	X
3464-019	25-Apr-07	299				X
3464-020	25-Apr-07	305				X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3464-018	27-Apr-07	191				X
3464-017	27-Apr-07	515		X		X
3464-022	30-Apr-07	109				
3464-021	30-Apr-07	134				
3464-023	11-May-07	747		X		X
3464-024	11-May-07	769		X		X
3507-004	30-May-07	354				X
3507-001	30-May-07	569		X		X
3507-002	30-May-07	614		X		X
3507-006	30-May-07	3200		X	X	X
3507-005	30-May-07	3860		X	X	X
3507-013	06-Jun-07	171				X
3507-009	06-Jun-07	312				X
3507-020	06-Jun-07	371				X
3507-008	06-Jun-07	444		X		X
3507-011	06-Jun-07	447		X		X
3507-007	06-Jun-07	486		X		X
3507-012	06-Jun-07	634		X		X
3507-010	06-Jun-07	776		X		X
3507-014	06-Jun-07	2330		X	X	X
3507-021	07-Jun-07	5	U			
3507-023	07-Jun-07	5	U			
3507-018	07-Jun-07	168				X
3507-017	07-Jun-07	187				X
3507-022	07-Jun-07	190				X
3507-016	07-Jun-07	218				X
3507-015	07-Jun-07	248				X
3507-019	07-Jun-07	290				X
3507-003	11-Jun-07	56.7				
3628-006	03-Aug-07	95.4				
3628-005	03-Aug-07	143				
3628-001	03-Aug-07	204				X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3628-002	03-Aug-07	288				X
3628-003	03-Aug-07	348				X
3628-007	03-Aug-07	622		X		X
3628-008	10-Aug-07	96.9				
3628-009	10-Aug-07	218				X
3628-019	10-Aug-07	1280		X	X	X
3628-010	10-Aug-07	2170		X	X	X
3628-018	10-Aug-07	4740		X	X	X
3628-011	07-Sep-07	97.7				
3628-013	07-Sep-07	290				X
3628-016	07-Sep-07	327				X
3628-014	11-Sep-07	315				X
3628-015	11-Sep-07	404		X		X
3680-002	24-Sep-07	121				
3680-001	24-Sep-07	374				X
3680-004	25-Sep-07	141				
3680-003	25-Sep-07	188				X
3680-005	25-Sep-07	1720		X	X	X
3733-001	18-Oct-07	184	J			X
3680-009	18-Oct-07	224				X
3680-008	18-Oct-07	320				X
3733-002	18-Oct-07	341				X
3733-003	18-Oct-07	362				X
3733-008	29-Oct-07	90.8				
3733-005	29-Oct-07	609		X		X
3733-004	29-Oct-07	644		X		X
3733-007	29-Oct-07	776		X		X
3733-006	29-Oct-07	1040		X		X
3733-010	12-Nov-07	162				
3733-011	12-Nov-07	206				X
3752-001	12-Nov-07	532	J	X		X
3733-013	13-Nov-07	88.6				

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3733-012	13-Nov-07	1100		X		X
3733-014	27-Nov-07	90.1				
3733-015	27-Nov-07	328				X
3733-016	27-Nov-07	838		X		X
3752-004	20-Dec-07	59	J			
3752-007	20-Dec-07	62.3	J			
3752-006	20-Dec-07	130	J			
3750-004	14-Jan-08	119	J			
3752-002	15-Jan-08	102	J			
3864-001	29-Apr-08	98.9				
3864-002	29-Apr-08	111				
3864-003	29-Apr-08	297				X
3377-309		59.7				
3377-312		67.4				
3377-318		106				
3377-304		107				
3377-316		109				
3377-307		116				
3377-306		118				
3377-310		118				
3377-319		125				
3377-313		162				
3377-311		170				X
3419-022		177				X
3419-020		179				X
3419-021		220				X
3377-302		229				X
3377-303		239				X
3377-314		263				X
3419-018		268				X
3419-007		311				X
3377-301		321				X

Table 4-40
Analytical Results for Lead in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Lead (mg/kg)	Q	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for lead (165.6 mg/kg)
3419-017		323				X
3419-015		327				X
3377-317		341				X
3419-019		371				X
3419-011		415		X		X
3419-014		454		X		X
3419-006		490		X		X
3419-008		509		X		X
2730-031		535		X		X
3419-013		551		X		X
3419-009		636		X		X
3419-010		637		X		X
3377-308		647		X		X
3419-012		675		X		X
3419-004		686		X		X
3628-012		821		X		X
3377-305		846		X		X
3419-001	NA	1030		X		X
3419-003	NA	1130		X		X
3419-002	NA	1190		X		X
3377-315	NA	1240		X	X	X
3419-005	NA	1370		X	X	X

Notes:

U=not detected.

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
0504490	15-Jun-05	11.7		X
0504489	15-Jun-05	12.7		X
0506663	15-Jun-05	14.4		X
0505598	15-Jun-05	18.7		X
0505597	15-Jun-05	27.7		X
0504493	17-Jun-05	5.3		X
0505541	29-Jun-05	0.936	J	X
0505542	29-Jun-05	2.17	J	X
0505543	29-Jun-05	2.18	J	X
0505512	30-Jun-05	14.1		X
0506757	30-Jun-05	20.1		X
2730-018	16-Aug-05	12.2	J	X
2730-014	16-Aug-05	15.6	J	X
2730-016	16-Aug-05	15.8	J	X
2730-017	16-Aug-05	19.6	J	X
2730-010	16-Aug-05	20	J	X
2730-015	16-Aug-05	20.5	J	X
2730-009	16-Aug-05	34.6		X
2730-025	20-Aug-05	5.98	J	X
2730-022	20-Aug-05	9.42	J	X
2730-026	20-Aug-05	12.7	J	X
2730-032	23-Aug-05	15.8	J	X
2730-034	23-Aug-05	19.2	J	X
2774-008	07-Sep-05	9.96	J	X
2774-012	07-Sep-05	14.7	J	X
2774-027	07-Sep-05	19.6	J	X
2774-007	08-Sep-05	11.4	J	X
2774-020	10-Sep-05	5.74	J	X
2774-026	10-Sep-05	6.4	J	X
2774-015	10-Sep-05	7.91	J	X
2774-019	10-Sep-05	8.47	J	X
2774-006	10-Sep-05	8.49	J	X
2774-021	10-Sep-05	9.22	J	X
2774-011	10-Sep-05	9.23	J	X
2774-014	10-Sep-05	10.6	J	X
2774-023	10-Sep-05	10.8	J	X
2774-022	10-Sep-05	11.8	J	X
2774-028	10-Sep-05	15.7	J	X
2774-016	10-Sep-05	18	J	X
2774-018	10-Sep-05	20.6	J	X
2774-025	10-Sep-05	21.6	J	X
2774-005	10-Sep-05	25.2	J	X
2774-010	11-Sep-05	5.15	J	X
2774-024	11-Sep-05	6.56	J	X
2774-003	11-Sep-05	21.3	J	X
2774-039	12-Sep-05	6.71	J	X
2788-014	12-Sep-05	6.91	J	X
2774-002	12-Sep-05	8.87	J	X
2774-001	12-Sep-05	9.21	J	X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2774-037	12-Sep-05	10.2	J	X
2774-004	12-Sep-05	10.8	J	X
2774-038	12-Sep-05	10.8	J	X
2774-034	13-Sep-05	4.55	J	X
2774-036	13-Sep-05	5.36	J	X
2788-015	13-Sep-05	5.9	J	X
2788-012	13-Sep-05	10.2	J	X
2788-013	13-Sep-05	13.4	J	X
2774-030	14-Sep-05	3.04	J	X
2774-035	14-Sep-05	12.6	J	X
2774-029	14-Sep-05	13	J	X
2774-031	14-Sep-05	14.6	J	X
2774-033	14-Sep-05	15.9	J	X
2774-032	14-Sep-05	20.5	J	X
2788-011	21-Sep-05	6.38	J	X
2788-003	21-Sep-05	6.73	J	X
2788-001	21-Sep-05	7.06	J	X
2788-002	21-Sep-05	7.1	J	X
2788-016	21-Sep-05	7.75	J	X
2788-019	21-Sep-05	8.41	J	X
2788-017	21-Sep-05	8.65	J	X
2788-018	21-Sep-05	9.43	J	X
2788-008	21-Sep-05	9.81	J	X
2788-004	21-Sep-05	9.84	J	X
2788-023	21-Sep-05	12.9	UJ	X
2788-005	21-Sep-05	16.7	J	X
2788-009	21-Sep-05	21.3	J	X
2788-006	21-Sep-05	24.2	J	X
2788-010	21-Sep-05	25.7	J	X
2788-007	21-Sep-05	27.8	J	X
2788-021	22-Sep-05	10.9	UJ	X
2788-020	22-Sep-05	11.7	J	X
2788-022	22-Sep-05	14.8	UJ	X
2788-026	24-Sep-05	6.96	UJ	X
2788-024	24-Sep-05	9.85	UJ	X
2788-033	26-Sep-05	6.16	UJ	X
2788-034	26-Sep-05	8.51	UJ	X
2788-031	26-Sep-05	10.1	UJ	X
2788-032	26-Sep-05	12.6	UJ	X
2873-018	19-Dec-05	5	U	X
2873-014	19-Dec-05	20		X
3333-003	04-Jan-06	4.8	U	X
2938-002	02-Mar-06	7.23		X
2938-003	02-Mar-06	11.1		X
2938-001	03-Mar-06	4.44	U	X
2938-012	08-Mar-06	3.61	U	X
2938-011	08-Mar-06	3.87	U	X
2938-004	08-Mar-06	4.33	U	X
2938-006	08-Mar-06	5.16	U	X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2938-007	08-Mar-06	5.37	U	X
2938-005	08-Mar-06	5.48	U	X
2938-008	08-Mar-06	5.79	U	X
2938-009	08-Mar-06	11.8		X
2955-004	16-Mar-06	5	U	X
2955-005	16-Mar-06	5	U	X
2955-008	16-Mar-06	5	U	X
2955-009	16-Mar-06	5	U	X
2955-010	16-Mar-06	5	U	X
2955-011	16-Mar-06	5	U	X
2955-012	16-Mar-06	5	U	X
2955-013	16-Mar-06	5	U	X
2955-014	16-Mar-06	5	U	X
2955-015	16-Mar-06	5	U	X
2955-016	16-Mar-06	5	U	X
2955-017	16-Mar-06	5	U	X
2955-018	16-Mar-06	5	U	X
2955-019	16-Mar-06	5	U	X
2955-001	17-Mar-06	5	U	X
2955-002	17-Mar-06	5	U	X
2955-006	17-Mar-06	5	U	X
2955-007	17-Mar-06	5	U	X
2955-020	17-Mar-06	5	U	X
2955-021	17-Mar-06	5	U	X
2955-022	17-Mar-06	5	U	X
2955-003	17-Mar-06	6.35		X
2955-023	20-Mar-06	5	U	X
2955-024	21-Mar-06	5	U	X
2955-025	21-Mar-06	5	U	X
2955-026	21-Mar-06	5	U	X
2955-027	21-Mar-06	5	U	X
2955-028	21-Mar-06	5	U	X
2955-030	21-Mar-06	5	U	X
2955-031	21-Mar-06	5	U	X
2955-032	22-Mar-06	5	U	X
2955-033	22-Mar-06	5	U	X
2955-034	22-Mar-06	5	U	X
2955-035	22-Mar-06	5	U	X
2955-036	22-Mar-06	5	U	X
2977-002	28-Mar-06	5	U	X
2977-001	29-Mar-06	5	UJ	X
2977-003	29-Mar-06	5	U	X
2977-004	29-Mar-06	5	U	X
2977-005	29-Mar-06	5	U	X
2977-006	29-Mar-06	5	U	X
2977-007	29-Mar-06	5	U	X
2977-008	29-Mar-06	5	U	X
2977-009	31-Mar-06	5	U	X
2977-010	31-Mar-06	5	U	X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2977-011	31-Mar-06	5	U	X
2977-012	31-Mar-06	5	U	X
2977-013	31-Mar-06	5	U	X
2977-014	31-Mar-06	5	U	X
2977-015	31-Mar-06	5	U	X
2977-016	31-Mar-06	5	U	X
2977-017	31-Mar-06	5	U	X
2977-018	31-Mar-06	5	U	X
2977-019	31-Mar-06	5	U	X
2977-020	31-Mar-06	5	U	X
2977-022	31-Mar-06	5	UJ	X
2977-021	31-Mar-06		R	X
2977-023	01-Apr-06	5	UJ	X
2977-024	01-Apr-06	5	UJ	X
2977-025	01-Apr-06	5	UJ	X
2959-003	03-Apr-06	5	U	X
2977-026	03-Apr-06	5	UJ	X
2977-027	03-Apr-06	5	UJ	X
2977-028	03-Apr-06	5	UJ	X
2977-029	03-Apr-06	5	UJ	X
2977-030	03-Apr-06	5	UJ	X
2977-031	03-Apr-06	5	UJ	X
2977-032	03-Apr-06	5	UJ	X
2977-033	03-Apr-06	5	UJ	X
2977-034	03-Apr-06	5	UJ	X
2977-035	05-Apr-06	5	UJ	X
2977-036	05-Apr-06	5	UJ	X
2977-037	05-Apr-06	5	U	X
2977-038	05-Apr-06	5	U	X
2977-039	05-Apr-06	5	U	X
2977-040	05-Apr-06	5	U	X
2977-042	05-Apr-06	5	U	X
2977-043	05-Apr-06	5	U	X
2977-044	05-Apr-06	5	U	X
2977-041	05-Apr-06		R	X
2992-001	10-Apr-06	6.91		X
2992-002	10-Apr-06	9.77		X
2992-004	12-Apr-06	6.3		X
2992-006	12-Apr-06	7.17		X
2992-005	12-Apr-06	8.27		X
2992-008	12-Apr-06	12.9		X
2992-003	12-Apr-06	13.6		X
2992-007	12-Apr-06	15.1		X
2992-009	13-Apr-06	5.31		X
3017-001	18-Apr-06	5.55		X
2992-018	18-Apr-06	6.55		X
2992-014	18-Apr-06	6.66		X
2992-017	18-Apr-06	6.95		X
3017-002	18-Apr-06	8.07		X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2992-013	18-Apr-06	10.3		X
2992-011	18-Apr-06	10.7		X
2992-015	18-Apr-06	10.8		X
2992-019	18-Apr-06	12.8		X
2992-016	18-Apr-06	17.1		X
2992-010	18-Apr-06	17.4		X
2992-012	18-Apr-06	64.2		X
3017-010	22-Apr-06	4.4		X
3017-005	22-Apr-06	4.6		X
3017-008	22-Apr-06	5.23		X
3017-025	22-Apr-06	5.56		X
3017-003	22-Apr-06	6.47		X
3017-011	22-Apr-06	6.74		X
3017-016	22-Apr-06	6.77		X
3017-021	22-Apr-06	6.83		X
3017-007	22-Apr-06	6.89		X
3017-026	22-Apr-06	7.21		X
3017-022	22-Apr-06	7.69		X
3017-018	22-Apr-06	7.73		X
3017-006	22-Apr-06	7.86		X
3017-019	22-Apr-06	7.96		X
3017-024	22-Apr-06	8.17		X
3017-009	22-Apr-06	8.46		X
3017-013	22-Apr-06	10		X
3017-004	22-Apr-06	10.1		X
3017-017	22-Apr-06	10.5		X
3017-015	22-Apr-06	11.1		X
3017-014	22-Apr-06	12.5		X
3017-020	22-Apr-06	13.5		X
3017-012	22-Apr-06	17.5		X
3017-023	22-Apr-06	56		X
3017-028	23-Apr-06	4.91		X
3017-027	23-Apr-06	13.6		X
3022-001	26-Apr-06	1.56	J	X
3017-030	26-Apr-06	4.68		X
3017-036	26-Apr-06	5.58		X
3017-032	26-Apr-06	6.46		X
3022-002	26-Apr-06	6.62	J	X
3017-040	26-Apr-06	8.14		X
3017-038	26-Apr-06	8.3		X
3017-042	26-Apr-06	8.61		X
3017-039	26-Apr-06	8.62		X
3017-029	26-Apr-06	8.85		X
3017-044	26-Apr-06	9.7		X
3017-043	26-Apr-06	9.89		X
3017-031	26-Apr-06	10.1		X
3017-037	26-Apr-06	12.2		X
3017-045	26-Apr-06	13.8		X
3017-034	26-Apr-06	14.3		X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
3017-035	26-Apr-06	14.9		X
3017-033	26-Apr-06	16.8		X
3017-041	26-Apr-06	24.8		X
3022-007	05-May-06	4.69	J	X
3022-008	05-May-06	5.59	J	X
3022-009	05-May-06	6.68	J	X
3022-010	05-May-06	7.1	J	X
3022-005	05-May-06	7.16	J	X
3022-003	05-May-06	8.49	J	X
3022-006	05-May-06	10.2	J	X
3022-004	05-May-06	10.5	J	X
3022-011	10-May-06	5.17	J	X
3022-014	10-May-06	5.56	J	X
3022-012	10-May-06	6.11	J	X
3022-013	10-May-06	7.5	J	X
3022-016	22-May-06	4.97		X
3022-017	22-May-06	5.05		X
3022-017-	22-May-06	5.09		X
3022-016-	22-May-06	5.85		X
3022-018-	22-May-06	8.02		X
3022-015-	22-May-06	9.21		X
3022-018	22-May-06	9.25		X
3022-015	22-May-06	9.61		X
3067-016	13-Jun-06	3.65		X
3067-011	13-Jun-06	5	U	X
3067-014	13-Jun-06	5	U	X
3067-012	13-Jun-06	5.14		X
3067-010	13-Jun-06	5.44		X
3067-007	13-Jun-06	5.78		X
3067-015	13-Jun-06	8.29		X
3067-002	14-Jun-06	5	U	X
3067-003	14-Jun-06	5	U	X
3067-004	14-Jun-06	5	U	X
3067-005	14-Jun-06	5	U	X
3067-006	14-Jun-06	5	U	X
3067-008	16-Jun-06	5	U	X
3067-009	16-Jun-06	6.3		X
3067-013	16-Jun-06	13.3		X
3067-020	26-Jun-06	5	U	X
3067-021	26-Jun-06	5	U	X
3067-018	26-Jun-06	5.89		X
3067-023	26-Jun-06	5.94		X
3067-026	26-Jun-06	6.1		X
3067-025	26-Jun-06	6.96		X
3067-028	26-Jun-06	7.09		X
3067-017	26-Jun-06	7.43		X
3067-022	26-Jun-06	8.64		X
3067-027	26-Jun-06	9.03		X
3067-019	26-Jun-06	9.07		X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
3067-024	26-Jun-06	9.11		X
3067-035	27-Jun-06	4.77		X
3067-036	27-Jun-06	5.33		X
3067-033	27-Jun-06	5.88		X
3067-031	27-Jun-06	7.59		X
3067-034	27-Jun-06	8.5		X
3067-032	27-Jun-06	9.13		X
3067-030	27-Jun-06	9.88		X
3165-003	22-Aug-06	5	U	X
3165-005	22-Aug-06	5	U	X
3165-006	22-Aug-06	5	U	X
3165-007	22-Aug-06	5	U	X
3165-008	22-Aug-06	5.22		X
3165-002	22-Aug-06	6.63		X
3165-009	23-Aug-06	5	U	X
3165-010	23-Aug-06	5	U	X
3165-012	23-Aug-06	5	U	X
3165-014	23-Aug-06	5	U	X
3165-015	23-Aug-06	5	U	X
3165-016	23-Aug-06	5	U	X
3165-017	23-Aug-06	5	U	X
3165-018	23-Aug-06	5	U	X
3165-011	23-Aug-06	6.98		X
3165-013	23-Aug-06	18		X
3165-021	24-Aug-06	5	U	X
3165-020	24-Aug-06	7.61		X
3165-023	24-Aug-06	11.5		X
3165-024	24-Aug-06	14		X
3165-026	24-Aug-06	14.5		X
3165-019	24-Aug-06	15.2		X
3165-022	24-Aug-06	15.8		X
3165-025	24-Aug-06	18.4		X
3165-028	25-Aug-06	5	U	X
3165-029	25-Aug-06	5	U	X
3165-029-	25-Aug-06	5	U	X
3165-031	25-Aug-06	5	U	X
3165-031-	25-Aug-06	5	U	X
3165-027	25-Aug-06	5.11		X
3165-035	25-Aug-06	12.3		X
3165-032	25-Aug-06	17.2		X
3165-036	25-Aug-06	17.4		X
3165-034	25-Aug-06	19.1		X
3067-039	05-Sep-06	5	U	X
3067-040	05-Sep-06	5	U	X
3067-037	05-Sep-06	5.18		X
3067-038	05-Sep-06	5.98		X
3067-041	08-Sep-06	5	U	X
3244-001	28-Sep-06	1.12	UJ	X
3244-002	06-Oct-06	1.83	J	X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
3244-003	06-Oct-06	2.94	J	X
3244-005	06-Oct-06	11.7	J	X
3244-004	06-Oct-06	12.2	J	X
3295-008	17-Oct-06	7.25		X
3295-009	24-Oct-06	11.3		X
3295-002	08-Nov-06	5.08	U	X
3295-001	08-Nov-06	6.01		X
3295-003	08-Nov-06	9.42		X
3295-004	09-Nov-06	6.36		X
3295-005	22-Nov-06	7.56		X
3295-006	22-Nov-06	13.3		X
3295-007	27-Nov-06	17.7		X
3333-001	04-Jan-07	5	U	X
3333-002	04-Jan-07	6.4		X
3333-004	08-Jan-07	4.9	U	X
3333-005	08-Jan-07	6.3		X
3333-007	12-Jan-07	6.2		X
3333-008	12-Jan-07	8.1		X
3333-011	12-Jan-07	8.4		X
3333-012	12-Jan-07	8.7		X
3333-006	12-Jan-07	9.2		X
3333-009	12-Jan-07	9.8		X
3333-015	12-Jan-07	11.7		X
3333-014	12-Jan-07	13.1		X
3333-016	12-Jan-07	13.2		X
3333-010	12-Jan-07	17.5		X
3333-013	12-Jan-07	18.2		X
3372-002	29-Jan-07	2.6	U	X
3372-003	29-Jan-07	2.7	U	X
3372-004	01-Feb-07	2.5	U	X
3372-005	01-Feb-07	2.7	U	X
3372-006	01-Feb-07	4.3		X
3372-007	02-Feb-07	2.7	U	X
3372-011	03-Feb-07	2.3	U	X
3372-013	03-Feb-07	2.5	U	X
3372-008	03-Feb-07	2.6	U	X
3372-009	03-Feb-07	2.6	U	X
3372-010	03-Feb-07	2.6	U	X
3372-012	03-Feb-07	2.7	U	X
3377-008	01-Mar-07	2.25		X
3377-006	01-Mar-07	2.77		X
3377-011	01-Mar-07	3.66		X
3377-010	01-Mar-07	3.93		X
3377-003	01-Mar-07	5.01		X
3377-012	01-Mar-07	5.42		X
3377-001	01-Mar-07	5.73		X
3377-005	01-Mar-07	6.1		X
3377-002	01-Mar-07	6.54		X
3377-004	01-Mar-07	7.13		X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
3377-013	01-Mar-07	7.95		X
3377-009	04-Mar-07	1.2		X
3377-007	04-Mar-07	2.61		X
3377-014	04-Mar-07	7.52		X
3377-017	06-Mar-07	2.7		X
3377-019	06-Mar-07	4.29		X
3377-016	06-Mar-07	5.99		X
3377-018	06-Mar-07	8.67		X
3377-015	06-Mar-07	26		X
3377-021	09-Mar-07	2.47		X
3377-022	09-Mar-07	4.41		X
3377-030	09-Mar-07	4.91		X
3377-023	09-Mar-07	6.2		X
3377-025	09-Mar-07	8.1		X
3377-024	09-Mar-07	16.8		X
3377-029	12-Mar-07	5.73		X
3377-033	12-Mar-07	5.77		X
3377-031	12-Mar-07	6.09		X
3377-032	12-Mar-07	7.03		X
3377-036	12-Mar-07	8.36		X
3377-026	12-Mar-07	9.96		X
3377-037	12-Mar-07	9.99		X
3377-041	13-Mar-07	5.5		X
3377-039	13-Mar-07	6.67		X
3377-035	13-Mar-07	7.15		X
3377-028	13-Mar-07	8.53		X
3377-020	13-Mar-07	10.1		X
3377-040	13-Mar-07	11.1		X
3377-042	13-Mar-07	17.5		X
3377-043	14-Mar-07	4.23		X
3377-034	14-Mar-07	5.38		X
3377-045	14-Mar-07	8.79		X
3377-046	14-Mar-07	11.5		X
3377-038	14-Mar-07	15.4		X
3377-044	14-Mar-07	17.1		X
3464-002	30-Mar-07	5.8		X
3464-005	30-Mar-07	9.9		X
3464-006	30-Mar-07	10.6		X
3464-001	30-Mar-07	11		X
3464-004	30-Mar-07	15		X
3464-003	30-Mar-07	20.1		X
3464-007	02-Apr-07	6.6		X
3464-008	02-Apr-07	7.5		X
3464-009	02-Apr-07	11.2		X
3464-010	02-Apr-07	16.8		X
3464-011	11-Apr-07	6.7		X
3464-012	11-Apr-07	7.7		X
3464-014	13-Apr-07	5		X
3464-013	13-Apr-07	5.7		X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
3464-015	24-Apr-07	7.7		X
3464-016	24-Apr-07	8.25		X
3464-020	25-Apr-07	5	U	X
3464-019	25-Apr-07	8.5		X
3464-018	27-Apr-07	5.5		X
3464-017	27-Apr-07	8.62		X
3464-022	30-Apr-07	5	U	X
3464-021	30-Apr-07	5.5		X
3464-024	11-May-07	9.7		X
3464-023	11-May-07	11.1		X
3507-004	30-May-07	6.1		X
3507-006	30-May-07	8.3		X
3507-001	30-May-07	8.4		X
3507-002	30-May-07	8.8		X
3507-005	30-May-07	10.8		X
3507-013	06-Jun-07	5	U	X
3507-020	06-Jun-07	5	U	X
3507-009	06-Jun-07	5.88		X
3507-007	06-Jun-07	6.2		X
3507-012	06-Jun-07	6.3		X
3507-008	06-Jun-07	6.5		X
3507-010	06-Jun-07	6.9		X
3507-011	06-Jun-07	7.3		X
3507-014	06-Jun-07	7.7		X
3507-021	07-Jun-07	5	U	X
3507-022	07-Jun-07	5	U	X
3507-023	07-Jun-07	5	U	X
3507-015	07-Jun-07	5.1	U	X
3507-017	07-Jun-07	5.2		X
3507-018	07-Jun-07	5.3		X
3507-016	07-Jun-07	6.2		X
3507-019	07-Jun-07	9.2		X
3507-003	11-Jun-07	5	U	X
3628-006	03-Aug-07	4.8	U	X
3628-001	03-Aug-07	4.9	U	X
3628-002	03-Aug-07	4.9	U	X
3628-005	03-Aug-07	5.1		X
3628-007	03-Aug-07	5.1	U	X
3628-003	03-Aug-07	6.7		X
3628-010	10-Aug-07	4.7	U	X
3628-008	10-Aug-07	4.9	U	X
3628-019	10-Aug-07	6.8		X
3628-018	10-Aug-07	7.5		X
3628-009	10-Aug-07	9.4		X
3628-011	07-Sep-07	5	U	X
3628-013	07-Sep-07	5.1	U	X
3628-016	07-Sep-07	5.1	U	X
3628-014	11-Sep-07	5	U	X
3628-015	11-Sep-07	5.1	U	X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
3680-002	24-Sep-07	5	U	X
3680-001	24-Sep-07	5.4		X
3680-004	25-Sep-07	5	U	X
3680-003	25-Sep-07	10.2		X
3680-005	25-Sep-07	15.8		X
3733-001	18-Oct-07	4.7	U	X
3733-002	18-Oct-07	4.8	U	X
3733-003	18-Oct-07	8.2		X
3680-009	18-Oct-07	20.1		X
3680-008	18-Oct-07	26		X
3733-004	29-Oct-07	4.7	U	X
3733-007	29-Oct-07	6		X
3733-008	29-Oct-07	6.6		X
3733-005	29-Oct-07	7.2		X
3733-006	29-Oct-07	8.7		X
3733-010	12-Nov-07	5.9		X
3752-001	12-Nov-07	7.68		X
3733-011	12-Nov-07	8.1		X
3733-013	13-Nov-07	5	U	X
3733-012	13-Nov-07	13.2		X
3733-014	27-Nov-07	5.4		X
3733-015	27-Nov-07	6.9		X
3733-016	27-Nov-07	9.4		X
3752-006	20-Dec-07	1.66	U	X
3752-004	20-Dec-07	2.21	U	X
3752-007	20-Dec-07	3.91	U	X
3752-002	15-Jan-08	7.07		X
3864-002	29-Apr-08	5	U	X
3864-001	29-Apr-08	5.3		X
3864-003	29-Apr-08	22.5		X
3419-004	NA	1.02	U	X
3419-005	NA	1.04	U	X
3419-020	NA	1.28	U	X
3419-009	NA	1.31	U	X
3419-018	NA	1.5	U	X
3419-017	NA	1.67	U	X
3419-010	NA	2.09	U	X
3419-021	NA	2.1	U	X
3419-011	NA	2.37	U	X
3419-007	NA	2.55		X
3419-014	NA	2.87	U	X
3377-312	NA	3.02		X
3377-311	NA	3.32		X
3377-303	NA	3.36		X
3377-302	NA	3.88		X
3419-008	NA	3.93		X
3377-319	NA	4.05		X
3377-316	NA	4.06		X
3377-314	NA	4.13		X

Table 4-41
Analytical Results for Arsenic in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Arsenic (mg/kg)	Q	Exceeds EPA RSL for Arsenic (0.39 mg/kg)
2730-031	NA	4.14	J	X
3377-306	NA	4.2		X
3377-313	NA	4.27		X
3377-315	NA	4.43		X
3419-013	NA	4.47	U	X
3419-022	NA	4.51		X
3377-309	NA	4.62		X
3377-304	NA	4.75		X
3628-012	NA	4.8	U	X
3377-310	NA	5.04		X
3377-301	NA	6.12		X
3377-318	NA	6.3		X
3419-001	NA	6.93		X
3419-002	NA	7.63		X
3377-307	NA	8.08		X
3419-015	NA	8.08		X
3419-019	NA	9.35		X
3419-006	NA	10.9		X
3377-305	NA	11.5		X
3377-308	NA	11.8		X
3419-003	NA	13.5		X
3419-012	NA	13.9		X
3377-317		14.3		X

Notes:

U=not detected.

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
2730-014	16-Aug-05	3490		
2730-015	16-Aug-05	3730		
2730-016	16-Aug-05	4010		
2730-018	16-Aug-05	5080		
2730-017	16-Aug-05	6120		
2730-010	16-Aug-05	6470		
2730-009	16-Aug-05	6700		
2730-025	20-Aug-05	784	J	
2730-022	20-Aug-05	2650	J	
2730-026	20-Aug-05	4470	J	
2730-032	23-Aug-05	4290	J	
2730-034	23-Aug-05	6110	J	
2774-008	07-Sep-05	4410	J	
2774-012	07-Sep-05	7280	J	
2774-027	07-Sep-05	7970		
2774-007	08-Sep-05	6160	J	
2774-026	10-Sep-05	1540		
2774-014	10-Sep-05	1620	J	
2774-006	10-Sep-05	1870	J	
2774-021	10-Sep-05	1880		
2774-011	10-Sep-05	2070	J	
2774-019	10-Sep-05	2340	J	
2774-023	10-Sep-05	2380		
2774-025	10-Sep-05	2820		
2774-015	10-Sep-05	3510	J	
2774-016	10-Sep-05	4080	J	
2774-005	10-Sep-05	4560	J	
2774-022	10-Sep-05	4570		
2774-028	10-Sep-05	5370		
2774-018	10-Sep-05	6590	J	
2774-020	10-Sep-05	8800	J	
2774-003	11-Sep-05	1040	J	
2774-010	11-Sep-05	1330	J	
2774-024	11-Sep-05	4930		
2788-014	12-Sep-05	1820	J	
2774-039	12-Sep-05	3610		
2774-004	12-Sep-05	3620	J	
2774-037	12-Sep-05	4460		
2774-038	12-Sep-05	4660		
2774-001	12-Sep-05	4790	J	
2774-002	12-Sep-05	6960	J	
2774-036	13-Sep-05	1270		
2788-015	13-Sep-05	2100	J	
2774-034	13-Sep-05	2390		
2788-013	13-Sep-05	4470	J	
2788-012	13-Sep-05	4550	J	
2774-030	14-Sep-05	1790		
2774-033	14-Sep-05	3030		
2774-029	14-Sep-05	4440		
2774-032	14-Sep-05	5920		
2774-035	14-Sep-05	7550		

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
2774-031	14-Sep-05	9120		
2788-002	21-Sep-05	1630	J	
2788-003	21-Sep-05	2290	J	
2788-004	21-Sep-05	2420	J	
2788-011	21-Sep-05	3690	J	
2788-016	21-Sep-05	3860	J	
2788-010	21-Sep-05	4160	J	
2788-006	21-Sep-05	4900	J	
2788-008	21-Sep-05	4960	J	
2788-005	21-Sep-05	4980	J	
2788-019	21-Sep-05	5020	J	
2788-001	21-Sep-05	5330	J	
2788-017	21-Sep-05	5830	J	
2788-018	21-Sep-05	5880	J	
2788-009	21-Sep-05	6210	J	
2788-007	21-Sep-05	6260	J	
2788-023	21-Sep-05	7460		
2788-020	22-Sep-05	4540	J	
2788-021	22-Sep-05	5050		
2788-022	22-Sep-05	5800		
2788-026	24-Sep-05	1930		
2788-024	24-Sep-05	2480		
2788-034	26-Sep-05	367		
2788-031	26-Sep-05	2330		
2788-033	26-Sep-05	2830		
2788-032	26-Sep-05	5830		
2873-014	19-Dec-05	2510		
2873-018	19-Dec-05	2740		
3333-003	04-Jan-06	893		
2938-002	02-Mar-06	273		
2938-003	02-Mar-06	1010		
2938-001	03-Mar-06	1750		
2938-011	08-Mar-06	354		
2938-012	08-Mar-06	467		
2938-008	08-Mar-06	488		
2938-009	08-Mar-06	929		
2938-006	08-Mar-06	1390		
2938-007	08-Mar-06	1930		
2938-005	08-Mar-06	4690		
2938-004	08-Mar-06	7100		
2955-017	16-Mar-06	951		
2955-014	16-Mar-06	975		
2955-009	16-Mar-06	2430		
2955-004	16-Mar-06	2550		
2955-019	16-Mar-06	2790		
2955-012	16-Mar-06	3090		
2955-011	16-Mar-06	3280		
2955-010	16-Mar-06	3320		
2955-015	16-Mar-06	3660		
2955-018	16-Mar-06	3850		
2955-013	16-Mar-06	4260		

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
2955-016	16-Mar-06	4260		
2955-005	16-Mar-06	4570		
2955-008	16-Mar-06	5310		
2955-020	17-Mar-06	1150		
2955-006	17-Mar-06	2140		
2955-002	17-Mar-06	2170		
2955-021	17-Mar-06	2520		
2955-003	17-Mar-06	2840		
2955-022	17-Mar-06	2890		
2955-001	17-Mar-06	3140		
2955-007	17-Mar-06	4470		
2955-023	20-Mar-06	981		
2955-031	21-Mar-06	565		
2955-028	21-Mar-06	999		
2955-027	21-Mar-06	1550		
2955-024	21-Mar-06	1650		
2955-025	21-Mar-06	1750		
2955-026	21-Mar-06	1890		
2955-030	21-Mar-06	2880		
2955-033	22-Mar-06	1380		
2955-036	22-Mar-06	2110		
2955-032	22-Mar-06	2160		
2955-035	22-Mar-06	2820		
2955-034	22-Mar-06	3550		
2977-002	28-Mar-06	1520	J	
2977-007	29-Mar-06	1030	J	
2977-008	29-Mar-06	1800	J	
2977-006	29-Mar-06	2140	J	
2977-003	29-Mar-06	2340	J	
2977-004	29-Mar-06	2360	J	
2977-001	29-Mar-06	2570	J	
2977-005	29-Mar-06	2930	J	
2977-015	31-Mar-06	689	J	
2977-022	31-Mar-06	804		
2977-016	31-Mar-06	1210	J	
2977-020	31-Mar-06	1440	J	
2977-011	31-Mar-06	2010	J	
2977-019	31-Mar-06	2130	J	
2977-018	31-Mar-06	2170	J	
2977-009	31-Mar-06	2180	J	
2977-013	31-Mar-06	2260	J	
2977-012	31-Mar-06	2300	J	
2977-017	31-Mar-06	2430	J	
2977-021	31-Mar-06	2870		
2977-010	31-Mar-06	3000	J	
2977-014	31-Mar-06	3030	J	
2977-024	01-Apr-06	1110		
2977-025	01-Apr-06	1910		
2977-023	01-Apr-06	2810		
2959-003	03-Apr-06	362		
2977-031	03-Apr-06	1220		

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
2977-033	03-Apr-06	2040		
2977-027	03-Apr-06	2150		
2977-028	03-Apr-06	2210		
2977-029	03-Apr-06	2310		
2977-026	03-Apr-06	2770		
2977-034	03-Apr-06	2780		
2977-032	03-Apr-06	3120		
2977-030	03-Apr-06	3310		
2977-037	05-Apr-06	994		
2977-043	05-Apr-06	1430		
2977-039	05-Apr-06	1920		
2977-040	05-Apr-06	2580		
2977-038	05-Apr-06	2680		
2977-044	05-Apr-06	2770		
2977-041	05-Apr-06	2790		
2977-036	05-Apr-06	2800		
2977-042	05-Apr-06	2810		
2977-035	05-Apr-06	2920		
2992-002	10-Apr-06	887		
2992-001	10-Apr-06	1040		
2992-004	12-Apr-06	930		
2992-005	12-Apr-06	1500		
2992-008	12-Apr-06	1970		
2992-006	12-Apr-06	2890		
2992-007	12-Apr-06	3130		
2992-003	12-Apr-06	3610		
2992-009	13-Apr-06	1150		
2992-011	18-Apr-06	1010		
2992-014	18-Apr-06	1630		
2992-012	18-Apr-06	1710		
2992-015	18-Apr-06	1880		
2992-017	18-Apr-06	2520		
2992-013	18-Apr-06	2680		
2992-019	18-Apr-06	2720		
2992-010	18-Apr-06	2730		
2992-018	18-Apr-06	2990		
2992-016	18-Apr-06	3440		
3017-002	18-Apr-06	3550	J	
3017-001	18-Apr-06	4650	J	
3017-026	22-Apr-06	345	J	
3017-010	22-Apr-06	491	J	
3017-014	22-Apr-06	742	J	
3017-011	22-Apr-06	758	J	
3017-021	22-Apr-06	1050	J	
3017-024	22-Apr-06	1460	J	
3017-013	22-Apr-06	1480	J	
3017-022	22-Apr-06	1660	J	
3017-008	22-Apr-06	2180	J	
3017-006	22-Apr-06	2560	J	
3017-019	22-Apr-06	3080	J	
3017-004	22-Apr-06	3160	J	

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
3017-015	22-Apr-06	3720	J	
3017-017	22-Apr-06	3830	J	
3017-005	22-Apr-06	4920	J	
3017-007	22-Apr-06	5150	J	
3017-003	22-Apr-06	5240	J	
3017-016	22-Apr-06	5400	J	
3017-009	22-Apr-06	5950	J	
3017-025	22-Apr-06	6040	J	
3017-012	22-Apr-06	6120	J	
3017-023	22-Apr-06	6170	J	
3017-018	22-Apr-06	6800	J	
3017-020	22-Apr-06	6880	J	
3017-027	23-Apr-06	6540	J	
3017-028	23-Apr-06	8870	J	
3017-037	26-Apr-06	393		
3017-036	26-Apr-06	677		
3017-030	26-Apr-06	729	J	
3017-039	26-Apr-06	1040		
3017-044	26-Apr-06	1170		
3022-002	26-Apr-06	1290	J	
3017-032	26-Apr-06	1380		
3017-034	26-Apr-06	1750		
3017-031	26-Apr-06	1850		
3017-035	26-Apr-06	2350		
3017-045	26-Apr-06	2370		
3017-029	26-Apr-06	2890	J	
3017-040	26-Apr-06	2890		
3017-043	26-Apr-06	2950		
3017-038	26-Apr-06	3100		
3017-033	26-Apr-06	4780		
3017-042	26-Apr-06	6830		
3017-041	26-Apr-06	6890		
3022-001	26-Apr-06	10900	J	
3022-005	05-May-06	569	J	
3022-003	05-May-06	985	J	
3022-009	05-May-06	1280	J	
3022-008	05-May-06	1410	J	
3022-006	05-May-06	1870	J	
3022-010	05-May-06	2420	J	
3022-007	05-May-06	4810	J	
3022-004	05-May-06	9480	J	
3022-012	10-May-06	959	J	
3022-014	10-May-06	1570	J	
3022-013	10-May-06	2970	J	
3022-011	10-May-06	5340	J	
3022-017	22-May-06	813	J	
3022-017-FD	22-May-06	838	J	
3022-018-FD	22-May-06	1300	J	
3022-015-FD	22-May-06	1410	J	
3022-015	22-May-06	1500	J	
3022-018	22-May-06	1550	J	

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
3022-016-FD	22-May-06	1960	J	
3022-016	22-May-06	1990	J	
3067-007	13-Jun-06	961		
3067-012	13-Jun-06	1000		
3067-010	13-Jun-06	1100		
3067-011	13-Jun-06	1130		
3067-015	13-Jun-06	1140		
3067-014	13-Jun-06	2190		
3067-016	13-Jun-06	2470		
3067-003	14-Jun-06	1060		
3067-002	14-Jun-06	1270		
3067-004	14-Jun-06	1390		
3067-006	14-Jun-06	1640		
3067-005	14-Jun-06	2680		
3053-025	14-Jun-06	3640		
3067-009	16-Jun-06	907		
3067-008	16-Jun-06	1490		
3067-013	16-Jun-06	1550		
3067-021	26-Jun-06	299		
3067-020	26-Jun-06	319		
3067-017	26-Jun-06	1410		
3067-025	26-Jun-06	1680		
3067-027	26-Jun-06	1940		
3067-023	26-Jun-06	2120		
3067-026	26-Jun-06	2390		
3067-019	26-Jun-06	2680		
3067-022	26-Jun-06	3020		
3067-024	26-Jun-06	3020		
3067-018	26-Jun-06	3500		
3067-028	26-Jun-06	3620		
3067-036	27-Jun-06	294		
3067-033	27-Jun-06	403		
3067-035	27-Jun-06	1550		
3067-034	27-Jun-06	1620		
3067-032	27-Jun-06	1970		
3067-030	27-Jun-06	2110		
3067-031	27-Jun-06	2460		
3165-006	22-Aug-06	97.3		
3165-008	22-Aug-06	261		
3165-002	22-Aug-06	1060		
3165-007	22-Aug-06	1820		
3165-005	22-Aug-06	4150		
3165-003	22-Aug-06	5480	J	
3165-016	23-Aug-06	246		
3165-010	23-Aug-06	317		
3165-017	23-Aug-06	407		
3165-015	23-Aug-06	444		
3165-009	23-Aug-06	485		
3165-012	23-Aug-06	842		
3165-014	23-Aug-06	964		
3165-011	23-Aug-06	1010		

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
3165-013	23-Aug-06	1780		
3165-018	23-Aug-06	2860		
3165-022	24-Aug-06	2620		
3165-020	24-Aug-06	2630		
3165-023	24-Aug-06	2730		
3165-021	24-Aug-06	2760	J	
3165-024	24-Aug-06	2840		
3165-026	24-Aug-06	3050		
3165-025	24-Aug-06	3160		
3165-019	24-Aug-06	3230		
3165-029-FD	25-Aug-06	532		
3165-029	25-Aug-06	679		
3165-031-FD	25-Aug-06	1920		
3165-028	25-Aug-06	2050		
3165-031	25-Aug-06	2190		
3165-027	25-Aug-06	2610		
3165-035	25-Aug-06	3550		
3165-034	25-Aug-06	3630		
3165-036	25-Aug-06	4340		
3165-032	25-Aug-06	5230		
3067-037	05-Sep-06	645		
3067-040	05-Sep-06	690		
3067-038	05-Sep-06	2000		
3067-039	05-Sep-06	2920		
3067-041	08-Sep-06	1170		
3244-001	28-Sep-06	9030		
3244-002	06-Oct-06	290		
3244-003	06-Oct-06	1120		
3244-004	06-Oct-06	1370		
3244-005	06-Oct-06	2330		
3295-008	17-Oct-06	3340		
3295-009	24-Oct-06	2980		
3295-002	08-Nov-06	150		
3295-001	08-Nov-06	838		
3295-003	08-Nov-06	2100		
3295-004	09-Nov-06	2820		
3295-005	22-Nov-06	1550		
3295-006	22-Nov-06	2620		
3295-007	27-Nov-06	2700		
3333-002	04-Jan-07	614		
3333-001	04-Jan-07	1570		
3339-013	04-Jan-07	3030		
3333-004	08-Jan-07	1650		
3333-005	08-Jan-07	2480		
3333-012	12-Jan-07	408		
3333-011	12-Jan-07	479		
3333-015	12-Jan-07	1340		
3333-007	12-Jan-07	1390		
3333-014	12-Jan-07	1760		
3333-006	12-Jan-07	2280		
3333-009	12-Jan-07	2480		

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
3333-016	12-Jan-07	2490		
3333-010	12-Jan-07	3440		
3333-008	12-Jan-07	3630		
3333-013	12-Jan-07	3730		
3372-002	29-Jan-07	361		
3372-003	29-Jan-07	623		
3372-004	01-Feb-07	291		
3372-005	01-Feb-07	993		
3372-006	01-Feb-07	1120		
3372-007	02-Feb-07	1390		
3372-013	03-Feb-07	442		
3372-008	03-Feb-07	635		
3372-011	03-Feb-07	1010		
3372-012	03-Feb-07	1230		
3372-010	03-Feb-07	1300		
3372-009	03-Feb-07	1560		
3359-009	10-Feb-07	3020	J	
3377-011	01-Mar-07	92.5		
3377-012	01-Mar-07	114		
3377-008	01-Mar-07	115		
3377-006	01-Mar-07	131		
3377-010	01-Mar-07	149		
3377-005	01-Mar-07	159		
3377-013	01-Mar-07	169		
3377-004	01-Mar-07	508		
3377-003	01-Mar-07	990		
3377-002	01-Mar-07	1670		
3377-001	01-Mar-07	3280		
3377-009	04-Mar-07	120		
3377-007	04-Mar-07	142		
3377-014	04-Mar-07	3340		
3377-017	06-Mar-07	105		
3377-018	06-Mar-07	111		
3377-019	06-Mar-07	133		
3377-016	06-Mar-07	170		
3377-015	06-Mar-07	558		
3377-021	09-Mar-07	290		
3377-022	09-Mar-07	726		
3377-030	09-Mar-07	3580		
3377-025	09-Mar-07	5400		
3377-024	09-Mar-07	5510		
3377-023	09-Mar-07	6270		
3377-033	12-Mar-07	1040		
3377-029	12-Mar-07	1240		
3377-032	12-Mar-07	1300		
3377-036	12-Mar-07	1390		
3377-031	12-Mar-07	1660		
3377-026	12-Mar-07	2490		
3377-037	12-Mar-07	8000		
3377-041	13-Mar-07	679		
3377-035	13-Mar-07	1680		

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
3377-039	13-Mar-07	3310		
3377-040	13-Mar-07	5070		
3377-042	13-Mar-07	5960		
3377-028	13-Mar-07	6030		
3377-020	13-Mar-07	7630		
3377-043	14-Mar-07	1540		
3377-034	14-Mar-07	2160		
3377-038	14-Mar-07	2750		
3377-045	14-Mar-07	3020		
3377-044	14-Mar-07	6180		
3377-046	14-Mar-07	6870		
3464-002	30-Mar-07	973		
3464-005	30-Mar-07	2450		
3464-001	30-Mar-07	3280		
3464-004	30-Mar-07	3350		
3464-006	30-Mar-07	3700		
3464-003	30-Mar-07	4410		
3464-009	02-Apr-07	1020		
3464-007	02-Apr-07	1260		
3464-008	02-Apr-07	3360		
3464-010	02-Apr-07	3960		
3464-011	11-Apr-07	3410		
3464-012	11-Apr-07	3500		
3464-014	13-Apr-07	2150		
3464-013	13-Apr-07	3430		
3464-016	24-Apr-07	2890		
3464-015	24-Apr-07	3240		
3464-020	25-Apr-07	582		
3464-019	25-Apr-07	2450		
3464-018	27-Apr-07	2830		
3464-017	27-Apr-07	4340		
3464-021	30-Apr-07	1240		
3464-022	30-Apr-07	1290		
3464-024	11-May-07	4150		
3464-023	11-May-07	4550		
3507-005	30-May-07	2490		
3507-001	30-May-07	2750	J	
3507-002	30-May-07	4300		
3507-004	30-May-07	4500		
3507-006	30-May-07	4550		
3507-020	06-Jun-07	344		
3507-014	06-Jun-07	919		
3507-009	06-Jun-07	1510		
3507-008	06-Jun-07	1700		
3507-007	06-Jun-07	1820		
3507-012	06-Jun-07	2060		
3507-011	06-Jun-07	2800	J	
3507-010	06-Jun-07	3660		
3507-013	06-Jun-07	4270		
3507-023	07-Jun-07	395		
3507-022	07-Jun-07	498		

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
3507-021	07-Jun-07	927		
3507-016	07-Jun-07	1700		
3507-017	07-Jun-07	1890		
3507-018	07-Jun-07	2700		
3507-015	07-Jun-07	3890		
3507-019	07-Jun-07	4670		
3507-003	11-Jun-07	1050		
3628-006	03-Aug-07	1040		
3628-005	03-Aug-07	1130		
3628-001	03-Aug-07	1850		
3628-007	03-Aug-07	1860		
3628-003	03-Aug-07	1940		
3628-002	03-Aug-07	2310		
3628-008	10-Aug-07	868		
3628-010	10-Aug-07	1330		
3628-019	10-Aug-07	2500		
3628-018	10-Aug-07	3210		
3628-009	10-Aug-07	3240		
3628-011	07-Sep-07	246		
3628-013	07-Sep-07	3090		
3628-016	07-Sep-07	3180		
3628-015	11-Sep-07	2590		
3628-014	11-Sep-07	2750		
3680-002	24-Sep-07	450		
3680-001	24-Sep-07	1030		
3680-004	25-Sep-07	1590		
3680-003	25-Sep-07	4980		
3680-005	25-Sep-07	6180		
3733-001	18-Oct-07	277		
3733-002	18-Oct-07	2220		
3680-008	18-Oct-07	3110		
3733-003	18-Oct-07	4210		
3680-009	18-Oct-07	4610		
3733-008	29-Oct-07	758		
3733-005	29-Oct-07	1620		
3733-007	29-Oct-07	2130		
3733-004	29-Oct-07	2320		
3733-006	29-Oct-07	2610		
3733-011	12-Nov-07	349		
3733-010	12-Nov-07	739		
3752-001	12-Nov-07	2530	J	
3733-013	13-Nov-07	384		
3733-012	13-Nov-07	3740		
3733-015	27-Nov-07	1520		
3733-016	27-Nov-07	2620		
3733-014	27-Nov-07	2830		
3752-004	20-Dec-07	124	J	
3752-007	20-Dec-07	344	J	
3752-006	20-Dec-07	764	J	
3750-004	14-Jan-08	2370	J	
3752-002	15-Jan-08	674	J	

Table 4-42
Analytical Results for Barium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Collected	Concentration - Barium (mg/kg)	Q	Exceeds EPA RSL for Arsenic (15,000 mg/kg)
3864-002	29-Apr-08	2840		
3864-001	29-Apr-08	4230	J	
3864-003	29-Apr-08	9460		
3419-022	NA	223		
3377-309	NA	269		
3377-304	NA	385		
3377-307	NA	422		
3377-313	NA	428		
3377-310	NA	663		
3377-303	NA	669		
3377-312	NA	670		
3377-319	NA	754		
3377-302	NA	1190		
3377-316	NA	1620		
3419-020	NA	1670		
3419-018	NA	1840		
3377-318	NA	1970		
3419-012	NA	1990		
3377-311	NA	2080		
3377-314	NA	2100		
3377-306	NA	2130		
3628-012	NA	2250		
3419-017	NA	2360		
3419-021	NA	2370		
3419-019	NA	2550		
3419-006	NA	2680		
3419-007	NA	2690		
3419-011	NA	2740		
3419-015	NA	2950		
3419-014	NA	3110		
3377-301	NA	3210		
3377-305	NA	3770		
3377-317	NA	3930		
2730-031	NA	3980	J	
3419-008	NA	4060		
3419-010	NA	4080		
3377-308	NA	4390		
3419-009	NA	4610		
3419-004	NA	4670		
3377-315	NA	5540		
3419-003	NA	6040		
3419-013	NA	6450		
3419-001	NA	6870		
3419-005	NA	7380		
3419-002	NA	7710		

Notes:

U=not detected.

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2730-009	16-Aug-05	0.515	UJ	
2730-010	16-Aug-05	0.511	UJ	
2730-014	16-Aug-05	0.526	UJ	
2730-015	16-Aug-05	0.529	UJ	
2730-016	16-Aug-05	0.519	UJ	
2730-017	16-Aug-05	0.508	UJ	
2730-018	16-Aug-05	1.98	J	
2730-022	20-Aug-05	0.51	UJ	
2730-025	20-Aug-05	0.512	UJ	
2730-026	20-Aug-05	0.525	UJ	
2730-031	NA	0.518	UJ	
2730-032	23-Aug-05	0.518	UJ	
2730-034	23-Aug-05	0.528	UJ	
2774-001	12-Sep-05	0.538	UJ	
2774-002	12-Sep-05	0.899	UJ	
2774-003	11-Sep-05	0.505	UJ	
2774-004	12-Sep-05	0.6	UJ	
2774-005	10-Sep-05	0.541	UJ	
2774-006	10-Sep-05	1.99	J	
2774-007	08-Sep-05	0.572	UJ	
2774-008	07-Sep-05	0.627	UJ	
2774-010	11-Sep-05	0.67	UJ	
2774-011	10-Sep-05	0.502	UJ	
2774-012	07-Sep-05	0.505	UJ	
2774-014	10-Sep-05	0.503	UJ	
2774-015	10-Sep-05	0.502	UJ	
2774-016	10-Sep-05	0.578	UJ	
2774-018	10-Sep-05	0.523	UJ	
2774-019	10-Sep-05	0.504	UJ	
2774-020	10-Sep-05	2.18	J	
2774-021	10-Sep-05	0.522	UJ	
2774-022	10-Sep-05	0.519	UJ	
2774-023	10-Sep-05	0.52	UJ	
2774-024	11-Sep-05	0.509	UJ	
2774-025	10-Sep-05	0.517	UJ	
2774-026	10-Sep-05	0.537	UJ	
2774-027	07-Sep-05	0.523	UJ	
2774-028	10-Sep-05	1.8	J	
2774-029	14-Sep-05	0.525	UJ	
2774-030	14-Sep-05	1.04	UJ	
2774-031	14-Sep-05	0.505	UJ	
2774-032	14-Sep-05	0.53	UJ	
2774-033	14-Sep-05	0.586	UJ	
2774-034	13-Sep-05	0.515	UJ	
2774-035	14-Sep-05	0.507	UJ	
2774-036	13-Sep-05	0.511	UJ	
2774-037	12-Sep-05	0.511	UJ	
2774-038	12-Sep-05	0.517	UJ	
2774-039	12-Sep-05	0.52	UJ	
2788-001	21-Sep-05	5.21		
2788-002	21-Sep-05	0.723	U	

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2788-003	21-Sep-05	1.01	J	
2788-004	21-Sep-05	0.525	U	
2788-005	21-Sep-05	0.742	U	
2788-006	21-Sep-05	0.559	U	
2788-007	21-Sep-05	0.564	U	
2788-008	21-Sep-05	1.01	J	
2788-009	21-Sep-05	1.54	J	
2788-010	21-Sep-05	0.552	U	
2788-011	21-Sep-05	0.516	U	
2788-012	13-Sep-05	0.52	U	
2788-013	13-Sep-05	0.518	U	
2788-014	12-Sep-05	0.511	U	
2788-015	13-Sep-05	1.92	J	
2788-016	21-Sep-05	1.01	J	
2788-017	21-Sep-05	1.1	J	
2788-018	21-Sep-05	1.51	J	
2788-019	21-Sep-05	1.28	J	
2788-020	22-Sep-05	2.89	J	
2788-021	22-Sep-05	1.31		
2788-022	22-Sep-05	0.671	U	
2788-023	21-Sep-05	0.548	U	
2788-024	24-Sep-05	0.521	U	
2788-026	24-Sep-05	0.524	U	
2788-031	26-Sep-05	0.514	U	
2788-032	26-Sep-05	0.907	U	
2788-033	26-Sep-05	0.686	U	
2788-034	26-Sep-05	0.518	U	
2873-014	19-Dec-05	3.63		
2873-018	19-Dec-05	1	U	
2938-001	03-Mar-06	0.565		
2938-002	02-Mar-06	0.506	U	
2938-003	02-Mar-06	0.513	U	
2938-004	08-Mar-06	2.23		
2938-005	08-Mar-06	1.79		
2938-006	08-Mar-06	0.719		
2938-007	08-Mar-06	3.72		
2938-008	08-Mar-06	22.2		
2938-009	08-Mar-06	1.81		
2938-011	08-Mar-06	0.509	U	
2938-012	08-Mar-06	0.507	U	
2955-001	17-Mar-06	1	U	
2955-002	17-Mar-06	1	U	
2955-003	17-Mar-06	1.2		
2955-004	16-Mar-06	1.14		
2955-005	16-Mar-06	1	U	
2955-006	17-Mar-06	1	U	
2955-007	17-Mar-06	1	U	
2955-008	16-Mar-06	1	U	
2955-009	16-Mar-06	1	U	
2955-010	16-Mar-06	1	U	
2955-011	16-Mar-06	1.08		

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2955-012	16-Mar-06	2.59		
2955-013	16-Mar-06	1	U	
2955-014	16-Mar-06	1	U	
2955-015	16-Mar-06	1	U	
2955-016	16-Mar-06	1	U	
2955-017	16-Mar-06	1	U	
2955-018	16-Mar-06	1	U	
2955-019	16-Mar-06	2.52		
2955-020	17-Mar-06	1	U	
2955-021	17-Mar-06	1	U	
2955-022	17-Mar-06	1	U	
2955-023	20-Mar-06	2.25		
2955-024	21-Mar-06	1		
2955-025	21-Mar-06	1	U	
2955-026	21-Mar-06	4.48		
2955-027	21-Mar-06	1	U	
2955-028	21-Mar-06	1	U	
2955-030	21-Mar-06	1	U	
2955-031	21-Mar-06	1	U	
2955-032	22-Mar-06	1.52		
2955-033	22-Mar-06	3.91		
2955-034	22-Mar-06	1.1		
2955-035	22-Mar-06	1	U	
2955-036	22-Mar-06	1	U	
2959-003	03-Apr-06	3.63		
2977-001	29-Mar-06	4.83		
2977-002	28-Mar-06	1	U	
2977-003	29-Mar-06	1	U	
2977-004	29-Mar-06	1	U	
2977-005	29-Mar-06	1	U	
2977-006	29-Mar-06	1	U	
2977-007	29-Mar-06	1.02		
2977-008	29-Mar-06	1	U	
2977-009	31-Mar-06	1	U	
2977-010	31-Mar-06	1	U	
2977-011	31-Mar-06	1	U	
2977-012	31-Mar-06	1.31		
2977-013	31-Mar-06	1	U	
2977-014	31-Mar-06	1	U	
2977-015	31-Mar-06	1	U	
2977-016	31-Mar-06	8.54		
2977-017	31-Mar-06	1	U	
2977-018	31-Mar-06	2.19		
2977-019	31-Mar-06	1	U	
2977-020	31-Mar-06	2.15		
2977-021	31-Mar-06	1	U	
2977-022	31-Mar-06	1	U	
2977-023	01-Apr-06	1	U	
2977-024	01-Apr-06	1	U	
2977-025	01-Apr-06	21.8		
2977-026	03-Apr-06	1	U	

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
2977-027	03-Apr-06	1	U	
2977-028	03-Apr-06	1	U	
2977-029	03-Apr-06	1	U	
2977-030	03-Apr-06	1	U	
2977-031	03-Apr-06	1	U	
2977-032	03-Apr-06	1	U	
2977-033	03-Apr-06	1	U	
2977-034	03-Apr-06	1	U	
2977-035	05-Apr-06	1	U	
2977-036	05-Apr-06	1	U	
2977-037	05-Apr-06	1	U	
2977-038	05-Apr-06	1	U	
2977-039	05-Apr-06	1	U	
2977-040	05-Apr-06	1	U	
2977-041	05-Apr-06	1	UJ	
2977-042	05-Apr-06	1	UJ	
2977-043	05-Apr-06	1	UJ	
2977-044	05-Apr-06	1	UJ	
2992-001	10-Apr-06	1.32		
2992-002	10-Apr-06	1.83		
2992-003	12-Apr-06	2.72		
2992-004	12-Apr-06	1.95		
2992-005	12-Apr-06	1.8		
2992-006	12-Apr-06	1.88		
2992-007	12-Apr-06	3.15		
2992-008	12-Apr-06	2.4		
2992-009	13-Apr-06	1.57		
2992-010	18-Apr-06	3.32		
2992-011	18-Apr-06	6.18		
2992-012	18-Apr-06	1.78		
2992-013	18-Apr-06	1.81		
2992-014	18-Apr-06	5.48		
2992-015	18-Apr-06	1.85		
2992-016	18-Apr-06	2.88		
2992-017	18-Apr-06	8.43		
2992-018	18-Apr-06	1.1		
2992-019	18-Apr-06	2.03		
3017-001	18-Apr-06	2.7		
3017-002	18-Apr-06	3.03	U	
3017-003	22-Apr-06	0.789	U	
3017-004	22-Apr-06	0.974		
3017-005	22-Apr-06	2.79		
3017-006	22-Apr-06	0.785	U	
3017-007	22-Apr-06	2.33		
3017-008	22-Apr-06	14.9		
3017-009	22-Apr-06	0.504	U	
3017-010	22-Apr-06	0.521	U	
3017-011	22-Apr-06	0.525	U	
3017-012	22-Apr-06	0.605	U	
3017-013	22-Apr-06	0.784	U	
3017-014	22-Apr-06	0.515	U	

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3017-015	22-Apr-06	1.25		
3017-016	22-Apr-06	1.57		
3017-017	22-Apr-06	1.33		
3017-018	22-Apr-06	0.506	U	
3017-019	22-Apr-06	17.2		
3017-020	22-Apr-06	1.16		
3017-021	22-Apr-06	0.513	U	
3017-022	22-Apr-06	0.518	U	
3017-023	22-Apr-06	0.545		
3017-024	22-Apr-06	0.516	U	
3017-025	22-Apr-06	2.12		
3017-026	22-Apr-06	4.28		
3017-027	23-Apr-06	1.43		
3017-028	23-Apr-06	0.502	U	
3017-029	26-Apr-06	0.533		
3017-030	26-Apr-06	0.536	U	
3017-031	26-Apr-06	0.666		
3017-032	26-Apr-06	0.511	U	
3017-033	26-Apr-06	0.602		
3017-034	26-Apr-06	0.78		
3017-035	26-Apr-06	0.789		
3017-036	26-Apr-06	0.512	U	
3017-037	26-Apr-06	0.509	U	
3017-038	26-Apr-06	6.81		
3017-039	26-Apr-06	0.727	U	
3017-040	26-Apr-06	0.51	U	
3017-041	26-Apr-06	1.02		
3017-042	26-Apr-06	1.12		
3017-043	26-Apr-06	0.513	U	
3017-044	26-Apr-06	0.513	U	
3017-045	26-Apr-06	0.797		
3022-001	26-Apr-06	0.501	U	
3022-002	26-Apr-06	7.16		
3022-003	05-May-06	0.51	U	
3022-004	05-May-06	0.81	U	
3022-005	05-May-06	0.51	U	
3022-006	05-May-06	0.611	U	
3022-007	05-May-06	5.28		
3022-008	05-May-06	1.01		
3022-009	05-May-06	3.21		
3022-010	05-May-06	0.774	U	
3022-011	10-May-06	0.505	U	
3022-012	10-May-06	0.503	U	
3022-013	10-May-06	1.55		
3022-014	10-May-06	0.716	U	
3022-015	22-May-06	0.572		
3022-015-FD	22-May-06	0.587		
3022-016	22-May-06	0.579		
3022-016-FD	22-May-06	0.58		
3022-017	22-May-06	0.509	U	
3022-017-FD	22-May-06	0.508	U	

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3022-018	22-May-06	5.75		
3022-018-FD	22-May-06	12		
3053-025	14-Jun-06	3.94		
3067-002	14-Jun-06	2.44		
3067-003	14-Jun-06	3.09		
3067-004	14-Jun-06	4.19		
3067-005	14-Jun-06	4.39		
3067-006	14-Jun-06	2.92		
3067-007	13-Jun-06	2.66		
3067-008	16-Jun-06	2.24		
3067-009	16-Jun-06	2.81		
3067-010	13-Jun-06	2.56		
3067-011	13-Jun-06	2.35		
3067-012	13-Jun-06	7.54		
3067-013	16-Jun-06	4.13		
3067-014	13-Jun-06	2.75		
3067-015	13-Jun-06	4.05		
3067-016	13-Jun-06	2.3		
3067-017	26-Jun-06	3.45		
3067-018	26-Jun-06	3.83		
3067-019	26-Jun-06	4		
3067-020	26-Jun-06	2.35		
3067-021	26-Jun-06	2.24		
3067-022	26-Jun-06	3.74		
3067-023	26-Jun-06	3.14		
3067-024	26-Jun-06	7.03		
3067-025	26-Jun-06	3.29		
3067-026	26-Jun-06	2.99		
3067-027	26-Jun-06	3.89		
3067-028	26-Jun-06	3.56		
3067-030	27-Jun-06	17.4		
3067-031	27-Jun-06	3.28		
3067-032	27-Jun-06	3.93		
3067-033	27-Jun-06	2.57		
3067-034	27-Jun-06	4.01		
3067-035	27-Jun-06	2.2		
3067-036	27-Jun-06	6.17		
3067-037	05-Sep-06	6.88		
3067-038	05-Sep-06	8.27		
3067-039	05-Sep-06	5.84		
3067-040	05-Sep-06	6.14		
3067-041	08-Sep-06	5.43		
3165-002	22-Aug-06	5.74		
3165-003	22-Aug-06	9.25	J	
3165-005	22-Aug-06	3.48		
3165-006	22-Aug-06	1.26		
3165-007	22-Aug-06	4.7		
3165-008	22-Aug-06	3.36		
3165-009	23-Aug-06	2.27		
3165-010	23-Aug-06	6.29		
3165-011	23-Aug-06	5.85		

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3165-012	23-Aug-06	3.32		
3165-013	23-Aug-06	11.6		
3165-014	23-Aug-06	1	U	
3165-015	23-Aug-06	7.21		
3165-016	23-Aug-06	4.05		
3165-017	23-Aug-06	9.98		
3165-018	23-Aug-06	6.09		
3165-019	24-Aug-06	7.82		
3165-020	24-Aug-06	5.37		
3165-021	24-Aug-06	4.6		
3165-022	24-Aug-06	8.11		
3165-023	24-Aug-06	10.8		
3165-024	24-Aug-06	9.3		
3165-025	24-Aug-06	9.55		
3165-026	24-Aug-06	11.5		
3165-027	25-Aug-06	7.43		
3165-028	25-Aug-06	5.79		
3165-029	25-Aug-06	3.16		
3165-029-FD	25-Aug-06	2.8		
3165-031	25-Aug-06	5.1		
3165-031-FD	25-Aug-06	4.57		
3165-032	25-Aug-06	12.1		
3165-034	25-Aug-06	11.2		
3165-035	25-Aug-06	9.86		
3165-036	25-Aug-06	11.9		
3244-001	28-Sep-06	1.52		
3244-002	06-Oct-06	0.508	U	
3244-003	06-Oct-06	1.58		
3244-004	06-Oct-06	0.527	U	
3244-005	06-Oct-06	0.516	U	
3295-001	08-Nov-06	6.64		
3295-002	08-Nov-06	2.18		
3295-003	08-Nov-06	6.88		
3295-004	09-Nov-06	4.98		
3295-005	22-Nov-06	5.01		
3295-006	22-Nov-06	8.03		
3295-007	27-Nov-06	11.4		
3295-008	17-Oct-06	6		
3295-009	24-Oct-06	7.9		
3333-001	04-Jan-07	3.9		
3333-002	04-Jan-07	3.4		
3333-003	04-Jan-06	5.3		
3333-004	08-Jan-07	2.8		
3333-005	08-Jan-07	5		
3333-006	12-Jan-07	5.7		
3333-007	12-Jan-07	4.2		
3333-008	12-Jan-07	5.5		
3333-009	12-Jan-07	5.9		
3333-010	12-Jan-07	7.1		
3333-011	12-Jan-07	4.7		
3333-012	12-Jan-07	4.1		

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3333-013	12-Jan-07	8		
3333-014	12-Jan-07	4.2		
3333-015	12-Jan-07	4.8		
3333-016	12-Jan-07	6.8		
3339-013	04-Jan-07	3.6		
3359-009	10-Feb-07	0.54	J	
3372-002	29-Jan-07	3.9		
3372-003	29-Jan-07	3.5		
3372-004	01-Feb-07	3.4		
3372-005	01-Feb-07	2.9		
3372-006	01-Feb-07	3.3		
3372-007	02-Feb-07	5.2		
3372-008	03-Feb-07	3.3		
3372-009	03-Feb-07	3.6		
3372-010	03-Feb-07	8.5		
3372-011	03-Feb-07	3.3		
3372-012	03-Feb-07	3.3		
3372-013	03-Feb-07	4.4		
3377-001	01-Mar-07	0.526	UJ	
3377-002	01-Mar-07	0.621	UJ	
3377-003	01-Mar-07	0.6	UJ	
3377-004	01-Mar-07	0.611	UJ	
3377-005	01-Mar-07	0.565	UJ	
3377-006	01-Mar-07	0.553	UJ	
3377-007	04-Mar-07	0.599	UJ	
3377-008	01-Mar-07	0.688	UJ	
3377-009	04-Mar-07	0.564	UJ	
3377-010	01-Mar-07	0.519	UJ	
3377-011	01-Mar-07	0.54	UJ	
3377-012	01-Mar-07	0.427	UJ	
3377-013	01-Mar-07	0.556	UJ	
3377-014	04-Mar-07	0.58	UJ	
3377-015	06-Mar-07	27.4		
3377-016	06-Mar-07	0.61	UJ	
3377-017	06-Mar-07	0.556	UJ	
3377-018	06-Mar-07	0.498	UJ	
3377-019	06-Mar-07	0.583	UJ	
3377-020	13-Mar-07	0.504	UJ	
3377-021	09-Mar-07	0.508	UJ	
3377-022	09-Mar-07	0.483	UJ	
3377-023	09-Mar-07	1.67		
3377-024	09-Mar-07	0.648	UJ	
3377-025	09-Mar-07	2.44		
3377-026	12-Mar-07	0.624	UJ	
3377-028	13-Mar-07	6.88		
3377-029	12-Mar-07	0.49	UJ	
3377-030	09-Mar-07	2.87		
3377-031	12-Mar-07	0.493	UJ	
3377-032	12-Mar-07	0.485	UJ	
3377-033	12-Mar-07	0.462	UJ	
3377-034	14-Mar-07	2.06		

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3377-035	13-Mar-07	0.537	UJ	
3377-036	12-Mar-07	0.944	J	
3377-037	12-Mar-07	0.46	UJ	
3377-038	14-Mar-07	0.47	UJ	
3377-039	13-Mar-07	0.477	UJ	
3377-040	13-Mar-07	0.503	UJ	
3377-041	13-Mar-07	0.498	UJ	
3377-042	13-Mar-07	0.89	J	
3377-043	14-Mar-07	0.498	UJ	
3377-044	14-Mar-07	0.498	UJ	
3377-045	14-Mar-07	0.666	J	
3377-046	14-Mar-07	12	J	
3377-301	NA	0.583	J	
3377-302	NA	0.486	U	
3377-303	NA	0.755		
3377-304	NA	0.583	J	
3377-305	NA	1.26		
3377-306	NA	0.625	J	
3377-307	NA	0.487	U	
3377-308	NA	1.46		
3377-309	NA	0.518	U	
3377-310	NA	0.518	U	
3377-311	NA	1.12		
3377-312	NA	0.755	U	
3377-313	NA	0.498	U	
3377-314	NA	0.509	U	
3377-315	NA	5.34		
3377-316	NA	0.567	J	
3377-317	NA	0.494	U	
3377-318	NA	0.504	U	
3377-319	NA	0.553	J	
3419-001	NA	0.579	UJ	
3419-002	NA	0.583	UJ	
3419-003	NA	0.766	UJ	
3419-004	NA	1.79		
3419-005	NA	6.31		
3419-006	NA	0.619	J	
3419-007	NA	1.41		
3419-008	NA	1.79		
3419-009	NA	0.933		
3419-010	NA	0.907	J	
3419-011	NA	0.831	UJ	
3419-012	NA	0.665	UJ	
3419-013	NA	0.651	UJ	
3419-014	NA	0.519	UJ	
3419-015	NA	0.513	UJ	
3419-017	NA	0.678	UJ	
3419-018	NA	0.507	UJ	
3419-019	NA	0.704	J	
3419-020	NA	0.51	UJ	
3419-021	NA	1.79	J	

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3419-022	NA	0.506	U	
3464-001	30-Mar-07	2.2		
3464-002	30-Mar-07	3		
3464-003	30-Mar-07	2.4		
3464-004	30-Mar-07	4.2		
3464-005	30-Mar-07	1.7		
3464-006	30-Mar-07	2.7		
3464-007	02-Apr-07	1	U	
3464-008	02-Apr-07	2.7		
3464-009	02-Apr-07	1.7		
3464-010	02-Apr-07	3.7		
3464-011	11-Apr-07	1.7		
3464-012	11-Apr-07	1.9		
3464-013	13-Apr-07	1		
3464-014	13-Apr-07	1		
3464-015	24-Apr-07	2		
3464-016	24-Apr-07	2.03		
3464-017	27-Apr-07	1.78		
3464-018	27-Apr-07	1	U	
3464-019	25-Apr-07	1.8		
3464-020	25-Apr-07	1.6		
3464-021	30-Apr-07	1	U	
3464-022	30-Apr-07	1	U	
3464-023	11-May-07	1.6		
3464-024	11-May-07	2.2		
3507-001	30-May-07	1.3		
3507-002	30-May-07	1.3		
3507-003	11-Jun-07	1	U	
3507-004	30-May-07	1	U	
3507-005	30-May-07	1	U	
3507-006	30-May-07	1.5		
3507-007	06-Jun-07	1	U	
3507-008	06-Jun-07	1	U	
3507-009	06-Jun-07	1	U	
3507-010	06-Jun-07	1	U	
3507-011	06-Jun-07	1	U	
3507-012	06-Jun-07	1	U	
3507-013	06-Jun-07	1.1		
3507-014	06-Jun-07	8.8		
3507-015	07-Jun-07	1	U	
3507-016	07-Jun-07	1	U	
3507-017	07-Jun-07	1	U	
3507-018	07-Jun-07	1	U	
3507-019	07-Jun-07	1	U	
3507-020	06-Jun-07	1	U	
3507-021	07-Jun-07	1	U	
3507-022	07-Jun-07	1	U	
3507-023	07-Jun-07	1	U	
3628-001	03-Aug-07	1	U	
3628-002	03-Aug-07	1	U	
3628-003	03-Aug-07	1	U	

Table 4-43
Analytical Results for Cadmium in Area-Wide Residential Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date_Collected	Concentration - Cadmium (mg/kg)	Q	Exceeds EPA RSL for Cadmium (70 mg/kg)
3628-005	03-Aug-07	0.9	U	
3628-006	03-Aug-07	1	U	
3628-007	03-Aug-07	1	U	
3628-008	10-Aug-07	1	U	
3628-009	10-Aug-07	1.2		
3628-013	07-Sep-07	1	U	
3628-014	11-Sep-07	1	U	
3628-015	11-Sep-07	1		
3628-016	07-Sep-07	1	U	
3628-018	10-Aug-07	2.1		
3628-019	10-Aug-07	2.2		
3628-010	10-Aug-07	2.4		
3628-011	07-Sep-07	1	U	
3628-012	NA	1	U	
3680-001	24-Sep-07	1	U	
3680-002	24-Sep-07	1	U	
3680-003	25-Sep-07	1	U	
3680-004	25-Sep-07	1	U	
3680-005	25-Sep-07	1		
3680-008	18-Oct-07	1.7		
3680-009	18-Oct-07	1	U	
3733-002	18-Oct-07	2.5		
3733-003	18-Oct-07	5.1		
3733-004	29-Oct-07	3.1		
3733-005	29-Oct-07	4.4		
3733-006	29-Oct-07	4.9		
3733-007	29-Oct-07	4.3		
3733-008	29-Oct-07	3.2		
3733-001	18-Oct-07	2		
3733-010	12-Nov-07	2.8		
3733-011	12-Nov-07	5.4		
3733-012	13-Nov-07	6.4		
3733-013	13-Nov-07	2		
3733-014	27-Nov-07	2.5		
3733-015	27-Nov-07	3.7		
3733-016	27-Nov-07	5.6		
3750-004	14-Jan-08	0.956	J	
3752-001	12-Nov-07	0.603	U	
3752-002	15-Jan-08	0.515	U	
3752-004	20-Dec-07	0.505	U	
3752-006	20-Dec-07	1.63		
3752-007	20-Dec-07	0.513	U	
3864-001	29-Apr-08	1	U	
3864-002	29-Apr-08	1	U	
3864-003	29-Apr-08	3.8		

Notes:

U=not detected.

J=Analyte present. Reported value may be estimated.

NA=Not Available.

Table 4-44
Analytical Results for Lead in Mine Waste Soil – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Quad No.	Date Collected	Concentration - Lead (mg/kg)	Exceeds EPA RSL for Lead (400 mg/kg)	Exceeds EPA Region 7 Time Critical Concentration for Lead (1200 mg/kg)	Exceeds Background Concentrations for Lead
20177.1	S-1	8/10/2004	851	X		X
20187	S-1	8/19/2005	946	X		X
20174.1	S-1	8/20/2005	528			
20248.1	S-1	9/8/2005	3097			
20249	S-1	9/8/2005	1810	X	X	X
20201.1	S-1	9/9/2005	986	X		X
20203.1	S-1	9/13/2005	1240	X		X
20203.2	S-2	9/13/2005	2573	X		X
20217.1	S-1	8/19/2005	796	X		X
20170.1	S-1	8/20/2005	1377	X		X
20189.1	S-1	8/20/2005	3020	X		X
20159.1	S-1	8/20/2005	891	X		X
20199.1	S-1	9/12/2005	1293	X	X	X
20259.1	S-1	9/13/2005	2617	X		X
70	S1	6/15/2005	1178	X		X
71	S2	6/15/2005	1651	X		X
97	S1	6/17/2005	234			
874	S1	7/1/2005	236	X		X
875	S2	7/1/2005	509	X		X
876	S3	7/1/2005	555	X		X
877	S4	7/1/2005	2647	X		X
878	S5	7/1/2005	335		X	X
1704	S6	7/1/2005	931	X		X
1705	S7	7/1/2005	602	X		X
1706	S8	7/1/2005	410	X		X
20247.1	S-1	9/8/2005	3343	X		X
20247.2	S-2	9/8/2005	1500	X		X

Table 4-45
Analytical Results for Lead in Wipe Samples– Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	B&V Sample No.	Composite Description	Date Collected	Lead Concentration (ug/cm2)	Q	Site
201	23264	IWGPLZZ-23264	Living Room	07/21/2008	0.005	U	Old Mines
202		ZWGPLZZ-23264	Dining Room	07/21/2008	0.005	U	
203		JWGPLZZ-23264	Bedroom	07/21/2008	0.005	U	
207	510	IWGPLZZ-510	Living Room	07/15/2008	0.005	U	Old Mines
208		ZWGPLZZ-510	Kitchen Window Sill	07/15/2008	0.006		
209		HWGPLZZ-510	Hallway	07/15/2008	0.005	U	
216	69	HWGPLZZ-69	Laundry Room	07/23/2008	0.005	U	Old Mines
217		IWGPLZZ-69	Living Room	07/23/2008	0.005	U	
218		JWGPLZZ-69	Bedroom	07/23/2008	0.005	U	
231	30079	IWGPLZZ-30079	Living Room	07/28/2008	0.005	U	Old Mines
232		ZWGPLZZ-30079	Kitchen	07/28/2008	0.005	U	
233		JWGPLZZ-30079	Bedroom	07/28/2008	0.005	U	
246	30965	IWGPLZZ-30965	Living Room	07/30/2008	0.005	U	Old Mines
247		ZWGPLZZ-30965	Kitchen	07/30/2008	0.005	U	
248		JWGPLZZ-30965	Bedroom	07/30/2008	0.005	U	
249	30448	IWGPLZZ-30448	Living Room	07/31/2008	0.005	U	Old Mines
250		ZWGPLZZ-30448	Kitchen	07/31/2008	0.005	U	
251		JWGPLZZ-30448	Bedroom	07/31/2008	0.005	U	
255	31016	IWGPLZZ-31016	Living Room	08/07/2008	0.005	U	Old Mines
256		ZWGPLZZ-31016	Kitchen	08/07/2008	0.005	U	
257		JWGPLZZ-31016	Bedroom	08/07/2008	0.005	U	
273	30914	IWGPLZZ-30914	Living Room	08/15/2008	0.78		Old Mines
274		ZWGPLZZ-30914	Kitchen	08/15/2008	0.084		
275		JWGPLZZ-30914	Bedroom	08/15/2008	0.066		
276	30553	IWGPLZZ-30553	Living Room	08/13/2008	0.149		Old Mines
277		ZWGPLZZ-30553	Kitchen	08/13/2008	0.111		

Table 4-45
Analytical Results for Lead in Wipe Samples– Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	B&V Sample No.	Composite Description	Date Collected	Lead Concentration (ug/cm2)	Q	Site
278		JWGPLZZ-30553	Bedroom	08/13/2008	0.111		
279	30911	IWGPLZZ-30911	Living Room	08/13/2008	0.141		Old Mines
280		ZWGPLZZ-30911	Kitchen	08/13/2008	0.034		
281		JWGPLZZ-30911	Bedroom	08/13/2008	0.011		
285	30651	IWGPLZZ-30651	Living Room	08/14/2008	0.005	U	Old Mines
286		ZWGPLZZ-30651	Kitchen	08/14/2008	0.031		
287		JWGPLZZ-30651	Bedroom	08/14/2008	0.005	U	
294	30417	IWGPLZZ-30417	Living Room	08/19/2008	0.005	U	Old Mines
295		ZWGPLZZ-30417	Kitchen	08/19/2008	0.005	U	
296		JWGPLZZ-30417	Bedroom	08/19/2008	0.005	U	
303	30177	IWGPLZZ-30177	Living Room	08/21/2008	0.005	U	Old Mines
304		ZWGPLZZ-30177	Kitchen	08/21/2008	0.005	U	
305		JWGPLZZ-30177	Bedroom	08/21/2008	0.005	U	
306	30364	IWGPLZZ-30364	Living Room	08/21/2008	0.005	U	Old Mines
307		ZWGPLZZ-30364	Kitchen	08/21/2008	0.005	U	
308		JWGPLZZ-30364	Bedroom	08/21/2008	0.005	U	
312	5012	IWGPLZZ-5012	Living Room	08/21/2008	0.005	U	Old Mines
313		ZWGPLZZ-5012	Kitchen	08/21/2008	0.005	U	
314		JWGPLZZ-5012	Bedroom	08/21/2008	0.005	U	
315	30172	IWGPLZZ-30172	Living Room	08/21/2008	0.005	U	Old Mines
316		ZWGPLZZ-30172	Kitchen	08/21/2008	0.005	U	
317		JWGPLZZ-30172	Bedroom	08/21/2008	0.005	U	
318	30126	IWGPLZZ-30126	Living Room	08/25/2008	0.005	U	Old Mines
319		ZWGPLZZ-30126	Kitchen	08/25/2008	0.005	U	
320		JWGPLZZ-30126	Bedroom	08/25/2008	0.005	U	

Table 4-45
Analytical Results for Lead in Wipe Samples– Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	B&V Sample No.	Composite Description	Date Collected	Lead Concentration (ug/cm2)	Q	Site
321	30577	IWGPLZZ-30577	Living Room	08/25/2008	0.011	U	Old Mines
322		ZWGPLZZ-30577	Kitchen	08/25/2008	0.005	U	
323		JWGPLZZ-30577	Bedroom	08/25/2008	0.005	U	
327	30271	IWGPLZZ-30271	Living Room	08/26/2008	0.005	U	Old Mines
328		ZWGPLZZ-30271	Dining Room	08/26/2008	0.005	U	
329		JWGPLZZ-30271	Bedroom	08/26/2008	0.005	U	
330	1643	IWGPLZZ-1643	Living Room	08/27/2008	0.005	U	Old Mines
331		ZWGPLZZ-1643	Kitchen	08/27/2008	0.005	U	
332		JWGPLZZ-1643	Bedroom	08/27/2008	0.005	U	
339	5014	IWGPLZZ-5014	Living Room	08/29/2008	0.005	U	Old Mines
340		ZWGPLZZ-5014	Kitchen	08/29/2008	0.005	U	
341		JWGPLZZ-5014	Bedroom	08/29/2008	0.011	U	
342	20171	IWGPLZZ-20171	Living Room	08/29/2008	0.005	U	Old Mines
343		ZWGPLZZ-20171	Kitchen	08/29/2008	0.005	U	
344		JWGPLZZ-20171	Bedroom	08/29/2008	0.005	U	
345	20173	ZWGPLZZ-20173	Kitchen	08/29/2008	0.005	U	Old Mines
346		IWGPLZZ-20173	Living Room	08/29/2008	0.005	U	
347		JWGPLZZ-20173	Bedroom	08/29/2008	0.005	U	
348	20187	IWGPLZZ-20187	Living Room	09/03/2008	0.005	U	Old Mines
349		ZWGPLZZ-20187	Kitchen	09/03/2008	0.005	U	
350		JWGPLZZ-20187	Bedroom	09/03/2008	0.005	U	

Notes:
U=not detected
J=Analyte present. Reported value may be estimated.

Minimum Concentration ND
Maximum Concentration 0.780

Table 4-46
Analytical Results for Lead in Vacuum Samples– Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Lab ID	Property	BV Sample No.	Composite Sample Description	Date Collected	Lead Concentration (mg/kg)	Q	Site
106	69	ZDCPLZZ-69	Family room, living room and bedroom floors	07/23/2008	94.6		Old Mines
138	5012	MDCPLZZ-5012	Living room, kitchen and bedroom floors	08/21/2008	51.6		Old Mines
147	5014	MDCPLZZ-5014	Family room, kitchen and bedroom floors	08/29/2008	159		Old Mines
149	20173	MDCPLZZ-20173	Living room, kitchen and bedroom floors	08/29/2008	23.3		Old Mines
150	20187	MDCPLZZ-20187	Living room, kitchen and bedroom floors	09/03/2008	20.7		Old Mines
112	30079	MDCPLZZ-30079	Living room, kitchen and bedroom floors	07/28/2008	64.7		Old Mines
140	30126	MDCPLZZ-30126	Living room, kitchen and bedroom floors	08/25/2008	152		Old Mines
139	30172	MDCPLZZ-30172	Living room, kitchen and bedroom floors	08/21/2008	80.2		Old Mines
135	30177	MDGPLZZ-30177	Living room, dining room, and bedroom floors	08/21/2008	113		Old Mines
143	30271	MDCPLZZ-30271	Family room, dining room, and bedroom floors	08/26/2008	9.7		Old Mines
136	30364	MDCPLZZ-30364	Living room, kitchen and bedroom floors	08/21/2008	78.2		Old Mines
132	30417	MDCPLZZ-30417	Living room, kitchen and bedroom floors	08/19/2008	125		Old Mines
117	30448	MDCPLZZ-30448	Living room, kitchen and bedroom floors	07/31/2008	107	J	Old Mines
126	30553	MDCPLZZ-30553	Living room, kitchen and bedroom floors	08/13/2008	276		Old Mines
141	30577	MDCPLZZ-30577	Living room, kitchen and bedroom floors	08/25/2008	179		Old Mines
129	30651	MDGPLZZ-30651	Living room, kitchen and bedroom floors	08/14/2008	334		Old Mines
127	30911	MDCPLZZ-30911	Living room, kitchen and bedroom floors	08/13/2008	13.8		Old Mines
125	30914	MDCPLZZ-30914	Living room, kitchen and bedroom floors	08/15/2008	356		Old Mines
116	30965	MDCPLZZ-30965	Living room, kitchen and bedroom floors	07/30/2008	40		Old Mines
119	31016	MDCPLZZ-31016	Family room, dining room, and bedroom floors	08/07/2008	105		Old Mines
				Minimum Concentration	9.7		
				Maximum Concentration	356		

Notes:
J=Analyte present. Reported value may be estimated.

Table 4-47
Analytical Results for Lead in Potable (Residential) Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	BV Sample No.	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)	Site
69	ZPGPLZZ-69	7/23/2008	8.8		Old Mines
5014	ZPGPLZZ-5014	8/29/2008	1.0		Old Mines
30079	ZPGPLZZ-30079	7/28/2008	1.3		Old Mines
30448	ZPGPLZZ-30448	7/31/2008	19.5	X	Old Mines
30553	ZPGPLZZ-30553	8/13/2008	1		Old Mines
30914	ZPGPLZZ-30914	8/15/2008	12.4		Old Mines
30965	ZPGPLZZ-30965	7/30/2008	1.0		Old Mines
31016	ZPGPLZZ-31016	8/7/2008	12.8		Old Mines

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
2882-114	05-Jan-06	1	
2882-117	05-Jan-06	1	
2882-119	05-Jan-06	1	
2882-122	05-Jan-06	1	
2882-124	05-Jan-06	1	
2882-125	05-Jan-06	1	
2882-113	05-Jan-06	1.04	
2882-120	05-Jan-06	1.36	
2882-123	05-Jan-06	3.31	
2882-121	05-Jan-06	6.08	
2882-116	05-Jan-06	7.7	
2882-126	05-Jan-06	17.5	X
2882-118	05-Jan-06	42.6	X
2882-129	06-Jan-06	1	
2882-131	06-Jan-06	1	
2882-135	06-Jan-06	1	
2882-136	06-Jan-06	1	
2882-137	06-Jan-06	1	
2882-138	06-Jan-06	1	
2882-134	06-Jan-06	1.4	
2882-127	06-Jan-06	1.93	
2882-133	06-Jan-06	2.39	
2882-132	06-Jan-06	2.76	
2882-130	06-Jan-06	4.47	
2882-128	06-Jan-06	7.29	
2882-139	07-Jan-06	1	
2882-140	07-Jan-06	1	
2882-141	07-Jan-06	1	
2882-142	07-Jan-06	1	
2882-144	07-Jan-06	1	
2882-147	07-Jan-06	1	
2882-148	07-Jan-06	1	
2882-150	07-Jan-06	1	
2882-151	07-Jan-06	1	
2882-153	07-Jan-06	1	
2882-154	07-Jan-06	1	
2882-155	07-Jan-06	1.35	
2882-146	07-Jan-06	2.01	
2882-143	07-Jan-06	2.07	
2882-149	07-Jan-06	3.72	
2882-145	07-Jan-06	6.66	
2882-157	09-Jan-06	1	
2882-159	09-Jan-06	1	
2882-163	09-Jan-06	1	
2882-164	09-Jan-06	1	
2882-165	09-Jan-06	1	
2882-167	09-Jan-06	1	
2882-166	09-Jan-06	1.1	
2882-158	09-Jan-06	1.28	
2882-161	09-Jan-06	1.33	
2882-156	09-Jan-06	5.48	
2882-160	09-Jan-06	11.3	
2882-168	10-Jan-06	1	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
0503999	21-May-05	1	
0504000	21-May-05	34.6	X
0504791	24-May-05	3.57	
0503843	06-Jun-05	1	
0503906	06-Jun-05	1	
0503953	06-Jun-05	1	
0503905	06-Jun-05	1.23	
0503904	06-Jun-05	17.1	X
0503903	06-Jun-05	27.2	X
0503846	07-Jun-05	1	
0503847	07-Jun-05	1	
0503848	07-Jun-05	1	
0503954	07-Jun-05	1	
0503845	07-Jun-05	1.49	
0503844	07-Jun-05	7.56	
0503907	07-Jun-05	27.6	X
0503956	08-Jun-05	1	
0503958	08-Jun-05	1	
0503959	08-Jun-05	1	
0503955	08-Jun-05	1.1	
0503862	08-Jun-05	2.49	
0503957	08-Jun-05	14.6	
0503853	09-Jun-05	1	
0503960	09-Jun-05	4.48	
0503983	09-Jun-05	7.32	
0503961	09-Jun-05	20.1	X
0503964	10-Jun-05	1	
0503982	10-Jun-05	1	
0503962	10-Jun-05	1.24	
0503908	10-Jun-05	2.76	
0503909	10-Jun-05	5.84	
0503963	10-Jun-05	28.2	X
0503918	13-Jun-05	1	
0503920	13-Jun-05	1	
0503925	13-Jun-05	1.46	
0503910	13-Jun-05	1.5	
0503924	13-Jun-05	3.45	
0503919	13-Jun-05	4.5	
0503922	13-Jun-05	16.5	X
0503923	13-Jun-05	16.9	X
0503968	13-Jun-05	24.2	X
0503967	13-Jun-05	34.9	X
0503966	13-Jun-05	38.9	X
0503921	13-Jun-05	39.3	X
0503965	13-Jun-05	43.5	X
0503911	14-Jun-05	1	
0503928	14-Jun-05	1	
0503933	14-Jun-05	1	
0503934	14-Jun-05	1	
0503970	14-Jun-05	1	
0503984	14-Jun-05	1	
0503932	14-Jun-05	1.16	
0503926	14-Jun-05	1.92	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
0503912	14-Jun-05	2	
0503931	14-Jun-05	2.03	
0503927	14-Jun-05	2.63	
0503972	14-Jun-05	2.71	
0503973	14-Jun-05	2.81	
0503935	14-Jun-05	6.32	
0503969	14-Jun-05	10.7	
0503930	14-Jun-05	11.3	
0503929	14-Jun-05	12.1	
0504002	14-Jun-05	14.7	
0503971	14-Jun-05	19	X
0503981	14-Jun-05	21.7	X
0503976	15-Jun-05	1.02	
0503914	15-Jun-05	1.77	
0503915	15-Jun-05	2.3	
0503937	15-Jun-05	8.41	
0503849	15-Jun-05	12.3	
0503975	15-Jun-05	12.7	
0503913	15-Jun-05	13	
0503941	15-Jun-05	13.1	
0503974	15-Jun-05	16.4	X
0503940	15-Jun-05	21.1	X
0503936	15-Jun-05	25.7	X
0503985	15-Jun-05	44.3	X
0503947	16-Jun-05	1	
0503994	16-Jun-05	1	
0503944	16-Jun-05	1.24	
0503945	16-Jun-05	1.33	
0503946	16-Jun-05	1.43	
0503943	16-Jun-05	1.87	
0503995	16-Jun-05	2.01	
0503851	16-Jun-05	2.61	
0503917	16-Jun-05	3.29	
0503948	16-Jun-05	3.61	
0503951	16-Jun-05	3.88	
0503986	16-Jun-05	4.19	
0503987	16-Jun-05	5.13	
0503850	16-Jun-05	7.74	
0503942	16-Jun-05	8.45	
0503977	16-Jun-05	13.7	
0503949	16-Jun-05	16.5	X
0503950	16-Jun-05	30.5	X
0503916	16-Jun-05	44.5	X
0503978	17-Jun-05	1.7	
0503979	17-Jun-05	6.81	
0503980	17-Jun-05	25.9	X
0503855	20-Jun-05	1	
0503858	20-Jun-05	1	
0503861	20-Jun-05	1	
0504773	20-Jun-05	1	
0503952	20-Jun-05	2.11	
0503854	20-Jun-05	3.26	
0504772	20-Jun-05	5.43	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
0503996	20-Jun-05	5.92	
0503990	20-Jun-05	6.08	
0503989	20-Jun-05	6.29	
0504770	20-Jun-05	7.96	
0504771	20-Jun-05	8.52	
0503997	20-Jun-05	40.3	X
0503859	21-Jun-05	1	
0504001	21-Jun-05	1.07	
0504774	21-Jun-05	1.2	
0504778	21-Jun-05	4.34	
0504775	21-Jun-05	6.83	
0503860	21-Jun-05	9.32	
0504779	21-Jun-05	26.8	X
0504777	21-Jun-05	41.4	X
0504776	21-Jun-05	50.3	X
0503856	22-Jun-05	1	
0503991	22-Jun-05	1	
0504781	22-Jun-05	1	
0504782	22-Jun-05	1	
0504793	22-Jun-05	1	
0504792	22-Jun-05	1.16	
0504784	22-Jun-05	1.65	
0504783	22-Jun-05	4.6	
0504794	22-Jun-05	6.62	
0504785	22-Jun-05	15.1	X
0503863	22-Jun-05	25.4	X
0504780	22-Jun-05	43.7	X
0503992	22-Jun-05	46.6	X
0503993	22-Jun-05	48.6	X
0503857	22-Jun-05	49.7	X
0504786	23-Jun-05	1	
0504788	23-Jun-05	1	
0504789	23-Jun-05	1	
0504796	23-Jun-05	1.3	
0503864	23-Jun-05	2.17	
0504795	23-Jun-05	24	X
0504787	23-Jun-05	58.8	X
0504803	24-Jun-05	1.22	
0503865	24-Jun-05	1.4	
0504800	24-Jun-05	1.62	
0504798	24-Jun-05	1.71	
0503866	24-Jun-05	3.25	
0504804	24-Jun-05	5.43	
0503867	24-Jun-05	6.99	
0504032	27-Jun-05	1	
0504037	27-Jun-05	1	
0504801	27-Jun-05	1	
0504802	27-Jun-05	3.6	
0504799	27-Jun-05	3.98	
0504797	27-Jun-05	10.2	
0503869	28-Jun-05	1.75	
0503870	28-Jun-05	1.8	
0504041	28-Jun-05	2.62	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
0504034	28-Jun-05	4.02	
0504033	28-Jun-05	24.6	X
0503868	28-Jun-05	92.8	X
0503883	29-Jun-05	1	
0504035	29-Jun-05	1	
0504036	29-Jun-05	1	
0503882	29-Jun-05	1.94	
0504038	29-Jun-05	5.46	
0504805	01-Jul-05	1	
0504858	01-Jul-05	4.56	
2730-103	17-Aug-05	10	
2774-145	15-Sep-05	2.58	
2774-144	15-Sep-05	3.35	
0504644	19-Sep-05	1	
0504645	19-Sep-05	1	
0504646	20-Sep-05	1	
0505127	20-Sep-05	2.42	
0504647	20-Sep-05	4.55	
0505126	20-Sep-05	27	X
0504809	22-Sep-05	2.33	
0504810	22-Sep-05	15.4	X
2801-104	06-Oct-05	1	
2801-104-	06-Oct-05	1	
2801-105	06-Oct-05	1	
2801-204	06-Oct-05	1	
2801-204-	06-Oct-05	1	
2801-240	06-Oct-05	1	
2801-230	06-Oct-05	1	
2801-231	06-Oct-05	1	
2801-242	06-Oct-05	1	
2801-246	06-Oct-05	1.3	
2801-239	06-Oct-05	1.36	
2801-237	06-Oct-05	1.58	
2801-243	06-Oct-05	2.02	
2801-113	07-Oct-05	1	
2801-228	07-Oct-05	1	
2801-234	07-Oct-05	1	
2801-247	07-Oct-05	1	
2801-249	07-Oct-05	1	
2801-235	07-Oct-05	1.49	
2801-248	07-Oct-05	4.01	
2801-256	07-Oct-05	5.92	
2801-120	07-Oct-05	12.8	
2801-114	10-Oct-05	1	
2801-118	10-Oct-05	1	
2801-233	10-Oct-05	1	
2801-241	10-Oct-05	1	
2801-252	10-Oct-05	1	
2801-109	10-Oct-05	1.11	
2801-254	10-Oct-05	1.49	
2801-253	10-Oct-05	2.24	
2801-236	10-Oct-05	3.37	
2801-232	10-Oct-05	4.91	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
2801-201-	10-Oct-05	6.32	
2801-101	10-Oct-05	6.4	
2801-101-	10-Oct-05	6.54	
2801-201	10-Oct-05	6.54	
2801-245	10-Oct-05	6.72	
2801-251	10-Oct-05	7.1	
2801-110	10-Oct-05	8.17	
2801-250	10-Oct-05	8.23	
2801-255	10-Oct-05	8.89	
2801-238	10-Oct-05	9.51	
2801-119	11-Oct-05	1	
2801-207	11-Oct-05	1	
2801-117	11-Oct-05	17.3	X
2801-220	11-Oct-05	17.5	X
2801-213	11-Oct-05	19	X
2801-108	11-Oct-05	21.5	X
2801-111	11-Oct-05	22.1	X
2823-113	11-Oct-05	23	X
2801-211	11-Oct-05	24.1	X
2801-112	12-Oct-05	1	
2801-205	12-Oct-05	1	
2801-219	12-Oct-05	1	
2801-221	12-Oct-05	1	
2801-222	12-Oct-05	1	
2801-206	12-Oct-05	1.04	
2801-244	12-Oct-05	1.66	
2801-102	12-Oct-05	1.85	
2801-102-	12-Oct-05	2.5	
2801-106	12-Oct-05	2.53	
2801-223	12-Oct-05	2.86	
2801-116	12-Oct-05	5.7	
2801-218	12-Oct-05	6.89	
2801-203-	12-Oct-05	7.9	
2801-203	12-Oct-05	12.6	
2801-216	12-Oct-05	14.8	
2801-209	12-Oct-05	17.2	X
2801-224	12-Oct-05	18.6	X
2801-115	12-Oct-05	18.8	X
2801-229	12-Oct-05	18.8	X
2801-217	12-Oct-05	22.2	X
2801-208	12-Oct-05	24.7	X
2801-226	12-Oct-05	36.8	X
2801-103-	12-Oct-05	46.7	X
2801-202-	12-Oct-05	47	X
2801-103	12-Oct-05	47.2	X
2801-212	12-Oct-05	47.2	X
2801-202	12-Oct-05	48.3	X
2801-210	12-Oct-05	58.8	X
2801-107	13-Oct-05	1	
2801-214	13-Oct-05	1	
2801-215	13-Oct-05	1	
2801-227	13-Oct-05	8.18	
0504653	18-Oct-05	1	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
0504654	18-Oct-05	1	
0504657	18-Oct-05	1	
0504658	18-Oct-05	1	
0504660	18-Oct-05	1	
0504659	18-Oct-05	1.71	
0504656	18-Oct-05	10.9	
0504655	18-Oct-05	11.5	
2801-122	20-Oct-05	1.33	
2823-115	20-Oct-05	1.92	
2823-114	20-Oct-05	3.5	
2823-122	20-Oct-05	3.82	
2823-120	20-Oct-05	6.06	
2801-269	20-Oct-05	6.07	
2801-123	20-Oct-05	8.65	
2823-119	20-Oct-05	9.14	
2823-123	20-Oct-05	11.9	
2801-272	20-Oct-05	12.6	
2823-109	20-Oct-05	15.9	X
2801-268	20-Oct-05	16.4	X
2801-271	20-Oct-05	16.9	X
2801-121	20-Oct-05	20.9	X
2823-118	20-Oct-05	22	X
2823-117	20-Oct-05	31.3	X
2823-116	20-Oct-05	38.2	X
2801-270	20-Oct-05	43	X
2823-121	21-Oct-05	1	
2823-112	21-Oct-05	2.98	
2823-107	21-Oct-05	3.11	
2823-106	21-Oct-05	3.97	
2823-110	21-Oct-05	5.59	
2823-108	21-Oct-05	6.83	
2823-201	21-Oct-05	9.4	
2823-111	21-Oct-05	11.8	
2823-202	21-Oct-05	174	X
2801-261	22-Oct-05	1.57	
2801-263	22-Oct-05	2.77	
2801-262	22-Oct-05	8.84	
2801-267	22-Oct-05	28	X
2801-264	22-Oct-05	37.7	X
2801-266	22-Oct-05	39.5	X
2801-265	22-Oct-05	57.6	X
2823-203	24-Oct-05	1	
2823-102	24-Oct-05	1.91	
2823-105	24-Oct-05	3.2	
2823-103	24-Oct-05	3.57	
2823-101	24-Oct-05	21.5	X
2823-104	24-Oct-05	30.9	X
2823-128	25-Oct-05	1	
2823-129	25-Oct-05	1	
2823-131	25-Oct-05	1	
2823-132	25-Oct-05	1	
2823-204	25-Oct-05	1	
2823-205	25-Oct-05	1	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
2823-207	25-Oct-05	1.33	
2823-134	25-Oct-05	1.73	
2823-208	25-Oct-05	3.08	
2823-125	25-Oct-05	3.49	
2823-126	25-Oct-05	8.67	
2823-130	25-Oct-05	12.1	
2823-206	25-Oct-05	12.1	
2823-127	25-Oct-05	13	
2823-124	25-Oct-05	15.4	X
2823-133	25-Oct-05	21.2	X
2823-137	25-Oct-05	26.8	X
2823-143	26-Oct-05	1	
2823-146	26-Oct-05	1	
2823-209	26-Oct-05	1.34	
2823-139	26-Oct-05	2.05	
2823-145	26-Oct-05	4.22	
2823-210	26-Oct-05	5.75	
2823-136	26-Oct-05	6.97	
2823-142	26-Oct-05	8.06	
2823-140	26-Oct-05	21.7	X
2823-144	26-Oct-05	34.6	X
2823-141	26-Oct-05	35.7	X
2823-138	26-Oct-05	44.2	X
2823-135	27-Oct-05	1	
2832-101	03-Nov-05	1	
2832-102	03-Nov-05	1	
2832-103	03-Nov-05	1	
2832-106	03-Nov-05	1	
2832-107	03-Nov-05	1.06	
2832-108	03-Nov-05	1.15	
2832-105	03-Nov-05	1.21	
2832-109	03-Nov-05	22.5	X
2832-104	08-Nov-05	1	
2832-124	16-Nov-05	1	
2832-121	16-Nov-05	1.32	
2832-114	16-Nov-05	1.93	
2832-123	16-Nov-05	2.5	
2832-118	16-Nov-05	2.63	
2832-111	16-Nov-05	3.13	
2832-117	16-Nov-05	5.16	
2832-122	16-Nov-05	5.52	
2832-113	16-Nov-05	6.18	
2832-115	16-Nov-05	6.8	
2832-116	16-Nov-05	10.2	
2832-112	16-Nov-05	11.8	
2832-120	16-Nov-05	21.5	X
2832-119	16-Nov-05	21.8	X
2832-131	17-Nov-05	1	
2832-136	17-Nov-05	9.9	
2832-132	18-Nov-05	1	
2832-133	18-Nov-05	1	
2832-134	18-Nov-05	1	
2832-139	18-Nov-05	1	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
2832-125	18-Nov-05	1.05	
2832-126	18-Nov-05	1.25	
2832-127	18-Nov-05	1.52	
2832-135	18-Nov-05	2	
2832-128	18-Nov-05	2.07	
2832-137	18-Nov-05	2.3	
2832-129	18-Nov-05	2.76	
2832-130	18-Nov-05	13.5	
2832-143	19-Nov-05	1.2	
2832-145	19-Nov-05	2	
2832-146	19-Nov-05	2.2	
2832-144	19-Nov-05	2.6	
2832-141	19-Nov-05	3.5	
2832-142	19-Nov-05	6.4	
2832-140	19-Nov-05	19.5	X
2832-151	21-Nov-05	1	
2832-153	21-Nov-05	1	
2832-148	21-Nov-05	1.02	
2832-149	21-Nov-05	1.79	
2832-147	21-Nov-05	1.87	
2832-154	21-Nov-05	2.19	
2832-152	21-Nov-05	3.93	
2832-150	21-Nov-05	7.43	
2832-156	21-Nov-05	7.54	
2832-155	21-Nov-05	9.15	
2832-160	22-Nov-05	1	
2832-164	22-Nov-05	1	
2882-162	22-Nov-05	1	
2832-163	22-Nov-05	1.87	
2832-162	22-Nov-05	11.2	
2832-161	22-Nov-05	14.3	
2832-166	22-Nov-05	18.3	X
2863-101	29-Nov-05	1	
2863-112	29-Nov-05	1	
2863-125	29-Nov-05	1	
2863-122	29-Nov-05	1.01	
2863-123	29-Nov-05	1.5	
2863-110	29-Nov-05	4.58	
2863-102	29-Nov-05	13.9	
2863-124	01-Dec-05	1.27	
2863-119	01-Dec-05	2.12	
2863-113	01-Dec-05	3.34	
2863-115	01-Dec-05	7.82	
2863-114	01-Dec-05	10.2	
2863-111	01-Dec-05	39	X
2863-116	01-Dec-05	50.2	X
2863-104	02-Dec-05	1	
2863-109	02-Dec-05	1	
2863-120	02-Dec-05	1	
2863-106	02-Dec-05	1.07	
2863-121	02-Dec-05	1.32	
2863-105	02-Dec-05	1.35	
2863-107	02-Dec-05	1.92	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
2863-103	02-Dec-05	5.07	
2863-108	03-Dec-05	1	
2863-131	03-Dec-05	1	
2863-135	03-Dec-05	1.09	
2863-137	03-Dec-05	18.9	X
2863-117	05-Dec-05	1	
2863-118	05-Dec-05	1	
2863-130	05-Dec-05	1	
2863-136	05-Dec-05	1	
2863-138	05-Dec-05	1	
2863-133	05-Dec-05	1.52	
2863-140	05-Dec-05	1.8	
2863-129	05-Dec-05	2.99	
2863-128	05-Dec-05	3.8	
2863-126	05-Dec-05	6.69	
2863-127	05-Dec-05	10.3	
2863-132	05-Dec-05	10.8	
2863-134	05-Dec-05	41.3	X
2863-139	05-Dec-05	41.8	X
2863-141	06-Dec-05	1	
2863-143	06-Dec-05	1	
2863-144	06-Dec-05	1	
2863-145	06-Dec-05	1	
2863-148	06-Dec-05	1	
2863-149	06-Dec-05	1	
2863-151	06-Dec-05	1	
2863-154	06-Dec-05	1	
2863-153	06-Dec-05	2.09	
2863-142	06-Dec-05	2.21	
2863-152	06-Dec-05	2.26	
2863-146	06-Dec-05	6.54	
2863-150	06-Dec-05	45.9	X
2863-155	06-Dec-05	73.7	X
2863-163	07-Dec-05	1	
2863-164	07-Dec-05	1	
2863-167	07-Dec-05	1	
2863-169	07-Dec-05	1	
2863-159	07-Dec-05	1.03	
2863-156	07-Dec-05	2.7	
2863-166	07-Dec-05	2.92	
2863-162	07-Dec-05	3.8	
2863-161	07-Dec-05	3.89	
2863-168	07-Dec-05	4.15	
2863-165	07-Dec-05	13.8	
2863-158	07-Dec-05	41.3	X
2863-157	07-Dec-05	83.9	X
2873-115	08-Dec-05	13.5	
2873-118	14-Dec-05	5.28	
2873-103	14-Dec-05	110	X
2873-112	15-Dec-05	1	
2873-114	15-Dec-05	1	
2873-106	15-Dec-05	1.25	
2873-120	15-Dec-05	1.46	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
2873-121	15-Dec-05	2.58	
2873-104	15-Dec-05	4.62	
2873-102	16-Dec-05	1	
2873-122	16-Dec-05	1	
2873-105	16-Dec-05	3.8	
2873-108	16-Dec-05	4.37	
2873-113	16-Dec-05	6.77	
2873-119	16-Dec-05	7.08	
2873-101	16-Dec-05	13.6	
2873-107	16-Dec-05	34.5	X
2873-123	17-Dec-05	1	
2873-128	17-Dec-05	2.32	
2873-125	17-Dec-05	4.13	
2873-124	17-Dec-05	5.03	
2873-126	17-Dec-05	15	X
2873-127	17-Dec-05	32.4	X
2873-133	19-Dec-05	1	
2873-137	19-Dec-05	1.02	
2873-131	19-Dec-05	1.45	
2873-130	19-Dec-05	4.02	
2873-135	19-Dec-05	4.13	
2873-136	19-Dec-05	5.42	
2873-129	19-Dec-05	6.12	
2873-132	19-Dec-05	16.7	X
2873-134	19-Dec-05	18.4	X
2873-142	20-Dec-05	1	
2873-143	20-Dec-05	2.67	
2873-139	20-Dec-05	3.78	
2873-144	20-Dec-05	8.72	
2873-140	20-Dec-05	22.3	X
2873-141	20-Dec-05	25.2	X
2873-138	20-Dec-05	31.9	X
2873-146	21-Dec-05	1	
2873-147	21-Dec-05	1	
2873-149	21-Dec-05	1	
2873-150	21-Dec-05	1	
2873-151	21-Dec-05	1	
2873-152	21-Dec-05	1	
2873-145	21-Dec-05	1.1	
2873-153	21-Dec-05	1.1	
2882-101	04-Jan-06	1	
2882-102	04-Jan-06	1	
2882-103	04-Jan-06	1	
2882-105	04-Jan-06	1	
2882-106	04-Jan-06	1	
2882-110	04-Jan-06	1	
2882-112	04-Jan-06	1.03	
2882-108	04-Jan-06	1.07	
2882-109	04-Jan-06	1.53	
2882-104	04-Jan-06	1.62	
2882-107	04-Jan-06	1.96	
2882-111	04-Jan-06	1.97	
2882-115	04-Jan-06	4.07	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
2882-170	10-Jan-06	1.05	
2882-174	10-Jan-06	1.11	
2882-169	10-Jan-06	1.79	
2882-173	10-Jan-06	2.17	
2882-171	10-Jan-06	5.24	
2882-175	10-Jan-06	6.61	
2882-172	10-Jan-06	11.9	
2901-111	19-Jan-06	1	
2901-114	19-Jan-06	1	
2901-115	19-Jan-06	16.2	X
2901-102	20-Jan-06	1	
2901-105	20-Jan-06	1	
2901-106	20-Jan-06	1	
2901-107	20-Jan-06	1	
2901-112	20-Jan-06	1	
2901-113	20-Jan-06	1	
2901-116	20-Jan-06	1	
2901-110	20-Jan-06	2.01	
2901-109	20-Jan-06	9.66	
2901-108	20-Jan-06	19.9	X
2901-101	21-Jan-06	1	
2901-104	21-Jan-06	1	
2901-117	21-Jan-06	1	
2901-118	21-Jan-06	1	
2901-103	21-Jan-06	7.32	
2915-108	01-Feb-06	1	
2915-112	01-Feb-06	1	
2915-115	01-Feb-06	1.09	
2915-116	01-Feb-06	1.42	
2915-111	01-Feb-06	2.07	
2915-107	01-Feb-06	6.57	
2915-103	01-Feb-06	10.3	
2915-101	02-Feb-06	1	
2915-105	02-Feb-06	1	
2915-113	02-Feb-06	1	
2915-109	02-Feb-06	1.13	
2915-102	02-Feb-06	1.47	
2915-106	02-Feb-06	2.95	
2915-110	02-Feb-06	5.47	
2915-104	02-Feb-06	8.66	
2915-117	03-Feb-06	1	
2915-118	03-Feb-06	2.52	
2915-114	03-Feb-06	3.42	
2915-119	06-Feb-06	1	
2915-121	06-Feb-06	1	
2915-120	06-Feb-06	2.1	
2915-122	07-Feb-06	1	
2944-118	15-Feb-06	1	
2944-104	15-Feb-06	2.03	
2944-103	20-Feb-06	1	
2944-105	20-Feb-06	1	
2944-108	20-Feb-06	1	
2944-109	20-Feb-06	1	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
2944-110	20-Feb-06	1	
2944-111	20-Feb-06	1	
2944-113	20-Feb-06	1	
2944-114	20-Feb-06	1	
2944-117	20-Feb-06	1	
2944-119	20-Feb-06	1	
2944-112	20-Feb-06	1.2	
2944-101	20-Feb-06	1.81	
2944-116	20-Feb-06	3.07	
2944-115	20-Feb-06	3.68	
2944-102	21-Feb-06	1	
2944-106	22-Feb-06	1	
2944-107	22-Feb-06	1	
2938-121	03-Mar-06	1.2	
2938-121	03-Mar-06	1.34	
3037-102	19-May-06	1	
3037-106	19-May-06	1	
3037-101	19-May-06	1.14	
3037-104	19-May-06	1.14	
3037-103	19-May-06	96.7	X
3037-105	23-May-06	1	
3037-108	23-May-06	1	
3037-109	23-May-06	10.3	
3149-002	21-Aug-06	1	
3149-009	21-Aug-06	1	
3149-012	21-Aug-06	1	
3149-014	21-Aug-06	1	
3149-016	21-Aug-06	1	
3149-017	21-Aug-06	1	
3149-017-	21-Aug-06	1	
3149-015	21-Aug-06	1.17	
3149-005	21-Aug-06	1.2	
3149-001	21-Aug-06	1.25	
3149-006	21-Aug-06	1.49	
3149-011	21-Aug-06	1.56	
3149-013	21-Aug-06	2	
3149-003	21-Aug-06	2.43	
3149-004	21-Aug-06	2.49	
3149-004-	21-Aug-06	2.64	
3149-010	21-Aug-06	8.58	
3149-007	21-Aug-06	14.3	
3149-024	22-Aug-06	1.29	
3149-020	22-Aug-06	9.89	
3149-023	22-Aug-06	42.9	X
3149-021	22-Aug-06	60.5	X
3227-103	12-Sep-06	24	X
3227-107	15-Sep-06	1	
3227-101	19-Sep-06	1	
3227-104	19-Sep-06	22.4	X
3227-115	20-Sep-06	1	
3227-109	20-Sep-06	1.5	
3227-105	20-Sep-06	1.9	
3227-114	20-Sep-06	9.7	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
3227-106	20-Sep-06	11.3	
3227-108	20-Sep-06	13	
3227-112	20-Sep-06	20.9	X
3227-110	21-Sep-06	4.2	
3227-113	21-Sep-06	41.5	X
3227-111	22-Sep-06	39.7	X
3271-103	03-Oct-06	15.5	X
3271-101	06-Oct-06	1	
3271-102	06-Oct-06	1	
3271-104	07-Oct-06	23.1	X
3271-105	07-Oct-06	59.1	X
3298-103	29-Nov-06	1	
3298-106	05-Dec-06	10.9	
3298-107	06-Dec-06	1.23	
3298-101-	06-Dec-06	3.09	
3298-101	06-Dec-06	3.19	
3298-108	08-Dec-06	1	
3298-109	08-Dec-06	1	
3339-107	02-Jan-07	1	
3339-108	05-Jan-07	16.8	X
3339-102	06-Jan-07	1	
3339-103	08-Jan-07	7.62	
3339-104	09-Jan-07	1	
3339-105	09-Jan-07	1	
3339-109	09-Jan-07	1	
3339-110	09-Jan-07	1	
3339-111	09-Jan-07	1	
3339-113	09-Jan-07	1	
3339-115	09-Jan-07	1	
3339-117	09-Jan-07	1	
3339-112	09-Jan-07	1.31	
3339-114	09-Jan-07	1.65	
3339-119	09-Jan-07	3.85	
3339-118	09-Jan-07	25	X
3339-106	09-Jan-07	35.3	X
3339-123	10-Jan-07	1	
3339-124	10-Jan-07	1	
3339-122	10-Jan-07	2.9	
3339-121	10-Jan-07	5.39	
3339-120	10-Jan-07	49.3	X
3339-126	11-Jan-07	1	
3339-127	11-Jan-07	1	
3339-128	11-Jan-07	1	
3339-129	11-Jan-07	1.18	
3339-125	11-Jan-07	2.07	
3339-132	11-Jan-07	5.15	
3339-130	11-Jan-07	13	
3339-131	11-Jan-07	13.7	
3339-134	16-Jan-07	1	
3339-134-	16-Jan-07	1	
3339-137	16-Jan-07	1	
3339-138	16-Jan-07	1	
3339-141	16-Jan-07	1	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
3339-136	16-Jan-07	1.23	
3339-139	16-Jan-07	1.23	
3339-139-	16-Jan-07	1.26	
3339-133-	16-Jan-07	3.45	
3339-133	16-Jan-07	3.52	
3339-140	16-Jan-07	5.41	
3339-135-	16-Jan-07	5.43	
3339-135	16-Jan-07	5.51	
3339-144	17-Jan-07	1	
3339-142	17-Jan-07	2.16	
3339-143-	17-Jan-07	29.9	X
3339-143	17-Jan-07	30.5	X
3339-148	18-Jan-07	1	
3339-150	18-Jan-07	1	
3339-152	18-Jan-07	1	
3339-153	18-Jan-07	1	
3339-155	18-Jan-07	1	
3339-149	18-Jan-07	1.11	
3339-146	18-Jan-07	1.37	
3339-151	18-Jan-07	1.82	
3339-147	18-Jan-07	2.82	
3339-157	18-Jan-07	3.77	
3339-145	18-Jan-07	9.05	
3339-154	18-Jan-07	63.9	X
3339-156	19-Jan-07	1	
3339-158	19-Jan-07	1	
3339-160	19-Jan-07	1	
3339-162	19-Jan-07	1	
3339-165	19-Jan-07	1	
3339-159	19-Jan-07	1.59	
3339-163	19-Jan-07	3.58	
3339-164	19-Jan-07	4.25	
3339-161	19-Jan-07	28.9	X
3339-166	20-Jan-07	1	
3339-168	20-Jan-07	1	
3339-169	20-Jan-07	1.66	
3339-167	20-Jan-07	39.6	X
3339-173	23-Jan-07	1	
3339-171	23-Jan-07	3.75	
3339-170	23-Jan-07	10.9	
3339-172	23-Jan-07	12.9	
3339-172-	23-Jan-07	13	
3359-101	06-Feb-07	1	
3359-103	06-Feb-07	1	
3359-105	06-Feb-07	1	
3359-102	06-Feb-07	1.62	
3359-104	06-Feb-07	11.3	
3359-107	07-Feb-07	13	
3359-108	07-Feb-07	47.2	X
3359-109	08-Feb-07	1	
3359-110	09-Feb-07	1	
3359-112	09-Feb-07	1	
3359-111	09-Feb-07	2.48	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
3359-114	10-Feb-07	1	
3359-113	10-Feb-07	18.5	X
3359-119	12-Feb-07	1	
3359-120	12-Feb-07	1	
3359-121	12-Feb-07	1	
3359-116	12-Feb-07	2.65	
3359-115	12-Feb-07	4.54	
3359-122	12-Feb-07	11.8	
3359-118	12-Feb-07	13.7	
3359-117	12-Feb-07	14	
3377-142	05-Mar-07	1.4	
3483-105	05-May-07	1.21	
3483-107	19-May-07	1	
3483-106	19-May-07	32.3	X
3483-103	21-May-07	1	
3483-103-	21-May-07	1	
3483-101	22-May-07	1	
3483-101-	22-May-07	1	
3483-104	22-May-07	3	
3483-108	22-May-07	6.18	
3483-102	23-May-07	1	
3534-101	29-Jun-07	1	
3534-101-	29-Jun-07	1	
3534-102	29-Jun-07	1	
3534-107	29-Jun-07	8.2	
3534-106-	29-Jun-07	13.2	
3534-106	29-Jun-07	13.6	
3534-104-	29-Jun-07	15.2	X
3534-104	29-Jun-07	15.4	X
3534-103-	30-Jun-07	2.8	
3534-103	30-Jun-07	3	
3534-108	30-Jun-07	10.2	
3534-105-	30-Jun-07	37.4	X
3534-105	30-Jun-07	37.5	X
3534-109	03-Jul-07	1	
3534-109-	03-Jul-07	1	
3575-107	23-Jul-07	8.5	
3575-107-	23-Jul-07	8.5	
3575-106	24-Jul-07	1	
3575-106-	24-Jul-07	1	
3575-105	01-Aug-07	3.6	
3575-105-	01-Aug-07	3.7	
3575-108-	03-Aug-07	1.3	
3575-108	03-Aug-07	1.8	
3575-101	04-Aug-07	20.6	X
3575-102-	04-Aug-07	20.7	X
3575-102	04-Aug-07	20.9	X
3575-103	06-Aug-07	1	
3575-104	06-Aug-07	1.1	
3675-106	01-Oct-07	2.9	
3675-108	01-Oct-07	3.4	
3675-105	01-Oct-07	3.7	
3675-101	01-Oct-07	6.3	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
3675-107	01-Oct-07	9.3	
3675-103	01-Oct-07	10.1	
3675-104	01-Oct-07	10.3	
3675-102	01-Oct-07	12	
3675-113	02-Oct-07	1	
3675-114	02-Oct-07	1	
3675-116	02-Oct-07	1	
3675-117	02-Oct-07	1	
3675-118	02-Oct-07	1	
3675-119	02-Oct-07	1	
3675-120	02-Oct-07	1	
3675-109	02-Oct-07	1.5	
3675-111	02-Oct-07	1.5	
3675-112	02-Oct-07	1.5	
3675-115	02-Oct-07	2.4	
3675-110	02-Oct-07	4.7	
3675-121	03-Oct-07	1	
3675-123	03-Oct-07	1	
3675-123-	03-Oct-07	1	
3675-124	03-Oct-07	1	
3675-121-	03-Oct-07	1	
3675-122	03-Oct-07	1	
3675-122-	03-Oct-07	1	
3675-124-	03-Oct-07	1	
3675-126	04-Oct-07	1	
3675-127	04-Oct-07	1	
3675-126-	04-Oct-07	1.1	
3675-128	04-Oct-07	1.1	
3675-125	04-Oct-07	1.5	
3675-128-	04-Oct-07	11.8	
3675-130	05-Oct-07	10.5	
3675-132	05-Oct-07	11.1	
3675-129	05-Oct-07	14.5	
3675-131	05-Oct-07	16.5	X
3675-133	08-Oct-07	16.4	X
3675-136	08-Oct-07	24.3	X
3675-134	08-Oct-07	31.6	X
3675-135	08-Oct-07	41.1	X
3691-101	19-Oct-07	1	
3691-102	19-Oct-07	1	
3691-104	19-Oct-07	1	
3691-104-	19-Oct-07	1	
3691-106	19-Oct-07	1	
3691-107	19-Oct-07	1	
3691-108	19-Oct-07	1	
3691-110	19-Oct-07	1	
3691-103	19-Oct-07	4.23	
3691-109	19-Oct-07	6.55	
3691-105	19-Oct-07	22.4	X
3691-114	20-Oct-07	1	
3691-116	20-Oct-07	1	
3691-119	20-Oct-07	1	
3691-120	20-Oct-07	1	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
3691-122-	20-Oct-07	1.15	
3691-122	20-Oct-07	1.17	
3691-113	20-Oct-07	1.81	
3691-121	20-Oct-07	3.58	
3691-117	20-Oct-07	7.32	
3691-118-	20-Oct-07	7.68	
3691-118	20-Oct-07	7.72	
3691-115	20-Oct-07	7.91	
3691-111	20-Oct-07	55.7	X
3691-112	20-Oct-07	57.7	X
3691-123	23-Oct-07	1	
3691-124	23-Oct-07	1	
3691-127	23-Oct-07	1	
3691-128	23-Oct-07	1	
3691-128-	23-Oct-07	1	
3691-130	23-Oct-07	1	
3691-126	23-Oct-07	1.34	
3691-129	23-Oct-07	4.56	
3691-125	23-Oct-07	4.85	
3691-133	24-Oct-07	1	
3691-134	24-Oct-07	1	
3691-136	24-Oct-07	1	
3691-132	24-Oct-07	4.72	
3691-131	24-Oct-07	5.19	
3691-135	24-Oct-07	8.04	
3691-138-	24-Oct-07	52.6	X
3691-138	24-Oct-07	52.8	X
3691-137	24-Oct-07	55.6	X
3708-101	25-Oct-07	1	
3708-102	25-Oct-07	1	
3708-104	25-Oct-07	1	
3708-106	25-Oct-07	1.06	
3708-105	25-Oct-07	1.2	
3708-103	25-Oct-07	4.32	
3708-111	03-Nov-07	11.6	
3708-112	03-Nov-07	13.8	
3708-112-	03-Nov-07	13.8	
3708-108	03-Nov-07	14.2	
3708-108-	03-Nov-07	14.3	
3708-107	03-Nov-07	15.4	X
3708-110	03-Nov-07	17.3	X
3708-110-	03-Nov-07	17.8	X
3708-109	03-Nov-07	370	X
3708-118	12-Nov-07	1	
3708-118-	12-Nov-07	1	
3708-120	12-Nov-07	1.13	
3708-117	12-Nov-07	1.38	
3708-119	12-Nov-07	228	X
3750-125	13-Dec-07	1	
3750-125-	13-Dec-07	1	
3750-126	13-Dec-07	1	
3750-126-	13-Dec-07	1	
3750-108	18-Dec-07	1.19	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
3750-107-	18-Dec-07	1.8	
3750-107	18-Dec-07	25.7	X
3750-127	10-Jan-08	1.64	
3750-111	11-Jan-08	3.89	
3750-112-	11-Jan-08	4.02	
3750-112	11-Jan-08	4.22	
3750-105	11-Jan-08	11	
3750-106	11-Jan-08	11.2	
3750-101	12-Jan-08	19.8	X
3750-104	12-Jan-08	23.2	X
3750-102	12-Jan-08	23.9	X
3750-103	12-Jan-08	69	X
3750-132	15-Jan-08	1	
3750-133	15-Jan-08	1	
3750-135	15-Jan-08	1	
3750-134	15-Jan-08	1.38	
3750-120	16-Jan-08	1	
3750-122	16-Jan-08	1	
3750-119	16-Jan-08	1.41	
3750-120-	16-Jan-08	1.44	
3750-121	16-Jan-08	2.39	
3750-129	16-Jan-08	6	
3750-131	16-Jan-08	13.8	
3750-130	16-Jan-08	15.6	X
3772-104	14-Feb-08	1.99	
3772-104-	14-Feb-08	2.16	
3772-103	14-Feb-08	2.32	
3772-102	14-Feb-08	9.23	
3772-101	14-Feb-08	26.6	X
3785-107	26-Feb-08	1	
3785-108	26-Feb-08	1	
3785-110	26-Feb-08	1.12	
3785-109	26-Feb-08	11.1	
3785-112	28-Feb-08	1	
3785-114	28-Feb-08	1	
3785-116	28-Feb-08	1	
3785-111	28-Feb-08	7.66	
3785-113	28-Feb-08	13	
3785-115	28-Feb-08	16.4	X
3785-118	29-Feb-08	1	
3785-119	29-Feb-08	1	
3785-122	29-Feb-08	1	
3785-123	29-Feb-08	1	
3785-124	29-Feb-08	1	
3785-124-	29-Feb-08	1	
3785-127	29-Feb-08	1	
3785-128	29-Feb-08	1	
3785-129	29-Feb-08	1	
3785-130	29-Feb-08	1	
3785-132	29-Feb-08	1	
3785-133	29-Feb-08	1	
3785-134	29-Feb-08	1	
3785-120	29-Feb-08	1.41	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
3785-117	29-Feb-08	2.07	
3785-126	29-Feb-08	76.4	X
3785-131	29-Feb-08	350	X
3785-125	29-Feb-08	808	X
3785-147	01-Mar-08	1	
3785-149	01-Mar-08	1	
3785-151	01-Mar-08	1	
3785-152	01-Mar-08	1	
3785-153	01-Mar-08	1	
3785-155	01-Mar-08	1.1	
3785-150	01-Mar-08	1.83	
3785-148	01-Mar-08	4.37	
3785-154	01-Mar-08	19	X
3785-146	01-Mar-08	26.3	X
3866-002	16-Apr-08	1.1	
3866-004	16-Apr-08	1.1	
3866-003	16-Apr-08	1.9	
3866-001	16-Apr-08	2.3	
3053-101	NA	1	
3053-103	NA	1	
3073-102	NA	1	
3134-004	NA	1	
3422-102	NA	1	
3449-101	NA	1	
3449-102	NA	1	
3449-103	NA	1	
3521-102	NA	1	
3521-102-	NA	1	
3521-103	NA	1	
3521-103-	NA	1	
3521-105	NA	1	
3521-105-	NA	1	
3521-106	NA	1	
3521-106-	NA	1	
3521-107	NA	1	
3521-108	NA	1	
3521-109	NA	1	
3656-108	NA	1	
3656-116	NA	1	
3656-119	NA	1	
3656-120	NA	1	
3656-121	NA	1	
3656-122	NA	1	
3656-124	NA	1	
3656-125	NA	1	
3656-126	NA	1	
3656-110	NA	1.1	
3656-107	NA	1.2	
3656-123	NA	1.2	
3053-106	NA	1.44	
3419-205	NA	2.17	
3656-102	NA	2.2	
3053-102	NA	2.66	

Table 4-48
Analytical Results for Lead in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Lead (ug/L)	Exceeds MCL - Lead (15 ug/L)
3656-101	NA	2.7	
3656-117	NA	2.7	
3656-109	NA	2.8	
3419-215	NA	2.83	
3419-149	NA	2.88	
3656-103	NA	2.9	
3656-104	NA	3.2	
3656-118	NA	3.7	
3656-106	NA	5.8	
3656-112	NA	6.6	
3656-111	NA	7.3	
3521-101-	NA	7.75	
3521-101	NA	7.84	
3656-113	NA	7.9	
3656-115	NA	8.2	
3656-114	NA	9.3	
3419-139	NA	11	
3656-105	NA	11	
3656-127	NA	11.2	
3656-129	NA	11.9	
3656-128	NA	12	
3422-101-	NA	13.2	
3134-001	NA	13.6	
3134-001	NA	13.7	
3422-101	NA	14	
3656-130	NA	14.6	
3053-104	NA	19.3	X
3073-104	NA	19.7	X
3422-103-	NA	26.3	X
3134-002	NA	29.5	X
3134-002	NA	29.5	X
3422-103	NA	29.6	X
3422-104	NA	37.9	X
3134-005	NA	41.6	X
3521-104-	NA	47.4	X
3521-104	NA	47.7	X
3449-104	NA	120	X

Notes:

NA=Not Available.

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
0503843	06-Jun-05	1.39	
0503844	07-Jun-05	3.82	
0503845	07-Jun-05	1	
0503846	07-Jun-05	1	
0503847	07-Jun-05	1	
0503848	07-Jun-05	1	
0503853	09-Jun-05	1	
0503862	08-Jun-05	1	
0503903	06-Jun-05	1.84	
0503904	06-Jun-05	2.19	
0503905	06-Jun-05	1.33	
0503906	06-Jun-05	2.39	
0503907	07-Jun-05	1	
0503908	10-Jun-05	1	
0503909	10-Jun-05	1	
0503953	06-Jun-05	1	
0503954	07-Jun-05	1	
0503955	08-Jun-05	1	
0503956	08-Jun-05	1	
0503957	08-Jun-05	1	
0503958	08-Jun-05	1	
0503959	08-Jun-05	1	
0503960	09-Jun-05	1	
0503961	09-Jun-05	1	
0503962	10-Jun-05	1	
0503963	10-Jun-05	1	
0503964	10-Jun-05	1	
0503982	10-Jun-05	1	
0503983	09-Jun-05	1	
2730-103	17-Aug-05	10	X
2774-144	15-Sep-05	4.69	
2774-145	15-Sep-05	1	
2801-101	10-Oct-05	1	
2801-101-	10-Oct-05	1	
2801-102	12-Oct-05	1	
2801-102-	12-Oct-05	1	
2801-103	12-Oct-05	1	
2801-103-	12-Oct-05	1	
2801-104	06-Oct-05	1	
2801-104-	06-Oct-05	1	
2801-105	06-Oct-05	1	
2801-106	12-Oct-05	1	
2801-107	13-Oct-05	1	
2801-108	11-Oct-05	1	
2801-109	10-Oct-05	1	
2801-110	10-Oct-05	1	
2801-111	11-Oct-05	1	
2801-112	12-Oct-05	1	
2801-113	07-Oct-05	1	
2801-114	10-Oct-05	1	

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
2801-115	12-Oct-05	1	
2801-116	12-Oct-05	1	
2801-117	11-Oct-05	1	
2801-118	10-Oct-05	1	
2801-119	11-Oct-05	1	
2801-120	07-Oct-05	1	
2801-121	20-Oct-05	1	
2801-122	20-Oct-05	1	
2801-123	20-Oct-05	1	
2801-202	12-Oct-05	1	
2801-202-	12-Oct-05	1	
2801-203	12-Oct-05	1	
2801-203-	12-Oct-05	1	
2801-204	06-Oct-05	1	
2801-204-	06-Oct-05	1	
2801-205	12-Oct-05	1	
2801-206	12-Oct-05	1	
2801-207	11-Oct-05	1	
2801-208	12-Oct-05	1	
2801-209	12-Oct-05	1	
2801-210	12-Oct-05	1	
2801-211	11-Oct-05	1	
2801-201	10-Oct-05	1	
2801-201-	10-Oct-05	1	
2801-239	06-Oct-05	1	
2801-240	06-Oct-05	1	
2801-241	10-Oct-05	1	
2801-257	19-Oct-05	1.11	
2801-262	22-Oct-05	1	
2801-263	22-Oct-05	1	
2801-267	22-Oct-05	1	
2801-268	20-Oct-05	1	
2801-269	20-Oct-05	1	
2801-270	20-Oct-05	1	
2801-271	20-Oct-05	1	
2801-212	12-Oct-05	1	
2801-213	11-Oct-05	1	
2801-214	13-Oct-05	1	
2801-215	13-Oct-05	1	
2801-216	12-Oct-05	1	
2801-217	12-Oct-05	1	
2801-218	12-Oct-05	1	
2801-219	12-Oct-05	1	
2801-220	11-Oct-05	1	
2801-221	12-Oct-05	1	
2801-222	12-Oct-05	1	
2801-223	12-Oct-05	1	
2801-224	12-Oct-05	1	
2801-226	12-Oct-05	1	
2801-227	13-Oct-05	1	

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
2801-228	07-Oct-05	1	
2801-229	12-Oct-05	1	
2801-230	06-Oct-05	1	
2801-231	06-Oct-05	1	
2801-232	10-Oct-05	1	
2801-233	10-Oct-05	1	
2801-234	07-Oct-05	1	
2801-235	07-Oct-05	1	
2801-236	10-Oct-05	1	
2801-237	06-Oct-05	1	
2801-238	10-Oct-05	1	
2801-242	06-Oct-05	1	
2801-243	06-Oct-05	1	
2801-244	12-Oct-05	1	
2801-245	10-Oct-05	1	
2801-246	06-Oct-05	1	
2801-247	07-Oct-05	1	
2801-248	07-Oct-05	1	
2801-249	07-Oct-05	1	
2801-250	10-Oct-05	1	
2801-251	10-Oct-05	1	
2801-252	10-Oct-05	1	
2801-253	10-Oct-05	1	
2801-254	10-Oct-05	1	
2801-255	10-Oct-05	1	
2801-256	07-Oct-05	1	
2801-261	22-Oct-05	1	
2801-264	22-Oct-05	1	
2801-265	22-Oct-05	1	
2801-266	22-Oct-05	1	
2801-272	20-Oct-05	1	
2823-101	24-Oct-05	1	
2823-102	24-Oct-05	1	
2823-103	24-Oct-05	1	
2823-104	24-Oct-05	1	
2823-105	24-Oct-05	1	
2823-106	21-Oct-05	1	
2823-107	21-Oct-05	1	
2823-108	21-Oct-05	1	
2823-109	20-Oct-05	1	
2823-110	21-Oct-05	1	
2823-111	21-Oct-05	1	
2823-112	21-Oct-05	1	
2823-113	11-Oct-05	1	
2823-114	20-Oct-05	1	
2823-115	20-Oct-05	1	
2823-116	20-Oct-05	1	
2823-117	20-Oct-05	1	
2823-118	20-Oct-05	1	
2823-119	20-Oct-05	1	

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
2823-120	20-Oct-05	1	
2823-121	21-Oct-05	1	
2823-122	20-Oct-05	1	
2823-123	20-Oct-05	1	
2823-124	25-Oct-05	1	
2823-125	25-Oct-05	1	
2823-126	25-Oct-05	1	
2823-127	25-Oct-05	1	
2823-128	25-Oct-05	1	
2823-129	25-Oct-05	1	
2823-130	25-Oct-05	1	
2823-131	25-Oct-05	1	
2823-132	25-Oct-05	1	
2823-133	25-Oct-05	1	
2823-134	25-Oct-05	1	
2823-135	27-Oct-05	1	
2823-136	26-Oct-05	1	
2823-137	25-Oct-05	1	
2823-138	26-Oct-05	1	
2823-139	26-Oct-05	1	
2823-140	26-Oct-05	1	
2823-141	26-Oct-05	1	
2823-142	26-Oct-05	1	
2823-143	26-Oct-05	1	
2823-144	26-Oct-05	1	
2823-145	26-Oct-05	1	
2823-146	26-Oct-05	1	
2823-201	21-Oct-05	1	
2823-202	21-Oct-05	1	
2823-203	24-Oct-05	1	
2823-204	25-Oct-05	1	
2823-205	25-Oct-05	1	
2823-206	25-Oct-05	1	
2823-207	25-Oct-05	1	
2823-208	25-Oct-05	1	
2823-209	26-Oct-05	1	
2823-210	26-Oct-05	1	
2832-101	03-Nov-05	1	
2832-102	03-Nov-05	1	
2832-103	03-Nov-05	1	
2832-104	08-Nov-05	1.08	
2832-105	03-Nov-05	1	
2832-106	03-Nov-05	1	
2832-107	03-Nov-05	1	
2832-108	03-Nov-05	1	
2832-109	03-Nov-05	1	
2832-111	16-Nov-05	1	
2832-112	16-Nov-05	2	
2832-113	16-Nov-05	1	
2832-114	16-Nov-05	2	

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
2832-115	16-Nov-05	2	
2832-116	16-Nov-05	1	
2832-117	16-Nov-05	1	
2832-118	16-Nov-05	1	
2832-119	16-Nov-05	1	
2832-120	16-Nov-05	1	
2832-121	16-Nov-05	1	
2832-122	16-Nov-05	1	
2832-123	16-Nov-05	1	
2832-124	16-Nov-05	1	
2832-125	18-Nov-05	1	
2832-126	18-Nov-05	1	
2832-127	18-Nov-05	1	
2832-128	18-Nov-05	1	
2832-129	18-Nov-05	1	
2832-130	18-Nov-05	1	
2832-131	17-Nov-05	1	
2832-132	18-Nov-05	1	
2832-133	18-Nov-05	1	
2832-134	18-Nov-05	1	
2832-135	18-Nov-05	2	
2832-136	17-Nov-05	2	
2832-137	18-Nov-05	2	
2832-139	18-Nov-05	1	
2832-140	19-Nov-05	2	
2832-141	19-Nov-05	2	
2832-142	19-Nov-05	2	
2832-143	19-Nov-05	1	
2832-144	19-Nov-05	2	
2832-145	19-Nov-05	2	
2832-146	19-Nov-05	2	
2832-147	21-Nov-05	1	
2832-148	21-Nov-05	1	
2832-149	21-Nov-05	1	
2832-150	21-Nov-05	1	
2832-151	21-Nov-05	1	
2832-152	21-Nov-05	1	
2832-153	21-Nov-05	1	
2832-154	21-Nov-05	1	
2832-155	21-Nov-05	1	
2832-156	21-Nov-05	1	
2832-160	22-Nov-05	1	
2832-161	22-Nov-05	1	
2832-162	22-Nov-05	1.3	
2832-163	22-Nov-05	1	
2832-164	22-Nov-05	1	
2832-166	22-Nov-05	1	
2863-101	29-Nov-05	1	
2863-102	29-Nov-05	1	
2863-103	02-Dec-05	1	

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
2863-104	02-Dec-05	1	
2863-105	02-Dec-05	1	
2863-106	02-Dec-05	1	
2863-107	02-Dec-05	1	
2863-108	03-Dec-05	1	
2863-109	02-Dec-05	1	
2863-110	29-Nov-05	1	
2863-111	01-Dec-05	2	
2863-112	29-Nov-05	1	
2863-113	01-Dec-05	1	
2863-114	01-Dec-05	1	
2863-115	01-Dec-05	1	
2863-116	01-Dec-05	1.6	
2863-117	05-Dec-05	1	
2863-118	05-Dec-05	1	
2863-119	01-Dec-05	1.92	
2863-120	02-Dec-05	1	
2863-121	02-Dec-05	1	
2863-122	29-Nov-05	1	
2863-123	29-Nov-05	1	
2863-124	01-Dec-05	1	
2863-125	29-Nov-05	1	
2863-126	05-Dec-05	1	
2863-127	05-Dec-05	1	
2863-128	05-Dec-05	1	
2863-129	05-Dec-05	1	
2863-130	05-Dec-05	1	
2863-131	03-Dec-05	1	
2863-132	05-Dec-05	1	
2863-133	05-Dec-05	1	
2863-134	05-Dec-05	1	
2863-135	03-Dec-05	1	
2863-136	05-Dec-05	1	
2863-137	03-Dec-05	1	
2863-138	05-Dec-05	1	
2863-139	05-Dec-05	1	
2863-140	05-Dec-05	1	
2863-141	06-Dec-05	1	
2863-142	06-Dec-05	1	
2863-143	06-Dec-05	1	
2863-144	06-Dec-05	1	
2863-145	06-Dec-05	1	
2863-146	06-Dec-05	1	
2863-148	06-Dec-05	1	
2863-149	06-Dec-05	1	
2863-150	06-Dec-05	1	
2863-151	06-Dec-05	1	
2863-152	06-Dec-05	1	
2863-153	06-Dec-05	1	
2863-154	06-Dec-05	1	

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
2863-155	06-Dec-05	1	
2863-156	07-Dec-05	1	
2863-157	07-Dec-05	1	
2863-158	07-Dec-05	1	
2863-159	07-Dec-05	1	
2863-161	07-Dec-05	1	
2863-162	07-Dec-05	1	
2863-163	07-Dec-05	1	
2863-164	07-Dec-05	1	
2863-165	07-Dec-05	1	
2863-166	07-Dec-05	1	
2863-167	07-Dec-05	1	
2863-168	07-Dec-05	1	
2863-169	07-Dec-05	1	
2873-101	16-Dec-05	1	
2873-102	16-Dec-05	1	
2873-103	14-Dec-05	1	
2873-104	15-Dec-05	1	
2873-105	16-Dec-05	1	
2873-106	15-Dec-05	1	
2873-107	16-Dec-05	1	
2873-108	16-Dec-05	1	
2873-112	15-Dec-05	1	
2873-113	16-Dec-05	1	
2873-114	15-Dec-05	1	
2873-115	08-Dec-05	1	
2873-118	14-Dec-05	1	
2873-119	16-Dec-05	1	
2873-120	15-Dec-05	1	
2873-121	15-Dec-05	1	
2873-122	16-Dec-05	1	
2873-123	17-Dec-05	1	
2873-124	17-Dec-05	1	
2873-125	17-Dec-05	1	
2873-126	17-Dec-05	1	
2873-127	17-Dec-05	1	
2873-128	17-Dec-05	1	
2873-129	19-Dec-05	1	
2873-130	19-Dec-05	1	
2873-131	19-Dec-05	1	
2873-132	19-Dec-05	1	
2873-133	19-Dec-05	1	
2873-134	19-Dec-05	1	
2873-135	19-Dec-05	1	
2873-136	19-Dec-05	1	
2873-137	19-Dec-05	1	
2873-138	20-Dec-05	1	
2873-139	20-Dec-05	1	
2873-140	20-Dec-05	1	
2873-141	20-Dec-05	1	

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
2873-142	20-Dec-05	1	
2873-143	20-Dec-05	1	
2873-144	20-Dec-05	1	
2873-145	21-Dec-05	1	
2873-146	21-Dec-05	1	
2873-147	21-Dec-05	1	
2873-149	21-Dec-05	1	
2873-150	21-Dec-05	1	
2873-151	21-Dec-05	1	
2873-152	21-Dec-05	1	
2873-153	21-Dec-05	1	
2882-101	04-Jan-06	1	
2882-102	04-Jan-06	1	
2882-103	04-Jan-06	1	
2882-104	04-Jan-06	1	
2882-105	04-Jan-06	1	
2882-106	04-Jan-06	1	
2882-107	04-Jan-06	1	
2882-108	04-Jan-06	1	
2882-109	04-Jan-06	1	
2882-110	04-Jan-06	1	
2882-111	04-Jan-06	1	
2882-112	04-Jan-06	1	
2882-113	05-Jan-06	1	
2882-114	05-Jan-06	1	
2882-115	04-Jan-06	1	
2882-116	05-Jan-06	1	
2882-117	05-Jan-06	1	
2882-118	05-Jan-06	1.09	
2882-119	05-Jan-06	1	
2882-120	05-Jan-06	1	
2882-121	05-Jan-06	1.49	
2882-122	05-Jan-06	1	
2882-123	05-Jan-06	1	
2882-124	05-Jan-06	1	
2882-125	05-Jan-06	1	
2882-126	05-Jan-06	1	
2882-127	06-Jan-06	1	
2882-128	06-Jan-06	2	
2882-129	06-Jan-06	2	
2882-130	06-Jan-06	1	
2882-131	06-Jan-06	1	
2882-132	06-Jan-06	2	
2882-133	06-Jan-06	2	
2882-134	06-Jan-06	2	
2882-135	06-Jan-06	1	
2882-136	06-Jan-06	2	
2882-137	06-Jan-06	2	
2882-138	06-Jan-06	2	
2882-139	07-Jan-06	1	

Table 4-49
Analytical Results for Arsenic in Area-wide Residential Groundwater – Potosi Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Arsenic (ug/L)	Exceeds MCL - Arsenic (10 ug/L)
2882-140	07-Jan-06	1	
2882-141	07-Jan-06	1	
2882-142	07-Jan-06	1	
2882-143	07-Jan-06	1	
2882-144	07-Jan-06	1	
2882-145	07-Jan-06	2.16	
2882-146	07-Jan-06	1	
2882-147	07-Jan-06	1	
2882-148	07-Jan-06	1	
2882-149	07-Jan-06	1	
2882-150	07-Jan-06	1	
2882-151	07-Jan-06	1	
2882-153	07-Jan-06	1	
2882-154	07-Jan-06	1	
2882-155	07-Jan-06	1	
2882-156	09-Jan-06	1	
2882-157	09-Jan-06	1	
2882-158	09-Jan-06	1	
2882-159	09-Jan-06	1	
2882-160	09-Jan-06	1	
2882-161	09-Jan-06	1	
2882-162	22-Nov-05	1	
2882-163	09-Jan-06	1	
2882-164	09-Jan-06	1	
2882-165	09-Jan-06	1	
2882-166	09-Jan-06	1	
2882-167	09-Jan-06	1	
2882-168	10-Jan-06	1	
2882-169	10-Jan-06	1	
2882-170	10-Jan-06	1	
2882-171	10-Jan-06	1	
2882-172	10-Jan-06	1	
2882-173	10-Jan-06	1	
2882-174	10-Jan-06	1	
2882-175	10-Jan-06	1	
2938-121	03-Mar-06	1	
2938-121	03-Mar-06	1	
3377-142	05-Mar-07	1	
3419-139		1	
3419-149		1	
3419-205		1	
3419-215		1	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
0503843	06-Jun-05	11.3	
0503844	07-Jun-05	10.3	
0503845	07-Jun-05	602	
0503846	07-Jun-05	40.1	
0503847	07-Jun-05	30.9	
0503848	07-Jun-05	1040	
0503849	15-Jun-05	626	
0503850	16-Jun-05	886	
0503851	16-Jun-05	1520	
0503853	09-Jun-05	1430	
0503854	20-Jun-05	251	
0503855	20-Jun-05	1430	
0503856	22-Jun-05	150	
0503857	22-Jun-05	254	
0503858	20-Jun-05	110	
0503859	21-Jun-05	192	
0503860	21-Jun-05	110	
0503861	20-Jun-05	48.3	
0503862	08-Jun-05	197	
0503863	22-Jun-05	1080	
0503864	23-Jun-05	481	
0503865	24-Jun-05	688	
0503866	24-Jun-05	1370	
0503867	24-Jun-05	600	
0503868	28-Jun-05	1400	
0503869	28-Jun-05	109	
0503870	28-Jun-05	81.5	
0503882	29-Jun-05	68.8	
0503883	29-Jun-05	391	
0503903	06-Jun-05	282	
0503904	06-Jun-05	254	
0503905	06-Jun-05	264	
0503906	06-Jun-05	1.65	
0503907	07-Jun-05	851	
0503908	10-Jun-05	967	
0503909	10-Jun-05	762	
0503910	13-Jun-05	1620	
0503911	14-Jun-05	41.4	
0503912	14-Jun-05	57.6	
0503913	15-Jun-05	123	
0503914	15-Jun-05	114	
0503915	15-Jun-05	210	
0503916	16-Jun-05	247	
0503917	16-Jun-05	529	
0503918	13-Jun-05	1040	
0503919	13-Jun-05	789	
0503920	13-Jun-05	544	
0503921	13-Jun-05	1250	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
0503922	13-Jun-05	846	
0503923	13-Jun-05	805	
0503924	13-Jun-05	615	
0503925	13-Jun-05	754	
503926	14-Jun-05	2220	X
0503927	14-Jun-05	1620	
0503928	14-Jun-05	41.7	
0503929	14-Jun-05	309	
0503930	14-Jun-05	240	
0503931	14-Jun-05	777	
0503932	14-Jun-05	339	
0503933	14-Jun-05	1000	
0503934	14-Jun-05	1	
0503935	14-Jun-05	116	
0503936	15-Jun-05	1270	
0503937	15-Jun-05	831	
0503940	15-Jun-05	73.7	
0503941	15-Jun-05	75.9	
0503942	16-Jun-05	875	
0503943	16-Jun-05	741	
0503944	16-Jun-05	786	
0503945	16-Jun-05	800	
0503946	16-Jun-05	1050	
0503947	16-Jun-05	1010	
0503948	16-Jun-05	342	
0503949	16-Jun-05	805	
0503950	16-Jun-05	29.4	
0503951	16-Jun-05	865	
0503952	20-Jun-05	114	
0503953	06-Jun-05	613	
0503953	06-Jun-05	613	
0503954	07-Jun-05	60.8	
0503955	08-Jun-05	837	
0503956	08-Jun-05	1120	
0503957	08-Jun-05	135	
0503958	08-Jun-05	90.5	
0503959	08-Jun-05	322	
0503960	09-Jun-05	327	
0503961	09-Jun-05	168	
0503962	10-Jun-05	141	
0503963	10-Jun-05	117	
0503964	10-Jun-05	1170	
0503965	13-Jun-05	771	
0503966	13-Jun-05	1210	
0503967	13-Jun-05	1060	
0503968	13-Jun-05	1020	
0503969	14-Jun-05	1130	
0503970	14-Jun-05	1170	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
0503971	14-Jun-05	1540	
0503972	14-Jun-05	1070	
0503973	14-Jun-05	1210	
0503974	15-Jun-05	765	
0503975	15-Jun-05	246	
0503976	15-Jun-05	144	
0503977	16-Jun-05	290	
0503978	17-Jun-05	1150	
0503979	17-Jun-05	1080	
0503980	17-Jun-05	999	
0503981	14-Jun-05	806	
0503982	10-Jun-05	149	
0503983	09-Jun-05	203	
0503984	14-Jun-05	958	
0503985	15-Jun-05	1550	
0503986	16-Jun-05	1280	
0503987	16-Jun-05	900	
0503989	20-Jun-05	1160	
0503990	20-Jun-05	924	
0503991	22-Jun-05	84.4	
0503992	22-Jun-05	774	
0503993	22-Jun-05	484	
0503994	16-Jun-05	2.09	
0503995	16-Jun-05	1130	
0503996	20-Jun-05	447	
0503997	20-Jun-05	152	
0503999	21-May-05	30	
0504000	21-May-05	666	
0504001	21-Jun-05	152	
0504002	14-Jun-05	940	
0504032	27-Jun-05	84.2	
0504033	28-Jun-05	50.7	
0504034	28-Jun-05	139	
0504035	29-Jun-05	72.7	
0504036	29-Jun-05	1160	
0504037	27-Jun-05	65.3	
0504038	29-Jun-05	464	
0504041	28-Jun-05	964	
0504644	19-Sep-05	1	
0504645	19-Sep-05	1	
0504646	20-Sep-05	76.4	
0504647	20-Sep-05	96.9	
0504653	18-Oct-05	3.45	
0504654	18-Oct-05	4.47	
0504655	18-Oct-05	967	
0504656	18-Oct-05	996	
0504657	18-Oct-05	1	
0504658	18-Oct-05	57.1	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
0504659	18-Oct-05	218	
0504660	18-Oct-05	2.03	
0504770	20-Jun-05	759	
0504771	20-Jun-05	609	
0504772	20-Jun-05	667	
0504773	20-Jun-05	3.98	
0504774	21-Jun-05	44.8	
0504775	21-Jun-05	130	
0504776	21-Jun-05	646	
0504777	21-Jun-05	647	
0504778	21-Jun-05	470	
0504779	21-Jun-05	143	
0504780	22-Jun-05	442	
0504781	22-Jun-05	678	
0504782	22-Jun-05	8.67	
0504783	22-Jun-05	6.43	
0504784	22-Jun-05	211	
0504785	22-Jun-05	106	
0504786	23-Jun-05	422	
0504787	23-Jun-05	1100	
0504788	23-Jun-05	1860	
0504789	23-Jun-05	933	
0504791	24-May-05	97.1	
0504792	22-Jun-05	782	
0504793	22-Jun-05	181	
0504794	22-Jun-05	172	
0504795	23-Jun-05	107	
0504796	23-Jun-05	67.5	
0504797	27-Jun-05	2090	X
0504798	24-Jun-05	577	
0504799	27-Jun-05	631	
0504800	24-Jun-05	645	
0504801	27-Jun-05	974	
0504802	27-Jun-05	767	
0504803	24-Jun-05	746	
0504804	24-Jun-05	1440	
0504805	01-Jul-05	339	
0504809	22-Sep-05	47	
0504810	22-Sep-05	153	
0504858	01-Jul-05	36.2	
0505127	20-Sep-05	28.7	
0505126	20-Sep-05	820	
2730-103	17-Aug-05	425	
2774-144	15-Sep-05	10	
2774-145	15-Sep-05	59.4	
2801-101	10-Oct-05	894	
2801-101-	10-Oct-05	925	
2801-102	12-Oct-05	38	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2801-102-	12-Oct-05	40.9	
2801-103	12-Oct-05	328	
2801-103-	12-Oct-05	328	
2801-104	06-Oct-05	240	
2801-104-	06-Oct-05	243	
2801-105	06-Oct-05	1030	
2801-106	12-Oct-05	99.2	
2801-107	13-Oct-05	801	
2801-108	11-Oct-05	347	
2801-109	10-Oct-05	558	
2801-110	10-Oct-05	362	
2801-111	11-Oct-05	253	
2801-112	12-Oct-05	709	
2801-113	07-Oct-05	635	
2801-114	10-Oct-05	863	
2801-115	12-Oct-05	1240	
2801-116	12-Oct-05	675	
2801-117	11-Oct-05	989	
2801-118	10-Oct-05	888	
2801-119	11-Oct-05	62.3	
2801-120	07-Oct-05	804	
2801-121	20-Oct-05	226	
2801-122	20-Oct-05	112	
2801-123	20-Oct-05	26.5	
2801-202	12-Oct-05	341	
2801-202-	12-Oct-05	329	
2801-203	12-Oct-05	36.9	
2801-203-	12-Oct-05	36.3	
2801-204	06-Oct-05	243	
2801-204-	06-Oct-05	244	
2801-205	12-Oct-05	679	
2801-206	12-Oct-05	591	
2801-207	11-Oct-05	61.5	
2801-208	12-Oct-05	1450	
2801-209	12-Oct-05	887	
2801-210	12-Oct-05	522	
2801-201	10-Oct-05	941	
2801-201-	10-Oct-05	905	
2801-239	06-Oct-05	1150	
2801-240	06-Oct-05	791	
2801-256	07-Oct-05	637	
2801-261	22-Oct-05	387	
2801-262	22-Oct-05	1410	
2801-263	22-Oct-05	580	
2801-266	22-Oct-05	659	
2801-267	22-Oct-05	924	
2801-268	20-Oct-05	26.8	
2801-269	20-Oct-05	412	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2801-270	20-Oct-05	661	
2801-211	11-Oct-05	471	
2801-212	12-Oct-05	1950	
2801-213	11-Oct-05	250	
2801-214	13-Oct-05	785	
2801-215	13-Oct-05	777	
2801-216	12-Oct-05	103	
2801-217	12-Oct-05	817	
2801-218	12-Oct-05	635	
2801-219	12-Oct-05	1470	
2801-220	11-Oct-05	973	
2801-221	12-Oct-05	87.4	
2801-222	12-Oct-05	154	
2801-223	12-Oct-05	859	
2801-224	12-Oct-05	1180	
2801-226	12-Oct-05	162	
2801-227	13-Oct-05	452	
2801-228	07-Oct-05	1080	
2801-229	12-Oct-05	1210	
2801-230	06-Oct-05	584	
2801-231	06-Oct-05	1010	
2801-232	10-Oct-05	1200	
2801-233	10-Oct-05	585	
2801-234	07-Oct-05	500	
2801-235	07-Oct-05	657	
2801-236	10-Oct-05	597	
2801-237	06-Oct-05	190	
2801-238	10-Oct-05	739	
2801-241	10-Oct-05	815	
2801-242	06-Oct-05	419	
2801-243	06-Oct-05	666	
2801-244	12-Oct-05	248	
2801-245	10-Oct-05	1030	
2801-246	06-Oct-05	629	
2801-247	07-Oct-05	760	
2801-248	07-Oct-05	713	
2801-249	07-Oct-05	531	
2801-250	10-Oct-05	183	
2801-251	10-Oct-05	140	
2801-252	10-Oct-05	833	
2801-253	10-Oct-05	1120	
2801-254	10-Oct-05	554	
2801-255	10-Oct-05	353	
2801-264	22-Oct-05	610	
2801-265	22-Oct-05	1190	
2801-271	20-Oct-05	486	
2801-272	20-Oct-05	233	
2823-101	24-Oct-05	197	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2823-102	24-Oct-05	205	
2823-103	24-Oct-05	443	
2823-104	24-Oct-05	646	
2823-105	24-Oct-05	300	
2823-106	21-Oct-05	684	
2823-107	21-Oct-05	154	
2823-108	21-Oct-05	168	
2823-109	20-Oct-05	232	
2823-110	21-Oct-05	640	
2823-111	21-Oct-05	111	
2823-112	21-Oct-05	846	
2823-113	11-Oct-05	349	
2823-114	20-Oct-05	117	
2823-115	20-Oct-05	693	
2823-116	20-Oct-05	118	
2823-117	20-Oct-05	89.1	
2823-118	20-Oct-05	204	
2823-119	20-Oct-05	507	
2823-120	20-Oct-05	310	
2823-121	21-Oct-05	40.1	
2823-122	20-Oct-05	243	
2823-123	20-Oct-05	299	
2823-124	25-Oct-05	458	
2823-125	25-Oct-05	792	
2823-126	25-Oct-05	156	
2823-127	25-Oct-05	180	
2823-128	25-Oct-05	329	
2823-129	25-Oct-05	229	
2823-130	25-Oct-05	180	
2823-131	25-Oct-05	313	
2823-132	25-Oct-05	157	
2823-133	25-Oct-05	109	
2823-134	25-Oct-05	160	
2823-135	27-Oct-05	17.6	
2823-136	26-Oct-05	132	
2823-137	25-Oct-05	533	
2823-138	26-Oct-05	265	
2823-139	26-Oct-05	232	
2823-140	26-Oct-05	120	
2823-141	26-Oct-05	176	
2823-142	26-Oct-05	360	
2823-143	26-Oct-05	15.4	
2823-144	26-Oct-05	583	
2823-145	26-Oct-05	119	
2823-146	26-Oct-05	358	
2823-201	21-Oct-05	98.3	
2823-202	21-Oct-05	811	
2823-203	24-Oct-05	436	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2823-204	25-Oct-05	227	
2823-205	25-Oct-05	152	
2823-206	25-Oct-05	182	
2823-207	25-Oct-05	160	
2823-208	25-Oct-05	787	
2823-209	26-Oct-05	372	
2823-210	26-Oct-05	130	
2832-101	03-Nov-05	90.7	
2832-102	03-Nov-05	73.6	
2832-103	03-Nov-05	92	
2832-104	08-Nov-05	51.6	
2832-105	03-Nov-05	2100	X
2832-106	03-Nov-05	96.9	
2832-107	03-Nov-05	160	
2832-108	03-Nov-05	66.8	
2832-109	03-Nov-05	1160	
2832-111	16-Nov-05	725	
2832-112	16-Nov-05	563	
2832-113	16-Nov-05	826	
2832-114	16-Nov-05	119	
2832-115	16-Nov-05	763	
2832-116	16-Nov-05	184	
2832-117	16-Nov-05	529	
2832-118	16-Nov-05	144	
2832-119	16-Nov-05	192	
2832-120	16-Nov-05	415	
2832-121	16-Nov-05	806	
2832-122	16-Nov-05	1050	
2832-123	16-Nov-05	63.5	
2832-124	16-Nov-05	416	
2832-125	18-Nov-05	808	
2832-126	18-Nov-05	1030	
2832-127	18-Nov-05	1180	
2832-128	18-Nov-05	1040	
2832-129	18-Nov-05	1380	
2832-130	18-Nov-05	1000	
2832-131	17-Nov-05	608	
2832-132	18-Nov-05	671	
2832-133	18-Nov-05	746	
2832-134	18-Nov-05	10	
2832-135	18-Nov-05	1140	
2832-136	17-Nov-05	1850	
2832-137	18-Nov-05	532	
2832-139	18-Nov-05	10	
2832-140	19-Nov-05	1270	
2832-141	19-Nov-05	923	
2832-142	19-Nov-05	974	
2832-143	19-Nov-05	678	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2832-144	19-Nov-05	1340	
2832-145	19-Nov-05	768	
2832-146	19-Nov-05	226	
2832-147	21-Nov-05	843	
2832-148	21-Nov-05	860	
2832-149	21-Nov-05	797	
2832-150	21-Nov-05	538	
2832-151	21-Nov-05	612	
2832-152	21-Nov-05	219	
2832-153	21-Nov-05	566	
2832-154	21-Nov-05	1020	
2832-155	21-Nov-05	1080	
2832-156	21-Nov-05	863	
2832-160	22-Nov-05	11	
2832-161	22-Nov-05	10.7	
2832-162	22-Nov-05	36.3	
2832-163	22-Nov-05	10	
2832-164	22-Nov-05	17.3	
2832-166	22-Nov-05	26.3	
2863-101	29-Nov-05	177	
2863-102	29-Nov-05	514	
2863-103	02-Dec-05	1120	
2863-104	02-Dec-05	977	
2863-105	02-Dec-05	1190	
2863-106	02-Dec-05	1190	
2863-107	02-Dec-05	1060	
2863-108	03-Dec-05	363	
2863-109	02-Dec-05	656	
2863-110	29-Nov-05	198	
2863-111	01-Dec-05	16.7	
2863-112	29-Nov-05	309	
2863-113	01-Dec-05	10	
2863-114	01-Dec-05	10.7	
2863-115	01-Dec-05	196	
2863-116	01-Dec-05	42	
2863-117	05-Dec-05	926	
2863-118	05-Dec-05	555	
2863-119	01-Dec-05	10	
2863-120	02-Dec-05	682	
2863-121	02-Dec-05	496	
2863-122	29-Nov-05	282	
2863-123	29-Nov-05	552	
2863-124	01-Dec-05	10	
2863-125	29-Nov-05	477	
2863-126	05-Dec-05	53.1	
2863-127	05-Dec-05	80.8	
2863-128	05-Dec-05	231	
2863-129	05-Dec-05	154	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2863-130	05-Dec-05	498	
2863-131	03-Dec-05	456	
2863-132	05-Dec-05	243	
2863-133	05-Dec-05	63.5	
2863-134	05-Dec-05	76.6	
2863-135	03-Dec-05	568	
2863-136	05-Dec-05	765	
2863-137	03-Dec-05	667	
2863-138	05-Dec-05	10	
2863-139	05-Dec-05	823	
2863-140	05-Dec-05	742	
2863-141	06-Dec-05	121	
2863-142	06-Dec-05	10	
2863-143	06-Dec-05	159	
2863-144	06-Dec-05	217	
2863-145	06-Dec-05	763	
2863-146	06-Dec-05	79.8	
2863-148	06-Dec-05	83.5	
2863-149	06-Dec-05	286	
2863-150	06-Dec-05	414	
2863-151	06-Dec-05	1720	
2863-152	06-Dec-05	533	
2863-153	06-Dec-05	147	
2863-154	06-Dec-05	443	
2863-155	06-Dec-05	30	
2863-156	07-Dec-05	596	
2863-157	07-Dec-05	650	
2863-158	07-Dec-05	839	
2863-159	07-Dec-05	658	
2863-161	07-Dec-05	325	
2863-162	07-Dec-05	185	
2863-163	07-Dec-05	970	
2863-164	07-Dec-05	847	
2863-165	07-Dec-05	578	
2863-166	07-Dec-05	716	
2863-167	07-Dec-05	93.8	
2863-168	07-Dec-05	204	
2863-169	07-Dec-05	990	
2873-101	16-Dec-05	72.5	
2873-102	16-Dec-05	79	
2873-103	14-Dec-05	511	
2873-104	15-Dec-05	512	
2873-105	16-Dec-05	25	
2873-106	15-Dec-05	801	
2873-107	16-Dec-05	1100	
2873-108	16-Dec-05	197	
2873-112	15-Dec-05	1060	
2873-113	16-Dec-05	843	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2873-114	15-Dec-05	1060	
2873-115	08-Dec-05	169	
2873-118	14-Dec-05	587	
2873-119	16-Dec-05	777	
2873-120	15-Dec-05	862	
2873-121	15-Dec-05	590	
2873-122	16-Dec-05	757	
2873-123	17-Dec-05	921	
2873-124	17-Dec-05	413	
2873-125	17-Dec-05	941	
2873-126	17-Dec-05	731	
2873-127	17-Dec-05	516	
2873-128	17-Dec-05	729	
2873-129	19-Dec-05	320	
2873-130	19-Dec-05	45.4	
2873-131	19-Dec-05	447	
2873-132	19-Dec-05	453	
2873-133	19-Dec-05	480	
2873-134	19-Dec-05	300	
2873-135	19-Dec-05	598	
2873-136	19-Dec-05	350	
2873-137	19-Dec-05	712	
2873-138	20-Dec-05	337	
2873-139	20-Dec-05	96.2	
2873-140	20-Dec-05	233	
2873-141	20-Dec-05	80.8	
2873-142	20-Dec-05	853	
2873-143	20-Dec-05	46	
2873-144	20-Dec-05	39.5	
2873-145	21-Dec-05	94.9	
2873-146	21-Dec-05	33.9	
2873-147	21-Dec-05	73.6	
2873-149	21-Dec-05	1070	
2873-150	21-Dec-05	762	
2873-151	21-Dec-05	633	
2873-152	21-Dec-05	10	
2873-153	21-Dec-05	75.3	
2882-101	04-Jan-06	111	
2882-102	04-Jan-06	1110	
2882-103	04-Jan-06	789	
2882-104	04-Jan-06	697	
2882-105	04-Jan-06	697	
2882-106	04-Jan-06	613	
2882-107	04-Jan-06	854	
2882-108	04-Jan-06	1180	
2882-109	04-Jan-06	655	
2882-110	04-Jan-06	726	
2882-111	04-Jan-06	841	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2882-112	04-Jan-06	1170	
2882-113	05-Jan-06	413	
2882-114	05-Jan-06	534	
2882-115	04-Jan-06	531	
2882-116	05-Jan-06	1390	
2882-117	05-Jan-06	70	
2882-118	05-Jan-06	727	
2882-119	05-Jan-06	458	
2882-120	05-Jan-06	64.4	
2882-121	05-Jan-06	696	
2882-122	05-Jan-06	1610	
2882-123	05-Jan-06	883	
2882-124	05-Jan-06	785	
2882-125	05-Jan-06	84.6	
2882-126	05-Jan-06	789	
2882-127	06-Jan-06	59.9	
2882-128	06-Jan-06	51.5	
2882-129	06-Jan-06	54.9	
2882-130	06-Jan-06	382	
2882-131	06-Jan-06	56.7	
2882-132	06-Jan-06	58.9	
2882-133	06-Jan-06	315	
2882-134	06-Jan-06	49.6	
2882-135	06-Jan-06	74	
2882-136	06-Jan-06	88.1	
2882-137	06-Jan-06	72.3	
2882-138	06-Jan-06	88.9	
2882-139	07-Jan-06	47.9	
2882-140	07-Jan-06	57.8	
2882-141	07-Jan-06	68.6	
2882-142	07-Jan-06	57.4	
2882-143	07-Jan-06	43	
2882-144	07-Jan-06	61.7	
2882-145	07-Jan-06	43.6	
2882-146	07-Jan-06	654	
2882-147	07-Jan-06	56.4	
2882-148	07-Jan-06	67.1	
2882-149	07-Jan-06	58.7	
2882-150	07-Jan-06	64.2	
2882-151	07-Jan-06	53	
2882-153	07-Jan-06	27.8	
2882-154	07-Jan-06	53.1	
2882-155	07-Jan-06	40.4	
2882-156	09-Jan-06	199	
2882-157	09-Jan-06	1420	
2882-158	09-Jan-06	283	
2882-159	09-Jan-06	51.5	
2882-160	09-Jan-06	81.2	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2882-161	09-Jan-06	45.6	
2882-162	22-Nov-05	70.4	
2882-163	09-Jan-06	63.2	
2882-164	09-Jan-06	249	
2882-165	09-Jan-06	74.3	
2882-166	09-Jan-06	539	
2882-167	09-Jan-06	753	
2882-168	10-Jan-06	41.2	
2882-169	10-Jan-06	40.5	
2882-170	10-Jan-06	38.7	
2882-171	10-Jan-06	38.8	
2882-172	10-Jan-06	277	
2882-173	10-Jan-06	273	
2882-174	10-Jan-06	289	
2882-175	10-Jan-06	265	
2901-101	21-Jan-06	146	
2901-102	20-Jan-06	10	
2901-103	21-Jan-06	487	
2901-104	21-Jan-06	74.6	
2901-105	20-Jan-06	169	
2901-106	20-Jan-06	185	
2901-107	20-Jan-06	157	
2901-108	20-Jan-06	261	
2901-109	20-Jan-06	400	
2901-110	20-Jan-06	62.1	
2901-111	19-Jan-06	445	
2901-112	20-Jan-06	10	
2901-113	20-Jan-06	187	
2901-114	19-Jan-06	53.8	
2901-115	19-Jan-06	190	
2901-116	20-Jan-06	205	
2901-117	21-Jan-06	41.4	
2901-118	21-Jan-06	61.3	
2915-101	02-Feb-06	81.2	
2915-102	02-Feb-06	104	
2915-103	01-Feb-06	269	
2915-104	02-Feb-06	114	
2915-105	02-Feb-06	72.7	
2915-106	02-Feb-06	78.1	
2915-107	01-Feb-06	549	
2915-108	01-Feb-06	103	
2915-109	02-Feb-06	116	
2915-110	02-Feb-06	10	
2915-111	01-Feb-06	63.9	
2915-112	01-Feb-06	10	
2915-113	02-Feb-06	147	
2915-114	03-Feb-06	84.5	
2915-115	01-Feb-06	96.9	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
2915-116	01-Feb-06	73.4	
2915-117	03-Feb-06	41.6	
2915-118	03-Feb-06	67.5	
2915-119	06-Feb-06	10	
2915-120	06-Feb-06	156	
2915-121	06-Feb-06	44	
2915-122	07-Feb-06	51	
2938-121	03-Mar-06	92.5	
2938-121	03-Mar-06	86	
2944-101	20-Feb-06	785	
2944-102	21-Feb-06	400	
2944-103	20-Feb-06	167	
2944-104	15-Feb-06	104	
2944-105	20-Feb-06	113	
2944-106	22-Feb-06	10	
2944-107	22-Feb-06	600	
2944-108	20-Feb-06	255	
2944-109	20-Feb-06	550	
2944-110	20-Feb-06	713	
2944-111	20-Feb-06	556	
2944-112	20-Feb-06	669	
2944-113	20-Feb-06	605	
2944-114	20-Feb-06	1060	
2944-115	20-Feb-06	1150	
2944-116	20-Feb-06	970	
2944-117	20-Feb-06	516	
2944-118	15-Feb-06	72.2	
2944-119	20-Feb-06	574	
3037-101	19-May-06	10	
3037-102	19-May-06	760	
3037-103	19-May-06	878	
3037-104	19-May-06	1050	
3037-105	23-May-06	75.4	
3037-106	19-May-06	75.4	
3037-108	23-May-06	75.1	
3037-109	23-May-06	184	
3053-101		81.3	
3053-102		969	
3053-103		10	
3053-104		224	
3053-106		1060	
3073-102		75.7	
3073-104		611	
3134-001		227	
3134-001		227	
3134-002		1340	
3134-002		1260	
3134-004		401	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3134-005		596	
3149-001	21-Aug-06	1180	
3149-002	21-Aug-06	784	
3149-003	21-Aug-06	1390	
3149-004	21-Aug-06	1340	
3149-004-	21-Aug-06	1390	
3149-005	21-Aug-06	1020	
3149-006	21-Aug-06	1230	
3149-007	21-Aug-06	1120	
3149-008	21-Aug-06	1750	
3149-009	21-Aug-06	1130	
3149-010	21-Aug-06	1110	
3149-011	21-Aug-06	1140	
3149-012	21-Aug-06	1240	
3149-013	21-Aug-06	1090	
3149-014	21-Aug-06	1180	
3149-015	21-Aug-06	1590	
3149-016	21-Aug-06	977	
3149-017	21-Aug-06	991	
3149-017-	21-Aug-06	994	
3149-018	22-Aug-06	10	
3149-019	22-Aug-06	1440	
3149-020	22-Aug-06	1430	
3149-021	22-Aug-06	1140	
3149-022	22-Aug-06	53	
3149-023	22-Aug-06	1380	
3149-024	22-Aug-06	2220	X
3227-101	19-Sep-06	143	
3227-103	12-Sep-06	1190	
3227-104	19-Sep-06	114	
3227-105	20-Sep-06	51.6	
3227-106	20-Sep-06	164	
3227-107	15-Sep-06	732	
3227-108	20-Sep-06	146	
3227-109	20-Sep-06	105	
3227-110	21-Sep-06	109	
3227-111	22-Sep-06	629	
3227-112	20-Sep-06	144	
3227-113	21-Sep-06	628	
3227-114	20-Sep-06	149	
3227-115	20-Sep-06	43.2	
3271-101	06-Oct-06	974	
3271-102	06-Oct-06	533	
3271-103	03-Oct-06	1500	
3271-104	07-Oct-06	1100	
3271-105	07-Oct-06	570	
3298-101	06-Dec-06	290	
3298-101-	06-Dec-06	302	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3298-103	29-Nov-06	113	
3298-106	05-Dec-06	1340	
3298-107	06-Dec-06	191	
3298-108	08-Dec-06	844	
3298-109	08-Dec-06	500	
3339-102	06-Jan-07	52.9	
3339-103	08-Jan-07	848	
3339-104	09-Jan-07	448	
3339-105	09-Jan-07	194	
3339-106	09-Jan-07	228	
3339-107	02-Jan-07	1540	
3339-108	05-Jan-07	673	
3339-109	09-Jan-07	64.9	
3339-110	09-Jan-07	571	
3339-111	09-Jan-07	301	
3339-112	09-Jan-07	12.7	
3339-113	09-Jan-07	234	
3339-114	09-Jan-07	288	
3339-115	09-Jan-07	1070	
3339-117	09-Jan-07	18.5	
3339-118	09-Jan-07	455	
3339-119	09-Jan-07	15.1	
3339-120	10-Jan-07	871	
3339-121	10-Jan-07	260	
3339-122	10-Jan-07	1170	
3339-123	10-Jan-07	164	
3339-124	10-Jan-07	523	
3339-125	11-Jan-07	55.3	
3339-126	11-Jan-07	75.6	
3339-127	11-Jan-07	1440	
3339-128	11-Jan-07	767	
3339-129	11-Jan-07	319	
3339-130	11-Jan-07	350	
3339-131	11-Jan-07	849	
3339-132	11-Jan-07	156	
3339-133	16-Jan-07	762	
3339-133-	16-Jan-07	757	
3339-134	16-Jan-07	538	
3339-134-	16-Jan-07	535	
3339-135	16-Jan-07	546	
3339-135-	16-Jan-07	536	
3339-136	16-Jan-07	1100	
3339-137	16-Jan-07	1090	
3339-138	16-Jan-07	182	
3339-139	16-Jan-07	1310	
3339-139-	16-Jan-07	1310	
3339-140	16-Jan-07	178	
3339-141	16-Jan-07	181	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3339-142	17-Jan-07	408	
3339-143	17-Jan-07	303	
3339-143-	17-Jan-07	297	
3339-144	17-Jan-07	37.1	
3339-145	18-Jan-07	696	
3339-146	18-Jan-07	856	
3339-147	18-Jan-07	865	
3339-148	18-Jan-07	57.3	
3339-149	18-Jan-07	59.3	
3339-150	18-Jan-07	87.9	
3339-151	18-Jan-07	73.7	
3339-152	18-Jan-07	48.4	
3339-153	18-Jan-07	53.6	
3339-154	18-Jan-07	10	
3339-155	18-Jan-07	67.3	
3339-156	19-Jan-07	10	
3339-157	18-Jan-07	1020	
3339-158	19-Jan-07	10	
3339-159	19-Jan-07	1530	
3339-160	19-Jan-07	10	
3339-161	19-Jan-07	25.4	
3339-162	19-Jan-07	54.9	
3339-163	19-Jan-07	213	
3339-164	19-Jan-07	30.4	
3339-165	19-Jan-07	66.8	
3339-166	20-Jan-07	1220	
3339-167	20-Jan-07	728	
3339-168	20-Jan-07	170	
3339-169	20-Jan-07	31.7	
3339-170	23-Jan-07	118	
3339-171	23-Jan-07	906	
3339-172	23-Jan-07	149	
3339-172-	23-Jan-07	151	
3339-173	23-Jan-07	914	
3359-101	06-Feb-07	81.2	
3359-102	06-Feb-07	162	
3359-103	06-Feb-07	796	
3359-104	06-Feb-07	45.7	
3359-105	06-Feb-07	1010	
3359-107	07-Feb-07	354	
3359-108	07-Feb-07	1150	
3359-109	08-Feb-07	156	
3359-110	09-Feb-07	835	
3359-111	09-Feb-07	119	
3359-112	09-Feb-07	236	
3359-113	10-Feb-07	61.3	
3359-114	10-Feb-07	182	
3359-115	12-Feb-07	101	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3359-116	12-Feb-07	967	
3359-117	12-Feb-07	649	
3359-118	12-Feb-07	101	
3359-119	12-Feb-07	172	
3359-120	12-Feb-07	41.4	
3359-121	12-Feb-07	74.9	
3359-122	12-Feb-07	60.3	
3377-142	05-Mar-07	94	
3419-139		88.3	
3419-149		189	
3419-205		88.2	
3419-215		196	
3422-101		119	
3422-101-		115	
3422-102		403	
3422-103		1250	
3422-103-		1130	
3422-104		1210	
3449-101		486	
3449-102		458	
3449-103		75.7	
3449-104		38.1	
3483-101	22-May-07	1190	
3483-101-	22-May-07	1180	
3483-102	23-May-07	55.2	
3483-103	21-May-07	54.9	
3483-103-	21-May-07	56.6	
3483-104	22-May-07	39.6	
3483-105	05-May-07	1120	
3483-106	19-May-07	1190	
3483-107	19-May-07	55.6	
3483-108	22-May-07	277	
3521-101		796	
3521-101-		787	
3521-102		808	
3521-102-		785	
3521-103		1240	
3521-103-		1240	
3521-104		1100	
3521-104-		1090	
3521-105		564	
3521-105-		567	
3521-106		809	
3521-106-		824	
3521-107		21.1	
3521-108		49.5	
3521-109		736	
3534-101	29-Jun-07	55.6	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3534-101-	29-Jun-07	55.2	
3534-102	29-Jun-07	55.5	
3534-103	30-Jun-07	80.8	
3534-103-	30-Jun-07	78.2	
3534-104	29-Jun-07	543	
3534-104-	29-Jun-07	545	
3534-105	30-Jun-07	69.7	
3534-105-	30-Jun-07	69.7	
3534-106	29-Jun-07	307	
3534-106-	29-Jun-07	302	
3534-107	29-Jun-07	515	
3534-108	30-Jun-07	48.1	
3534-109	03-Jul-07	39.4	
3534-109-	03-Jul-07	39.5	
3575-101	04-Aug-07	148	
3575-102	04-Aug-07	201	
3575-102-	04-Aug-07	205	
3575-103	06-Aug-07	5	
3575-104	06-Aug-07	51.5	
3575-105	01-Aug-07	459	
3575-105-	01-Aug-07	458	
3575-106	24-Jul-07	797	
3575-106-	24-Jul-07	783	
3575-107	23-Jul-07	87.4	
3575-107-	23-Jul-07	86.8	
3575-108	03-Aug-07	61.3	
3575-108-	03-Aug-07	54.1	
3656-101		175	
3656-102		174	
3656-103		172	
3656-104		188	
3656-105		281	
3656-106		224	
3656-107		199	
3656-108		199	
3656-109		231	
3656-110		212	
3656-111		741	
3656-112		759	
3656-113		739	
3656-114		764	
3656-115		962	
3656-116		921	
3656-117		921	
3656-118		931	
3656-119		314	
3656-120		308	
3656-121		312	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3656-122		315	
3656-123		79.7	
3656-124		77.4	
3656-125		79.9	
3656-126		77.3	
3656-127		213	
3656-128		192	
3656-129		198	
3656-130		221	
3675-101	01-Oct-07	37.4	
3675-102	01-Oct-07	39.6	
3675-103	01-Oct-07	37.5	
3675-104	01-Oct-07	40.2	
3675-105	01-Oct-07	296	
3675-106	01-Oct-07	328	
3675-107	01-Oct-07	335	
3675-108	01-Oct-07	453	
3675-109	02-Oct-07	31.7	
3675-110	02-Oct-07	38.4	
3675-111	02-Oct-07	27.3	
3675-112	02-Oct-07	27.7	
3675-113	02-Oct-07	63	
3675-114	02-Oct-07	60.7	
3675-115	02-Oct-07	63.8	
3675-116	02-Oct-07	61.3	
3675-117	02-Oct-07	58.6	
3675-118	02-Oct-07	60.8	
3675-119	02-Oct-07	6.3	
3675-120	02-Oct-07	63.8	
3675-121	03-Oct-07	67.2	
3675-121-	03-Oct-07	68.1	
3675-123-	03-Oct-07	69.1	
3675-124	03-Oct-07	67.2	
3675-124-	03-Oct-07	67	
3675-122	03-Oct-07	67.7	
3675-122-	03-Oct-07	67.5	
3675-123	03-Oct-07	67.3	
3675-125	04-Oct-07	739	
3675-126	04-Oct-07	771	
3675-126-	04-Oct-07	819	
3675-127	04-Oct-07	808	
3675-128	04-Oct-07	789	
3675-128-	04-Oct-07	803	
3675-129	05-Oct-07	635	
3675-130	05-Oct-07	599	
3675-131	05-Oct-07	638	
3675-132	05-Oct-07	600	
3675-133	08-Oct-07	448	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3675-134	08-Oct-07	448	
3675-135	08-Oct-07	457	
3675-136	08-Oct-07	442	
3691-101	19-Oct-07	48.2	
3691-102	19-Oct-07	47.3	
3691-103	19-Oct-07	58.6	
3691-104	19-Oct-07	47.6	
3691-104-	19-Oct-07	48	
3691-105	19-Oct-07	39.4	
3691-106	19-Oct-07	49.3	
3691-107	19-Oct-07	50	
3691-108	19-Oct-07	49.8	
3691-109	19-Oct-07	48.9	
3691-110	19-Oct-07	47.6	
3691-111	20-Oct-07	1000	
3691-112	20-Oct-07	994	
3691-113	20-Oct-07	594	
3691-114	20-Oct-07	630	
3691-115	20-Oct-07	632	
3691-116	20-Oct-07	631	
3691-117	20-Oct-07	876	
3691-118	20-Oct-07	889	
3691-118-	20-Oct-07	876	
3691-119	20-Oct-07	434	
3691-120	20-Oct-07	442	
3691-121	20-Oct-07	435	
3691-122	20-Oct-07	434	
3691-122-	20-Oct-07	433	
3691-123	23-Oct-07	76.4	
3691-124	23-Oct-07	74.8	
3691-125	23-Oct-07	76.7	
3691-126	23-Oct-07	72.3	
3691-127	23-Oct-07	70.8	
3691-128	23-Oct-07	70.4	
3691-128-	23-Oct-07	71.8	
3691-129	23-Oct-07	68.7	
3691-130	23-Oct-07	68.8	
3691-131	24-Oct-07	757	
3691-132	24-Oct-07	761	
3691-133	24-Oct-07	745	
3691-134	24-Oct-07	714	
3691-135	24-Oct-07	739	
3691-136	24-Oct-07	711	
3691-137	24-Oct-07	524	
3691-138	24-Oct-07	505	
3691-138-	24-Oct-07	508	
3708-101	25-Oct-07	76.8	
3708-102	25-Oct-07	80.3	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3708-103	25-Oct-07	73.5	
3708-104	25-Oct-07	77.3	
3708-105	25-Oct-07	117	
3708-106	25-Oct-07	113	
3708-107	03-Nov-07	449	
3708-108	03-Nov-07	471	
3708-108-	03-Nov-07	470	
3708-109	03-Nov-07	415	
3708-110	03-Nov-07	500	
3708-110-	03-Nov-07	512	
3708-111	03-Nov-07	465	
3708-112	03-Nov-07	449	
3708-112-	03-Nov-07	456	
3708-117	12-Nov-07	766	
3708-118	12-Nov-07	752	
3708-118-	12-Nov-07	764	
3708-119	12-Nov-07	725	
3708-120	12-Nov-07	744	
3750-101	12-Jan-08	186	
3750-102	12-Jan-08	192	
3750-103	12-Jan-08	192	
3750-104	12-Jan-08	166	
3750-105	11-Jan-08	174	
3750-106	11-Jan-08	166	
3750-107	18-Dec-07	692	
3750-107-	18-Dec-07	680	
3750-108	18-Dec-07	679	
3750-111	11-Jan-08	116	
3750-112	11-Jan-08	113	
3750-112-	11-Jan-08	113	
3750-119	16-Jan-08	10	
3750-120	16-Jan-08	84.6	
3750-120-	16-Jan-08	91.7	
3750-121	16-Jan-08	88	
3750-122	16-Jan-08	86	
3750-125	13-Dec-07	46.1	
3750-125-	13-Dec-07	46.7	
3750-126	13-Dec-07	49.3	
3750-126-	13-Dec-07	47.1	
3750-127	10-Jan-08	594	
3750-129	16-Jan-08	389	
3750-130	16-Jan-08	446	
3750-131	16-Jan-08	466	
3750-132	15-Jan-08	947	
3750-133	15-Jan-08	1020	
3750-134	15-Jan-08	960	
3750-135	15-Jan-08	999	
3772-101	14-Feb-08	289	

Table 4-50
Analytical Results for Barium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Barium (ug/L)	Exceeds MCL - Barium (2,000 ug/L)
3772-102	14-Feb-08	215	
3772-103	14-Feb-08	267	
3772-104	14-Feb-08	282	
3772-104-	14-Feb-08	302	
3785-107	26-Feb-08	62	
3785-108	26-Feb-08	56.1	
3785-109	26-Feb-08	112	
3785-110	26-Feb-08	101	
3785-111	28-Feb-08	482	
3785-112	28-Feb-08	498	
3785-113	28-Feb-08	482	
3785-114	28-Feb-08	458	
3785-115	28-Feb-08	907	
3785-116	28-Feb-08	832	
3785-117	29-Feb-08	1730	
3785-118	29-Feb-08	1720	
3785-119	29-Feb-08	1650	
3785-120	29-Feb-08	1880	
3785-122	29-Feb-08	941	
3785-123	29-Feb-08	1020	
3785-124	29-Feb-08	985	
3785-124-	29-Feb-08	951	
3785-125	29-Feb-08	10.1	
3785-126	29-Feb-08	10	
3785-127	29-Feb-08	992	
3785-128	29-Feb-08	1000	
3785-129	29-Feb-08	101	
3785-130	29-Feb-08	90.3	
3785-131	29-Feb-08	94.8	
3785-132	29-Feb-08	104	
3785-133	29-Feb-08	982	
3785-134	29-Feb-08	957	
3785-146	01-Mar-08	393	
3785-147	01-Mar-08	398	
3785-148	01-Mar-08	1100	
3785-149	01-Mar-08	1170	
3785-150	01-Mar-08	181	
3785-151	01-Mar-08	176	
3785-152	01-Mar-08	2140	X
3785-153	01-Mar-08	1890	
3785-154	01-Mar-08	1850	
3785-155	01-Mar-08	2050	X
3866-001	16-Apr-08	373	
3866-002	16-Apr-08	420	
3866-003	16-Apr-08	397	
3866-004	16-Apr-08	486	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2730-103	17-Aug-05	5	X
2774-144	15-Sep-05	1	
2774-145	15-Sep-05	1	
2801-104	06-Oct-05	1	
2801-104-	06-Oct-05	1	
2801-105	06-Oct-05	1	
2801-204	06-Oct-05	1	
2801-204-	06-Oct-05	1	
2801-239	06-Oct-05	1	
2801-231	06-Oct-05	1	
2801-237	06-Oct-05	1	
2801-243	06-Oct-05	1	
2801-246	06-Oct-05	1	
2801-240	06-Oct-05	1.13	
2801-230	06-Oct-05	1.32	
2801-242	06-Oct-05	1.58	
2801-113	07-Oct-05	1	
2801-120	07-Oct-05	1	
2801-256	07-Oct-05	1	
2801-228	07-Oct-05	1	
2801-235	07-Oct-05	1	
2801-247	07-Oct-05	1	
2801-249	07-Oct-05	1	
2801-248	07-Oct-05	1.33	
2801-234	07-Oct-05	1.42	
2801-101	10-Oct-05	1	
2801-101-	10-Oct-05	1	
2801-109	10-Oct-05	1	
2801-110	10-Oct-05	1	
2801-114	10-Oct-05	1	
2801-118	10-Oct-05	1	
2801-201	10-Oct-05	1	
2801-201-	10-Oct-05	1	
2801-232	10-Oct-05	1	
2801-233	10-Oct-05	1	
2801-236	10-Oct-05	1	
2801-238	10-Oct-05	1	
2801-241	10-Oct-05	1	
2801-245	10-Oct-05	1	
2801-250	10-Oct-05	1	
2801-251	10-Oct-05	1	
2801-252	10-Oct-05	1	
2801-253	10-Oct-05	1	
2801-254	10-Oct-05	1	
2801-255	10-Oct-05	1	
2801-108	11-Oct-05	1	
2801-111	11-Oct-05	1	
2801-117	11-Oct-05	1	
2801-119	11-Oct-05	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2801-207	11-Oct-05	1	
2801-211	11-Oct-05	1	
2801-213	11-Oct-05	1	
2801-220	11-Oct-05	1	
2823-113	11-Oct-05	1	
2801-103	12-Oct-05	1	
2801-103-	12-Oct-05	1	
2801-106	12-Oct-05	1	
2801-112	12-Oct-05	1	
2801-115	12-Oct-05	1	
2801-116	12-Oct-05	1	
2801-202	12-Oct-05	1	
2801-202-	12-Oct-05	1	
2801-205	12-Oct-05	1	
2801-208	12-Oct-05	1	
2801-209	12-Oct-05	1	
2801-210	12-Oct-05	1	
2801-212	12-Oct-05	1	
2801-216	12-Oct-05	1	
2801-217	12-Oct-05	1	
2801-218	12-Oct-05	1	
2801-219	12-Oct-05	1	
2801-221	12-Oct-05	1	
2801-222	12-Oct-05	1	
2801-223	12-Oct-05	1	
2801-224	12-Oct-05	1	
2801-226	12-Oct-05	1	
2801-229	12-Oct-05	1	
2801-244	12-Oct-05	1	
2801-206	12-Oct-05	1.34	
2801-203	12-Oct-05	2.31	
2801-102	12-Oct-05	2.33	
2801-203-	12-Oct-05	2.41	
2801-102-	12-Oct-05	2.49	
2801-107	13-Oct-05	1	
2801-214	13-Oct-05	1	
2801-215	13-Oct-05	1	
2801-227	13-Oct-05	1	
2801-122	20-Oct-05	1	
2801-123	20-Oct-05	1	
2801-268	20-Oct-05	1	
2801-271	20-Oct-05	1	
2801-272	20-Oct-05	1	
2823-114	20-Oct-05	1	
2823-115	20-Oct-05	1	
2823-117	20-Oct-05	1	
2823-118	20-Oct-05	1	
2823-119	20-Oct-05	1	
2823-120	20-Oct-05	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2823-122	20-Oct-05	1.02	
2801-269	20-Oct-05	1.21	
2801-270	20-Oct-05	1.24	
2823-109	20-Oct-05	1.36	
2823-123	20-Oct-05	1.37	
2801-121	20-Oct-05	1.48	
2823-116	20-Oct-05	7.58	X
2823-107	21-Oct-05	1	
2823-108	21-Oct-05	1	
2823-111	21-Oct-05	1	
2823-112	21-Oct-05	1	
2823-121	21-Oct-05	1	
2823-201	21-Oct-05	1	
2823-202	21-Oct-05	1	
2823-106	21-Oct-05	1.45	
2823-110	21-Oct-05	1.62	
2801-261	22-Oct-05	1	
2801-263	22-Oct-05	1	
2801-266	22-Oct-05	1	
2801-267	22-Oct-05	1	
2801-264	22-Oct-05	1	
2801-265	22-Oct-05	1	
2801-262	22-Oct-05	1.43	
2823-101	24-Oct-05	1	
2823-102	24-Oct-05	1	
2823-103	24-Oct-05	1	
2823-104	24-Oct-05	1	
2823-105	24-Oct-05	1	
2823-203	24-Oct-05	1	
2823-124	25-Oct-05	1	
2823-125	25-Oct-05	1	
2823-126	25-Oct-05	1	
2823-127	25-Oct-05	1	
2823-128	25-Oct-05	1	
2823-129	25-Oct-05	1	
2823-130	25-Oct-05	1	
2823-131	25-Oct-05	1	
2823-132	25-Oct-05	1	
2823-133	25-Oct-05	1	
2823-134	25-Oct-05	1	
2823-204	25-Oct-05	1	
2823-205	25-Oct-05	1	
2823-206	25-Oct-05	1	
2823-207	25-Oct-05	1	
2823-208	25-Oct-05	1	
2823-137	25-Oct-05	1.25	
2823-136	26-Oct-05	1	
2823-140	26-Oct-05	1	
2823-143	26-Oct-05	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2823-145	26-Oct-05	1	
2823-210	26-Oct-05	1	
2823-139	26-Oct-05	1.67	
2823-142	26-Oct-05	1.97	
2823-209	26-Oct-05	2.1	
2823-144	26-Oct-05	2.14	
2823-141	26-Oct-05	2.22	
2823-138	26-Oct-05	2.69	
2823-146	26-Oct-05	3.98	
2823-135	27-Oct-05	1	
2832-101	03-Nov-05	1	
2832-102	03-Nov-05	1	
2832-103	03-Nov-05	1	
2832-106	03-Nov-05	1	
2832-107	03-Nov-05	1	
2832-108	03-Nov-05	1	
2832-109	03-Nov-05	1.37	
2832-105	03-Nov-05	1.48	
2832-104	08-Nov-05	1	
2832-111	16-Nov-05	1	
2832-114	16-Nov-05	1	
2832-117	16-Nov-05	1	
2832-118	16-Nov-05	1	
2832-119	16-Nov-05	1	
2832-121	16-Nov-05	1	
2832-122	16-Nov-05	1	
2832-124	16-Nov-05	1	
2832-115	16-Nov-05	1.01	
2832-112	16-Nov-05	1.11	
2832-113	16-Nov-05	1.16	
2832-116	16-Nov-05	1.25	
2832-120	16-Nov-05	1.34	
2832-123	16-Nov-05	5.43	X
2832-131	17-Nov-05	1	
2832-136	17-Nov-05	2	
2832-125	18-Nov-05	1	
2832-126	18-Nov-05	1	
2832-127	18-Nov-05	1	
2832-128	18-Nov-05	1	
2832-130	18-Nov-05	1	
2832-132	18-Nov-05	1	
2832-133	18-Nov-05	1	
2832-134	18-Nov-05	1	
2832-139	18-Nov-05	1	
2832-129	18-Nov-05	1.49	
2832-135	18-Nov-05	2	
2832-137	18-Nov-05	2	
2832-143	19-Nov-05	1	
2832-140	19-Nov-05	2	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2832-141	19-Nov-05	2	
2832-142	19-Nov-05	2	
2832-144	19-Nov-05	2	
2832-145	19-Nov-05	2	
2832-146	19-Nov-05	2	
2832-147	21-Nov-05	1	
2832-148	21-Nov-05	1	
2832-149	21-Nov-05	1	
2832-151	21-Nov-05	1	
2832-152	21-Nov-05	1	
2832-153	21-Nov-05	1	
2832-154	21-Nov-05	1	
2832-155	21-Nov-05	1	
2832-156	21-Nov-05	1.06	
2832-150	21-Nov-05	2.24	
2832-160	22-Nov-05	1	
2832-161	22-Nov-05	1	
2832-162	22-Nov-05	1	
2832-163	22-Nov-05	1	
2832-164	22-Nov-05	1	
2882-162	22-Nov-05	1	
2832-166	22-Nov-05	1.27	
2863-102	29-Nov-05	1	
2863-122	29-Nov-05	1	
2863-123	29-Nov-05	1	
2863-125	29-Nov-05	1	
2863-112	29-Nov-05	1.09	
2863-101	29-Nov-05	1.53	
2863-110	29-Nov-05	1.86	
2863-111	01-Dec-05	1	
2863-113	01-Dec-05	1	
2863-116	01-Dec-05	1	
2863-119	01-Dec-05	1	
2863-124	01-Dec-05	1	
2863-115	01-Dec-05	1.41	
2863-114	01-Dec-05	2.21	
2863-104	02-Dec-05	1	
2863-105	02-Dec-05	1	
2863-106	02-Dec-05	1	
2863-107	02-Dec-05	1	
2863-109	02-Dec-05	1	
2863-121	02-Dec-05	1	
2863-120	02-Dec-05	1.02	
2863-103	02-Dec-05	1.15	
2863-108	03-Dec-05	1	
2863-131	03-Dec-05	1	
2863-135	03-Dec-05	1	
2863-137	03-Dec-05	1	
2863-117	05-Dec-05	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2863-118	05-Dec-05	1	
2863-126	05-Dec-05	1	
2863-127	05-Dec-05	1	
2863-128	05-Dec-05	1	
2863-129	05-Dec-05	1	
2863-130	05-Dec-05	1	
2863-136	05-Dec-05	1	
2863-138	05-Dec-05	1	
2863-139	05-Dec-05	1	
2863-140	05-Dec-05	1	
2863-132	05-Dec-05	1.03	
2863-133	05-Dec-05	1.37	
2863-134	05-Dec-05	8.11	X
2863-141	06-Dec-05	1	
2863-142	06-Dec-05	1	
2863-143	06-Dec-05	1	
2863-144	06-Dec-05	1	
2863-145	06-Dec-05	1	
2863-146	06-Dec-05	1	
2863-149	06-Dec-05	1	
2863-150	06-Dec-05	1	
2863-152	06-Dec-05	1	
2863-153	06-Dec-05	1	
2863-154	06-Dec-05	1	
2863-155	06-Dec-05	1	
2863-148	06-Dec-05	1.15	
2863-151	06-Dec-05	1.93	
2863-156	07-Dec-05	1	
2863-159	07-Dec-05	1	
2863-161	07-Dec-05	1	
2863-162	07-Dec-05	1	
2863-163	07-Dec-05	1	
2863-165	07-Dec-05	1	
2863-166	07-Dec-05	1	
2863-167	07-Dec-05	1	
2863-168	07-Dec-05	1	
2863-169	07-Dec-05	1	
2863-164	07-Dec-05	1.11	
2863-158	07-Dec-05	1.75	
2863-157	07-Dec-05	2.42	
2873-115	08-Dec-05	1	
2873-103	14-Dec-05	1	
2873-118	14-Dec-05	1	
2873-104	15-Dec-05	1	
2873-106	15-Dec-05	1	
2873-112	15-Dec-05	1	
2873-114	15-Dec-05	1	
2873-120	15-Dec-05	1	
2873-121	15-Dec-05	1.24	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2873-101	16-Dec-05	1	
2873-102	16-Dec-05	1	
2873-105	16-Dec-05	1	
2873-108	16-Dec-05	1	
2873-113	16-Dec-05	1	
2873-122	16-Dec-05	1	
2873-107	16-Dec-05	2.65	
2873-119	16-Dec-05	3.13	
2873-123	17-Dec-05	1	
2873-126	17-Dec-05	1	
2873-127	17-Dec-05	1	
2873-128	17-Dec-05	1	
2873-125	17-Dec-05	1.38	
2873-124	17-Dec-05	1.54	
2873-131	19-Dec-05	1	
2873-132	19-Dec-05	1	
2873-133	19-Dec-05	1	
2873-134	19-Dec-05	1	
2873-135	19-Dec-05	1	
2873-136	19-Dec-05	1	
2873-130	19-Dec-05	1.26	
2873-137	19-Dec-05	1.27	
2873-129	19-Dec-05	1.45	
2873-138	20-Dec-05	1	
2873-139	20-Dec-05	1	
2873-140	20-Dec-05	1	
2873-141	20-Dec-05	1	
2873-142	20-Dec-05	1	
2873-143	20-Dec-05	1	
2873-144	20-Dec-05	1	
2873-145	21-Dec-05	1	
2873-146	21-Dec-05	1	
2873-147	21-Dec-05	1	
2873-149	21-Dec-05	1	
2873-150	21-Dec-05	1	
2873-152	21-Dec-05	1	
2873-153	21-Dec-05	1	
2873-151	21-Dec-05	1.24	
2882-101	04-Jan-06	1	
2882-102	04-Jan-06	1	
2882-103	04-Jan-06	1	
2882-104	04-Jan-06	1	
2882-105	04-Jan-06	1	
2882-106	04-Jan-06	1	
2882-107	04-Jan-06	1	
2882-108	04-Jan-06	1	
2882-109	04-Jan-06	1	
2882-110	04-Jan-06	1	
2882-111	04-Jan-06	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2882-112	04-Jan-06	1	
2882-115	04-Jan-06	1	
2882-113	05-Jan-06	1	
2882-114	05-Jan-06	1	
2882-116	05-Jan-06	1	
2882-117	05-Jan-06	1	
2882-119	05-Jan-06	1	
2882-121	05-Jan-06	1	
2882-122	05-Jan-06	1	
2882-124	05-Jan-06	1	
2882-125	05-Jan-06	1	
2882-126	05-Jan-06	1	
2882-118	05-Jan-06	1.08	
2882-123	05-Jan-06	1.15	
2882-120	05-Jan-06	1.88	
2882-127	06-Jan-06	1	
2882-129	06-Jan-06	1	
2882-131	06-Jan-06	1	
2882-132	06-Jan-06	1	
2882-133	06-Jan-06	1	
2882-134	06-Jan-06	1	
2882-135	06-Jan-06	1	
2882-136	06-Jan-06	1	
2882-137	06-Jan-06	1	
2882-138	06-Jan-06	1	
2882-130	06-Jan-06	1.45	
2882-128	06-Jan-06	1.49	
2882-139	07-Jan-06	1	
2882-140	07-Jan-06	1	
2882-141	07-Jan-06	1	
2882-142	07-Jan-06	1	
2882-143	07-Jan-06	1	
2882-144	07-Jan-06	1	
2882-145	07-Jan-06	1	
2882-146	07-Jan-06	1	
2882-147	07-Jan-06	1	
2882-148	07-Jan-06	1	
2882-149	07-Jan-06	1	
2882-150	07-Jan-06	1	
2882-151	07-Jan-06	1	
2882-153	07-Jan-06	1	
2882-154	07-Jan-06	1	
2882-155	07-Jan-06	1	
2882-156	09-Jan-06	1	
2882-158	09-Jan-06	1	
2882-159	09-Jan-06	1	
2882-160	09-Jan-06	1	
2882-161	09-Jan-06	1	
2882-163	09-Jan-06	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2882-164	09-Jan-06	1	
2882-165	09-Jan-06	1	
2882-166	09-Jan-06	1	
2882-167	09-Jan-06	1	
2882-157	09-Jan-06	2.1	
2882-168	10-Jan-06	1	
2882-169	10-Jan-06	1	
2882-170	10-Jan-06	1	
2882-171	10-Jan-06	1	
2882-172	10-Jan-06	1	
2882-173	10-Jan-06	1	
2882-174	10-Jan-06	1.03	
2882-175	10-Jan-06	2.06	
2901-111	19-Jan-06	1	
2901-114	19-Jan-06	1	
2901-115	19-Jan-06	2.5	
2901-102	20-Jan-06	1	
2901-105	20-Jan-06	1	
2901-106	20-Jan-06	1	
2901-108	20-Jan-06	1	
2901-109	20-Jan-06	1	
2901-110	20-Jan-06	1	
2901-112	20-Jan-06	1	
2901-113	20-Jan-06	1	
2901-116	20-Jan-06	1	
2901-107	20-Jan-06	2.38	
2901-101	21-Jan-06	1	
2901-104	21-Jan-06	1	
2901-117	21-Jan-06	1	
2901-118	21-Jan-06	1	
2901-103	21-Jan-06	1.57	
2915-103	01-Feb-06	1	
2915-107	01-Feb-06	1	
2915-108	01-Feb-06	1	
2915-111	01-Feb-06	1	
2915-112	01-Feb-06	1	
2915-115	01-Feb-06	1	
2915-116	01-Feb-06	1	
2915-101	02-Feb-06	1	
2915-102	02-Feb-06	1	
2915-104	02-Feb-06	1	
2915-105	02-Feb-06	1	
2915-106	02-Feb-06	1	
2915-109	02-Feb-06	1	
2915-110	02-Feb-06	1	
2915-113	02-Feb-06	1	
2915-114	03-Feb-06	1	
2915-117	03-Feb-06	1	
2915-118	03-Feb-06	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
2915-119	06-Feb-06	1	
2915-120	06-Feb-06	1	
2915-121	06-Feb-06	1	
2915-122	07-Feb-06	1	
2944-104	15-Feb-06	1	
2944-118	15-Feb-06	1	
2944-103	20-Feb-06	1	
2944-105	20-Feb-06	1	
2944-108	20-Feb-06	1	
2944-109	20-Feb-06	1	
2944-110	20-Feb-06	1	
2944-111	20-Feb-06	1	
2944-112	20-Feb-06	1	
2944-114	20-Feb-06	1	
2944-115	20-Feb-06	1	
2944-117	20-Feb-06	1	
2944-119	20-Feb-06	1	
2944-101	20-Feb-06	1.06	
2944-113	20-Feb-06	1.28	
2944-116	20-Feb-06	1.34	
2944-102	21-Feb-06	1	
2944-106	22-Feb-06	1	
2944-107	22-Feb-06	1	
2938-121	03-Mar-06	1	
2938-121	03-Mar-06	1	
3037-101	19-May-06	1	
3037-102	19-May-06	1	
3037-106	19-May-06	1	
3037-104	19-May-06	1.05	
3037-103	19-May-06	1.34	
3037-105	23-May-06	1	
3037-108	23-May-06	1	
3037-109	23-May-06	1	
3149-001	21-Aug-06	1	
3149-002	21-Aug-06	1	
3149-004	21-Aug-06	1	
3149-004-	21-Aug-06	1	
3149-005	21-Aug-06	1	
3149-006	21-Aug-06	1	
3149-009	21-Aug-06	1	
3149-010	21-Aug-06	1	
3149-011	21-Aug-06	1	
3149-012	21-Aug-06	1	
3149-014	21-Aug-06	1	
3149-015	21-Aug-06	1	
3149-016	21-Aug-06	1	
3149-017	21-Aug-06	1	
3149-017-	21-Aug-06	1	
3149-003	21-Aug-06	1.24	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3149-007	21-Aug-06	2	
3149-008	21-Aug-06	2	
3149-013	21-Aug-06	2	
3149-018	22-Aug-06	1	
3149-019	22-Aug-06	1	
3149-021	22-Aug-06	1	
3149-022	22-Aug-06	1	
3149-023	22-Aug-06	1	
3149-024	22-Aug-06	1	
3149-020	22-Aug-06	1.22	
3227-103	12-Sep-06	1.6	
3227-107	15-Sep-06	1	
3227-104	19-Sep-06	1	
3227-101	19-Sep-06	1.8	
3227-105	20-Sep-06	1	
3227-106	20-Sep-06	1	
3227-109	20-Sep-06	1	
3227-112	20-Sep-06	1	
3227-114	20-Sep-06	1	
3227-108	20-Sep-06	2.5	
3227-115	20-Sep-06	5.4	X
3227-110	21-Sep-06	1	
3227-113	21-Sep-06	1	
3227-111	22-Sep-06	1	
3271-103	03-Oct-06	1.58	
3271-101	06-Oct-06	1	
3271-102	06-Oct-06	1	
3271-104	07-Oct-06	1	
3271-105	07-Oct-06	1.45	
3298-103	29-Nov-06	1	
3298-106	05-Dec-06	2.7	
3298-101	06-Dec-06	1	
3298-101-	06-Dec-06	1	
3298-107	06-Dec-06	1	
3298-108	08-Dec-06	1	
3298-109	08-Dec-06	1	
3339-107	02-Jan-07	1	
3339-108	05-Jan-07	1	
3339-102	06-Jan-07	1	
3339-103	08-Jan-07	1	
3339-104	09-Jan-07	1	
3339-105	09-Jan-07	1	
3339-106	09-Jan-07	1	
3339-109	09-Jan-07	1	
3339-110	09-Jan-07	1	
3339-111	09-Jan-07	1	
3339-112	09-Jan-07	1	
3339-114	09-Jan-07	1	
3339-115	09-Jan-07	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3339-117	09-Jan-07	1	
3339-119	09-Jan-07	1	
3339-113	09-Jan-07	1.03	
3339-118	09-Jan-07	1.03	
3339-123	10-Jan-07	1	
3339-124	10-Jan-07	1	
3339-122	10-Jan-07	1.15	
3339-121	10-Jan-07	1.71	
3339-120	10-Jan-07	1.86	
3339-125	11-Jan-07	1	
3339-126	11-Jan-07	1	
3339-127	11-Jan-07	1	
3339-128	11-Jan-07	1	
3339-129	11-Jan-07	1	
3339-130	11-Jan-07	1	
3339-131	11-Jan-07	1	
3339-132	11-Jan-07	1	
3339-136	16-Jan-07	1	
3339-140	16-Jan-07	1	
3339-141	16-Jan-07	1	
3339-139-	16-Jan-07	1.08	
3339-134	16-Jan-07	1.09	
3339-139	16-Jan-07	1.09	
3339-134-	16-Jan-07	1.13	
3339-138	16-Jan-07	1.27	
3339-133-	16-Jan-07	1.31	
3339-133	16-Jan-07	1.32	
3339-135-	16-Jan-07	1.48	
3339-135	16-Jan-07	1.51	
3339-137	16-Jan-07	1.52	
3339-142	17-Jan-07	1	
3339-144	17-Jan-07	1	
3339-143-	17-Jan-07	2.63	
3339-143	17-Jan-07	2.69	
3339-145	18-Jan-07	1	
3339-147	18-Jan-07	1	
3339-148	18-Jan-07	1	
3339-149	18-Jan-07	1	
3339-150	18-Jan-07	1	
3339-151	18-Jan-07	1	
3339-152	18-Jan-07	1	
3339-153	18-Jan-07	1	
3339-154	18-Jan-07	1	
3339-155	18-Jan-07	1	
3339-157	18-Jan-07	1	
3339-146	18-Jan-07	2.09	
3339-156	19-Jan-07	1	
3339-158	19-Jan-07	1	
3339-159	19-Jan-07	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3339-160	19-Jan-07	1	
3339-161	19-Jan-07	1	
3339-162	19-Jan-07	1	
3339-163	19-Jan-07	1	
3339-165	19-Jan-07	1	
3339-164	19-Jan-07	2.06	
3339-166	20-Jan-07	1	
3339-167	20-Jan-07	1	
3339-168	20-Jan-07	1	
3339-169	20-Jan-07	1	
3339-170	23-Jan-07	1	
3339-171	23-Jan-07	1	
3339-173	23-Jan-07	1	
3339-172-	23-Jan-07	2.47	
3339-172	23-Jan-07	2.52	
3359-101	06-Feb-07	1	
3359-102	06-Feb-07	1	
3359-103	06-Feb-07	1	
3359-105	06-Feb-07	1	
3359-104	06-Feb-07	1.1	
3359-108	07-Feb-07	1	
3359-107	07-Feb-07	1.3	
3359-109	08-Feb-07	1	
3359-110	09-Feb-07	1	
3359-111	09-Feb-07	1	
3359-112	09-Feb-07	1	
3359-113	10-Feb-07	1	
3359-114	10-Feb-07	1	
3359-115	12-Feb-07	1	
3359-116	12-Feb-07	1	
3359-118	12-Feb-07	1	
3359-119	12-Feb-07	1	
3359-120	12-Feb-07	1	
3359-121	12-Feb-07	1	
3359-122	12-Feb-07	1	
3359-117	12-Feb-07	1.43	
3377-142	05-Mar-07	1	
3483-105	05-May-07	1	
3483-107	19-May-07	1	
3483-106	19-May-07	1.06	
3483-103	21-May-07	1	
3483-103-	21-May-07	1	
3483-104	22-May-07	1	
3483-108	22-May-07	1	
3483-101	22-May-07	1.47	
3483-101-	22-May-07	1.51	
3483-102	23-May-07	1	
3534-101	29-Jun-07	1	
3534-101-	29-Jun-07	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3534-102	29-Jun-07	1	
3534-104	29-Jun-07	1	
3534-104-	29-Jun-07	1	
3534-106	29-Jun-07	1	
3534-106-	29-Jun-07	1	
3534-107	29-Jun-07	1	
3534-103	30-Jun-07	1	
3534-103-	30-Jun-07	1	
3534-105	30-Jun-07	1	
3534-105-	30-Jun-07	1	
3534-108	30-Jun-07	1	
3534-109	03-Jul-07	1	
3534-109-	03-Jul-07	1	
3575-107	23-Jul-07	1	
3575-107-	23-Jul-07	1	
3575-106	24-Jul-07	1	
3575-106-	24-Jul-07	1	
3575-105	01-Aug-07	1.9	
3575-105-	01-Aug-07	1.9	
3575-108	03-Aug-07	1	
3575-108-	03-Aug-07	1	
3575-101	04-Aug-07	1	
3575-102	04-Aug-07	1	
3575-102-	04-Aug-07	1	
3575-103	06-Aug-07	1	
3575-104	06-Aug-07	1	
3675-101	01-Oct-07	1	
3675-102	01-Oct-07	1	
3675-103	01-Oct-07	1	
3675-104	01-Oct-07	1	
3675-105	01-Oct-07	1	
3675-106	01-Oct-07	1	
3675-107	01-Oct-07	1	
3675-108	01-Oct-07	1.1	
3675-109	02-Oct-07	1	
3675-110	02-Oct-07	1	
3675-111	02-Oct-07	1	
3675-112	02-Oct-07	1	
3675-113	02-Oct-07	1	
3675-114	02-Oct-07	1	
3675-115	02-Oct-07	1	
3675-116	02-Oct-07	1	
3675-117	02-Oct-07	1	
3675-118	02-Oct-07	1	
3675-119	02-Oct-07	1	
3675-120	02-Oct-07	1	
3675-121	03-Oct-07	1	
3675-123	03-Oct-07	1	
3675-123-	03-Oct-07	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3675-124	03-Oct-07	1	
3675-121-	03-Oct-07	1	
3675-122	03-Oct-07	1	
3675-122-	03-Oct-07	1	
3675-124-	03-Oct-07	1	
3675-125	04-Oct-07	1	
3675-126	04-Oct-07	1	
3675-126-	04-Oct-07	1	
3675-127	04-Oct-07	1	
3675-128	04-Oct-07	1	
3675-128-	04-Oct-07	1	
3675-129	05-Oct-07	1	
3675-130	05-Oct-07	1	
3675-131	05-Oct-07	1	
3675-132	05-Oct-07	1	
3675-134	08-Oct-07	1	
3675-133	08-Oct-07	1.1	
3675-135	08-Oct-07	1.1	
3675-136	08-Oct-07	1.8	
3691-101	19-Oct-07	1	
3691-102	19-Oct-07	1	
3691-103	19-Oct-07	1	
3691-104	19-Oct-07	1	
3691-104-	19-Oct-07	1	
3691-105	19-Oct-07	1	
3691-106	19-Oct-07	1	
3691-107	19-Oct-07	1	
3691-108	19-Oct-07	1	
3691-109	19-Oct-07	1	
3691-110	19-Oct-07	1	
3691-111	20-Oct-07	1	
3691-112	20-Oct-07	1	
3691-117	20-Oct-07	1	
3691-118	20-Oct-07	1	
3691-118-	20-Oct-07	1	
3691-119	20-Oct-07	1	
3691-120	20-Oct-07	1	
3691-121	20-Oct-07	1	
3691-122	20-Oct-07	1	
3691-122-	20-Oct-07	1	
3691-113	20-Oct-07	1.19	
3691-114	20-Oct-07	1.23	
3691-116	20-Oct-07	1.24	
3691-115	20-Oct-07	1.83	
3691-123	23-Oct-07	1	
3691-124	23-Oct-07	1	
3691-125	23-Oct-07	1	
3691-126	23-Oct-07	1	
3691-127	23-Oct-07	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3691-128	23-Oct-07	1	
3691-128-	23-Oct-07	1	
3691-129	23-Oct-07	1	
3691-130	23-Oct-07	1	
3691-133	24-Oct-07	1	
3691-134	24-Oct-07	1	
3691-135	24-Oct-07	1	
3691-136	24-Oct-07	1	
3691-131	24-Oct-07	1.17	
3691-137	24-Oct-07	1.21	
3691-138-	24-Oct-07	1.22	
3691-132	24-Oct-07	1.32	
3691-138	24-Oct-07	1.37	
3708-101	25-Oct-07	1	
3708-102	25-Oct-07	1	
3708-103	25-Oct-07	1	
3708-104	25-Oct-07	1	
3708-105	25-Oct-07	1	
3708-106	25-Oct-07	1	
3708-107	03-Nov-07	1	
3708-108	03-Nov-07	1	
3708-108-	03-Nov-07	1	
3708-110	03-Nov-07	1	
3708-110-	03-Nov-07	1	
3708-111	03-Nov-07	1	
3708-112	03-Nov-07	1	
3708-112-	03-Nov-07	1	
3708-109	03-Nov-07	1.17	
3708-117	12-Nov-07	1	
3708-118	12-Nov-07	1	
3708-118-	12-Nov-07	1	
3708-119	12-Nov-07	1	
3708-120	12-Nov-07	1	
3750-125	13-Dec-07	1	
3750-125-	13-Dec-07	1	
3750-126	13-Dec-07	1	
3750-126-	13-Dec-07	1	
3750-107	18-Dec-07	1	
3750-107-	18-Dec-07	1	
3750-108	18-Dec-07	1	
3750-127	10-Jan-08	1	
3750-111	11-Jan-08	1	
3750-112	11-Jan-08	1	
3750-112-	11-Jan-08	1	
3750-106	11-Jan-08	1.04	
3750-105	11-Jan-08	1.15	
3750-101	12-Jan-08	1	
3750-102	12-Jan-08	1	
3750-103	12-Jan-08	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3750-104	12-Jan-08	1	
3750-132	15-Jan-08	1	
3750-133	15-Jan-08	1	
3750-134	15-Jan-08	1	
3750-135	15-Jan-08	1	
3750-119	16-Jan-08	1	
3750-120	16-Jan-08	1	
3750-120-	16-Jan-08	1	
3750-121	16-Jan-08	1	
3750-122	16-Jan-08	1	
3750-130	16-Jan-08	1	
3750-131	16-Jan-08	1	
3750-129	16-Jan-08	1.08	
3772-101	14-Feb-08	1	
3772-102	14-Feb-08	1	
3772-103	14-Feb-08	1	
3772-104	14-Feb-08	1	
3772-104-	14-Feb-08	1	
3785-107	26-Feb-08	1	
3785-108	26-Feb-08	1	
3785-109	26-Feb-08	1	
3785-110	26-Feb-08	1	
3785-111	28-Feb-08	1	
3785-112	28-Feb-08	1	
3785-113	28-Feb-08	1	
3785-114	28-Feb-08	1	
3785-115	28-Feb-08	1	
3785-116	28-Feb-08	1	
3785-117	29-Feb-08	1	
3785-118	29-Feb-08	1	
3785-119	29-Feb-08	1	
3785-120	29-Feb-08	1	
3785-122	29-Feb-08	1	
3785-123	29-Feb-08	1	
3785-124	29-Feb-08	1	
3785-124-	29-Feb-08	1	
3785-125	29-Feb-08	1	
3785-126	29-Feb-08	1	
3785-127	29-Feb-08	1	
3785-128	29-Feb-08	1	
3785-129	29-Feb-08	1	
3785-130	29-Feb-08	1	
3785-131	29-Feb-08	1	
3785-132	29-Feb-08	1	
3785-133	29-Feb-08	1	
3785-134	29-Feb-08	1	
3785-146	01-Mar-08	1	
3785-147	01-Mar-08	1	
3785-148	01-Mar-08	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3785-149	01-Mar-08	1	
3785-150	01-Mar-08	1	
3785-151	01-Mar-08	1	
3785-152	01-Mar-08	1	
3785-153	01-Mar-08	1	
3785-154	01-Mar-08	1	
3785-155	01-Mar-08	1	
3866-001	16-Apr-08	1	
3866-002	16-Apr-08	1	
3866-003	16-Apr-08	1	
3866-004	16-Apr-08	1	
3053-101	NA	1	
3053-103	NA	1	
3053-104	NA	1	
3053-106	NA	1	
3073-102	NA	1	
3073-104	NA	1	
3134-002	NA	1	
3134-002	NA	1	
3134-004	NA	1	
3134-005	NA	1	
3419-139	NA	1	
3419-205	NA	1	
3422-101	NA	1	
3422-101-	NA	1	
3422-102	NA	1	
3449-101	NA	1	
3449-102	NA	1	
3449-103	NA	1	
3449-104	NA	1	
3521-101	NA	1	
3521-101-	NA	1	
3521-102	NA	1	
3521-102-	NA	1	
3521-103	NA	1	
3521-103-	NA	1	
3521-104	NA	1	
3521-104-	NA	1	
3521-105	NA	1	
3521-105-	NA	1	
3521-109	NA	1	
3656-101	NA	1	
3656-102	NA	1	
3656-103	NA	1	
3656-104	NA	1	
3656-105	NA	1	
3656-106	NA	1	
3656-107	NA	1	
3656-108	NA	1	

Table 4-51
Analytical Results for Cadmium in Area-wide Residential Groundwater – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Date Sampled	Concentration - Cadmium (ug/L)	Exceeds MCL - Cadmium (5 ug/L)
3656-109	NA	1	
3656-110	NA	1	
3656-111	NA	1	
3656-112	NA	1	
3656-113	NA	1	
3656-114	NA	1	
3656-115	NA	1	
3656-116	NA	1	
3656-117	NA	1	
3656-118	NA	1	
3656-119	NA	1	
3656-120	NA	1	
3656-121	NA	1	
3656-122	NA	1	
3656-123	NA	1	
3656-124	NA	1	
3656-125	NA	1	
3656-126	NA	1	
3656-127	NA	1	
3656-128	NA	1	
3656-129	NA	1	
3419-149	NA	1.01	
3134-001	NA	1.04	
3419-215	NA	1.08	
3521-108	NA	1.08	
3656-130	NA	1.1	
3521-106-	NA	1.14	
3521-106	NA	1.15	
3521-107	NA	1.17	
3134-001	NA	1.21	
3053-102	NA	1.26	
3422-103-	NA	1.41	
3422-103	NA	1.54	
3422-104	NA	2.98	

Notes:
NA=Not Available.

Table 4-52
Analytical Results for Surface Water – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Concentration - Lead (ug/L)	Q	Exceeds NAWQC - Lead
SW-24	1.7		
SW-25	1.24		
SW-26	2.04		
SW-1, Area 19	25.1		X
SW-30	25.6		X
SW-4, Area 19	1.39		
SW-2, Area 19	540		X
SW-3, Area 19	13.9		X
SW-20	1.26		
SW-19	11.9		X
SW-28	3.82		
SW-31	1.68		
SW-21	31.8		X
SW-15	28.9		X
SW-16	1	U	
SW-33	2.13	J	
SW-23	1.78		
SW-18	1.31		
SW-18	1.23		
SW-19A	1.09		
SW-19A	4.45		

Notes:

U=not detected

J=Analyte present. Reported value may be estimated.

Table 4-53
Analytical Results for Sediment – Old Mines Site
Washington County Lead District Site
Washington County, Missouri

Sample ID	Concentration - Lead (ug/L)	Q	Exceeds SQG - Lead
SED-25	440		X
SED-26	234	J	X
SED-30	75		X
SED-4, Area 19	33.8		X
SED-2, Area 19	183		X
SED-3, Area 19	83.7		X
SED-20	38.8		X
SED-19	70.2		X
SED-28	265		X
SED-31	171		X
SED-21	1110		X
SED-29	59.6		X
SED-14	672		X
SED-15	291		X
SED-16	1620		X
SED-33	368		X
SED-23	239		X
SED-22	437		X
SED-18	93.3		X
SED-18-FD	58.3		X
SED-19A	287		X
SED-19A-FD	103		X

Notes:

SQG= 35.8 mg/kg (TEC) and 128 mg/kg (PEC)

U=not detected

J=Analyte present. Reported value may be estimated.

Table 6-1
Chemicals of Potential Concern for Quantitative Risk Assessment
Washington County Lead District RI/FS

	Exposure Point	
Chemical of Potential Concern	**Soil (Residential Properties)**	**Potable Well Water (Residential Properties)**
Aluminum	X	
Antimony	X	
Arsenic	X	X
Barium	X	X
Cadmium	X	X
Cobalt	X	
Iron	X	
Lead	X	X
Manganese	X	
Vanadium	X	
Zinc	X	

Note: Arsenic retained as a COPC in potable well water based on inadequate detection limits.

Appendix A

Background Data and Previous Investigations

ECOLOGICAL RISK ASSESSMENT WASHINGTON COUNTY LEAD DISTRICT - POTOSI SITE WASHINGTON COUNTY, MISSOURI DECEMBER, 2008

PREPARED BY:

VENESSA MADDEN
ENVIRONMENTAL SERVICES DIVISON
USEPA REGION 7

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Acronyms and Abbreviations

ADD	Average Daily Dose
AUF	Area Use Factor
BCF	Bioconcentration Factor
BERA	Baseline Ecological Risk Assessment
$CaCO_3$	Calcium Carbonate
COPEC	Chemical of Potential Ecological Concern
CPUE	Catch Per Unit Effort
Eco-SSL	Ecological Soil Screening Level
HQ	Hazard Quotient
LOAEL	Lowest-Observed-Adverse-Effect-Concentration
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
mg/kg	Milligrams per Kilogram
NVSS	Non-Volatile Suspended Solids
NAWQC	National Ambient Water Quality Criteria
NOAEL	No Observed Adverse Effect Level
PEC	Probable Effect Concentration
ppm	Parts per Million
PRGs	Preliminary Remediation Goals
QHEI	Qualitative Habitat Evaluation Index
RBC	Risk Based Concentration
RI/FS	Remedial Investigation/Feasibility Study
SLERA	Screening Level Ecological Risk Assessment
SQG	Sediment Quality Guidelines
TEC	Threshold Effect Concentration
TSC	Tissue Screening Concentration
USEPA or EPA	United States Environmental Protection Agency
µg/L	Micrograms per Liter
WCLD	Washington County Lead District
95% UCL	95% Upper Confidence Limit

1.0 SITE BACKGROUND

The Washington County Lead District Site (WCLD) is part of Missouri's Old Lead Belt, which is located in the Ozark Mountains in southeast Missouri (Figure 1). The Old Lead Belt provided approximately 80 percent of the lead produced in the United States. In Washington County, the first mines were mostly surface diggings advanced by manual labor with a pick and shovel. Starting in 1799, deeper mines were started in the area. Additionally, this area is part of the barite mineralization district of Missouri. After the Civil War, numerous small barite mines operated in Washington County. Barite mining boomed in 1926 as the mineral's use for oil drilling mud was discovered and for a number of years, Washington County was the world's leading producer of barite before declining in the 1980s. Many of the later large mining operations reworked lands that were previously hand mined for galena (a mineral source of lead) or barite. Washington County has hosted over 1,000 lead and barite mining, milling, or smelting sites. The Potosi Site encompasses approximately 40 square miles in the central eastern portion of Washington County, Missouri, and contains soil, groundwater, surface water and sediment contaminated with metals associated with historical mining practices.

1.1. ENVIRONMENTAL SETTING AND CONTAMINANTS OF POTENTIAL CONCERN

The existing information describing the habitat and ecology of the area includes maps, aerial photography, and several ecological studies. *A Biological Assessment Report for Mill Creek* (MDNR, 2006) evaluated the habitat and aquatic macroinvertebrate communities of Mill Creek, the primary stream flowing through the site. Also, information pertaining to the aquatic ecology of the site can be found in the Missouri Department of Conservation's (MDC) Big River Inventory and Assessment. This report includes fish, mussel, crayfish, aquatic insect, and habitat data for the streams and tributaries found within the site. EPA Region 7 Conservation Opportunity Area maps also identify high priority terrestrial and aquatic conservation areas that may occur within the site boundaries. Finally, general references, such as *The Fishes of Missouri* (Pflieger, 1997) and *The Wild Mammals of Missouri* (Schwartz *et al*., 2001) were consulted.

1.1.1. Aquatic Habitat. Mill Creek flows northeasterly from Potosi, Missouri, to its confluence with the Big River near Blackwell, Missouri (Figure 2). The classified section of stream is approximately 12 miles long and is categorized as a Class "P" stream (MDNR, 2005), meaning that it maintains flow during periods of drought. The stream has beneficial use designations for livestock and wildlife watering, protection of warm water aquatic life, human health fish consumption, and whole body contact (MDNR, 2005).

The Mill Creek watershed is known to be affected by mine related activities. Shibboleth Branch, a downstream tributary to Mill Creek, was placed on the 2002 303(d) list of impaired waters in Missouri for Non-Volatile Suspended Solids (sediment) (MDNR, 2003). A barite tailing dam breach in 1975 on Shibboleth Branch impacted Mill Creek and Big River with sediment for about 9 months. Fountain Farm Branch may also contribute barite mining sediment to Mill Creek. Pond Creek, an upstream tributary to Mill Creek, is 303 (d) listed for sediment from barite mining sources (MDNR, 2002). In 2002-2003, MDNR identified elevated levels of

dissolved barite in the Big River with probable origins in the Mill Creek watershed (MDNR, 2003).

As part of EPA's 2008 sampling effort for the risk assessment, the instream aquatic and riparian habitat of Mill Creek and its tributaries were evaluated using the Ohio Qualitative Habitat Evaluation Index (QHEI). The QHEI is a physical habitat index designed to provide an empirical, quantified evaluation of general lotic macrohabitat characteristics that are important to fish communities. A detailed analysis of the development of the QHEI is available in Rankin (1989) and Rankin (1995). The QHEI results indicate that stream substrates are composed primarily of gravel, cobble and boulders, which is typical of Ozark streams. Instream cover and habitat varied from site to site, with Mill Creek generally having better instream habitat due to the presence of deeper riffles and pools. Generally, the riparian zones are forested and wide, although some sites are directly impacted by cropland, highway infrastructure, and/or residential development. All of the sites within the Mill Creek watershed have QHEI scores of either good or excellent. Mine A Breton Creek and Bates Creek, which flow through the western edge of Potosi and are not part of the Mill Creek watershed, scored only fair on the QHEI. These scores may be due to the impacts of development in Potosi, Highway 8 infrastructure, and agricultural impacts along riparian corridors.

There are also a number of tailings ponds associated with the site. These ponds are inhabited by a variety of fish and other aquatic species, as well as semi-aquatic receptors that feed on aquatic life.

1.1.2. Terrestrial Habitat. The Washington County Lead District Site is located in the Ozark Highland eco-region and is situated within the Salem Plateau section of the Ozark physiographic province (Fenneman, 1938). The Site topography can be described as hilly and is located within a region of several hundred feet of relief and altitudes ranging from 700 to 1,000 feet above mean sea level (msl). The Ozark highlands are dominated by oak and oak-hickory forests.

The vegetation present at the Site is similar in composition to that typical of the region. The climax vegetation community in the Ozarks is mature oak-hickory forest. Due to over 300 years of human activity, other vegetation communities at the site are also important. Such communities include; urban areas, pasture, cultivated farmlands, and second growth oak and hickory. There are also a number of former tailings ponds that have since filled in with soil, and are currently in the early stages of forest succession.

1.1.3. Geology. Barite and lead (galena) mineralization in the area occurs in fractured and solution bedrock and red clay residuum derived chiefly from the Cambrian Potosi and Eminance dolomite. Some mineralization in veins and small isolated residual deposits are associated with the Ordovician Dolomite in northeastern Washington County and southeastern Franklin County. The majority of the barite mines were processed from residuum. The residuum is often capped at the surface by layers of barren soil that range from several inches to three to four feet deep. In many areas, vegetation now covers the previously mined areas, with mine waste intermingled with the soil.

1.1.4. Wildlife. The wildlife of Washington County is typical of the Ozarks. A species list for Washington County, provided by the MDC, can be found in Table 1 (Appendix A). Two federally listed bat species, the gray bat (*Myotis grisescens*) and the Indiana bat (*Myotis sodalis*) occur in Washington County. Gray bats use caves year around. Winter hibernation caves are typically vertical (pit) caves with cool, stable temperatures ranging from 42 to 52 degrees Fahrenheit. Summer caves are warmer (58 to 77 degrees Fahrenheit) with domed ceilings. The caves are usually found within two miles of rivers, streams, or lakes. Gray bats may require a corridor of forest vegetation between roosting caves and foraging areas. It is estimated that 95% of all gray bats hibernate in eight caves, three of which are in Missouri. Most of the known gray bat caves are south of the Missouri River, particularly in the Ozarks, although a few exist north of the river.

Indiana bats hibernate in the winter in limestone caves. Over 85% of the total population of Indiana bats hibernate in only eight specific locations, one of which is located in Washington County. However, in the spring, Indiana bats migrate to summer roosting and foraging locations in northern Missouri. Summer habitat includes mature riparian and adjacent upland forests. Full forest canopy with open understory is preferred. Snags and cavity trees (greater than 9" diameter at breast height) are also important. Indiana bats forage in riparian forest and over water.

In addition, two state listed species occur in Washington County, the northern harrier hawk (*Circus cyaneus*) and the plains spotted skunk (*Spilogale putorius*). The northern harrier is a rare summer resident and uncommon winter resident of Missouri. It inhabits open fields, prairies, native grass plantings and shallow marshes. Northern harriers require dense herbaceous vegetation, with nearly 100% canopy cover, reaching a height of 10" by mid-May. The plains spotted skunk is very rare in Missouri. It inhabits fencerows, vegetated gullies and brushy borders with logs, brush piles, snags, rocky outcrops, open prairies, and riparian woodland areas.

1.1.5. Site Related Contaminants. The primary contaminants of potential ecological concern at this site are metals. Metals, especially lead and barium, are typically associated with mine wastes at the site. Toxicological profiles for each Contaminant of Potential Ecological Concern (COPEC) can be found in Appendix G.

1.2. CONTAMINANT FATE AND TRANSPORT.

The primary sources of contamination at the Site are mine waste piles and tailings ponds which provided disposal areas for the majority of the mine waste. Based on the nature of the contamination at the WCLD site and the physical characteristics of the site, potential routes of contaminant migration likely include the following:

- Impounded Sediment/Surface Water-to-Flowing Surface Water
- Soil-to-Surface Water/Sediment Migration
- Soil-to-Groundwater Migration
- Groundwater-to-Surface Water Migration
- Biological/Food Chain Bioaccumulation, and
- Soil-to-Air Migration.

The following subsections present a discussion of each potential route of contaminant migration for the site.

1.2.1. Impounded Sediment/Surface Water-to-Flowing Surface Water. Tailings ponds can constitute a source of contaminated sediment and surface water. Breached dams have, in the past, been a major source of contamination to flowing surface water. For example, a barite tailing dam breach in 1975 on Shibboleth Branch impacted Mill Creek and Big River with sediment for about 9 months.

1.2.2. Soil-to-Surface Water/Sediment. Contaminants from source areas may be transported by the wind or surface water runoff and deposited in downgradient floodplains, surface waters and/or settle in surface water bodies as sediment. Shallow groundwater beneath the source areas is also likely to flow into these surface water systems.

1.2.3. Soil-to-Groundwater. During periods of rainfall, water may infiltrate the source areas. A portion of the dissolved constituents are adsorbed by the soils underneath the affected surface soil zone. The remaining portion of the constituents, which is desorbed from the soil particles, continues to leach downward with infiltrating precipitation until it reaches the groundwater. The potential for contaminants to move into groundwater from source material is dependent on several physical and chemical properties of the particular contaminants. Metals (or their related salts) may readily become soluble with infiltrating precipitation and are likely to contaminate groundwater.

1.2.4. Groundwater-to-Surface Water. Groundwater flow beneath tailings ponds and waste piles generally flows consistent with the original surface topography and will generally flow towards and discharge to the nearest surface water features. Shallow groundwater under native soils in this region also typically flows toward the nearest stream and discharges to surface water; however, it is important to note that there are numerous bedrock outcrops in the area. When infiltrating groundwater from the source areas flows directly into bedrock, the flow direction has not been determined.

1.2.5. Biological/Food Chain. Biological migration may occur through uptake, bioaccumulation, and food-chain transfer.

1.2.6 Soil-to-Air. Fine-grained materials from source areas may be transported by the wind and released to the atmosphere. Constituents bound to surface soils may be transported as suspended particulates or dust to downwind locations. Factors influencing the potential for dust entrainment into the atmosphere include surface roughness, surface soil moisture, soil particle sizes, type and amount of vegetative cover, amount of soil surface exposed to the eroding wind force, physical and chemical properties of the soil, wind velocity, and other meteorological conditions.

2.0 SITE INVESTIGATION AND DATA ANALYSIS

The Screening Level Ecological Risk Assessment (SLERA) (EPA, 2008a) addressed the degree to which the environments and ecological receptors associated with the WCLD site are potentially at risk. The WCLD SLERA used data from the preliminary site assessment to screen COPECs, as well as to develop the screening level problem formulation for the site. Despite the site-specificity of the initial evaluation, many estimates and assumptions were required to fill gaps in needed knowledge and data to complete the evaluation of potential risk. The following sections discuss the scope and extent of additional investigations done to address the uncertainties inherent in the initial evaluation. Detailed information on the site investigation and data analysis, including all SOPs, can be found in the Field Sampling Plan (EPA, 2008b). The SLERA addressed the entire WCLD, which includes the Potosi, Richwoods and Old Mines sites. The site investigation and data analysis for this Baseline Ecological Risk Assessment (BERA) focuses only on the Potosi portion of the WCLD. Additional BERAs for the Richwoods and Old Mines Sites are forthcoming.

2.1. ASSESSMENT OF SOIL

The soil data from the preliminary site investigation targeted yards of home, and soil samples were only analyzed for arsenic, barium, cadmium and lead. Therefore, additional soil samples were collected throughout the Potosi site, with emphasis on areas in which sensitive wildlife of concern (e.g., ground-feeding insectivores) would most likely forage, such as the forested edges of clearings and forested riparian areas. Ground-feeding insectivore species are particularly sensitive because as they forage for soil invertebrates they directly ingest the metals found in the soil. In addition to targeting specific ecological habitats that are important to ground-feeding insectivores, all surface soil samples were analyzed for Target Analyte List (TAL) total metals and the following physical characteristics: percent moisture, total organic carbon (TOC), and field pH.

The surface soil investigation included the collection of eleven soil samples from mining impacted areas from the 0 to 12-inch depth interval (Figure 3). Background locations within the boundaries of the Potosi Site are not available due to the widespread nature of the mining. Therefore, background metal concentrations are based on the range typical for Missouri (EPA, 2003a).

2.2. ASSESSMENT OF SURFACE WATER

The aquatic habitat of primary concern within the Potosi Site is the Mill Creek watershed, which originates within the site and flows into the Big River near Blackwell, Missouri. Although some surface water data from Mill Creek is available from the Biological Assessment Report for Mill Creek (MDNR, 2003), no data was collected in Mill Creek or its tributaries as part of EPA's preliminary site investigation. Therefore, additional surface water samples were collected for the BERA at a 0 to 12-inch depth interval in Mill Creek and its tributaries (Figure 4). In addition, several tailings ponds throughout the site, as well as Bates Creek and Mine A Breton Creek, which flow through the western edge of Potosi, were sampled. Surface water sampling included the following:

- One sample from Hornsey Lake (tailings pond);
- Two samples from tailings ponds west of Highway 21;
- One sample from Powder Springs Lake (tailings pond on Shibboleth Branch);
- One sample from Apex lake (tailings pond on Pond Creek);
- One sample from Mine A Breton Creek;
- One sample from Bates Creek (tributary to Mine A Breton Creek);
- One sample from Long Hollow Branch (tributary to Fountain Farm Branch, which is a tributary to Mill Creek);
- One sample from Keyes Branch (tributary to Fountain Farm Branch, which is a tributary to Mill Creek);
- One sample from the East Branch of Mill Creek;
- Two samples from Shibboleth Branch (tributary to Mill Creek);
- One sample from Fountain Farm Branch (tributary to Mill Creek);
- One sample from the east branch of Pond Creek (tributary to Mill Creek);
- One sample from the west branch of Pond Creek (tributary to Mill Creek); and
- Six samples from Mill Creek (major tributary to the Big River).

Surface water samples were filtered in the field to represent the dissolved portion of metals, which provides a better estimation of the bioavailable concentrations of contaminants present in surface waters. It also enables a direct comparison to Federal and State of Missouri Water Quality Criteria, which are based on dissolved metals. All surface water samples were analyzed for hardness, pH, temperature, and dissolved oxygen.

2.3. ASSESSMENT OF SEDIMENT

Sediment data was co-located with surface water samples (Figure 4). Sediment samples were collected at a 0 to 6-inch depth interval. All sediment samples were sieved in the field and analyzed for total metals, TOC, and percent moisture. Because Mill Creek originates within the Potosi Site, where mining impacts are widespread, two sampling locations on the Big River (upstream of the Leadwood access) were considered background for the Potosi site.

2.4. ASSESSMENT OF BIOTA

2.4.1. Terrestrial Biota Sampling. At each soil sampling location, vegetation was collected and analyzed for cadmium, lead, and selenium. Although the same target analyte list used for soil was requested for biological tissue, the Region 7 laboratory was only able to analyze for the metal listed above. In addition to the analysis of vegetation, earthworm abundance was surveyed at each soil sampling location. The Catch Per Unit Effort (CPUE) was recorded, with one person collecting worms for a total of 10 minutes. Because ground feeding insectivores are primary receptors of concern for metals in soil, the earthworm CPUE data will be used to verify the presence or absence of earthworms in impacted areas at the site.

2.4.2. Aquatic Biota Sampling. Fish samples (whole body) were collected at six locations on Mill Creek, corresponding to the sediment/surface water sampling locations and the macroinvertebrate surveys. In addition, fish were collected at one location in Pond Creek, as

well as in two of the tailings ponds. The Region 7 laboratory analyzed for cadmium, lead and selenium. In addition to fish tissue, three crayfish samples from Mill Creek were collected and analyzed for cadmium, lead, and selenium.

2.4.3. Macroinvertebrate Survey. A macroinvertebrate survey was also performed at six locations corresponding to the sediment and surface water sampling locations on Mill Creek**.** The methods, analysis, and results of the macroinvertebrate survey for the site are described in detail in Appendix C.

3.0 CONCEPTUAL ECOLOGICAL EXPOSURE MODEL

The assessment of pathways by which ecological receptors may be exposed to COPECs from the Potosi Site includes an examination of the source areas, existing migration pathways, and potential exposure routes as well as those that may be reasonably expected in the future. The determination of exposure pathways was made by a careful evaluation of the current extent of affected media at the site in relation to habitats, and the results of a fate and transport assessment that evaluates constituent migration pathways.

For an exposure pathway to be complete, a chemical must be able to travel from the source to ecological receptors and be taken up by the receptors via one or more exposure routes (EPA, 1997). Incomplete exposure pathways are characterized by either a disruption in chemical transport to plants or animals or by the absence of chemicals in a medium to which an ecological receptor is exposed. Identifying complete exposure pathways before the analysis step focuses the exposure and ecological effects analyses on only those chemicals that can reach ecological receptors.

The site conceptual exposure model integrates and summarizes the information concerning sources, constituent migration pathways, exposure routes, and receptors into a combination of potential exposure pathways. The site conceptual exposure model, including a graphical representation of the complete exposure pathways to ecological receptors by direct exposure or through food-chain transfer, is presented in Figure 5. This model identifies the key potential release mechanisms, transport media, exposure media, exposure routes, and terrestrial and aquatic ecological receptors for the site. The identified potential exposure pathways included in this model are complete pathways (i.e., COPECs are expected to reach receptors). Table 2 presents the assessment and measurement endpoints as well as the risk questions for the Potosi site.

Ecological endpoints are identified within the ERA process to provide a basis for characterizing risks. Ecological endpoints are the types of actual or potential impacts a chemical stressor has on an ecological component. An assessment endpoint is "an explicit expression of the environmental value that is to be protected" (EPA, 1992). Ecological risk assessments involve multiple species that are likely to be exposed to differing degrees and to respond differently to the same contaminant. Nonetheless, it is not practical or possible to directly evaluate risks to all of the individual components of the ecosystem at a site. Therefore, site-specific assessment endpoints for the site were developed based on the available information. The assessment endpoints are listed below:

- Protection of terrestrial plant communities from the toxic effects (on survival and reproduction) of COPECs present in surface soils via direct exposure.

- Protection of terrestrial soil invertebrate communities from the toxic effects (on survival and reproduction) of COPECs present in surface soils via direct exposure.

- Protection of terrestrial herbivore communities from the toxic effects (on survival and reproduction) of COPECs present in vegetation.

- Protection of terrestrial ground-feeding insectivore communities from the toxic effects (on survival and reproduction) of COPECs present in soil invertebrate tissue.

- Protection of terrestrial carnivore communities from the toxic effects (on survival and reproduction) of COPECs present in terrestrial wildlife prey tissue.

- Protection of benthic invertebrate communities from the toxic effects (on survival and reproduction) of COPECs present in sediment via direct exposure.

- Protection of piscivore communities from the toxic effects (on survival and reproduction) of COPECs present in fish and crayfish tissue.

- Protection of aerial-feeding insectivore communities from the toxic effects (on survival and reproduction) of COPECs present in aquatic emergent invertebrate tissue.

3.1. REPRESENTATIVE RECEPTORS

The following sections describe representative receptors for each of the assessment endpoints outlined above. Specific plant and soil invertebrate species are not described in this section because these assessment endpoints are being addressed in the context of direct exposure to plant and soil invertebrate communities.

3.1.1. Herbivorous Mammal. A prairie vole (*Microtus ochrogaster*) was selected as a representative receptor of an herbivorous mammal that may be present in the terrestrial and wetland habitats of concern at the site. The prairie vole represents the ground-burrowing members of the rodent family and is found in the north and central plains of the United States and southern Canada. The prairie vole inhabits a wide variety of prairie plant communities and moisture regimes, including riparian as well as short-grass or tall-grass communities. Prairie voles prefer areas of dense vegetation, such as grass, alfalfa, or clover. Prairie voles are largely herbivorous, consuming primarily green succulent vegetation, but also roots, bark, seeds, and fungi (EPA, 1993).

3.1.2. Herbivorous Bird. A mourning dove (*Zenaida macroura*) was selected as a representative receptor of an herbivorous bird that may be present in at the site. In Missouri, good nesting habitat consists of fairly low, shrubby trees in fence rows or at forest edges. Conifers are often used for first nests, but are less likely to be used in later nesting attempts. Doves roost in habitats ranging from grasslands to dense timber. Mourning doves are migratory in southern Missouri. However, a few choice locations with abundant food and roosting sites hold flocks all year. Food and water generally are not limiting factors for mourning doves in Missouri. Harvesting of crops, such as corn and wheat, leaves behind waste grain, and is an important dove food source. Corn from the previous year's harvest is the primary food in spring. Doves also eat waste wheat, sorghum, sunflower, and rice after the summer harvest. In the fall, seeds of foxtail, bristlegrass, ragweed, pigweed, and other annual weeds are eaten.

3.1.3. Ground-Feeding Insectivore Mammal. A short-tailed shrew (*Blarina brevicauda*) was selected as a representative receptor of a ground-feeding insectivorous mammal that may be present in terrestrial habitats of concern at the site. The northern short-tailed shrew ranges throughout the north-central and northeastern United States and into southern Canada. Short-tailed shrews inhabit a wide variety of habitats and are common in areas with abundant vegetative cover. Short-tailed shrews need cool, moist habitats because of their high metabolic and water-loss rates. The short-tailed shrew is primarily carnivorous. Stomach analyses indicate that insects, earthworms, slugs, and snails can make up most of the shrew's food, while plants, fungi, millipedes, centipedes, arachnids, and small mammals also are consumed. Small mammals are consumed more when invertebrates are less available. Shrews are able to prey on small vertebrates because they produce a poisonous secretion that is transmitted during biting (EPA, 1993).

3.1.4. Ground-Feeding Insectivore Bird. The American woodcock (*Scolopax minor*) was selected as a representative receptor of a ground-feeding insectivorous bird that may be present in terrestrial habitats of concern at the site. Woodcocks inhabit both woodlands and abandoned fields, particularly those with rich and moderately to poorly drained loamy soils, which tend to support abundant earthworm populations. Woodcocks feed primarily on invertebrates found in moist upland soils by probing the soil with their long prehensile-tipped bill. Earthworms are the preferred diet, but when earthworms are not available, other soil invertebrates are consumed (EPA, 1993).

3.1.5. **Carnivorous Mammal**. A long-tailed weasel (*Mustela frenata*) was selected as a representative receptor of a carnivorous mammal that may be present in terrestrial habitats of concern at the site. Weasels, once common in Missouri, are now rare. They use a variety of habitats, but especially edges of fields and woods. They are commonly found close to farm buildings and have been known to raid hen houses. Ounce for ounce, long-tailed weasels are the most aggressive and ferocious predators in Missouri, often killing animals two to three times their size. They are fond of rats, mice, moles, shrews, and even cottontail rabbits (Schwartz *et al*., 1981).

3.1.6. Carnivorous Bird. A red-tailed hawk (*Buteo jamaicencis*) was selected as a representative receptor of a carnivorous bird that may be present in terrestrial habitats of concern at the site. The red-tailed hawk is the most common *Buteo* species in the United States. Breeding populations are distributed throughout most wooded and semi-wooded regions of the United States and Canada south of the tundra, although some populations are found in deserts and prairie habitats. They appear to prefer a mixed landscape containing old fields, wetlands, and pastures for foraging interspersed with groves of woodlands and bluffs, as well as streamside trees for perching and nesting. Red-tail hawks build their nests close to the tops of trees in low-density forests and often in trees that are on a slope. In winter, night roosts usually are in thick conifers if available and in other types of trees otherwise. Red-tail hawks hunt primarily from an elevated perch, often near woodland edges. Small mammals, including mice, shrews, voles, rabbits, and squirrels, are important prey, particularly during winter. Red-tail hawks also eat a wide variety of foods depending on availability, including birds, lizards, snakes, and large insects. In general, red-tail hawks are opportunistic and will feed on whatever species are most abundant. Winter food choices vary with snow cover; when small mammals such as

voles become unavailable (under the snow), red-tail hawks may concentrate on larger prey, such as pheasants (EPA, 1993).

3.1.7. Piscivorous Mammal. A river otter (*Lutra canadensis*) was selected as a representative receptor of a piscivorous mammal that may be present in or near wetlands and aquatic habitats of concern at the site. The river otter lives along streams and lakes. Only infrequently does it wander far from them when traveling from one water body to another. Its den is usually never more than a few hundred yards from water. A family group may hunt and fish over a waterway of 10 or more miles. The river otter feeds on crayfish, frogs, turtles, earthworms, aquatic insects, and fish (EPA, 1993).

3.1.8. Piscivorous Bird. A belted kingfisher (*Ceryle alcyon*) was selected as a representative receptor of a piscivorous bird. Belted kingfishers are typically found along rivers and streams and along lake and pond edges. They prefer waters that are free of thick vegetation that obscures the view of the water and water that is not completely overshadowed by trees. Kingfishers also require relatively clear water in order to see their prey and are noticeably absent in areas when waters become turbid. Belted kingfishers nest in burrows within steep earthen banks devoid of vegetation beside rivers, streams, ponds, and lakes; they also have been found to nest in slopes created by human excavations such as road-cuts and landfills. Sandy soil banks, which are easy to excavate and provide good drainage, are preferred. In general, kingfishers nest near suitable fishing areas when possible but will nest away from water and feed in bodies of water other than the one closest to home (EPA, 1993).

3.1.9. Aerial-Feeding Mammal. The federally endangered gray bat (*Myotis grisescens*) was selected as the representative aerial-feeding insectivore. Missouri contains about 20% of the total population of gray bats. Most of the known gray bat caves are south of the Missouri River, particularly in the Ozarks, although a few exist north of the river. Adult female gray bats enter hibernation caves in September and October and are soon followed by males and juvenile females. Gray bats hibernate in large, loose clusters across the ceiling and walls. Female bats emerge from hibernation in early March to mid-April, while males do not leave until mid-April or May. Pregnant females roost in maternity colonies in caves separate from males and young females from late May to June. Each female gives birth to a single young in June. Gray bats exhibit great loyalty to their roosting and hibernating sites and will return to the same locations year after year. Gray bats are active at night, foraging over water or along shorelines. They are insectivorous and eat a variety of flying aquatic and terrestrial insects. They may fly up to 12 miles from the roosting cave to the feeding area. Gray bats use caves the entire year. Winter hibernation caves are typically vertical (pit) caves with cool, stable temperatures ranging from 42 to 52 degrees Fahrenheit. Summer caves are warmer (58 to 77 degrees Fahrenheit) with domed ceilings. The caves are usually found within two miles of rivers, streams, or lakes.

4.0 EXPANDED CONTAMINANT SCREEN

Because arsenic, cadmium, lead, and zinc were identified early on as the primary metals of concern at mining sites in Region 7, the data from the preliminary site assessment, which was used for the WCLD SLERA, limited laboratory analysis to these metals (with barium being added due to barite mining). Thus, the COPECs identified in the SLERA for the WCLD site were based on data for these five metals. However, there is a concern over the potential ecological impacts from trace metals that may be associated with mining. Therefore, as part of the baseline problem formulation for the Potosi site, soil, surface water, and sediment was analyzed and screened for all of the metals on the laboratory's target analyte list. As part of the baseline risk assessment, the COPECs may also be refined in one or more of the following ways (USEPA, 2001):

- Comparison to background,
- Frequency and magnitude of detection, and
- Dietary considerations (essential nutrients).

4.1. SOIL SCREENING RESULTS

Tables 3-18 (Appendix A) show the results of the expanded soil screening. In addition to the inclusion of all metals, the data was screened more extensively using Ecological Soil Screening Levels (Eco-SSLs) for birds, mammals, soil invertebrates, and plants. Eco-SSLs (EPA, 2003b) are concentrations of contaminants in soils protective of ecological receptors that commonly contact soil or ingest biota that live in or on soil. Eco-SSLs also serve as the Preliminary Remediation Goals (PRGs) for soil at the site. For birds and mammals, Eco-SSLs are available for herbivores, carnivores, and insectivores. Carnivore Eco-SSLs are based on long-tailed weasels and red-tailed hawks; insectivore Eco-SSLs are based on short-tailed shrews and American woodcocks; and herbivore Eco-SSLs are based on meadow voles and mourning doves. In general, all of these receptors can be found in south eastern Missouri, except for the meadow vole. Therefore, the exposure assumptions for the meadow vole were replaced with exposure assumptions for the prairie vole, which is the vole species more commonly found in southern Missouri. All exposure assumptions for prairie voles, including normalized ingestion rates, are based on information in the *Wildlife Exposure Factors Handbook* (EPA, 1993).

The Eco-SSLs for ground-feeding insectivores are generally the most conservative of the three receptor groups. This is driven by exposure assumptions that predict higher direct exposure to soil via foraging. Therefore the insectivore avian and mammalian Eco-SSLs are presented in the tables. However, if the Eco-SSLs for insectivores are exceeded, concentrations are also compared to herbivores and carnivores. For some of the metals, Eco-SSLs have not been developed for all four of the receptor categories mentioned above. Only the Eco-SSLs that are currently available are presented. We have also found that some of the Eco-SSLs are below typical background soil concentrations. This usually occurs when the geometric mean of the No-Observed-Adverse-Effect-Level (NOAEL) data for reproduction and growth is higher than the lowest bounded Lowest-Observed-Adverse-Effect-Level (LOAEL) for reproduction, growth, or mortality. In this case the Eco-SSL is calculated based on the highest bounded NOAEL below the lowest bounded LOAEL. Rather than using an Eco-SSL that is below background, we have

calculated the Eco-SSL based on the geometric mean of the NOAEL data for reproduction and growth. This approach typically provides a protective level that is also within or above the typical range of background concentrations.

Because this expanded screening is being done as part of the baseline risk assessment, supplemental components, such as background concentrations and frequency of detection, will also be considered (EPA, 2001). The mining in Washington County is so widespread that representative background data from within the Potosi site was difficult to locate. Therefore, background was based on typical background concentrations in Missouri (EPA, 2003a). The following sections address potential risk due to all of the metals screened. Although calcium, iron, magnesium, potassium and sodium data was collected at the site, these compounds are considered essential nutrients and were not included in the screen. Finally, detailed toxicity profiles for COPECs are included in Appendix E.

4.1.1. Aluminum. Soluble aluminum, not total recoverable aluminum, is associated with uptake and toxicity to ecological receptors. However, soluble aluminum is difficult to measure in the field, and the presence of soluble forms is pH dependent. For these reasons, an alternative method for evaluating potential aluminum toxicity is to measure soil pH. Thus, aluminum is identified as a COPEC only for those sites in which soil pH is less than 5.5 (EPA, 2003c). Soil pH at the site ranged from 6.98 to 7.64 (Table 3). Therefore, aluminum is not considered a COPEC.

4.1.2. Antimony. Concentrations of antimony exceed the Eco-SSL for mammals at all of the locations sampled. Antimony does not exceed the Eco-SSL for soil invertebrates at any of the locations (Table 4). Eco-SSLs for birds and plants are not available (EPA, 2003d). According to the methods outlined in the Eco-SSL guidance, the Eco-SSL for antimony for mammals is based on the highest bounded NOAEL that is less than the lowest bounded LOAEL. This approach results in an antimony Eco-SSL that is below typical background levels. Alternatively, a mammalian Eco-SSL calculated using the geometric mean of the NOAEL data for reproduction and growth results in a mammalian Eco-SSL of 62 mg/kg. Thus, based on the recalculated Eco-SSL for mammals and the existing Eco-SSL for soil invertebrates, antimony is not retained as a COPEC at the site.

4.1.3. Arsenic. The highest concentration of arsenic at SS01 slightly exceeds the Eco-SSL for plants (HQ = 1), however arsenic at all other locations was below Eco-SSLs for plants, birds and mammals (Table 5). An Eco-SSL is not available for soil invertebrates (EPA, 2003e). Given the low HQ at one location for a single receptor group (plants), and the fact that soil concentrations generally fall within typical background concentrations, arsenic is not retained as a COPEC at the site.

4.1.4. Barium. Barium concentrations exceed Eco-SSLs for soil invertebrates and mammals at all locations (Table 6). Eco-SSLs are not available for plants or birds (EPA, 2005a). Because barium exceeds the Eco-SSL for mammalian insectivores, the mammalian herbivore and carnivore Eco-SSLs were also reviewed. Barium concentrations do not exceed the Eco-SSL for prairie voles (13,500 mg/kg) or long-tailed weasels (9,100 mg/kg). Therefore, barium is

considered a COPEC for soil invertebrates and mammalian ground-feeding insectivores at the site.

4.1.5. Beryllium. Beryllium concentrations at all locations are below Eco-SSLs for mammals and soil invertebrates (EPA, 2005b) (Table 7). Eco-SSLs are not available for birds or plants. Beryllium concentrations are also below typical background concentrations. Therefore, beryllium is not considered a COPEC in soil at the site.

4.1.6. Cadmium. Cadmium concentrations exceed the Eco-SSLs for birds and mammals at all locations, but do not exceed the Eco-SSLs for plants or soil invertebrates at any location (Table 8). Because cadmium exceeds Eco-SSLs for avian and mammalian insectivores, carnivore and herbivore Eco-SSLs were also reviewed. Cadmium concentrations do not exceed herbivore or carnivore Eco-SSLs for birds or mammals (EPA, 2005c). Therefore, cadmium is retained as a COPEC for avian and mammalian ground-feeding insectivores.

4.1.7. Chromium. Total chromium concentrations slightly exceed the Eco-SSL for birds at locations SS01, SS04, and SS09 (HQs between 1 and 2). The concentration at location SS01 was also slightly higher than the Eco-SSL for mammals (HQ = 1). Eco-SSLs are not available for plants or soil invertebrates (EPA, 2005d) (Table 9). Although chromium concentrations slightly exceed Eco-SSLs for mammalian and avian ground-feeding insectivores, concentrations at the site are at or below background for Missouri soils. Therefore, chromium is not retained as a COPEC at the site.

4.1.8. Cobalt. Cobalt concentrations slightly exceed the Eco-SSL for plants at locations SS03 and SS04 (HQ=1), but cobalt does not exceed the Eco-SSL for birds at any location (EPA, 2005e) (Table 10). Cobalt concentrations are also within the background range for Missouri soils. Therefore, cobalt is not retained as a COPEC at the site.

4.1.9. Copper. Copper concentrations exceed the Eco-SSL for birds at SS01, SS03, SS04, SS07, SS10 and SS11 (HQs between 1 and 2). Copper also exceeds the Eco-SSL for mammals at locations SS01, SS03 and SS04 (HQs = 1). Copper concentrations do not exceed the Eco-SSLs for plants or soil invertebrates at any location (EPA, 2007a) (Table 11). Because copper exceeds Eco-SSLs for avian and mammalian insectivores, mammalian and avian carnivore and herbivore Eco-SSLs were also reviewed. Copper concentrations do not exceed herbivore or carnivore Eco-SSLs. Therefore, copper is retained as a COPEC for avian and mammalian ground-feeding insectivores.

4.1.10. Lead. Lead concentrations exceed the Eco-SSLs for birds, mammals and plants at every location. At locations SS01 and SS10, lead concentrations also exceed the Eco-SSL for soil invertebrates (EPA, 2005f) (Table 12). Because lead concentrations exceed the Eco-SSL for insectivores, the herbivore and carnivore Eco-SSLs were also reviewed. Lead concentrations exceed the Eco-SSLs for avian herbivores (46 mg/kg), avian carnivores (510 mg/kg), and mammalian carnivores (460 mg/kg). Therefore, lead is considered a COPEC at the site for avian herbivores, avian ground-feeding insectivores, avian carnivores, mammalian insectivores, mammalian carnivores, plants and soil invertebrates.

4.1.11. Manganese. Manganese exceeds the Eco-SSL for plants at all locations, as well as the Eco-SSL for soil invertebrates at all but three locations (SS01, SS02 and SS06). Manganese concentrations are below the Eco-SSLs for birds and mammals at all locations (EPA, 2007b) (Table 13). Although the concentrations at the site exceed the Eco-SSLs plants and soil invertebrates, these Eco-SSLs are below typical background concentrations in Missouri. Therefore, manganese concentrations at the site were compared to background. Only two locations slightly exceed average background, but are still within the range of typical background concentrations. And, concentrations at the site are well below the Eco-SSLs for birds and mammals. Therefore, manganese is not retained as a COPEC for the site.

4.1.12. Nickel. Nickel concentrations do not exceed Eco-SSLs for plants, soil invertebrates, birds or mammals at any of the locations (EPA, 2007c) (Table 14). Therefore nickel is not retained as a COPEC in soil at the site.

4.1.13. Selenium. Selenium exceeds the Eco-SSLs for plants, soil invertebrates, birds, and mammals at all locations (EPA, 2007d) (Table 15). Selenium also exceeds typical background concentrations for Missouri. Because selenium concentrations exceed the Eco-SSLs for insectivore birds and mammals, Eco-SSLs for carnivores and herbivores were reviewed. Selenium concentrations exceed the Eco-SSLs for mammalian carnivores (2.8 mg/kg) and avian herbivores (2.2 mg/kg). Therefore, selenium is retained as a COPEC at the site for mammalian ground-feeding insectivores, mammalian carnivores, avian insectivores, avian herbivores, plants and soil invertebrates.

4.1.14. Silver. Silver concentrations do not exceed Eco-SSLs for plants, birds or mammals at any of the locations. An Eco-SSL for soil invertebrates is not available (EPA, 2006) (Table 16). Based on the Eco-SSLs that are available, silver is not retained as a COPEC for soil at the site.

4.1.15. Vanadium. Vanadium concentrations exceed the Eco-SSL for birds at every location, but do not exceed the Eco-SSL for mammals at any location (EPA, 2005g) (Table 17). The Eco-SSL for avian wildlife is lower than the reported range of background soil concentrations in Missouri. Moreover, an Eco-SSL based on the geometric mean of the NOAEL values for reproduction and growth in birds is also lower than typical background concentrations. The majority of the vanadium toxicity data for birds is based on chicken studies. Chickens may be unusually sensitive to vanadium. Two toxicity studies using Japanese quail are cited in the Eco-SSL document (EPA, 2005). These studies identified a reproductive NOAEL of 39.0 mg/kg, and a growth NOAEL of 46.1 mg/kg (Hafez and Kratzer, 1976). A vanadium Eco-SSL based on either of the Japanese quail NOAELs is greater than concentrations found on site. Based on further analysis of the Eco-SSL bird data, as well as the fact that vanadium does not exceed the mammalian Eco-SSL or typical background concentrations, it is not retained as a COPEC for soil at the site.

4.1.16. Zinc. Zinc exceeds the Eco-SSLs for plants, soil invertebrates, birds, and mammals at all locations (EPA, 2007e) (Table 18). Because zinc exceeds the Eco-SSLs for insectivores, the carnivore and herbivore Eco-SSLs were also reviewed. Zinc concentrations also exceed the Eco-SSL for avian herbivores (950 mg/kg). Therefore, zinc is retained as a COPEC at the site for

plants, soil invertebrates, avian herbivores, and mammalian and avian ground-feeding insectivores.

4.2. SEDIMENT SCREENING RESULTS

Tables 19 through 34 (Appendix A) present the results of the expanded sediment screen. Sediment concentrations were compared to the Consensus-based Sediment Quality Guidelines (SQG) (MacDonald *et al*., 2000). The SQGs include both a Threshold Effect Concentration (TEC) and a Probable Effect Concentration (PEC). The initial sediment screen in the SLERA (EPA, 2008a) compared the maximum sediment concentration to the TECs. As part of the refinement of COPECs, the sediment concentrations at each location will be compared to both the TECs and PECs.

As with soil, the sediment screen is expanded to include the entire TAL for metals (excluding essential nutrients). However, because this extended screen is included as part of the BERA, background concentrations and frequency of detection will be considered. When SQGs are not available, background concentrations will be used. Because Mill Creek and its tributaries originate within the site, representative background data from the Big River will be used. Mill Creek is a tributary of the Big River.

4.2.1. Aluminum. The transport and partitioning of aluminum in the environment is determined by its chemical properties, as well as the characteristics of the environmental matrix that affect its solubility. At a pH >5.5, naturally occurring aluminum compounds exist predominantly in an undissolved form. The pH of the aquatic environments (surface water) at the Potosi site were 8.0 or above (Table 19). Although the pH of the sediment was not directly measured, it is unlikely that the pH in the aquatic environments of the site is low enough to allow for the release of soluble aluminum. Therefore, aluminum is not retained as a COPEC in sediment at the site.

4.2.2. Antimony. SQGs are not available for antimony; therefore, antimony concentrations from the site were compared to background concentrations from the Big River watershed (Table 20). Antimony in sediment does not exceed background; therefore, it is not retained as a COPEC for the site.

4.2.3. Arsenic. Arsenic concentrations exceed the TEC at three locations (HQs between 1 and 2). However, concentrations do not exceed the PEC at any of the locations sampled. Given that only three locations exceed the TEC, and with very low HQs, arsenic is not retained as a COPEC in sediment at the site (Table 21).

4.2.4. Barium. SQGs are not available for barium; therefore, concentrations from the site were compared to background concentrations in the Big River watershed (Table 22). Barium in sediment exceeds background at every location sampled. Therefore, barium is retained as a COPEC in sediment at the site.

4.2.5. Beryllium. SQGs are not available for beryllium; therefore, concentrations from the site were compared to background concentrations from the Big River watershed (Table 23). Although the detection limits for beryllium varied, beryllium was generally non-detect in

background as well as site related sediments. Beryllium was detected at one location above the detection limit; however, given the low frequency of detection, beryllium is not retained as a COPEC in sediment for the site.

4.2.6. Cadmium. Cadmium concentrations exceed the TEC at every location sampled. Concentrations also exceed the PEC at six of the locations sampled (Table 24). Therefore, cadmium is retained as a COPEC in sediment at the site.

4.2.7. Chromium. Chromium concentrations exceed the TEC at two locations (HQ=1), but do not exceed the PEC at any of the locations sampled. Given that only two locations exceed the TEC, and with very low HQs, chromium is not retained as a COPEC in sediment at the site (Table 25).

4.2.8. Cobalt. A PEC is not available for cobalt; therefore, concentrations from the site were compared to background concentrations from the Big River watershed (Table 26). Cobalt in sediment does not exceed background; therefore it is not retained as a COPEC for the site.

4.2.9. Copper. Copper concentrations exceed the TEC at two locations (HQs between 1 and 2), but concentrations do not exceed the PEC at any of the locations sampled. Given that only two locations exceed the TEC, and with very low HQs, copper is not retained as a COPEC in sediment at the site (Table 27).

4.2.10. Lead. Lead concentrations exceed the TEC at every location, and concentrations exceed the PEC at fourteen of the locations sampled (Table 28). Therefore, lead is retained as a COPEC in sediment at the site.

4.2.11. Manganese. SQGs are not available for manganese; therefore, concentrations from the site were compared to background concentrations from the Big River watershed (Table 29). Manganese in sediment slightly exceeds background at one location. However all other locations are below background, therefore it is not retained as a COPEC in sediment at the site.

4.2.12. Nickel. Nickel concentrations do not exceed the TEC or the PEC at any of the locations sampled (Table 30). Therefore, nickel is not retained as a COPEC in sediment at the site.

4.2.13. Selenium. SQGs are not available for selenium. However, because of the bioaccumalative nature of selenium, assessment of selenium in the aquatic environment is better accomplished by evaluating fish tissue concentrations. Selenium ecotoxicity in the aquatic environment is driven by bioaccumulation in invertebrate tissue and exposure to fish via the diet. Accumulation in invertebrate tissue occurs via surface/pore water, sediment and diet. EPA has developed a draft fish tissue chronic criterion value for selenium (EPA, 2004). This chronic criterion is expressed as a concentration in whole-body fish tissue, and is equal to 7.91 mg/kg dry weight. In addition, the USFWS has developed a whole-body fish tissue threshold of 4.0 mg/kg dry weight. The maximum fish tissue concentration at the site is 2.24 mg/kg WW (8.0 mg/kg dw) (Table 31). However, all other locations showed fish tissue concentrations below the EPA criterion. Therefore, selenium is not retained as a COPEC for the site.

4.2.14. Silver. Because SQGs are not available for silver, concentrations from the site were compared to background concentrations from the Big River watershed (Table 32). Silver in sediment does not exceed background; therefore, it is not retained as a COPEC for the site.

4.2.15. Vanadium. Because SQGs are not available for vanadium, concentrations from the site were compared to background concentrations from the Big River watershed (Table 33). Vanadium in sediment exceeds background at every location; therefore, it is retained as a COPEC in sediment at the site.

4.2.16. Zinc. Zinc concentrations exceed the TEC at every location sampled. Concentrations also exceed the PEC at eight of the locations sampled (Table 34). Therefore, zinc is retained as a COPEC in sediment at the site.

4.3. SURFACE WATER SCREENING RESULTS

Tables 35 through 50 (Appendix A) present the results of the expanded surface water screen. Dissolved metal concentrations in surface water were compared to the chronic National Ambient Water Quality Criteria (NAWQC). NAWQC were not available for barium, beryllium, cobalt or vanadium. In those cases, water quality criteria available from various states, as well as the Great Lakes Tier II values (EPA, 1993), were used. For metals in which criteria are hardness dependent, the criteria were calculated based on the hardness for each location.

Fish tissue concentrations were also available for cadmium, lead, and selenium. If surface water concentrations exceeded water quality criteria for any of these three metals, they were further evaluated using Aquatic Tissue Screening Concentrations (TSCs). TSCs were developed by Sheppard (1996) with the purpose of assessing potential ecological risk from chemical residues in tissue to the aquatic biota themselves. TSCs are based on the following formula:

$$TSC = AWQC \times BCF$$

Where:
AWQC = Chronic ambient water quality criteria;
BCF = Bioconcentration Factor (EPA, 1999).

Because the TSC is based on chronic ambient water quality criteria, they would be expected to be protective of 95% of the fish genera. The 95% UCL for fish tissue from the site was compared to the TSC. If fish tissue concentrations exceed the TSC, the contaminant was retained as a COPEC for surface water.

4.3.1. Aluminum. Given the pH of surface water at the site is well above 5.5, the soluble forms of aluminum are likely not available (Table 35). Therefore, aluminum is not retained as a COPEC in surface water at the site.

4.3.2. Antimony. An antimony surface water criteria is available from the State of Indiana. Antimony was non-detect in surface water at a detection limit of 2.0 µg/L, which is below the criteria of 80 µg/L (Table 36). Therefore, antimony is not retained as a COPEC for surface water at the site.

4.3.3. Arsenic. Arsenic concentrations do not exceed the NAWQC at any of the locations sampled; therefore, arsenic is not retained as a COPEC in surface water at the site (Table 37).

4.3.4. Barium. Barium exceeds the state of Ohio's chronic criteria of 220 µg/L at every location sampled; therefore, barium is retained as a COPEC in surface water at the site (Table 38).

4.3.5. Beryllium. Beryllium concentrations in surface water do not exceed the state of Missouri's chronic criteria (5.0 µg/L); therefore, beryllium is not retained as a COPEC in surface water at the site (Table 39).

4.3.6. Cadmium. The Region 7 laboratory was not able to achieve the detection limits necessary to screen cadmium. The lowest reporting limit for cadmium was 1.0 µg/L, and the chronic NAWQC for cadmium is 0.41 µg/L, based on an average site specific hardness of 208 mg/kg $CaCO_3$. Therefore, although cadmium was non-detect at every location sampled, cadmium is a COPEC at the site due to inadequate laboratory detection limits (Table 40). However, cadmium can be furthered screened using the aquatic TSC, which for cadmium is equal to 0.36 mg/kg. The 95% UCL for cadmium in fish tissue at the site is 0.117 mg/kg. Although the detection limits for cadmium in surface water were inadequate, the fish tissue concentrations indicate that cadmium in surface water is not accumulating in fish tissue at potentially harmful concentrations. Therefore, cadmium is not retained as a COPEC in surface water at the site.

4.3.7. Chromium. Chromium concentrations do not exceed the NAWQC at any of the locations sampled; therefore, chromium is not retained as a COPEC in surface water at the site (Table 41).

4.3.8. Cobalt. Cobalt concentrations do not exceed the Great Lakes Tier II water quality value of 3.0 µg/L, as presented in Suter and Tsao (1996). Therefore, cobalt is not retained as a COPEC in surface water at the site (Table 42).

4.3.9. Copper. Copper concentrations do not exceed the NAWQC at any of the locations sampled; therefore, copper is not retained as a COPEC in surface water at the site (Table 43).

4.3.10. Lead – Lead exceeds the NAWQC at locations SW01 and SW22, with HQs equal to 3 at both sites (Table 44). Lead was furthered screened using the aquatic TSC, which is equal to 1.65 mg/kg (adjusted for hardness). The 95% UCL for lead in fish tissue at the site is 2.37 mg/kg. Therefore, lead is retained as a COPEC for surface water based on the fact that lead concentrations in surface water exceed NAWQC, and because fish tissue concentrations exceed the TSC.

4.3.11. Manganese. Manganese concentrations slightly exceed the Great Lakes Tier II water quality value of 80 µg/L, as presented in Suter and Tsao (1996), at one location. However, all other locations are below the Tier II value. Therefore, manganese is not retained as a COPEC in surface water at the site (Table 45).

4.3.12. Nickel. Nickel concentrations do not exceed the NAWQC at any of the locations sampled; therefore, nickel is not retained as a COPEC in surface water at the site (Table 46).

4.3.13. Selenium. Selenium was non-detect at all locations at a detection limit of 5.0 µg/L. The detection limit is equal to the NAWQC; therefore, selenium is not retained as a COPEC in surface water at the site (Table 47). In addition, selenium in fish tissue does not exceed EPA's draft fish-tissue criterion of 7.91 mg/kg dw (Table 31).

4.3.14. Silver. Although silver was not detected in surface water at a detection limit of 1.0 µg/L, this concentration exceeds the only benchmarks that were available (Table 48). The State of Minnesota provides a chronic criteria of 0.12 µg/L, and a Great Lakes Tier II secondary chronic value of 0.36 µg/L is provided in Suter and Tsao (1996). Therefore, silver is retained as a COPEC for surface water at the site due to inadequate laboratory detection limits.

4.3.15. Vanadium. Vanadium concentrations do not exceed the Great Lakes Tier II water quality value of 19.0 µg/L, as presented in Suter and Tsao (1996). Therefore, vanadium is not retained as a COPEC in surface water at the site (Table 49).

4.3.16. Zinc. Zinc concentrations do not exceed the NAWQC at any of the locations sampled; therefore, zinc is not retained as a COPEC in surface water at the site (Table 50).

4.4. SUMMARY OF COPEC RESULTS

In terrestrial habitats, barium, lead, selenium, and zinc are COPECs for several key receptors (soil invertebrates, plants, birds and mammals). Cadmium and copper are COPECs for ground-feeding insectivorous birds and mammals. In aquatic habitats, barium and vanadium are COPECs for sediment based on a comparison with background concentrations from within the watershed. Cadmium, lead, and zinc are COPECs for sediment because they exceed the TEC, as well as the PEC at one or more locations. In surface water, silver is a COPEC because of inadequate detection limits. Barium and lead are COPECs for surface water because they exceed the Tier II criteria and the NAWQC, respectively.

5.0 TERRESTRIAL RISK CHARACTERIZATION

In the ecological risk characterization, data on exposure and effects are integrated into a statement about risk to each assessment endpoint. A weight-of-evidence approach is used to interpret the implications of different studies and tests for each assessment endpoint. Risk characterization constitutes the final phase of the risk assessment process.

The preliminary assessment endpoints have been refined based on the results of the expanded contaminant screen. Now, further evaluation using additional measurement endpoints, as well as more site-specific exposure and toxicity information will be used to further characterize risk.

5.1. PLANT AND SOIL INVERTEBRATE COMMUNITIES

Barium, lead, selenium and zinc are contaminants of concern for plant and soil invertebrate communities that are directly exposed to these metals in soil. Additional measurement endpoints for these assessment endpoints include the analysis of metal concentrations in vegetation collected at each soil sampling location, and the catch per unit effort of earthworms at each soil sampling location.

Relationships between soil metal concentrations and earthworm CPUE were evaluated visually using scatter plots (Appendix F). No relationships between soil invertebrate abundance (number of individuals) and concentrations of barium, lead, selenium, or zinc in soil were indicated by these plots. Trend lines were relatively flat.

Visual inspection of the vegetation collected at every location did not reveal any signs of stress (wilting, leaf yellowing), nor were there any signs of impact to overall vegetative growth. Each vegetation sample collected in the field was analyzed for cadmium, lead, and selenium. Relationships between lead and selenium concentrations in soil and vegetation were evaluated visually using scatter plots. For lead, there appears to be a positive linear relationship between soil concentrations and concentrations in vegetation. Based on the positive trend line, an r-squared was calculated (r-squared = 0.41). No relationship between selenium in soil and vegetation was indicated in the scatter plot. Cadmium concentrations in vegetation are available; however, cadmium was not retained as a COPEC for plant communities.

In the Big River Ecological Risk Assessment (EPA, 2005h), toxicity tests using Oats (*Avena sativa*) and earthworms (*Eisenia fetida*) were conducted by the Region 7 Laboratory to further assess the effects of metal exposure on plant and soil invertebrate communities (EPA, 2005h). Seed germination, root elongation and biomass production were measured after 7 days. Reduced biomass production in oats at three locations was the only significant effect found in the plant toxicity tests. However, these effects were not correlated with higher metal concentrations in soil. No statistically significant differences were found between treatment soil and the control soil for seed germination and root elongation. The earthworm toxicity test also showed no significant effects of metals on earthworm survival.

Thus far, earthworm toxicity tests and field measurements of catch per unit effort have not indicated effects on soil invertebrates due to metals. These additional measurement endpoints for soil invertebrates need to be re-evaluated in how they can be used to develop a toxicity threshold for soil invertebrates exposed to metals. The same can be said for the measurement endpoints used for plants.

5.2 HERBIVOROUS BIRDS AND MAMMALS

Lead, selenium, and zinc are COPECs for avian herbivores (mourning dove) at the site. None of the metals are COPECs for mammalian herbivores (prairie voles) at the site.

The ingestion dose exposure model used to estimate food chain exposure of specific constituents, derived from the *EPA Wildlife Exposure Factors Handbook* (EPA, 1993) and the Eco-SSL Guidance (EPA, 2005i) is presented below:

$$ADD = (C_v * FR_v * NIR_F) + (C_M * P_s) * AUF$$

Where:
ADD = Average daily ingestion dose (mg/kgBW-day)
C_v = Concentration of metals in vegetation (mg/kg dw)
C_M = Concentration of metal in soil (mg/kg dw)
NIR_F = Normalized food ingestion rate (kg dw/kg bw/d)
P_s = Soil ingestion as a proportion of the diet
FR_v = Dietary fraction comprised of vegetation
AUF = Area Use factor

Lead and selenium in vegetation was calculated using ProUCL 4.0 to determine the 95% UCL of the data (Appendix D). The water content of vegetation has been estimated to be between 47% (DOI, 1998) and 85% (EPA, 2005). Using an average water content of 66%, wet weight vegetation concentrations have been converted to dry weight by dividing by 0.34. The estimated zinc concentration in vegetation is based on the following uptake equation (EPA, 2005i).

Zinc: $$In(C_p) = 0.554 * In(C_s) + 1.575$$

The 95% UCL for lead, selenium, and zinc in soil was also calculated using ProUCL 4.0.

The normalized food ingestion rate for the mourning dove is assumed to be 0.190 (kg dw/kg bw/d), the soil ingestion rate as proportion of diet is assumed to be 0.139, and the diet is assumed to be 100% vegetation (EPA, 1993, 2005i). The AUF for the mourning dove is assumed to be 67% because they are migratory in southern Missouri from late October through early March.

ADDs are compared to both the NOAEL and LOAEL data, which are based on the geometric means for reproduction and growth. The corresponding Hazard Quotient (HQs) were calculated (Table 51).

Table 51. Risk Characterization for Herbivorous Birds.

Receptor	Metal	ADD (mg/kg)	NOAEL (mg/kg)	LOAEL (mg/kg)	HQ_{NOAEL}	HQ_{LOAEL}
Dove	Lead	56.3	1.63	39.5	**35***	**1***
Dove	Selenium	1.01	0.29	1.67	**4***	<1
Dove	Zinc	49.49	66.1	154	<1	<1

* Numbers in bold represent HQs above 1.

5.3. GROUND-FEEDING INSECTIVOROUS BIRDS AND MAMMALS

Barium, cadmium, copper, lead, selenium and zinc are COPECs for mammalian insectivores. COPECs for avian insectivores include cadmium, copper, lead, selenium, and zinc.

As discussed in Section 3.1, risks to avian insectivores are based on the American woodcock and risks to mammalian insectivores are based on the short-tailed shrew. The ingestion dose exposure model used to estimate food chain exposure of specific constituents, derived from the *EPA Wildlife Exposure Factors Handbook* (EPA, 1993) and the Eco-SSL Guidance (EPA, 2005i) is presented below:

$$ADD = (C_I * FR_I * NIR_F) + (C_M * P_s) * AUF$$

Where:
ADD = Average daily ingestion dose (mg/kgBW-day)
C_I = Concentration of metal in soil invertebrates (mg/kg dw)
C_M = Concentration of metal in soil (mg/kg)
NIR_F = Normalized food ingestion rate (kg dw/kg bw/d)
P_s = Soil ingestion as a proportion of the diet
FR_I = Dietary fraction comprised of soil invertebrates
AUF = Area Use factor

Soil concentrations were calculated using ProUCL 4.0 to determine the 95% UCL of the data (Appendix D). The estimated soil invertebrate concentrations are based on the following uptake equations (EPA, 2005i).

Barium: $C_i = 0.091 * Cs$
Cadmium: $In(C_i) = 0.795 * In(C_s) + 2.114$
Copper: $C_i = 0.515 * Cs$
Lead: $In(C_i) = 0.807 * In(C_s) - 0.218$
Selenium: $In(C_i) = 0.733 * In(C_s) - 0.075$
Zinc: $In(C_i) = 0.328 * In(C_s) + 4.449$

The normalized food ingestion rate for the American woodcock is assumed to be 0.214 (kg dw/kg bw/d), the soil ingestion rate as proportion of diet is assumed to be 0.164, and the diet is assumed to be 100% soil invertebrate (EPA, 1993, 2005i). The AUF for the American woodcock is assumed to be 67% because they are migratory in southern Missouri from late October through early March. The normalized food ingestion rate for the short-tailed shrew is assumed to be 0.209 (kg dw/kg bw/d), the soil ingestion rate as proportion of diet is assumed to be 0.030, and the diet is assumed to be 100% soil invertebrate (EPA, 1993, 2005). The AUF for the short-tailed shrew is assumed to be 100% as their home ranges are less than half an acre and they are active year around.

ADDs are compared to both the NOAELs and LOAELs, which are based on the geometric means of the data for reproduction and growth. The corresponding HQs were then calculated (Table 52).

Table 52. Risk Characterization for Insectivorous Birds and Mammals.

Receptor	Metal	ADD (mg/kg)	NOAEL (mg/kg)	LOAEL (mg/kg)	HQ_{NOAEL}	HQ_{LOAEL}
Shrew	Barium	102.7	51.8	269	**2**	<1
Shrew	Cadmium	8.35	0.77	9.22	**11**	<1
Shrew	Copper	4.89	5.6	180.25	<1	<1
Shrew	Lead	95.5	4.7	136.7	**20**	<1
Shrew	Selenium	0.67	0.143	0.84	**5**	<1
Shrew	Zinc	186.5	75.4	894.5	**3**	<1
Woodcock	Cadmium	5.8	1.47	5.88	**4**	<1
Woodcock	Copper	4.1	4.05	35.5	**1**	<1
Woodcock	Lead	105.1	1.63	39.5	**65**	**3**
Woodcock	Selenium	1.0	0.29	1.67	**4**	<1
Woodcock	Zinc	147.4	66.1	154	**2**	<1

5.4. CARNIVOROUS BIRDS AND MAMMALS

Lead and selenium are COPECs for mammalian carnivores, and lead is a COPEC for avian carnivores.

Risk to avian carnivores will be based on the red-tailed hawk and risk to mammalian carnivores will be based on the long-tailed weasel. The ingestion dose exposure model used to estimate food chain exposure of specific constituents, derived from the *EPA Wildlife Exposure Factors Handbook* (EPA, 1993) and the Eco-SSL Guidance (EPA, 2005i) is presented as follows:

$$ADD = (C_{SM} * FR_{SM} * NIR_F) + (C_M * P_s) * AUF$$

Where:
ADD = Average daily ingestion dose (mg/kgBW-day)
C_{SM} = Concentration of contaminant in small mammals (mg/kg dw)

C_M = Concentration of metal in soil (mg/kg)
N_{FIR} = Normalized food ingestion rate (kg dw/kg bw/d)
P_s = Soil ingestion as a proportion of the diet
FR_{SM} = Dietary fraction comprised of small mammals
AUF = Area Use factor

Soil concentrations were calculated using ProUCL 4.0 to determine the 95% UCL of the data (Appendix D). The estimated small mammal concentrations are based on the following uptake equations (EPA, 2005i):

Lead: $In(C_{SM}) = 0.4422 * In(C_s) + 0.0761$
Selenium: $C_{SM} = 0.004 * C_s$

The normalized food ingestion rate for the red-tailed hawk is assumed to be 0.0353 (kg dw/kg bw/d), the soil ingestion rate as proportion of diet is assumed to be 0.057, and the diet is assumed to be 100% small mammal (EPA, 1993, 2005i). The AUF for the red-tailed hawk is assumed to be 100% because typical home ranges easily fit within the area of the site, and they are year-around residents in southern Missouri. The normalized food ingestion rate for the long-tailed weasel is assumed to be 0.130 (kg dw/kg bw/d), the soil ingestion rate as proportion of diet is assumed to be 0.043, and the diet is assumed to be 100% small mammal (EPA, 1993, 2005i). The AUF for the long-tailed weasel is assumed to be 100% as their home range easily fits within the area of site and they are active year around.

ADDs are compared to both the NOAELs and LOAELs, which are based on the geometric means of the data for reproduction and growth. The corresponding HQs were then calculated (Table 53).

Table 53. Risk Characterization for Carnivorous Birds and Mammals.

Receptor	Metal	ADD (mg/kg)	NOAEL (mg/kg)	LOAEL (mg/kg)	HQ_{NOAEL}	HQ_{LOAEL}
Weasel	Lead	16.2	4.7	136.7	**4**	<1
Weasel	Selenium	0.28	0.143	0.84	**2**	<1
Hawk	Lead	5.4	1.63	39.5	**3**	<1

5.5. RISK BASED CONCENTRATIONS (RBCS) FOR SOIL

For this risk assessment, PRGs for soil were based on Eco-SSLs. The Eco-SSLs were used in the screening because they constitute conservative no effect screening levels. However, these are not intended to be used as clean-up numbers. In this section, Risk Based Concentrations (RBCs) for soil are presented. RBCs are similar to Eco-SSLs, except that they are not based on screening level assumptions, but are identified from the assessment endpoints evaluated in the baseline risk characterization.

To develop the RBC range for each receptor evaluated in the baseline risk characterization, RBCs were calculated based on average daily doses equivalent to either the NOAEL or LOAEL. In some cases, the RBC_{NOAEL} is the same as the Eco-SSL (the exposure

assumptions from the screening level risk characterization were not changed in the baseline risk characterization). For example, RBC_{NOAELS} for soil invertebrates and plants are equivalent to the Eco-SSLs.

Table 54. Risk-Based Concentrations for Soil.

Receptor	Metal	RBC_{NOAEL} (mg/kg)	RBC_{LOAEL} (mg/kg)	95% UCL Soil at site (mg/kg)
Shrew	Barium	2,000	10,700	4,062
Soil Invertebrates	Barium	330	NA	
Shrew	Cadmium	0.36	8.2	7.2
Woodcock	Cadmium	1.4	9.2	
Shrew	Copper	50	1,600	42.98
Woodcock	Copper	42	400	
Dove	Lead	1	1,200	2,145
Woodcock	Lead	20	720	
Shrew	Lead	60	3,295	
Hawk	Lead	550	20,000	
Weasel	Lead	500	23,000	
Plants	Lead	120	NA	
Soil Invertebrates	Lead	1,700	NA	
Dove	Selenium	0	50	11.67
Woodcock	Selenium	2.7	22	
Shrew	Selenium	1.6	17	
Weasel	Selenium	3.5	75	
Plants	Selenium	0.52	NA	
Soil Invertebrates	Selenium	4.1	NA	
Dove	Zinc	1,700	5,000	1,131
Shrew	Zinc	79	50,000	
Woodcock	Zinc	160	1,400	
Plants	Zinc	160	NA	
Soil Invertebrates	Zinc	120	NA	

5.6. RECOMMENDED ECOLOGICAL CLEAN-UP GOALS FOR SOIL

Recommended ecological clean-up goals are derived from the range of RBCs and constitute a site-specific concentration associated with an unacceptable level of ecological risk. The RBCs and clean-up goals for this risk assessment are based primarily on predictive risk methods (HQ calculations) used to model the potential for adverse effects. This section will discuss the range of RBCs for each assessment endpoint as well as recommend a clean-up goal for each metal based on that range. In most cases, the recommended clean-up goal will be calculated based on the geometric mean of the highest RBC_{NOAEL} and the lowest RBC_{LOAEL} for the all of the assessment endpoints evaluated for each COPEC. Any supporting information, derived from additional toxicity and exposure data or from measurement endpoints, is also presented. Finally, clean-up goals for barium, cadmium, lead and zinc have been adjusted based

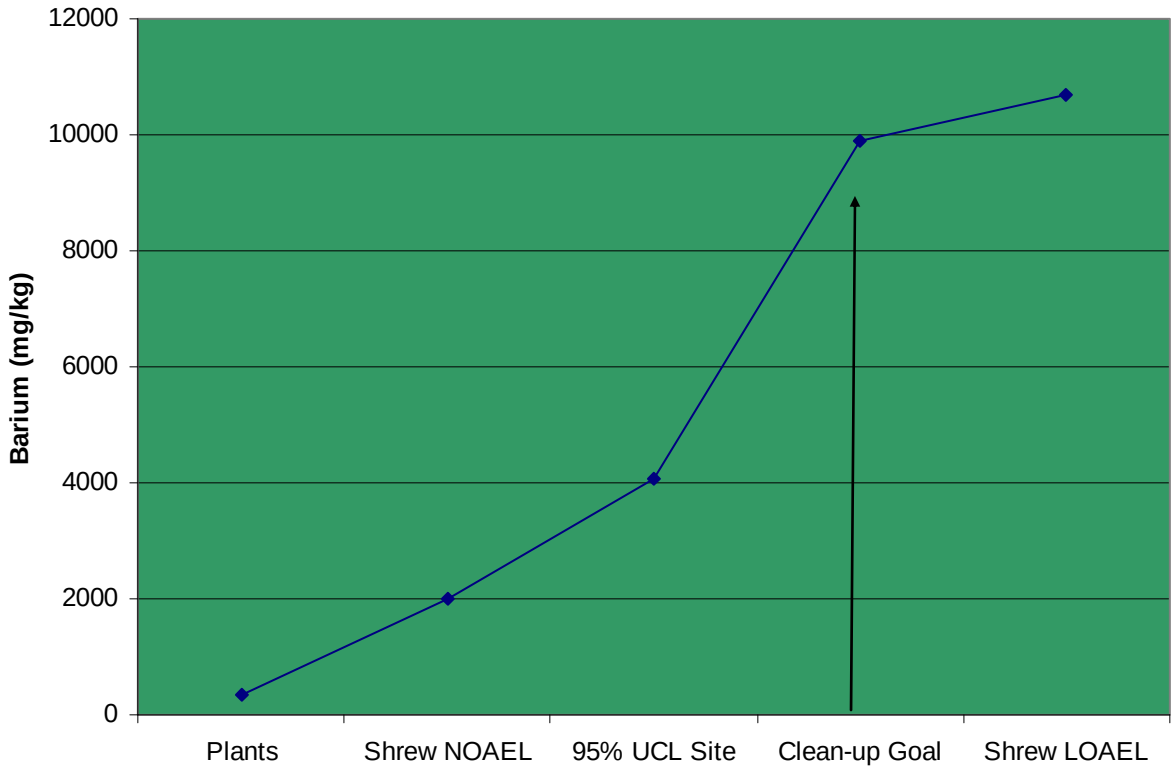
on the estimated bioavailability for each metal. The recommended clean-up goals identified here are not the final clean-up levels for the site, which are values that are modified by the nine remedy selection criteria outlined in 40 CFR 300.430(e)(2)(i).

5.6.1. Barium Soil Clean-Up Goal. Barium was identified as a COPEC for soil invertebrates and insectivorous mammals. Therefore, a range of RBCs were developed for these assessment endpoints. The geometric mean of the highest RBC_{NOAEL} (330 mg/kg for soil invertebrates) and the lowest RBC_{LOAEL} (10,700 mg/kg for shrews) is 1,879 mg/kg. This concentration is slightly less than the RBC_{NOAEL} for insectivorous mammals (shrews) of 2,000 mg/kg. Eco-SSL data is not currently available to develop RBCs for plants or birds; however, the proposed concentration of 1,879 mg/kg is similar to the maximum acceptable toxicant concentration for bush beans (*Phaseolus vulgaris*) of 1,414 mg/kg, which was identified as the one acceptable plant study in the barium Eco-SSL document.

The Eco-SSL data, on which the RBCs are derived, is based on studies using soluble barium salts such as barium acetate and barium chloride. The barium at the site is predominately in the form of barite (barium sulfate), which is virtually insoluble (0.00246 g/L @ 25° C). For example, NOAELs for soil invertebrates exposed to soils amended with barite (barium sulfate) ranged between 17,000 and 1,000,000 mg/kg (Kuperman *et al*., 2002; ESG, 2003). These concentrations are significantly higher than the Eco-SSL for soil invertebrates (330 mg/kg). The insolubility of barite greatly reduces toxicity to plants as well. Miller *et al*. (1980) found that a barite concentration of 795,300 mg/kg reduced sweet corn growth by 20%, but a concentration of 227,500 mg/kg had no effect.

Shock *et al.* (2007) investigated the solubility and bioaccessibility of barium from soils containing barite in simulated gastric fluids. Results indicated bioaccessibility values from 0.08% to 19%. Based on the highest barium bioaccessibility value from the Shock study, the recommended clean-up goal for barium is equal to the geometric mean of the highest RBC_{NOAEL} and the lowest RBC_{LOAEL}, adjusted by a relative bioavailability of 19%, which is equal to 9,889 mg/kg.

The recommended clean-up goal of 9,889 mg/kg is supported by limited bird data using a less soluble form of barium, barium hydroxide. In a study exposing 1-day old chicks to barium hydroxide over a four week period, 2,000 mg/kg barium hydroxide caused no mortality. Five percent mortality was experienced in chicks receiving 4,000 mg/kg barium hydroxide (Sample *et al*., 1996). The modeled RBC range for a woodcock, based on the NOAELs and LOAELs derived from this study, range from 6,000 mg/kg to 12,000 mg/kg, with a geometric mean of 8,485 mg/kg.

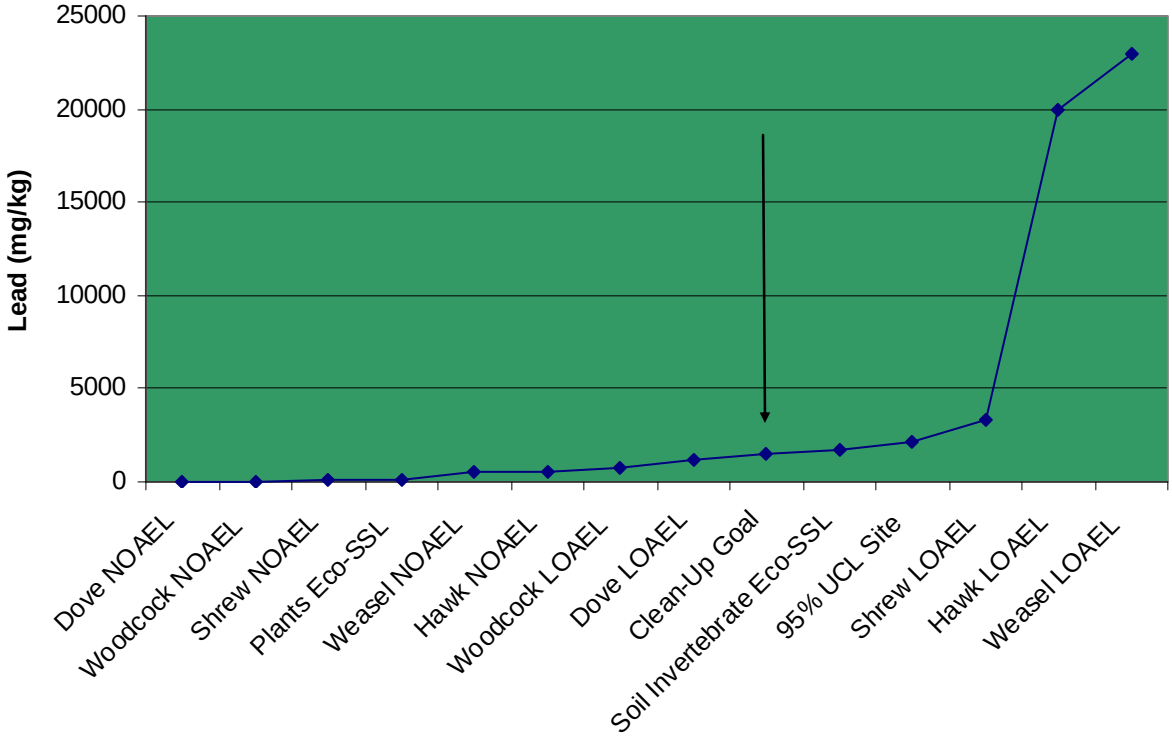


5.6.2. Cadmium Soil Clean-Up Goal. Cadmium was identified as a COPEC for insectivorous birds and mammals. The RBC range for insectivores is 0.36 – 9.2 mg/kg cadmium in soil. The geometric mean of the highest RBC_{NOAEL} (1.4 mg/kg for the woodcock) and the lowest RBC_{LOAEL} (8.2 mg/kg for the shrew) is 3.4 mg/kg. The relative bioavailability of cadmium is assumed to be 0.70 based on one *in vitro* study of cadmium bioaccessibility from soil, which was conducted on soils collected in the vicinity of the National Zinc Smelter in Bartlesville, Ok. A companion *in vivo* study was conducted on young rats that were given either soil containing cadmium (174 mg/kg) or cadmium chloride mixed in diet. A relative bioavailability estimate of 0.33 was obtained based on liver and kidney tissue concentrations in animals receiving soil relative to soluble cadmium (Schoof and Freeman, 1995). The recommended clean-up goal for cadmium is adjusted based on the *in vitro* study. Therefore the recommended clean-up goal is equal to the geometric mean of the highest RBC_{NOAEL} and the lowest RBC_{LOAEL}, adjusted by a relative bioavailability of 0.70, which is equal to 4.9 mg/kg. Figure 6 shows the locations that exceed the recommended cadmium clean-up goal for the site.

5.6.3. Copper Soil Clean-Up Goal. A range of RBCs were developed for insectivorous mammals and birds exposed to copper. The RBC range for insectivores is 42.0 – 1,600 mg/kg copper in soil. The copper clean-up goal, based on the geometric mean of the highest RBC_{NOAEL} (50 mg/kg) and the lowest RBC_{LOAEL} (400 mg/kg) is 141 mg/kg. None of the locations at the site exceed this recommended clean-up goal.

5.6.4. Lead Soil Clean-Up Goal. Lead was identified as a COPEC for plants, soil invertebrates, herbivores, insectivores, and carnivores. The lead clean-up goal, which is based on the geometric mean of the second highest RBC_{NOAEL} (550 mg/kg for the hawk) and the lowest RBC_{LOAEL} (720 mg/kg for the woodcock), is 629 mg/kg. The highest RBC_{NOAEL} for soil invertebrates was not used because it exceeds the RBC_{LOAEL} for the woodcock.

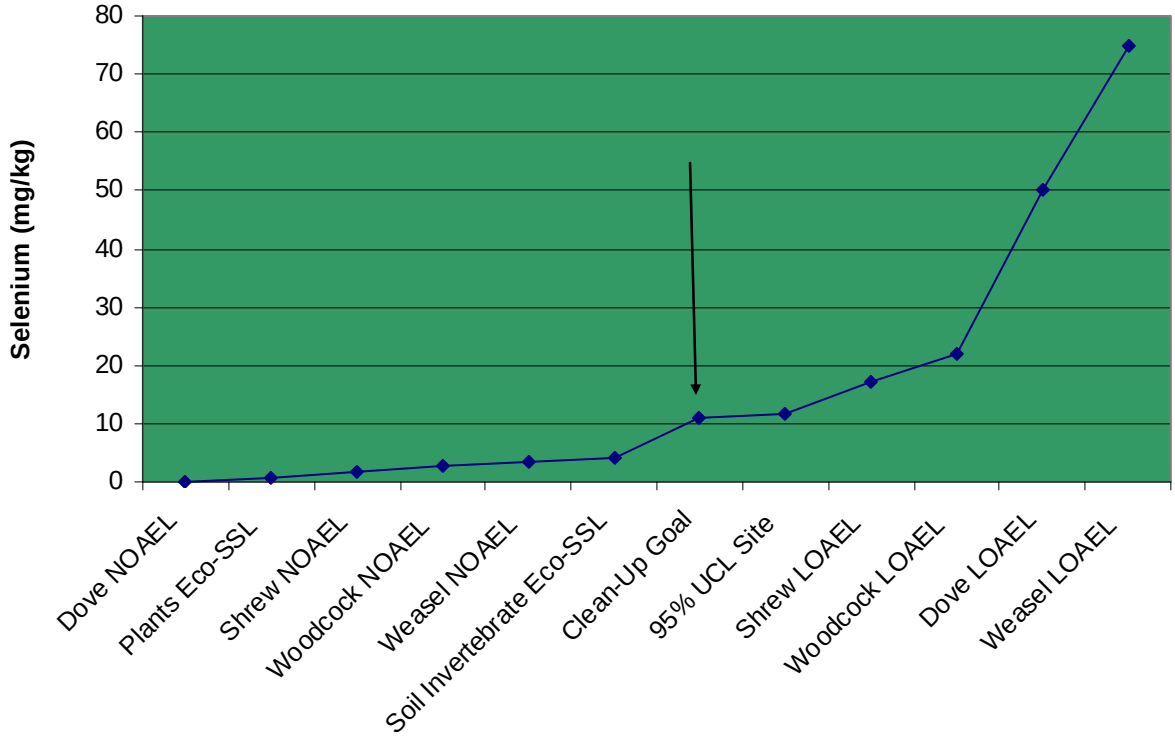
Several studies of relative bioavailability from soil from mining sites have been conducted in a weanling rat model (Dieter *et al.*, 1993; Freeman *et al.*, 1992; Schoof *et al.*, 1995). Estimates of bioavailability developed from these studies in rats ranged from 0.087 to 0.41, depending on the origin of the various metals studied. Using a relative bioavailability of 0.41, the lead clean-up goal is equal to 1,534 mg/kg. Figure 7 shows the locations that exceed the recommended lead clean-up goal for the site.



5.6.5. Selenium Soil Clean-Up Goal. Selenium was identified as a COPEC for plants; soil invertebrates; herbivorous birds; insectivorous birds and mammals; and carnivorous mammals. A range of RBCs were developed for each of these assessment endpoints. The selenium clean-up goal, based on the geometric mean of the highest RBC_{NOAEL} (4.1 mg/kg for soil invertebrates) and the lowest RBC_{LOAEL} (17 mg/kg for the shrew) is 8.3 mg/kg.

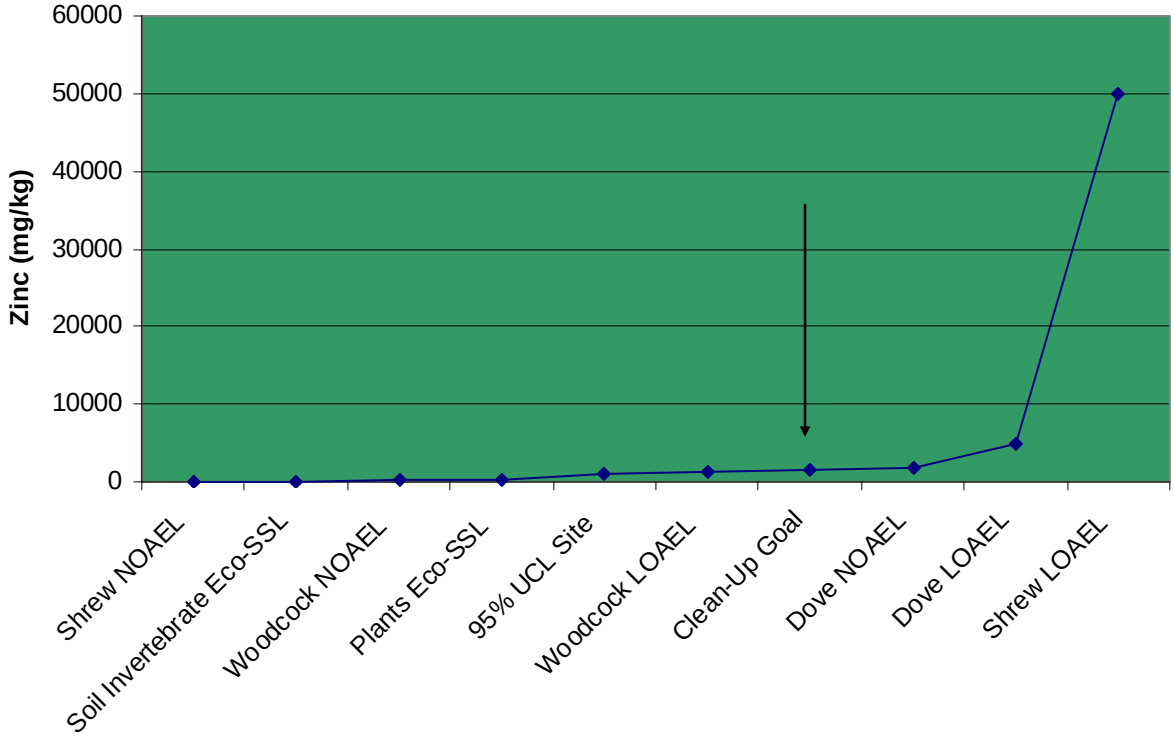
Alternatively, an RBC_{NOAEL}, based on the preponderance of toxicity data for birds and mammals, could be used to develop the clean-up goal. RBCs calculated based on the geometric means of the NOAELs for reproduction and growth result in RBC_{NOAELS} of 7.0 mg/kg for mammalian insectivores; 7.0 mg/kg for avian insectivores; 11.0 mg/kg for mammalian carnivores; and 3.5 mg/kg for avian herbivores. Using a value of 7.0 mg/kg for insectivorous birds and mammals, a recommended clean-up goal of 10.9 mg/kg is calculated as the geometric mean of 7.0 mg/kg for woodcocks and shrews, and 17 mg/kg for shrews.

Selenium is an essential nutrient. However, there is only a 20-fold difference between essentiality and toxicity (Mason, 1988). Selenium absorption in the diet is relatively high (90 – 96%) (Mason and Weaver, 1986). Given the relatively high bioavailability of selenium from food sources, the recommended clean-up goal was not adjusted. Also, a review of the toxicity data showed that the chemical form of selenium used in the reproduction and growth studies did not significantly influence the resulting NOAEL or LOAEL values, except for when selenous acid was used. However, only two studies used this chemical form, which resulted in very little change to the geometric mean of the NOAEL or LOAEL values. Figure 8 shows the locations that exceed the recommended selenium clean-up goal for the site.



5.6.6. Zinc Soil Clean-Up Goal. Zinc was identified as a COPEC for plants, soil invertebrates, insectivorous birds and mammals, and herbivorous birds. The zinc clean-up goal, which is based on the geometric mean of the second highest RBC_{NOAEL} (160 mg/kg for plants and woodcocks) and the lowest RBC_{LOAEL} (1,400 mg/kg for woodcocks) is 473 mg/kg. The RBC_{NOAEL} for the woodcock was used rather than the RBC_{NOAEL} for the dove because it is greater than the RBC_{LOAEL} for the woodcock.

Zinc is an essential trace mineral in the diet. As with many nutrients, zinc exhibits a profile of intakes which progress through the stages of deficiency-adequacy-toxicity. Zinc bioavailability can be related to absorption, which is homeostatically regulated. Absorption of zinc has generally been found to be approximately 30% (Smith, 1989). Therefore, based on an absorption efficiency of 30%, the recommended clean-up goal is equal to the geometric mean of the highest RBC_{NOAEL} and the lowest RBC_{LOAEL}, adjusted by 0.30, which is equal to 1,576 mg/kg. Figure 9 shows the locations that exceed the recommended zinc clean-up goal for the site.



5.6.7. Summary of Recommended Clean-Up Goals for Soil. The following table summarizes the recommended terrestrial clean-up goals for the Potosi site. Figures 6-9 show the locations of sampling sites that exceed the recommended clean-up goals. In general, cadmium and selenium concentrations at the site are the primary risk drivers. The overall risk from these metals is greater due to the fact that these are the most bioconcentrative metals on site. All of the recommended clean-up goals are well above typical background concentrations in Missouri.

Table 55. Recommended Clean-up Goals for Soil at the Potosi site.

Metal	Barium	Cadmium	Copper	Lead	Selenium	Zinc
Clean-up Goal (mg/kg)	9,889	4.9	141	1,534	10.9	1,576

6.0 AQUATIC RISK CHARACTERIZATION

Just as in the terrestrial risk characterization, data on exposure and effects are integrated into a statement about risk to each aquatic assessment endpoint. A weight-of-evidence approach is used to interpret the implications of different studies and tests for each assessment endpoint. Risk characterization constitutes the final phase of the risk assessment process.

The preliminary assessment endpoints have been refined based on the results of the expanded contaminant screen. Now, further evaluation using various additional measurement endpoints as well as more site-specific exposure and toxicity information will be used to further characterize risk. Barium, selenium and vanadium were retained as COPECs for sediment because concentrations at the site are greater than background within the watershed. Cadmium, lead, and zinc were retained as COPECs for sediment because they exceed screening levels. In surface water, barium and lead were retained as COPECs because they exceed screening benchmarks, and silver was retained due to insufficient detection limits.

6.1. BENTHIC MACROINVERTEBRATE COMMUNITIES

Potential risks to benthic macroinvertebrate communities were evaluated based on a comparison to threshold and probable effect concentrations (MacDonald *et al*., 2000). Cadmium, lead, and zinc exceed the PECs at several locations. However, these locations are primarily tailings ponds and tributaries to Mill Creek. Barium and vanadium are COPECs for sediment because they exceed background concentrations from within the Big River watershed.

In addition to comparing sieved sediment concentrations to TECs and PECs, a macroinvertebrate survey was conducted as an additional measurement endpoint for benthic macroinvertebrate communities. The results of the survey can be found in Appendix C, and the locations of each benthic macroinvertebrate survey location can be found in Figure 10. The following table shows the results of the macroinvertebrate study. The biosurvey score, condition category, and habitat score (QHEI) for each site are included.

Table 56. Biosurvey and habitat scores for Macroinvertebrate Survey.

Mill Creek Sites	SD03 Highway Department	SD06 Highway 47	SD07 Tiff Road	SD08 Tiff Road	SD09 Tiff Road	SD10 Mill Creek at Blackwell
Biosurvey Score	12	24	18	18	24	15
Condition Category	**Fair**	Good	Good	Good	Good	**Fair**
QHEI	73.5	75	80	84.5	75	73.5
Barium (mg/kg)	3800	898	262	269	201	136
Cadmium (mg/kg)	4.5	1.9	1.7	1.6	1.2	1.1
Lead (mg/kg)	**266**	99.4	49	53.2	37.5	38.7
Vanadium (mg/kg)	44.3	27.6	24.8	22.1	16.4	16.9
Zinc (mg/kg)	**688**	276	182	178	131	141

PECs equal to 4.98 mg/kg for cadmium, 128 mg/kg for lead, and 459 mg/kg for zinc.

Both SD03 and SD10 had biosurvey scores of fair. Good scores were achieved at SD06, SD07, SD08 and SD09. The fair score at SD03 (highway department location) appears to be

related to metal concentrations in sediment. Both lead and zinc exceed the PEC at this location, and the cadmium concentration is only slightly less than the PEC. Barium and vanadium sediment concentrations were also higher here than at any of the other locations in the survey. This location is surrounded by tailings piles as well as a number of tailings ponds that have filled in with silt. In addition to high metal concentrations in sediment, there was also evidence of nutrient loading at the site (algal growth and odor). Finally, this site received a lower overall habitat quality score compared to the other sites.

The fair score at SD10, which was the last location sampled on Mill Creek before reaching the confluence of the Big River, is not as clearly related to metal concentrations in the sediment. The concentrations of cadmium, lead, and zinc in sediment were only slightly above the TEC. Barium and vanadium concentrations were similar to the sites that received good ratings. However, this was the only sampling location along Mill Creek in which agricultural impacts were clearly evident along both streambanks. Heavier sediment loads were observed here, and the riparian zone is much more limited here compared to other sites. Habitat was also likely impacted by a low water crossing directly upstream of the sampling site.

6.2. PISCIVORES

Potential risks to piscivores will be evaluated using the hazard quotient approach. Each of the COPECs for surface water and sediment will be evaluated. Avian piscivores will be evaluated based on the belted kingfisher and mammalian piscivores will be evaluated based on the river otter. The ingestion dose exposure model used to estimate food chain exposure of specific constituents, derived from the *EPA Wildlife Exposure Factors Handbook* (EPA, 1993) is presented below:

$$ADD = (C_F * FR_F * NIR_F) + (NIR_{SW} * C_{SW}) + (C_M * P_s) * AUF$$

Where:
ADD = Average daily ingestion dose (mg/kgBW-day)
C_F = Concentration of contaminant in Fish/Crayfish (mg/kg dw)
C_M = Concentration of metal in sediment (mg/kg)
NIR_F = Normalized food ingestion rate (kg dw/kg bw/d)
P_s = Sediment ingestion as a proportion of the diet
FR_F = Dietary fraction comprised of Fish/Crayfish
AUF = Area Use Factor

Fish and crayfish tissue, sediment, and surface water concentrations will be calculated using ProUCL 4.0 to determine the 95% UCL of the data (Appendix D). The estimated fish concentrations for barium, vanadium, silver, and zinc are based on the following water-to-fish bioconcentration factors (EPA, 1999).

Barium = 633
Silver = 87.71
Vanadium = 633
Zinc = 2059

The normalized food ingestion rate for the kingfisher is assumed to be 0.14 (kg dw/kg bw/d). The water content in fish is assumed to be 72% (Holmes and Donaldson, 1969); thus, wet weight fish concentrations were converted to dry weight by dividing by 0.28. The water ingestion rate is estimated to be 0.11 (L/kgBW/day). The sediment ingestion rate, as a proportion of diet, is assumed to be one percent. The diet is assumed to be 100% fish and crayfish (EPA, 1993). The AUF for the kingfisher is assumed to be 100% because they are winter residents in southern Missouri and their home range easily fits within the area of the site.

The normalized food ingestion rate for the river otter is assumed to be 0.06 (kg dw/kg bw/d) based on a lower average body weight of 4.0 kg, as reported in the literature (EPA, 1993), and a food ingestion rate of 0.9 kg ww/day (0.25 kg dw/day) (Sample and Suter, 1998). The water ingestion rate is assumed to be 0.17 (L/kgBW/day). The sediment ingestion rate, as a proportion of diet, is assumed to be one percent. The diet is assumed to be 100% fish and crayfish (EPA, 1993, 2005i). The AUF for the river otter is assumed to be 100% as their home range easily fits within the area of site and they are active year around.

ADDs are compared to both the avian and mammalian NOAELs and LOAELs, which are based on the geometric means of the data for reproduction and growth found in the Eco-SSL documents for each metal. The NOAEL and LOAEL comparisons and HQs are presented in the table below. A LOAEL for silver could not be calculated for birds or mammals; however, the ADDs did not exceed the NOAEL for silver.

Table 56. Risk Characterization for Piscivorous Birds and Mammals.

Receptor	Metal	ADD (mg/kg)	NOAEL (mg/kg)	LOAEL (mg/kg)	HQ_{NOAEL}	HQ_{LOAEL}
Otter	Barium	150	51.8	269	**3**	<1
Otter	Cadmium	0.20	0.77	9.29	<1	<1
Otter	Lead	1.9	4.7	136.7	<1	<1
Otter	Silver	0.18	6.02	NA	<1	
Otter	Vanadium	0.23	4.16	7.67	<1	<1
Otter	Zinc	8.1	75.4	894.5	<1	<1
Kingfisher	Barium	145	208.3*	416.5*	<1	<1
Kingfisher	Cadmium	0.18	1.47	5.88	<1	<1
Kingfisher	Lead	2.8	1.63	39.5	**1**	<1
Kingfisher	Silver	0.13	2.02	NA	<1	
Kingfisher	Vanadium	0.24	0.344	1.89	<1	<1
Kingfisher	Zinc	11.23	66.1	154	<1	<1

* NOAEL and LOAEL data based on data from Sample *et al*.(1996).

For the otter, the HQ_{NOAEL} for barium exceeds one. For the kingfisher, the $HQ_{NOAEL\ for}$ lead exceeds one.

6.3. AERIAL-FEEDING INSECTIVORES

Potential risks to the gray bat will be evaluated using the hazard quotient approach. Each of the COPECs for surface water and sediment will be evaluated. The ingestion dose exposure model used to estimate food chain exposure of specific constituents, which is derived from the *EPA Wildlife Exposure Factors Handbook* (EPA, 1993), is presented as follows:

$$ADD = (C_I * FR_I * NIR_F) + (NIR_{SW} * C_{SW}) * AUF$$

Where:
ADD = Average daily ingestion dose (mg/kgBW-day)
C_I = Concentration of contaminant in aquatic emergent invertebrates (mg/kg dw)
NIR_F = Normalized food ingestion rate (kg dw/kg bw/d)
NIR_{SW} = Normalized surface water ingestion rate (L/kg bw/d)
C_{SW} = Concentration in surface water (µg/L)
FR_I = Dietary fraction comprised of aquatic emergent invertebrates
AUF = Area Use Factor

Sediment and surface water concentrations are based on the 95% UCL of the data (Appendix D). The estimated aquatic emergent benthic invertebrate concentrations (mg/kg dw) are based on the following biota-sediment accumulation factors.

Barium: $C_I = 0.951 * Sediment$ (USACE, 2006),
Cadmium: $C_I = 0.191 + 0.688[\log(Sediment)]$ (Bechtel, 1998),
Lead: $C_I = 0.066 * Sediment$ (Bechtel, 1998),
Silver: $C_I = 18.0 * Sediment$ (Hirsch, 1998),
Vanadium: $C_I = -1.5311 + 0.7219[In(Sediment)]$ (Hamilton and Buhl, 2003),
Zinc: $C_I = 0.884 * Sediment$ (USACE, 2006).

Assuming that a gray bat consumes half its body weight in flying insects per night, the normalized food ingestion rate for the gray bat is assumed to be 0.175 (kg dw/kg bw/d). This is based on a 9 gram bat and a wet weight to dry weight conversion factor for aquatic emergent insects of 0.35 (Sample *et al*., 1997). The water ingestion rate is estimated to be 0.159 (L/kg BW/day), and the sediment ingestion rate as proportion of diet is assumed to be zero. The diet is assumed to be 100% aquatic emergent insects. The AUF for the gray bat is assumed to be 67% because while they are winter residents in southern Missouri, they are hibernating between November and March.

Table 57. Risk Characterization for Gray Bats.

Receptor	Metal	ADD (mg/kg)	NOAEL (mg/kg)	HQ_{NOAEL}	LOAEL (mg/kg)	HQ_{LOAEL}
Gray Bat	Barium	365.9	51.8	**7**	269	1
Gray Bat	Cadmium	1.69	0.77	**2**	9.22	<1
Gray Bat	Lead	7.44	4.7	**2**	136.7	<1
Gray Bat	Silver	5.17	6.02	<1	NA	
Gray Bat	Vanadium	2.4	4.16	<1	7.67	<1

Gray Bat	Zinc	63.3	75.4	<1	894.5	<1

6.4. RISK-BASED CONCENTRATIONS (RBCS) FOR SEDIMENT

In the screening level risk assessment, PRGs for sediment were based on TECs. These benchmarks constitute conservative no effect screening levels; however, they are not appropriate clean-up levels. In the baseline risk characterization, targeted site specific HQs were calculated. Based on these results, RBCs for sediment are presented here. Sediment RBCs are identified from the assessment endpoints evaluated in the baseline risk characterization, and recommended clean-up levels are chosen from this range of RBCs.

Sediment RBCs are based on risks to aquatic macroinvertebrates, as well as gray bats who feed on emergent aquatic invertebrates. For aquatic macroinvertebrates, the RBC_{NOAEL} is based on the TEC, and the RBC_{LOAEL} is based on the PEC. For the gray bat, sediment concentrations were adjusted in the dose equation using biota-sediment accumulation factors to allow the ADD to equal the NOAEL or LOAEL.

Table 58. Risk Based Concentrations for Sediment.

Receptor	Metal	RBC_{NOAEL} (mg/kg)	RBC_{LOAEL} (mg/kg)	95% UCL (mg/kg)
Gray Bats	Barium	250	2,200	2,599
Macroinvertebrates	Cadmium	0.99	4.98	4.4
Gray Bats	Cadmium	2.1	26	
Macroinvertebrates	Lead	35.8	149	896.4
Gray Bats	Lead	550	18,000	
Gray Bats	Vanadium	90	NA	37.4
Macroinvertebrates	Zinc	121	459	583.5
Gray Bats	Zinc	770	9,000	

6.5. RECOMMENDED ECOLOGICAL CLEAN-UP GOALS FOR SEDIMENT

Ecological clean-up goals for sediment are derived from the range of RBCs and constitute a site-specific concentration associated with an unacceptable level of aquatic risk. The RBCs and clean-up goals for this risk assessment are based primarily on predictive risk methods (HQ calculations) used to model the potential for adverse effects. This section will discuss the range of RBCs for each assessment endpoint as well as recommend a clean-up goal for each metal based on that range. For sediment, the recommended clean-up goal will be calculated based on the geometric mean of the highest RBC_{NOAEL} and the lowest RBC_{LOAEL} for the assessment endpoints evaluated for each COPEC. Any supporting information derived from additional toxicity and exposure data or from measurement endpoints is also presented. The recommended clean-up goals identified here are not the final clean-up level for the site, which are values that are modified by the nine remedy selection criteria outlined in 40 CFR 300.430(e)(2)(i).

6.5.1. Barium Sediment Clean-Up Goal. The recommended sediment clean-up goal for barium is based on the geometric mean of the RBC_{NOAEL} and RBC_{LOAEL} for the gray bat, which is equal to 742 mg/kg. As with soil, the limited solubility and bioavailability of barite is taken into account. The proposed clean-up goal is therefore adjusted by a bioavailability factor of 0.19, resulting in a recommended clean-up goal of 3,900 mg/kg. Figure 11 shows the locations of the sites that exceed the recommended clean-up goal. In general, the benthic macroinvertebrate survey results support this recommended clean-up goal, with all of the sites showing good biosurvey scores having barium concentrations below this level. The one location with a fair biosurvey score (which is likely attributable to elevated metal concentrations) had barium concentrations of 3,800 mg/kg.

6.5.2. Cadmium Sediment Clean-Up Goal. The recommended sediment clean-up goal for cadmium is based on the geometric mean of the RBC_{NOAEL} for the gray bat (2.1 mg/kg) and the RBC_{LOAEL} for benthic macroinvertebrates (4.98 mg/kg), which is equal to 3.2 mg/kg. Figure 12 shows the locations of the sites that exceed the recommended clean-up goal. Sediment clean-up goals for cadmium are not adjusted due to bioavailability because the value is based, in part, on direct effects to macroinvertebrates. The benthic macroinvertebrate survey results support this recommended clean-up goal, with all of the sites showing good biosurvey scores having cadmium concentrations below this level.

6.5.3. Lead Sediment Clean-Up Goal. Because the RBC range for benthic macroinvertebrates is below the range for the gray bat, the recommended sediment clean-up goal is based on the geometric means of the RBC_{NOAELs} for benthic macroinvertebrates (39.5 mg/kg) and gray bats (550 mg/kg), which is equal to 147 mg/kg. This value is roughly equal to the RBC_{LOAEL} for benthic macroinvertebrates. Sediment clean-up goals for lead are not adjusted due to bioavailability because the value is based, in part, on direct effects to macroinvertebrates. Figure 13 shows the locations of the sites that exceed the recommended clean-up goal. The benthic macroinvertebrate survey results support this recommended clean-up goal, with all of the sites showing good biosurvey scores having lead concentrations below this level.

6.5.4. Vanadium Sediment Clean-Up Goal. The clean-up goal for vanadium is based on the RBC_{NOAEL} for the gray bat, which is equal to 90 mg/kg. None of the sediment sampling locations exceed this level.

6.5.5. Zinc Sediment Clean-Up Goal. Because the RBC range for benthic macroinvertebrates is below the RBC range for the gray bat, the recommended sediment clean-up goal is based on the geometric means of the RBC_{NOAELs} for benthic macroinvertebrates (121 mg/kg) and gray bats (770 mg/kg), which is equal to 305 mg/kg. Figure 14 shows the locations of the sites that exceed the recommended clean-up goal. Zinc concentrations at location SD04 (East Branch of Mill Creek) slightly exceed the recommended clean-up goal, but it is not a location that exceeds recommended clean-up goals for barium, cadmium or lead. Therefore, it is not included as a recommended clean-up location based on zinc alone. The benthic macroinvertebrate survey results support this recommended clean-up goal, with all of the sites showing good biosurvey scores having zinc concentrations below this level.

6.5.6. Summary of Recommended Clean-Up Goals for Sediment. The following table summarizes the recommended sediment clean-up goals for the Potosi site.

Table 58. Recommended Clean-up Goals for Sediment at the Potosi site.

Metal	Barium	Cadmium	Lead	Zinc
Soil Clean-up Goal (mg/kg)	3,900	3.2	147	305

6.6. RECOMMENDED ECOLOGICAL CLEAN-UP GOALS FOR SURFACE WATER

Barium, lead, and silver were identified as COPECs for surface water. The recommended clean-up goal for lead is based on the chronic NAWQC. There were only two sites that exceeded the chronic criteria for lead, SW01 and SW22. Figure 15 shows these locations.

Surface water concentrations of barium are elevated throughout the site, but there are no federal or state of Missouri water quality criteria for barium. Therefore, it is recommended that clean-up of barium in the aquatic ecosystem be focused on sediment.

Finally, silver was identified as a COPEC due to insufficient detection limits. There are no federal or state chronic criteria for silver. However, there is a federal acute criterion, which based on the average surface water hardness at the site is equal to 11.3 µg/L. Surface water concentrations of silver were 1.0 µg/L or less. The ADDs for kingfishers and otters exposed to silver also did not exceed NOAELs. Although we know that silver concentrations do not exceed acute water quality criteria, or NOAELs for piscivores, it is recommended that further surface water analysis at the site be done at lower detection limits to ensure that silver in surface water is not a potential threat to aquatic life.

7.0 UNCERTAINTIES AND RECOMMENDATIONS

The baseline risk assessment addresses the degree to which the environments and ecological receptors associated with the Potosi site are potentially at risk. Despite the site-specificity of this evaluation, many estimates and assumptions were required to fill gaps in knowledge and data to complete the evaluation of potential risk. An analysis of the uncertainties helps the risk manager place the characterization of risk in context of relevant issues at a site. The assumptions and uncertainties inherent in this analysis are presented to place the risk estimates in the proper perspective. The following sections discuss the specific and generic sources of uncertainty in the evaluation that are generated from these knowledge gaps, assumptions, and estimates. Awareness of these uncertainties are essential in determining if further evaluations are necessary and for developing the scope and extent of additional evaluations.

7.1. ASSESSMENT OF SOIL

The evaluation of the ecological risks associated with soil at WCLD site has identified the following uncertainties and data gaps:

- Recommended clean-up goals for soil were driven by a number of factors. However, two major sources of uncertainty need to be addressed. These include potential risks to soil invertebrates and the organisms that feed on them, as well as potential risks to plants. It is recommended that additional surveys of earthworm CPUE, along a gradient of metal contamination, be completed, and that the earthworm tissue from those survey locations be analyzed for metals. Similarly, plant surveys of productivity and diversity along a gradient of metal contamination should be completed. Plant tissue from the survey locations should be analyzed for metals. We recommend that these surveys be completed as part of the risk assessments for the Richwoods and Old Mines sites in WCLD.

7.2. ASSESSMENT OF SURFACE WATER

The evaluation of the ecological risks associated with surface water has identified the following uncertainties and data gaps.

- Any future sampling of cadmium and silver in surface water must be analyzed at detection limits below chronic surface water screening benchmarks.
- Elevated barium concentrations in surface water throughout the site may pose unacceptable risk. We recommend that surface water toxicity tests using *Hyallela azteca* and/or *Pimephales promelas* along a gradient of barium concentrations be completed as part of the risk assessment for the Richwoods and Old Mines sites in WCLD.

7.3. ASSESSMENT OF SEDIMENT

The evaluation of the ecological risks associated with sediment at the site has identified the following uncertainties and data gaps:

- Site-specific sediment toxicity tests are not available. Examples include toxicity tests with the amphipod (*Hyalella azteca*) and midge (*Chironomus tentans*). Results from site-specific aquatic toxicity tests would provide an additional line of evidence and may reduce uncertainty associated with using conservative screening values.
- Collection and analysis of emergent aquatic invertebrates tissue would resolve uncertainty regarding potential risk to gay bats and other aerial insectivores that consume these organisms. We recommend that emergent aquatic invertebrates be collected as part of the risk assessment for the Richwoods and Old Mines sites in WCLD.

7.4. BACKGROUND

Inorganic constituents are a naturally occurring component of environmental media and it is important to consider representative background conditions in completing any risk evaluation. Due to the widespread nature of the metal contamination at the site, soil background data was difficult to locate within the Potosi site. However, additional background samples can be located within the WCLD. We recommend that additional background sampling be completed as part of the risk assessment for the Richwoods and Old Mines sites in WCLD.

7.5. BIOAVAILABILITY

There are a myriad of complex physical, chemical, and biological conditions that influence the biochemistry of exposure. These may be physical retention by media (e.g., irreversible adsorption), chemical speciation and transformation (e.g., the chemical is in a precipitated or otherwise non-toxic form; such as sediment-bound aluminum in the form of aluminum silicates and carbonates), or biological (e.g., chemical depuration/elimination, or physiological metabolism to non-toxic metabolites). In all cases, the portion of chemical truly available to inflict an adverse effect on an individual receptor organism is less than 100%. Adjustments to bioavailability have been made for certain metals, such as lead and barium. However, the bioavailability assumptions were made based on information in the literature. Some of the uncertainty regarding bioavailability can be resolved by collecting additional site specific data on soil invertebrates, semi-aquatic emergent invertebrates, plants, and small mammals.

7.6. PROPOSED ECOLOGICAL CLEAN-UP GOALS

The ecological clean-up goals proposed in this BERA are intended to be protective of a wide range of ecological receptors. The proposed clean-up goals are above background but fall within a range of RBCs that are based on both NOAELs and LOAELs. However, these proposed clean-up goals could be improved by collecting additional site-specific biotic data (such earthworm and small mammal concentrations), rather than modeling components of diet. The proposed ecological clean-up goals for the aqautic habitats could also be improved through the collection of emergent aqautic invertebrates.

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APPENDIX A: TABLES
WASHINGTON COUNTY LEAD DISTRICT
POTOSI SITE

Table 1. Species List for Washington County. Federal or state listed Threatened or endangered species are in bold.

Amphibians

* BULLFROG (RANA CATESBEIANA)
* COMMON MUDPUPPY (NECTURUS MACULOSUS MACULOSUS)
* FROG, BLANCHARD'S CRICKET (ACRIS CREPITANS BLANCHARDI)
* FROG, GREEN (RANA CLAMITANS MELANOTA)
* FROG, PICKEREL (RANA PALUSTRIS)
* FROG, SOUTHERN LEOPARD (RANA SPHENOCEPHALA UTRICULARIA)
* NEWT, CENTRAL (NOTOPHTHALMUS VIRIDESCENS LOUISIANENSIS)
* PEEPER, NORTHERN SPRING (PSEUDACRIS CRUCIFER CRUCIFER)
* SALAMANDER, CAVE (EURYCEA LUCIFUGA)
* SALAMANDER, DARK-SIDED (EURYCEA LONGICAUDA MELANOPLEURA)
* SALAMANDER, FOUR-TOED (HEMIDACTYLIUM SCUTATUM)
* SALAMANDER, LONG-TAILED (EURYCEA LONGICAUDA LONGICAUDA)
* SALAMANDER, MARBLED (AMBYSTOMA OPACUM)
* SALAMANDER, SOUTHERN RED-BACKED (PLETHODON SERRATUS)
* SALAMANDER, SPOTTED (AMBYSTOMA MACULATUM)
* SALAMANDER, WESTERN SLIMY (PLETHODON ALBAGULA)
* TOAD, DWARF AMERICAN (BUFO AMERICANUS CHARLESMITHI)
* TOAD, FOWLER'S (BUFO FOWLERI)

Amphipods

* CENTRAL MISSOURI CAVE AMPHIPOD (ALLOCRANGONYX HUBRICHTI)
* ONONDAGA CAVE AMPHIPOD (STYGOBROMUS ONONDAGAENSIS)

Birds

* BLACKBIRD, BREWER'S (EUPHAGUS CYANOCEPHALUS)
* BLACKBIRD, RED-WINGED (AGELAIUS PHOENICUS)
* BLUEBIRD, EASTERN (SIALIA SIALIS SIALIS)
* BOBWHITE, NORTHERN (COLINUS VIRGINIANUS VIRGINIANUS)
* BUNTING, INDIGO (PASSERINA CYANEA)
* BUNTING, SNOW (PLEXTROPHENAX NIVALIS NIVALIS)
* CARDINAL, NORTHERN (CARDINALIS CARDINALIS CARDINALIS)
* CATBIRD, GRAY (DUMETELLA CAROLINENSIS)
* CHAT, YELLOW-BREASTED (ICTERIA VIRENS VIRENS)
* CHICKADEE, CAROLINA (PARUS CAROLINENSIS EXTIMUS)
* CHUCK-WILL'S WIDOW (CAPRIMULGUS CAROLINENSIS)
* COOT, AMERICAN (FULICA AMERICANA AMERICANA)
* COWBIRD, BROWN-HEADED (MOLOTHRUS ATER)
* CROW, AMERICAN (CORVUS BRACHYRHYNCHOS)
* CUCKOO, BLACK-BILLED (COCCYZUS ERYTHROPTHALMUS)
* CUCKOO, YELLOW-BILLED (COCCYZUS AMERICANUS AMERICANUS)
* DICKCISSEL (SPIZA AMERICANA)
* DOVE, MOURNING (ZENAIDA MACROURA CAROLINENSIS)
* DOVE, ROCK (COLUMBA LIVIA)
* DUCK, RING-NECKED (ATHYA COLLARIS)
* DUCK, RUDDY (OXYURA JAMAICENSIS RUBIDA)
* DUCK, WOOD (AIX SPONSA)
* EGRET, CATTLE (BULBULCUS IBIS IBIS)
* FINCH, PURPLE (CARPODACUS PURPUREUS PURPUREUS)
* FLICKER, NORTHERN (COLAPTES AURATUS AURATUS)
* FLYCATCHER, ACADIAN (EMPIDONAX VIRESCENS)
* FLYCATCHER, GREAT CRESTED (MYIARCHUS CRINITUS)
* FLYCATCHER, SCISSOR-TAILED (MUSCIVORA FORFICATA)

* FLYCATCHER, WILLOW (EMPIDONAX TRAILII)
* GADWALL (ANAS STREPERA)
* GNATCATCHER, BLUE-GRAY (POLIOPTILA CAERULEA CAERULEA)
* GOLDENEYE, COMMON (BUCEPHALA CLANGULA AMERICANA)
* GOLDFINCH, AMERICAN (CARDUELIS TRISTIS TRISTIS)
* GRACKLE, COMMON (QUISCALUS QUISCULA)
* GREBE, HORNED (PODICEPS AURITUS)
* GROSBEAK, BLUE (PASSERINA CAERULEA CAERULEA)
* GROSBEAK, EVENING (COCCOTHRAUSTES VESPERTINUS VESPERTINUS)
* GROUSE, RUFFED (BONASA UMBELLUS MEDIANA)
*** HARRIER, NORTHERN (CIRCUS CYANEUS)**
* HAWK, BROAD-WINGED (BUTEO PLATYPTERUS PLATYPTERUS)
* HAWK, COOPER'S (ACCIPITER COOPERII)
* HAWK, RED-SHOULDERED (BUTEO LINEATUS LINEATUS)
* HAWK, RED-TAILED (BUTEO JAMAICENSIS BOREALIS)
* HAWK, ROUGH-LEGGED (BUTEO LAGOPUS SANCTIJOHANNIS)
* HAWK, SHARP-SHINNED (ACCIPITER STRIATUS VELOX)
* HERON, GREAT BLUE (ARDEA HERODIAS)
* HERON, GREEN (BUTORIDES VIRESCENS)
* HUMMINGBIRD, RUBY-THROATED (ARCHILOCHUS COLUBRIS)
* JAY, BLUE (CYANOCITTA CRISTATA CRISTATA)
* JUNCO, DARK-EYED (JUNCO HYEMALIS)
* KESTREL, AMERICAN (FALCO SPARVERIUS SPARVERIUS)
* KILLDEER (CHARADRIUS VOCIFERUS)
* KINGBIRD, EASTERN (TYRANNUS TYRANNUS)
* KINGBIRD, WESTERN (TYRANNUS VERTICALIS)
* KINGFISHER, BELTED (MEGACERYLE ALCYON ALCYON)
* KINGLET, GOLDEN-CROWNED (REGULUS SATRAPA SATRAPA)
* MALLARD (ANAS PLATYRHYNCHOS PLATYRHYNCHOS)
* MARTIN, PURPLE (PROGNE SUBIS SUBIS)
* MEADOWLARK, EASTERN (STURNELLA MAGNA)
* MEADOWLARK, WESTERN (STURNELLA NEGLECTA)
* MERGANSER, HOODED (LOPHODYTES CUCULLATUS)
* MOCKINGBIRD, NORTHERN (MIMUS POLYGLOTTOS POLYGLOTTOS)
* NIGHTHAWK, COMMON (CHORDEILES MINOR)
* NUTHATCH, RED-BREASTED (SITTA CANADENSIS)
* NUTHATCH, WHITE-BREASTED (SITTA CAROLINENSIS CAROLINENSIS)
* ORIOLE, BALTIMORE (ICTERUS GALBULA)
* ORIOLE, ORCHARD (ICTERUS SPURIUS)
* OVENBIRD (SEIURUS AUROCAPILLUS)
* OWL, BARRED (STRIX VARIA)
* OWL, EASTERN SCREECH (OTUS ASIO ASIO)
* OWL, GREAT HORNED (BUBO VIRGINIANUS)
* PARULA, NORTHERN (PARULA AMERICANA)
* PEWEE, EASTERN WOOD- (CONTOPUS VIRENS)
* PHOEBE, EASTERN (SAYORNIS PHOEBE)
* PINTAIL, NORTHERN (ANAS ACUTA)
* REDHEAD (ATHYA AMERICANA)
* REDSTART, AMERICAN (SETOPHAGA RUTICILLA)
* ROBIN, AMERICAN (TURDUS MIGRATORIUS MIGRATORIUS)
* SAPSUCKER, YELLOW-BELLIED (SPHYRAPICUS VARIUS)
* SCAUP, LESSER (ATHYA AFFINIS)
* SCOTER, SURF (MELANITTA PERSPICILLATA)
* SHOVELER, NORTHERN (ANAS CLYPEATA)
* SHRIKE, LOGGERHEAD (LANIUS LUDOVICIANUS MIGRANS)
* SORA (PORZANA CAROLINA)

* SPARROW, AMERICAN TREE (SPIZELLA ARBOREA ARBOREA)
* SPARROW, FIELD (SPIZELLA PUSILLA PUSILLA)
* SPARROW, FOX (PASSERELLA ILIACA ILIACA)
* SPARROW, GRASSHOPPER (AMMODRAMUS SAVANNARUM PRATENSIS)
* SPARROW, HOUSE (PASSER DOMESTICUS)
* SPARROW, SONG (MELOSPIZA MELODIA MELODIA)
* SPARROW, SWAMP (MELOSPIZA GEORGIANA GEORGIANA)
* SPARROW, WHITE-CROWNED (ZONOTRICHA LEUCOPHRYS LEUCOPHRYS)
* SPARROW, WHITE-THROATED (ZONOTRICHA ALBICOLLIS)
* STARLING, EUROPEAN (STURNUS VULGARIS VULGARIS)
* SWALLOW, BARN (HIRUNDO RUSTICO)
* SWALLOW, NORTHERN ROUGH-WINGED (STELGIDOPTERYX SERRIPENNIS)
* SWALLOW, TREE (IRIDOPROCNE BICOLOR)
* SWIFT, CHIMNEY (CHAETURA PELAGICA)
* TANAGER, SCARLET (PIRANGA OLIVACEA)
* TANAGER, SUMMER (PIRANGA RUBRA)
* TEAL, BLUE-WINGED (ANAS DISCORS DISCORS)
* TEAL, GREEN-WINGED (ANAS CRECCA)
* THRASHER, BROWN (TOXOSTOMA RUFUM RUFUM)
* THRUSH, WOOD (HYLOCICHLA MUSTELINA)
* TITMOUSE, TUFTED (PARUS BICOLOR)
* TOWHEE, EASTERN (PIPILO ERYTHROPHTHALMUS)
* TURKEY, WILD (MELEAGRIS GALLOPAVO SILVESTRIS)
* VIREO, PHILADELPHIA (VIREO PHILADELPHICUS)
* VIREO, RED-EYED (VIREO OLIVACEUS)
* VIREO, WARBLING (VIREO GILVUS)
* VIREO, WHITE-EYED (VIREO GRISEUS)
* VIREO, YELLOW-THROATED (VIREO FLAVIFRONS)
* VULTURE, TURKEY (CATHARTES AURA SEPTENTRIONALIS)
* WARBLER, BLACK-AND-WHITE (MNIOTILTA VARIA)
* WARBLER, BLUE-WINGED (VERMIVORA PINUS)
* WARBLER, CERULEAN (DENDROICA CERULEA)
* WARBLER, GOLDEN-WINGED (VERMIVORA CHRYSOPTERA)
* WARBLER, HOODED (WILSONIA CITRINA)
* WARBLER, KENTUCKY (OPORORNIS FORMOSUS)
* WARBLER, PINE (DENDROICA PINUS PINUS)
* WARBLER, PRAIRIE (DENDROICA DISCOLOR)
* WARBLER, PROTHONOTARY (PROTONOTARIA CITREA)
* WARBLER, WORM-EATING (HELMITHEROS VERMIVORUS)
* WARBLER, YELLOW (DENDROICA PETECHIA)
* WARBLER, YELLOW-RUMPED (DENDROICA CORONATA)
* WARBLER, YELLOW-THROATED (DENDROICA DOMINICA)
* WATERTHRUSH, LOUISIANA (SEIURUS MOTACILLA)
* WAXWING, CEDAR (BOMBYCILLA CEDRORUM)
* WHIP-POOR-WILL (CAPRIMULGUS VOCIFERUS)
* WIGEON, AMERICAN (ANAS AMERICANA)
* WOODCOCK, AMERICAN (PHILOHELA MINOR)
* WOODPECKER, DOWNY (PICOIDES PUBESCENS PUBESCENS)
* WOODPECKER, HAIRY (PICOIDES VILLOSUS)
* WOODPECKER, PILEATED (DRYOCOPUS PILEATUS)
* WOODPECKER, RED-BELLIED (MELANERPES CAROLINUS)
* WOODPECKER, RED-HEADED (MELANERPES ERYTHROCEPHALUS)
* WREN, BEWICK'S (TROGLODYTES BEWICKII BEWICKII)
* WREN, CAROLINA (THRYOTHORUS LUDOVICIANUS LUDOVICIANUS)
* WREN, HOUSE (TROGLODYTES AEDON PARKMANII)
* YELLOWTHROAT, COMMON (GEOTHLYPIS TRICHAS BRACHIDACTYLUS)

Crayfish

* CRAYFISH, BELTED (ORCONECTES HARRISONI)
* CRAYFISH, DEVIL (CAMBARUS DIOGENES)
* CRAYFISH, FRECKLED (CAMBARUS MACULATUS)
* CRAYFISH, GOLDEN (ORCONECTES LUTEUS)
* CRAYFISH, SADDLEBACKED (ORCONECTES MEDIUS)
* CRAYFISH, SPOTHANDED (ORCONECTES PUNCTIMANUS)
* CRAYFISH, VIRILE (ORCONECTES VIRILIS)
* CRAYFISH, WOODLAND (ORCONECTES HYLAS)

Fish

* BASS, LARGEMOUTH (MICROPTERUS SALMOIDES)
* BASS, ROCK (AMBLOPLITES RUPESTRIS)
* BASS, SMALLMOUTH (MICROPTERUS DOLOMIEU)
* BLUEGILL (LEPOMIS MACROCHIRUS)
* BULLHEAD, YELLOW (AMEIURUS NATALIS)
* CHUB, BIGEYE (NOTROPIS AMBLOPS)
* CHUB, CREEK (SEMOTILUS ATROMACULATUS)
* CHUB, GRAVEL (ERIMYSTAX X-PUNCTATA)
* CHUB, HORNYHEAD (NOCOMIS BIGUTTATUS)
* CHUBSUCKER, CREEK (ERIMYZON OBLONGUS)
* DACE, SOUTHERN REDBELLY (PHOXINUS ERYTHROGASTER)
* DARTER, BANDED (ETHEOSTOMA ZONALE)
* DARTER, FANTAIL (ETHEOSTOMA FLABELLARE)
* DARTER, GREENSIDE (ETHEOSTOMA BLENNIOIDES)
* DARTER, JOHNNY (ETHEOSTOMA NIGRUM)
* DARTER, MISSOURI SADDLED (ETHEOSTOMA TETRAZONUM)
* DARTER, ORANGETHROAT (ETHEOSTOMA SPECTABILE)
* DARTER, RAINBOW (ETHEOSTOMA CAERULEUM)
* LAMPREY, LEAST BROOK (LAMPETRA AEPYPTERA)
* LOGPERCH (PERCINA CAPRODES)
* MADTOM, SLENDER (NOTURUS EXILIS)
* MINNOW, BLUNTNOSE (PIMEPHALES NOTATUS)
* MINNOW, FATHEAD (PIMEPHALES PROMELAS)
* MINNOW, OZARK (NOTROPIS NUBILA)
* MINNOW, SILVERJAW (NOTROPIS BUCCATUS)
* PICKEREL, GRASS (ESOX AMERICANUS)
* REDHORSE, BLACK (MOXOSTOMA DUQUESNEI)
* REDHORSE, GOLDEN (MOXOSTOMA ERYTHRURUM)
* SCULPIN, BANDED (COTTUS CAROLINAE)
* SCULPIN, MOTTLED (COTTUS BAIRDI)
* SHINER, BIGEYE (NOTROPIS BOOPS)
* SHINER, BLEEDING (LUXILUS ZONATUS)
* SHINER, CARMINE (NOTROPIS PERCOBROMUS)
* SHINER, GOLDEN (NOTEMIGONUS CRYSOLEUCAS)
* SHINER, MIMIC (NOTROPIS VOLUCELLUS)
* SHINER, REDFIN (LYTHRURUS UMBRATILIS)
* SHINER, SAND (NOTROPIS STRAMINEUS)
* SHINER, SPOTFIN (CYPRINELLA SPILOPTERA)
* SHINER, STEELCOLOR (CYPRINELLA WHIPPLEI)
* SHINER, STRIPED (LUXILUS CHRYSOCEPHALUS)
* SHINER, WEDGESPOT (NOTROPIS GREENEI)
* SILVERSIDE, BROOK (LABIDESTHES SICCULUS)
* STONECAT (NOTURUS FLAVUS)
* STONEROLLER, CENTRAL (CAMPOSTOMA PULLUM)
* STONEROLLER, LARGESCALE (CAMPOSTOMA OLIGOLEPIS)

* STUDFISH, NORTHERN (FUNDULUS CATENATUS)
* SUCKER, NORTHERN HOG (HYPENTELIUM NIGRICANS)
* SUNFISH, GREEN (LEPOMIS CYANELLUS)
* SUNFISH, LONGEAR (LEPOMIS MEGALOTIS)
* SUNFISH, REDEAR (LEPOMIS MICROLOPHUS)
* TOPMINNOW, BLACKSPOTTED (FUNDULUS OLIVACEOUS)
* A HEPTAGENIID MAYFLY (STENONEMA BEDNARIKI)
* WESTFALL'S SNAKETAIL (OPHIOGOMPHUS WESTFALLI)

Mammals

* ARMADILLO, NINE-BANDED (DASYPUS NOVEMCINCTUS MEXICANUS)
* BAT, BIG BROWN (EPTESICUS FUSCUS FUSCUS)
* BAT, EVENING (NYCTICEIUS HUMERALIS HUMERALIS)
* **BAT, GRAY (MYOTIS GRISESCENS)**
* BAT, HOARY (LASIURUS CINEREA CINEREA)
* **BAT, INDIANA (MYOTIS SODALIS)**
* BAT, LITTLE BROWN (MYOTIS LUCIFUGUS LUCIFUGUS)
* BAT, NORTHERN (MYOTIS SEPTENTRIONALIS)
* BAT, RED (LASIURUS BOREALIS BOREALIS)
* BAT, SILVER-HAIRED (LASIONYCTERIS NOCTIVAGANS)
* BEAR, BLACK (URSUS AMERICANUS AMERICANUS)
* BEAVER (CASTOR CANADENSIS CAROLINENSIS)
* BOBCAT (LYNX RUFUS RUFUS)
* CHIPMUNK, EASTERN (TAMIAS STRIATUS GRISEUS)
* COYOTE (CANIS LATRANS FRUSTROR)
* DEER, WHITE-TAILED (ODOCOILEUS VIRGINIANUS)
* FOX, GRAY (UROCYON CINEREOARGENTEUS)
* FOX, RED (VULPES VULPES FULVA)
* MINK (MUSTELA VISON LETIFERA)
* MOUSE, HOUSE (MUS MUSCULUS DOMESTICUS)
* MUSKRAT (ONDATRA ZIBETHICUS)
* MYOTIS, EASTERN SMALL-FOOTED (MYOTIS LEIBII)
* OPOSSUM, VIRGINIA (DIDELPHIS VIRGINIANA VIRGINIANA)
* OTTER, RIVER (LONTRA CANADENSIS)
* PIPISTRELLE, EASTERN (PIPISTRELLUS SUBFLAVUS)
* RABBIT, EASTERN COTTONTAIL (SYLVILAGUS FLORIDANUS ALACER)
* RACCOON (PROCYON LOTOR HIRTUS)
* RAT, EASTERN WOOD (NEOTOMA FLORIDANA)
* RAT, NORWAY (RATTUS NORVEGICUS NORVEGICUS)
* **SKUNK, PLAINS SPOTTED (SPILOGALE PUTORIUS)**
* SKUNK, STRIPED (MEPHITIS MEPHITIS AVIA)
* SQUIRREL, FOX (SCIURUS NIGER RUFIVENTER)
* SQUIRREL, GRAY (SCIURUS CAROLINENSIS CAROLINENSIS)
* SQUIRREL, SOUTHERN FLYING (GLAUCOMYS VOLANS)
* WOODCHUCK (MARMOTA MONAX MONAX)

Flora

* BIG-BEAKED WOODSY MOSS (PLAGIOMNIUM ROSTRATUM)
* BUTTERNUT (JUGLANS CINEREA)
* COMMON LADIES' TRESSES (SPIRANTHES CERNUA)
* CRESTED CORAL ROOT (HEXALECTRIS SPICATA SPICATA)
* GATTINGER'S GOLDENROD (SOLIDAGO GATTINGERI)
* GRASS-OF-PARNASSUS (PARNASSIA GRANDIFOLIA)
* HEART-LEAVED PLANTAIN (PLANTAGO CORDATA)
* LARGE TWAYBLADE (LIPARIS LILIIFOLIA)
* LATE CORAL ROOT (CORALLORHIZA ODONTORHIZA)
* LITTLE LADIES' TRESSES (SPIRANTHES TUBEROSA)

* OVAL LADIES' TRESSES (SPIRANTHES OVALIS EROSTELLATA)
* ROCK CRESS (ARABIS MISSOURIENSIS)
* ROYAL CATCHFLY (SILENE REGIA)
* SAND GRAPE (VITIS RUPESTRIS)
* SHINING LADIES' TRESSES (SPIRANTHES LUCIDA)
* SHOWY ORCHIS (GALEARIS SPECTABILIS)
* SLENDER LADIES' TRESSES (SPIRANTHES LACERA)
* SULLIVANT (ORANGE) CONEFLOWER (RUDBECKIA FULGIDA SULLIVANTII)
* WEAKSTALK BULRUSH (SCHOENOPLECTUS PURSHIANUS)
* WILD SWEET WILLIAM (PHLOX MACULATA PYRAMIDALIS)
* YELLOW LADY'S SLIPPER (CYPRIPEDIUM CALCEOLUS)

Reptiles

* COACHWHIP, EASTERN (MASTICOPHIS FLAGELLUM FLAGELLUM)
* COPPERHEAD, OSAGE (AGKISTRODON CONTORTRIX PHAEOGASTER)
* COTTONMOUTH, WESTERN (AGKISTRODON PISCIVORUS LEUCOSTOMA)
* KINGSNAKE, PRAIRIE (LAMPROPELTIS CALLIGASTER CALLIGASTER)
* KINGSNAKE, SPECKLED (LAMPROPELTIS GETULUS HOLBROOKI)
* LIZARD, EASTERN COLLARED (CROTAPHYTUS COLLARIS)
* LIZARD, NORTHERN FENCE (SCELOPORUS UNDULATUS HYACINTHINUS)
* LIZARD, WESTERN SLENDER GLASS (OPHISAURUS ATTENUATUS ATTENUATUS)
* RACER, EASTERN YELLOW-BELLIED (COLUBER CONSTRICTOR FLAVIVENTRIS)
* RACERUNNER, EASTERN SIX-LINED (CNEMIDOPHORUS SEXLINEATUS SEXLINEATUS)
* RACERUNNER, PRAIRIE (CNEMIDOPHORUS SEXLINEATUS VIRIDIS)
* RATTLESNAKE, TIMBER (CROTALUS HORRIDUS)
* RATTLESNAKE, WESTERN PIGMY (SISTRURUS MILIARIUS STRECKERI)
* SKINK, BROAD-HEADED (EUMECES LATICEPS)
* SKINK, COMMON FIVE-LINED (EUMECES FASCIATUS)
* SKINK, GROUND (SCINCELLA LATERALIS)
* SLIDER, RED-EARED (TRACHEMYS SCRIPTA ELEGANS)
* SNAKE, BLACK RAT (ELAPHE OBSOLETA OBSOLETA)
* SNAKE, EASTERN GARTER (THAMNOPHIS SIRTALIS SIRTALIS)
* SNAKE, EASTERN HOG-NOSED (HETERODON PLATIRHINOS)
* SNAKE, FLAT-HEADED (TANTILLA GRACILIS)
* SNAKE, GREAT PLAINS RAT (ELAPHE GUTTATA EMORYI)
* SNAKE, MIDLAND BROWN (STORERIA DEKAYI WRIGHTORUM)
* SNAKE, NORTHERN RED-BELLIED (STORERIA OCCIPITOMACULATA OCCIPITOMACULATA)
* SNAKE, NORTHERN WATER (NERODIA SIPEDON SIPEDON)
* SNAKE, PRAIRIE RING-NECKED (DIADOPHIS PUNCTATUS ARNYI)
* SNAKE, RED MILK (LAMPROPELTIS TRIANGULUM SYSPILA)
* SNAKE, ROUGH GREEN (OPHEODRYS AESTIVUS AESTIVUS)
* SNAKE, WESTERN EARTH (VIRGINIA VALERIAE ELEGANS)
* SNAKE, WESTERN RIBBON (THAMNOPHIS PROXIMUS PROXIMUS)
* SNAKE, WESTERN WORM (CARPHOPHIS VERMIS)
* SOFTSHELL, WESTERN SPINY (APALONE SPINIFERA HARTWEGI)
* TURTLE, COMMON MAP (GRAPTEMYS GEOGRAPHICA)
* TURTLE, COMMON MUSK (STERNOTHERUS ODORATUS)
* TURTLE, COMMON SNAPPING (CHELYDRA SERPENTINA SERPENTINA)
* TURTLE, ORNATE BOX (TERRAPENE ORNATA ORNATA)
* TURTLE, THREE-TOED BOX (TERRAPENE CAROLINA TRIUNGUIS)
* TURTLE, WESTERN PAINTED (CHRYSEMYS PICTA BELLII)

Table 2. Ecological Risk Assessment Endpoints and Measurement Endpoints

Exposure Medium	Exposure Scenario Description/Timeframe	Assessment Endpoint	Rationale for Selection	Risk Hypothesis	Exposure Route	Measurement Endpoint
Soil	Uptake of COPECs from soil by plants (current/future)	Protection of terrestrial plant communities from the toxic effects (on survival and reproduction) of COPECs present in soils via direct exposure.	Lead and zinc were identified as COPECs for direct exposure to plants.	Are concentrations of lead and zinc at levels that can adversely impact the terrestrial plant community?	Direct Exposure	Concentrations of lead and zinc in vegetation.
Soil	Uptake of COPECs from soil by terrestrial invertebrates (current/future)	Protection of terrestrial soil invertebrate communities from the toxic effects (on survival and reproduction) of COPECs present in soils via direct exposure.	Barium, lead, selenium and zinc were identified as COPECs for soil invertebrates.	Are concentrations of barium, lead, selenium and zinc at levels that can adversely impact the terrestrial invertebrate community?	Direct Exposure	CPUE of earthworms in the field.
Soil	Ingestion of COPECs absorbed by plants (current/future)	Protection of terrestrial herbivore communities from the toxic effects (on survival and reproduction) of COPECs present in vegetation.	Lead, selenium and zinc were identified as a preliminary COPECs for terrestrial herbivore communities.	Are concentrations of lead, selenium and zinc present in vegetation sufficient enough to cause adverse effects on herbivore communities through food chain transfer?	Ingestion – food chain	Use measured concentrations of lead and selenium in plants for input in the exposure model for the prairie vole and dove.
Soil	Ingestion of COPECs absorbed by terrestrial invertebrates (current/future)	Protection of terrestrial ground feeding insectivore communities from the toxic effects (on	Barium, cadmium, copper, lead, selenium and zinc were identified as preliminary COPECs	Are concentrations of barium, cadmium, copper, lead, selenium and zinc present in earthworms sufficient to	Ingestion – food chain	Use modeled COPEC concentrations in earthworms for input in exposure models for short-tailed shrew

		survival and reproduction) of COPECs present in terrestrial invertebrate communities.	for terrestrial insectivore communities.	cause adverse effects on insectivore communities through food chain transfer?		and American woodcock.
Soil	Ingestion of COPECs absorbed by small mammals (current/future)	Protection of terrestrial carnivore communities from the toxic effects (on survival and reproduction) of COPECs present in terrestrial wildlife prey tissue.	Lead and selenium were identified as preliminary COPECs for terrestrial carnivore communities.	Are concentrations of lead and selenium present in small mammals sufficient to cause adverse effects on carnivore communities through food chain transfer?	Ingestion – food chain	Use modeled COPEC concentrations in small mammals for input in exposure models for long-tailed weasel and red-tailed hawk.
Surface Water	Uptake/ingestion of COPECs from surface water by aquatic organisms (current/future)	Protection of aquatic communities from the toxic effects (on survival and reproduction) of COPCs present in surface water via direct exposure.	Barium, lead and silver were identified as preliminary COPECs for aquatic communities exposed to surface water.	Are concentrations of barium, lead and silver present in surface water that can adversely impact survival and growth of aquatic organisms?	Direct Exposure	Measure COPEC concentrations in surface water and compare to ecological benchmarks for aquatic organisms.
Sediment	Uptake/Ingestion of COPECs from sediment by benthic invertebrates (current/future)	Protection of benthic invertebrate communities from the toxic effects (on survival and reproduction) of COPECs present in sediment via direct exposure.	Barium, cadmium, lead, selenium, vanadium and zinc were identified as preliminary COPECs for benthic invertebrates exposed to sediment.	Are concentrations of barium, cadmium, lead, selenium, vanadium and zinc present in sediment that can adversely impact survival and growth of aquatic organisms?	Direct Exposure	Measure COPEC concentrations in surface water and compare to ecological benchmarks for aquatic organisms; Benthic invertebrate community analysis.
Surface Water/ Sediment/Soil	Ingestion of COPECs absorbed by fish (current/future)	Protection of piscivore communities from the toxic effects (on survival and	Barium, cadmium, lead, vanadium, and zinc were identified as preliminary COPECs	Are concentrations of barium, cadmium, lead, vanadium and zinc present in fish sufficient	Ingestion – food chain	Use measured and modeled concentrations in fish for input in the

		reproduction) of COPECs present in fish.	for piscivore communities.	to cause adverse effects to piscivore communities?		exposure model for the river otter and kingfisher.
Surface Water/ Sediment/Soil	Ingestion of COPECs absorbed by emergent aquatic invertebrates (current/future)	Protection of aerial-feeding insectivore communities from the toxic effects (on survival and reproduction) of COPCs present in emergent aquatic invertebrates.	COPECs in surface water/sediment may be taken up and accumulate in invertebrates and may impact aerial-feeding insectivore communities.	Are concentrations of barium, cadmium, lead, vanadium and zinc sufficient to cause adverse effects on aerial-feeding insectivore communities through food chain transfer?	Ingestion – food cahin	Use modeled COPEC concentrations in aquatic emergent invertebrates for input in the exposure model for aerial-feeding insectivores.

Table 3. Screening Table for Aluminum (based on pH measurments) in Soil.

Location	Aluminum mg/kg	Eco-SSL (pH)	pH	COPEC*
SS01	29800	≤ 5.5	7.48	No
SS02	7600	≤ 5.5	7.64	No
SS07	3350	≤ 5.5	7.22	No
SS10	3790	≤ 5.5	NA	Data gap
SS03	17100	≤ 5.5	7.32	No
SS04	23300	≤ 5.5	7.02	No
SS09	2500	≤ 5.5	NA	Data gap
SS11	5860	≤ 5.5	NA	Data gap
SS05	8100	≤ 5.5	7.02	No
SS06	9390	≤ 5.5	6.92	No
SS08	9950	≤ 5.5	7.29	No

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 4. Screening Table for Antimony in Soil.

Location	Antimony (mg/kg)	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) (Geometric Mean NOAELS) Mammals	HQ	COPEC* Mammals (Geometric mean NOAELs)	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC* Soil Invertebrates	Background (mg/kg)
SS01	2.8	0.27	10	Yes	62	<1	No	78	<1	No	1.0
SS02	2	0.27	7	Yes	62	<1	No	78	<1	No	1.0
SS07	2.3	0.27	9	Yes	62	<1	No	78	<1	No	1.0
SS10	1.8	0.27	7	Yes	62	<1	No	78	<1	No	1.0
SS03	2.2	0.27	8	Yes	62	<1	No	78	<1	No	1.0
SS04	2.3	0.27	9	Yes	62	<1	No	78	<1	No	1.0
SS09	1.8	0.27	7	Yes	62	<1	No	78	<1	No	1.0
SS11	2.1	0.27	8	Yes	62	<1	No	78	<1	No	1.0
SS05	2.3	0.27	9	Yes	62	<1	No	78	<1	No	1.0
SS06	2.3	0.27	9	Yes	62	<1	No	78	<1	No	1.0
SS08	2.2	0.27	8	Yes	62	<1	No	78	<1	No	1.0

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 5. Screening Table for Arsenic in Soil.

Location	Arsenic (mg/kg)	Eco-SSL (mg/kg) Plants	HQ	COPEC* Plants	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Background (mg/kg)
SS01	26.5	18	1	**Yes**	43	<1	No	46	<1	No	10
SS02	7.4	18	<1	No	43	<1	No	46	<1	No	10
SS07	6.9	18	<1	No	43	<1	No	46	<1	No	10
SS10	12.3	18	<1	No	43	<1	No	46	<1	No	10
SS03	17.4	18	<1	No	43	<1	No	46	<1	No	10
SS04	15.8	18	<1	No	43	<1	No	46	<1	No	10
SS09	4.5	18	<1	No	43	<1	No	46	<1	No	10
SS11	10.6	18	<1	No	43	<1	No	46	<1	No	10
SS05	5.7	18	<1	No	43	<1	No	46	<1	No	10
SS06	10.8	18	<1	No	43	<1	No	46	<1	No	10
SS08	7	18	<1	No	43	<1	No	46	<1	No	10

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 6. Screening Table for Barium in Soil.

Location	Barium (mg/kg)	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC* Soil Invertebrates	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Background (mg/kg)
SS01	5030	330	15	**Yes**	2000	3	**Yes**	499
SS02	2810	330	9	**Yes**	2000	1	**Yes**	499
SS07	3760	330	11	**Yes**	2000	2	**Yes**	499
SS10	2310	330	7	**Yes**	2000	1	**Yes**	499
SS03	4550	330	14	**Yes**	2000	2	**Yes**	499
SS04	4230	330	13	**Yes**	2000	2	**Yes**	499
SS09	3910	330	12	**Yes**	2000	2	**Yes**	499
SS11	2730	330	8	**Yes**	2000	1	**Yes**	499
SS05	2750	330	8	**Yes**	2000	1	**Yes**	499
SS06	3900	330	12	**Yes**	2000	2	**Yes**	499
SS08	3560	330	11	**Yes**	2000	2	**Yes**	499

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 7 Screening Table for Beryllium in Soil.

Location	Beryllium (mg/kg)	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Background (mg/kg)
SS01	1.4	21	<1	No	40	<1	No	1.0
SS02	1	21	<1	No	40	<1	No	1.0
SS07	1.1	21	<1	No	40	<1	No	1.0
SS10	0.9	21	<1	No	40	<1	No	1.0
SS03	1.1	21	<1	No	40	<1	No	1.0
SS04	1.5	21	<1	No	40	<1	No	1.0
SS09	0.9	21	<1	No	40	<1	No	1.0
SS11	1.1	21	<1	No	40	<1	No	1.0
SS05	1.1	21	<1	No	40	<1	No	1.0
SS06	1.1	21	<1	No	40	<1	No	1.0
SS08	1.1	21	<1	No	40	<1	No	1.0

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 8. Screening Table for Cadmium in Soil.

Location	Cadmium (mg/kg)	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) Birds	HQ	COPEC Birds	Eco-SSL (mg/kg) Plants	HQ	COPEC Plants	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC Soil Invertebrates	Background Eastern Soils (mg/kg)
SS01	7.3	0.36	20	**Yes**	0.77	20	**Yes**	32	<1	No	140	<1	No	< 1.0
SS02	2.9	0.36	8	**Yes**	0.77	4	**Yes**	32	<1	No	140	<1	No	< 1.0
SS07	8.3	0.36	23	**Yes**	0.77	11	**Yes**	32	<1	No	140	<1	No	< 1.0
SS10	2.5	0.36	7	**Yes**	0.77	3	**Yes**	32	<1	No	140	<1	No	< 1.0
SS03	12.7	0.36	35	**Yes**	0.77	17	**Yes**	32	<1	No	140	<1	No	< 1.0
SS04	7.5	0.36	21	**Yes**	0.77	10	**Yes**	32	<1	No	140	<1	No	< 1.0
SS09	2	0.36	6	**Yes**	0.77	3	**Yes**	32	<1	No	140	<1	No	< 1.0
SS11	5.2	0.36	14	**Yes**	0.77	7	**Yes**	32	<1	No	140	<1	No	< 1.0
SS05	3.1	0.36	9	**Yes**	0.77	4	**Yes**	32	<1	No	140	<1	No	< 1.0
SS06	4	0.36	11	**Yes**	0.77	5	**Yes**	32	<1	No	140	<1	No	< 1.0
SS08	4.2	0.36	12	**Yes**	0.77	6	**Yes**	32	<1	No	140	<1	No	< 1.0

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 9. Screening Table for Chromium in Soil.

Location	Chromium (mg/kg)	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Background (mg/kg)
SS01	45.5	26	2	**Yes**	34	1	**Yes**	50.0
SS02	9.1	26	<1	No	34	<1	No	50.0
SS07	18.3	26	<1	No	34	<1	No	50.0
SS10	6.5	26	<1	No	34	<1	No	50.0
SS03	23.5	26	<1	No	34	<1	No	50.0
SS04	29	26	1	**Yes**	34	<1	No	50.0
SS09	27.5	26	1	**Yes**	34	<1	No	50.0
SS11	22.4	26	<1	No	34	<1	No	50.0
SS05	16	26	<1	No	34	<1	No	50.0
SS06	17.7	26	<1	No	34	<1	No	50.0
SS08	20.1	26	<1	No	34	<1	No	50.0

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 10. Screening Table for Cobalt in Soil.

Location	Cobalt (mg/kg)	Eco-SSL (mg/kg) Plants	HQ	COPEC* Plants	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Background (mg/kg)
SS01	4.6	13	<1	No	120	<1	No	12.0
SS02	8.5	13	<1	No	120	<1	No	12.0
SS07	9	13	<1	No	120	<1	No	12.0
SS10	8.3	13	<1	No	120	<1	No	12.0
SS03	15.2	13	1	**Yes**	120	<1	No	12.0
SS04	13.4	13	1	**Yes**	120	<1	No	12.0
SS09	5.4	13	<1	No	120	<1	No	12.0
SS11	8.8	13	<1	No	120	<1	No	12.0
SS05	9.2	13	<1	No	120	<1	No	12.0
SS06	6.8	13	<1	No	120	<1	No	12.0
SS08	9.2	13	<1	No	120	<1	No	12.0

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 11. Screening Table for Copper in Soil.

Location	Copper (mg/kg)	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL mg/kg Plants	HQ	COPEC* Plants	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC* Soil Invertebrates	Background (mg/kg)
SS01	56.6	28	2	**Yes**	49	1	**Yes**	70	<1	No	80	<1	No	19.0
SS02	10.2	28	<1	No	49	<1	No	70	<1	No	80	<1	No	19.0
SS07	38.4	28	1	**Yes**	49	<1	No	70	<1	No	80	<1	No	19.0
SS10	31.9	28	1	**Yes**	49	<1	No	70	<1	No	80	<1	No	19.0
SS03	58.2	28	2	**Yes**	49	1	**Yes**	70	<1	No	80	<1	No	19.0
SS04	57.8	28	2	**Yes**	49	1	**Yes**	70	<1	No	80	<1	No	19.0
SS09	11	28	<1	No	49	<1	No	70	<1	No	80	<1	No	19.0
SS11	37.6	28	1	**Yes**	49	<1	No	70	<1	No	80	<1	No	19.0
SS05	14.8	28	<1	No	49	<1	No	70	<1	No	80	<1	No	19.0
SS06	19.3	28	<1	No	49	<1	No	70	<1	No	80	<1	No	19.0
SS08	25.5	28	<1	No	49	<1	No	70	<1	No	80	<1	No	19.0

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 12. Screening Table for Lead in Soil.

Location	Lead (mg/kg)	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) Plants	HQ	COPEC* Plants	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC* Soil Invertebrates	Background (mg/kg)
SS01	2150	11	195	**Yes**	56	38	**Yes**	120	18	**Yes**	1,700	1	**Yes**	23.0
SS02	339	11	31	**Yes**	56	6	**Yes**	120	3	**Yes**	1,700	<1	No	23.0
SS07	1160	11	105	**Yes**	56	21	**Yes**	120	10	**Yes**	1,700	<1	No	23.0
SS10	2540	11	231	**Yes**	56	45	**Yes**	120	21	**Yes**	1,700	2	**Yes**	23.0
SS03	396	11	36	**Yes**	56	7	**Yes**	120	3	**Yes**	1,700	<1	No	23.0
SS04	1560	11	142	**Yes**	56	28	**Yes**	120	13	**Yes**	1,700	<1	No	23.0
SS09	386	11	35	**Yes**	56	7	**Yes**	120	3	**Yes**	1,700	<1	No	23.0
SS11	346	11	31	**Yes**	56	6	**Yes**	120	3	**Yes**	1,700	<1	No	23.0
SS05	150	11	14	**Yes**	56	3	**Yes**	120	1	**Yes**	1,700	<1	No	23.0
SS06	279	11	25	**Yes**	56	5	**Yes**	120	2	**Yes**	1,700	<1	No	23.0
SS08	340	11	31	**Yes**	56	6	**Yes**	120	3	**Yes**	1,700	<1	No	23.0

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 13. Screening Table for Manganese in Soil.

Location	Manganese (mg/kg)	Eco-SSL (mg/kg) Plants	HQ	COPEC* Plants	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC* Soil Invertebrates	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Background (mg/kg)
SS01	250	220	1	**Yes**	450	<1	No	4,000	<1	No	4,300	<1	No	940
SS02	373	220	2	**Yes**	450	<1	No	4,000	<1	No	4,300	<1	No	940
SS07	789	220	4	**Yes**	450	2	**Yes**	4,000	<1	No	4,300	<1	No	940
SS10	574	220	3	**Yes**	450	1	**Yes**	4,000	<1	No	4,300	<1	No	940
SS03	1470	220	7	**Yes**	450	3	**Yes**	4,000	<1	No	4,300	<1	No	940
SS04	566	220	3	**Yes**	450	1	**Yes**	4,000	<1	No	4,300	<1	No	940
SS09	574	220	3	**Yes**	450	1	**Yes**	4,000	<1	No	4,300	<1	No	940
SS11	575	220	3	**Yes**	450	1	**Yes**	4,000	<1	No	4,300	<1	No	940
SS05	899	220	4	**Yes**	450	2	**Yes**	4,000	<1	No	4,300	<1	No	940
SS06	363	220	2	**Yes**	450	<1	No	4,000	<1	No	4,300	<1	No	940
SS08	1160	220	5	**Yes**	450	3	**Yes**	4,000	<1	No	4,300	<1	No	940

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 14. Screening Table for Nickel in Soil.

Location	Nickel (mg/kg)	Eco-SSL (mg/kg) Plants	HQ	COPEC* Plants	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC* Soil Invertebrates	Background (mg/kg)
SS01	20	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS02	9.1	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS07	9.9	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS10	8.7	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS03	35.2	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS04	25.5	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS09	4.6	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS11	12.2	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS05	12.2	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS06	10	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0
SS08	17.6	38	<1	No	130	<1	No	210	<1	No	280	<1	No	20.0

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 15. Screening Table for Selenium in Soil.

Location	Selenium (mg/kg)	Eco-SSL (mg/kg) Plants	HQ	COPEC* Plants	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC* Soil Invertebrates	Background (mg/kg)
SS01	14.2	0.52	27	**Yes**	0.63	23	**Yes**	1.2	12	**Yes**	4.1	4	**Yes**	0.5
SS02	9.8	0.52	19	**Yes**	0.63	16	**Yes**	1.2	8	**Yes**	4.1	2	**Yes**	0.5
SS07	11.3	0.52	22	**Yes**	0.63	18	**Yes**	1.2	9	**Yes**	4.1	3	**Yes**	0.5
SS10	8.9	0.52	17	**Yes**	0.63	14	**Yes**	1.2	7	**Yes**	4.1	2	**Yes**	0.5
SS03	11.1	0.52	21	**Yes**	0.63	18	**Yes**	1.2	9	**Yes**	4.1	3	**Yes**	0.5
SS04	11.3	0.52	22	**Yes**	0.63	18	**Yes**	1.2	9	**Yes**	4.1	3	**Yes**	0.5
SS09	9	0.52	17	**Yes**	0.63	14	**Yes**	1.2	8	**Yes**	4.1	2	**Yes**	0.5
SS11	10.6	0.52	20	**Yes**	0.63	17	**Yes**	1.2	9	**Yes**	4.1	3	**Yes**	0.5
SS05	11.4	0.52	22	**Yes**	0.63	18	**Yes**	1.2	10	**Yes**	4.1	3	**Yes**	0.5
SS06	11.3	0.52	22	**Yes**	0.63	18	**Yes**	1.2	9	**Yes**	4.1	3	**Yes**	0.5
SS08	10.8	0.52	21	**Yes**	0.63	17	**Yes**	1.2	9	**Yes**	4.1	3	**Yes**	0.5

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 16. Screening Table for Silver in Soil.

Location	Silver (mg/kg)	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) Plants	HQ	COPEC* Plants	Background Eastern Soils (mg/kg)
SS01	2.8	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS02	2	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS07	2.3	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS10	1.8	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS03	2.2	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS04	2.3	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS09	1.8	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS11	2.1	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS05	2.3	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS06	2.3	4.2	<1	No	14	<1	No	560	<1	No	≤ 1
SS08	2.2	4.2	<1	No	14	<1	No	560	<1	No	≤ 1

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 17. Screening Table for Vanadium in Soil.

Location	Vanadium (mg/kg)	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Background (mg/kg)
SS01	117	7.8	15	**Yes**	280	<1	No	72
SS02	25.2	7.8	3	**Yes**	280	<1	No	72
SS07	26	7.8	3	**Yes**	280	<1	No	72
SS10	25.8	7.8	3	**Yes**	280	<1	No	72
SS03	87.4	7.8	11	**Yes**	280	<1	No	72
SS04	83.6	7.8	11	**Yes**	280	<1	No	72
SS09	29.4	7.8	4	**Yes**	280	<1	No	72
SS11	42.9	7.8	6	**Yes**	280	<1	No	72
SS05	32.2	7.8	4	**Yes**	280	<1	No	72
SS06	44.3	7.8	6	**Yes**	280	<1	No	72
SS08	41.4	7.8	5	**Yes**	280	<1	No	72

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 18. Screening Table for Zinc in Soil.

Location	Zinc (mg/kg)	Eco-SSL (mg/kg) Birds	HQ	COPEC* Birds	Eco-SSL (mg/kg) Mammals	HQ	COPEC* Mammals	Eco-SSL (mg/kg) Soil Invertebrates	HQ	COPEC* Soil Invertebrates	Eco-SSL (mg/kg) Plants	HQ	COPEC* Plants	Background (mg/kg)
SS01	293	46	6	**Yes**	79	4	**Yes**	120	2	**Yes**	160	2	**Yes**	53
SS02	209	46	5	**Yes**	79	3	**Yes**	120	2	**Yes**	160	1	**Yes**	53
SS07	1290	46	28	**Yes**	79	16	**Yes**	120	11	**Yes**	160	8	**Yes**	53
SS10	201	46	4	**Yes**	79	3	**Yes**	120	2	**Yes**	160	1	**Yes**	53
SS03	1850	46	40	**Yes**	79	23	**Yes**	120	15	**Yes**	160	12	**Yes**	53
SS04	1530	46	33	**Yes**	79	19	**Yes**	120	13	**Yes**	160	10	**Yes**	53
SS09	216	46	5	**Yes**	79	3	**Yes**	120	2	**Yes**	160	1	**Yes**	53
SS11	663	46	14	**Yes**	79	8	**Yes**	120	6	**Yes**	160	4	**Yes**	53
SS05	402	46	9	**Yes**	79	5	**Yes**	120	3	**Yes**	160	3	**Yes**	53
SS06	481	46	10	**Yes**	79	6	**Yes**	120	4	**Yes**	160	3	**Yes**	53
SS08	534	46	12	**Yes**	79	7	**Yes**	120	5	**Yes**	160	3	**Yes**	53

*Although a contaminant may be identified as a COPEC for a specific receptor at a particular location, it may not be identified as a COPEC for the entire site.

Table 19. Screening Table for Aluminum in Sediment

Location	pH (surface water)	COPEC* (< 5.5)
SD01	8.89	No
SD02	NA	Data Gap
SD03	NA	Data Gap
SD04	NA	Data Gap
SD05	NA	Data Gap
SD06	8.85	No
SD07	8.47	No
SD08	8.41	No
SD09	8.35	No
SD10	8.35	No
SD11	NA	Data Gap
SD12	8.25	No
SD13	NA	Data Gap
SD14	NA	Data Gap
SD15	NA	Data Gap
SD16	NA	Data Gap
SD17	NA	Data Gap
SD18	7.59	No
SD19	8.46	No
SD20	7.93	No
SD22	7.87	No
SD30	NA	Data Gap

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 20. Screening Table for Antimony in Sediment

Location	Antimony mg/kg	Background mg/kg	COPEC
SD01	2.1	7.7	No
SD02	4.5	7.7	No
SD03	3	7.7	No
SD04	2	7.7	No
SD05	2.4	7.7	No
SD06	2	7.7	No
SD07	1.4	7.7	No
SD08	1.4	7.7	No
SD09	1.9	7.7	No
SD10	1.6	7.7	No
SD11	1.7	7.7	No
SD12	2.6	7.7	No
SD13	2.5	7.7	No
SD14	2	7.7	No
SD15	2	7.7	No

SD16	1.6	7.7	No
SD17	2.1	7.7	No
SD18	1.5	7.7	No
SD19	1.6	7.7	No
SD20	2.2	7.7	No
SD22	1.6	7.7	No
SD30	2.4	7.7	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 21. Screening Table for Arsenic in Sediment.

Location	Arsenic mg/kg	TEC mg/kg	HQ	PEC mg/kg	HQ	COPEC*
SD01	6.9	9.79	<1	33	<1	No
SD02	17.8	9.79	2	33	<1	Yes
SD03	11.7	9.79	1	33	<1	Yes
SD04	5	9.79	<1	33	<1	No
SD05	7.4	9.79	<1	33	<1	No
SD06	5	9.79	<1	33	<1	No
SD07	3.5	9.79	<1	33	<1	No
SD08	3.4	9.79	<1	33	<1	No
SD09	4.9	9.79	<1	33	<1	No
SD10	4.1	9.79	<1	33	<1	No
SD11	4.2	9.79	<1	33	<1	No
SD12	7.1	9.79	<1	33	<1	No
SD13	6.3	9.79	<1	33	<1	No
SD14	8.6	9.79	<1	33	<1	No
SD15	9	9.79	<1	33	<1	No
SD16	6.3	9.79	<1	33	<1	No
SD17	6.3	9.79	<1	33	<1	No
SD18	3.8	9.79	<1	33	<1	No
SD19	4.1	9.79	<1	33	<1	No
SD20	12.3	9.79	1	33	<1	Yes
SD22	7.6	9.79	<1	33	<1	No
SD30	6	9.79	<1	33	<1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 22. Screening Table for Barium in Sediment.

Location	Barium mg/kg	Background mg/kg	COPEC*
SD01	994	70	**Yes**
SD02	6910	70	**Yes**
SD03	3800	70	**Yes**
SD04	726	70	**Yes**
SD05	420	70	**Yes**
SD06	898	70	**Yes**
SD07	262	70	**Yes**

SD08	269	70	**Yes**
SD09	201	70	**Yes**
SD10	136	70	**Yes**
SD11	131	70	**Yes**
SD12	3040	70	**Yes**
SD13	1760	70	**Yes**
SD14	2880	70	**Yes**
SD15	2420	70	**Yes**
SD16	1340	70	**Yes**
SD17	2000	70	**Yes**
SD18	506	70	**Yes**
SD19	1090	70	**Yes**
SD20	4490	70	**Yes**
SD22	2400	70	**Yes**
SD30	35.7	70	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 23. Screening Table for Beryllium in Sediment.

Location	Beryllium mg/kg	Background mg/kg	COPEC*
SD01	1.1 U	0.7 U	No
SD02	2.7	0.7 U	Yes
SD03	1.5 U	0.7 U	No
SD04	1.0 U	0.7 U	No
SD05	1.2 U	0.7 U	No
SD06	1.0 U	0.7 U	No
SD07	0.7 U	0.7 U	No
SD08	0.7 U	0.7 U	No
SD09	1.0 U	0.7 U	No
SD10	0.8 U	0.7 U	No
SD11	0.8 U	0.7 U	No
SD12	1.3 U	0.7 U	No
SD13	1.3 U	0.7 U	No
SD14	1 U	0.7 U	No
SD15	1.0 U	0.7 U	No
SD16	0.8 U	0.7 U	No
SD17	1.1 U	0.7 U	No
SD18	0.8 U	0.7 U	No
SD19	0.8 U	0.7 U	No
SD20	1.1 U	0.7 U	No
SD22	0.8 U	0.7 U	No
SD30	1.2 U	0.7 U	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 24. Screening Table for Cadmium in Sediment.

Location	Cadmium mg/kg	TEC mg/kg	HQ	PEC mg/kg	HQ	COPEC*
SD01	5.2	0.99	5	4.98	1	Yes
SD02	6.4	0.99	7	4.98	1	Yes
SD03	4.5	0.99	5	4.98	< 1	Yes
SD04	3.3	0.99	3	4.98	< 1	Yes
SD05	2.3	0.99	2	4.98	< 1	Yes
SD06	1.9	0.99	2	4.98	< 1	Yes
SD07	1.7	0.99	2	4.98	< 1	Yes
SD08	1.6	0.99	2	4.98	< 1	Yes
SD09	1.2	0.99	1	4.98	< 1	Yes
SD10	1.1	0.99	1	4.98	< 1	Yes
SD11	1.6	0.99	2	4.98	< 1	Yes
SD12	4.7	0.99	5	4.98	< 1	Yes
SD13	2.4	0.99	2	4.98	< 1	Yes
SD14	2.2	0.99	2	4.98	< 1	Yes
SD15	4.7	0.99	5	4.98	< 1	Yes
SD16	5.1	0.99	5	4.98	1	Yes
SD17	8.5	0.99	9	4.98	2	Yes
SD18	2	0.99	2	4.98	< 1	Yes
SD19	6.4	0.99	7	4.98	1	Yes
SD20	5	0.99	5	4.98	1	Yes
SD22	3.9	0.99	4	4.98	< 1	Yes
SD30	4.9	0.99	5	4.98	< 1	Yes

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 25. Screening Table for Chromium in Sediment

Location	Chromium mg/kg	TEC mg/kg	HQ	PEC mg/kg	HQ	COPEC*
SD01	17.6	43.4	< 1	111	< 1	No
SD02	26.6	43.4	< 1	111	< 1	No
SD03	20.5	43.4	< 1	111	< 1	No
SD04	52.5	43.4	1	111	< 1	Yes
SD05	23.7	43.4	< 1	111	< 1	No
SD06	25.9	43.4	< 1	111	< 1	No
SD07	21.9	43.4	< 1	111	< 1	No
SD08	25.4	43.4	< 1	111	< 1	No
SD09	12.7	43.4	< 1	111	< 1	No
SD10	14.2	43.4	< 1	111	< 1	No
SD11	17.2	43.4	< 1	111	< 1	No
SD12	16.5	43.4	< 1	111	< 1	No
SD13	13.6	43.4	< 1	111	< 1	No
SD14	15.3	43.4	< 1	111	< 1	No
SD15	19.4	43.4	< 1	111	< 1	No
SD16	29.6	43.4	< 1	111	< 1	No
SD17	34	43.4	< 1	111	< 1	No

SD18	25.8	43.4	< 1	111	< 1	No
SD19	54.2	43.4	1	111	< 1	Yes
SD20	29.2	43.4	< 1	111	< 1	No
SD22	20.5	43.4	< 1	111	< 1	No
SD30	11.6	43.4	< 1	111	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 26. Screening Table for Cobalt in Sediment.

Location	Cobalt mg/kg	Background mg/kg	COPEC*
SD01	4.3	15	No
SD02	9.6	15	No
SD03	8	15	No
SD04	12	15	No
SD05	7	15	No
SD06	3.1	15	No
SD07	3.3	15	No
SD08	2.8	15	No
SD09	2.4	15	No
SD10	2.2	15	No
SD11	3.4	15	No
SD12	7.7	15	No
SD13	5.9	15	No
SD14	2.1	15	No
SD15	15.5	15	No
SD16	12.2	15	No
SD17	8.3	15	No
SD18	4	15	No
SD19	5.3	15	No
SD20	1.5	15	No
SD22	7	15	No
SD30	13.5	15	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 27. Screening Table for Copper in Sediment

Location	Copper mg/kg	TEC mg/kg	HQ	PEC mg/kg	HQ	COPEC*
SD01	8.4	31.6	< 1	149	< 1	No
SD02	53.4	31.6	2	149	< 1	Yes
SD03	23.9	31.6	< 1	149	< 1	No
SD04	6.9	31.6	< 1	149	< 1	No
SD05	4.5	31.6	< 1	149	< 1	No
SD06	5.2	31.6	< 1	149	< 1	No
SD07	2.9	31.6	< 1	149	< 1	No
SD08	2.9	31.6	< 1	149	< 1	No
SD09	1.9	31.6	< 1	149	< 1	No

SD10	3.1	31.6	< 1	149	< 1	No
SD11	1	31.6	< 1	149	< 1	No
SD12	34.2	31.6	1	149	< 1	Yes
SD13	16.6	31.6	< 1	149	< 1	No
SD14	11	31.6	< 1	149	< 1	No
SD15	17	31.6	< 1	149	< 1	No
SD16	18.3	31.6	< 1	149	< 1	No
SD17	24.8	31.6	< 1	149	< 1	No
SD18	4.3	31.6	< 1	149	< 1	No
SD19	27	31.6	< 1	149	< 1	No
SD20	28.9	31.6	< 1	149	< 1	No
SD22	24.8	31.6	< 1	149	< 1	No
SD30	6	31.6	< 1	149	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 28. Screening Table for lead in Sediment.

Location	Lead mg/kg	TEC mg/kg	HQ	PEC mg/kg	HQ	COPEC*
SD01	4040	35.8	113	128	32	**Yes**
SD02	2550	35.8	71	128	20	**Yes**
SD03	266	35.8	7	128	2	**Yes**
SD04	140	35.8	4	128	1	**Yes**
SD05	54.3	35.8	2	128	< 1	**Yes**
SD06	99.4	35.8	3	128	< 1	**Yes**
SD07	49	35.8	1	128	< 1	**Yes**
SD08	53.2	35.8	2	128	< 1	**Yes**
SD09	37.5	35.8	1	128	< 1	**Yes**
SD10	38.7	35.8	1	128	< 1	**Yes**
SD11	70.8	35.8	2	128	< 1	**Yes**
SD12	614	35.8	17	128	5	**Yes**
SD13	193	35.8	5	128	2	**Yes**
SD14	228	35.8	6	128	2	**Yes**
SD15	703	35.8	20	128	6	**Yes**
SD16	397	35.8	11	128	3	**Yes**
SD17	763	35.8	21	128	6	**Yes**
SD18	113	35.8	3	128	< 1	**Yes**
SD19	251	35.8	7	128	2	**Yes**
SD20	167	35.8	5	128	1	**Yes**
SD22	513	35.8	14	128	4	**Yes**
SD30	490	35.8	14	128	4	**Yes**

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 29. Screening Table for Manganese in Sediment.

Location	Manganese mg/kg	Background mg/kg	COPEC*
SD01	1020	1260	No
SD02	166	1260	No
SD03	593	1260	No
SD04	949	1260	No
SD05	640	1260	No
SD06	137	1260	No
SD07	96.4	1260	No
SD08	121	1260	No
SD09	125	1260	No
SD10	83.9	1260	No
SD11	250	1260	No
SD12	782	1260	No
SD13	273	1260	No
SD14	121	1260	No
SD15	1290	1260	Yes
SD16	114	1260	No
SD17	1210	1260	No
SD18	344	1260	No
SD19	356	1260	No
SD20	110	1260	No
SD22	840	1260	No
SD30	1260	1260	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 30. Screening Table for Nickel in Sediment.

Location	Nickel mg/kg	TEC mg/kg	HQ	PEC mg/kg	HQ	COPEC*
SD01	6.7	22.7	<1	48.6	< 1	No
SD02	22.4	22.7	1	48.6	< 1	Yes
SD03	13.5	22.7	<1	48.6	< 1	No
SD04	8.2	22.7	<1	48.6	< 1	No
SD05	6.5	22.7	<1	48.6	< 1	No
SD06	4.7	22.7	<1	48.6	< 1	No
SD07	4.3	22.7	<1	48.6	< 1	No
SD08	4	22.7	<1	48.6	< 1	No
SD09	2.9	22.7	<1	48.6	< 1	No
SD10	2.9	22.7	<1	48.6	< 1	No
SD11	2.2	22.7	<1	48.6	< 1	No
SD12	10.4	22.7	<1	48.6	< 1	No
SD13	7.2	22.7	<1	48.6	< 1	No
SD14	5.3	22.7	<1	48.6	< 1	No
SD15	12.8	22.7	<1	48.6	< 1	No
SD16	10.4	22.7	<1	48.6	< 1	No
SD17	11.4	22.7	<1	48.6	< 1	No

SD18	4.3	22.7	<1	48.6	< 1	No
SD19	14.2	22.7	<1	48.6	< 1	No
SD20	13.5	22.7	<1	48.6	< 1	No
SD22	8	22.7	<1	48.6	< 1	No
SD30	11.8	22.7	<1	48.6	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 31. Screening Table for Selenium in Fish Tissue.

Location	Selenium mg/kg ww	Selenium mg/kg dw	Fish Tissue Criterion (mg/kg dw)	COPEC*
SD08	2.2	7.85	7.91	No
SD03	2.24	8.0	7.91	Yes
SD04	2.2	7.85	7.91	No
SD02	2.07	7.39	7.91	No
SD05	2.18	7.78	7.91	No
SD10	2.2	7.85	7.91	No
SD06	2.14	7.64	7.91	No
SD09	2.2	7.85	7.91	No
SD14	2.11	7.53	7.91	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 32. Screening Table for Silver in Sediment

Location	Silver mg/kg	Background mg/kg	COPEC*
SD01	2.1	5.6	No
SD02	4.5	5.6	No
SD03	3	5.6	No
SD04	2	5.6	No
SD05	2.4	5.6	No
SD06	2	5.6	No
SD07	1.4	5.6	No
SD08	1.4	5.6	No
SD09	1.9	5.6	No
SD10	1.6	5.6	No
SD11	1.7	5.6	No
SD12	2.6	5.6	No
SD13	2.5	5.6	No
SD14	2	5.6	No
SD15	2	5.6	No
SD16	1.6	5.6	No
SD17	2.1	5.6	No
SD18	1.5	5.6	No
SD19	1.6	5.6	No
SD20	2.2	5.6	No
SD22	1.6	5.6	No
SD30	2.4	5.6	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 33. Screening Table for Vanadium in Sediment

Location	Vanadium mg/kg	Background mg/kg	COPEC*
SD01	15.2	14	Yes
SD02	80	14	Yes
SD03	44.3	14	Yes
SD04	43.4	14	Yes
SD05	30.6	14	Yes
SD06	27.6	14	Yes
SD07	24.8	14	Yes
SD08	22.1	14	Yes
SD09	16.4	14	Yes
SD10	16.9	14	Yes
SD11	16.4	14	Yes
SD12	26.6	14	Yes
SD13	25.6	14	Yes
SD14	22.9	14	Yes
SD15	49.9	14	Yes
SD16	59.3	14	Yes
SD17	23.4	14	Yes
SD18	24.4	14	Yes
SD19	41	14	Yes
SD20	32	14	Yes
SD22	29	14	Yes
SD30	19.6	14	Yes

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 34. Screening Table for Zinc in Sediment.

Location	Zinc mg/kg	TEC mg/kg	HQ	PEC mg/kg	HQ	COPEC
SD01	193	121	1	459	< 1	**Yes**
SD02	770	121	6	459	2	**Yes**
SD03	688	121	6	459	2	**Yes**
SD04	338	121	3	459	< 1	**Yes**
SD05	172	121	1	459	< 1	**Yes**
SD06	276	121	2	459	< 1	**Yes**
SD07	182	121	2	459	< 1	**Yes**
SD08	178	121	2	459	< 1	**Yes**
SD09	131	121	1	459	< 1	**Yes**
SD10	141	121	1	459	< 1	**Yes**
SD11	162	121	1	459	< 1	**Yes**
SD12	436	121	4	459	< 1	**Yes**
SD13	298	121	3	459	< 1	**Yes**
SD14	283	121	2	459	< 1	**Yes**
SD15	609	121	5	459	1	**Yes**

SD16	650	121	5	459	1	**Yes**
SD17	604	121	5	459	1	**Yes**
SD18	304	121	3	459	< 1	**Yes**
SD19	608	121	5	459	1	**Yes**
SD20	611	121	5	459	1	**Yes**
SD22	598	121	5	459	1	**Yes**
SD30	242	121	2	459	< 1	**Yes**

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 35. Screening Table for Aluminum in Surface Water.

Location	pH (surface water)	COPEC* (< 5.5)
SD01	8.89	No
SD02	NA	Data Gap
SD03	NA	Data Gap
SD04	NA	Data Gap
SD05	NA	Data Gap
SD06	8.85	No
SD07	8.47	No
SD08	8.41	No
SD09	8.35	No
SD10	8.35	No
SD11	NA	Data Gap
SD12	8.25	No
SD13	NA	Data Gap
SD14	NA	Data Gap
SD15	NA	Data Gap
SD16	NA	Data Gap
SD17	NA	Data Gap
SD18	7.59	No
SD19	8.46	No
SD20	7.93	No
SD22	7.87	No
SD30	NA	Data Gap

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 36. Screening Table for Arsenic in Surface Water.

Location	Arsenic µg/L	NAWQC µg/L	HQ	COPEC*
SW01	1.0	190	< 1	No
SW02	1.1	190	< 1	No
SW03	1.0	190	< 1	No
SW04	1.0	190	< 1	No
SW06	1.0	190	< 1	No
SW07	1.0	190	< 1	No

SW08	1.0	190	< 1	No
SW09	1.0	190	< 1	No
SW10	1.0	190	< 1	No
SW11	1.0	190	< 1	No
SW12	1.0	190	< 1	No
SW13	1.0	190	< 1	No
SW14	1.0	190	< 1	No
SW15	1.0	190	< 1	No
SW16	1.0	190	< 1	No
SW18	1.0	190	< 1	No
SW19	1.0	190	< 1	No
SW20	1.0	190	< 1	No
SW22	1.0	190	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 37. Screening Table for Antimony in Surface Water.

Location	Antimony µg/L	Indiana µg/L	HQ	COPEC
SW01	2.0	80	< 1	No
SW02	2.0	80	< 1	No
SW03	2.0	80	< 1	No
SW04	2.0	80	< 1	No
SW06	2.0	80	< 1	No
SW07	2.0	80	< 1	No
SW08	2.0	80	< 1	No
SW09	2.0	80	< 1	No
SW10	2.0	80	< 1	No
SW11	2.0	80	< 1	No
SW12	2.0	80	< 1	No
SW13	2.0	80	< 1	No
SW14	2.0	80	< 1	No
SW15	2.0	80	< 1	No
SW16	2.0	80	< 1	No
SW18	2.0	80	< 1	No
SW19	2.0	80	< 1	No
SW20	2.0	80	< 1	No
SW22	2.0	80	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 38. Screening Table for Barium in Surface Water.

Location	Barium µg/L	Ohio WQS µg/L	HQ	COPEC*
SW01	1190	220	5	Yes
SW02	1170	220	5	Yes
SW03	527	220	2	Yes
SW04	411	220	2	Yes

SW06	536	220	2	Yes
SW07	512	220	2	Yes
SW08	530	220	2	Yes
SW09	540	220	2	Yes
SW10	612	220	3	Yes
SW11	835	220	4	Yes
SW12	259	220	1	Yes
SW13	384	220	2	Yes
SW14	949	220	4	Yes
SW15	321	220	1	Yes
SW16	452	220	2	Yes
SW18	688	220	3	Yes
SW19	669	220	3	Yes
SW20	457	220	2	Yes
SW22	369	220	2	Yes

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 39. Screening Table for Beryllium in Surface Water.

Location	Beryllium µg/L	MDNR µg/L	HQ	COPEC*
SW01	1.0	5	< 1	No
SW02	1.0	5	< 1	No
SW03	1.0	5	< 1	No
SW04	1.0	5	< 1	No
SW06	1.0	5	< 1	No
SW07	1.0	5	< 1	No
SW08	1.0	5	< 1	No
SW09	1.0	5	< 1	No
SW10	1.0	5	< 1	No
SW11	1.0	5	< 1	No
SW12	1.0	5	< 1	No
SW13	1.0	5	< 1	No
SW14	1.0	5	< 1	No
SW15	1.0	5	< 1	No
SW16	1.0	5	< 1	No
SW18	1.0	5	< 1	No
SW19	1.0	5	< 1	No
SW20	1.0	5	< 1	No
SW22	1.0	5	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 40. Screening Table for Cadmium in Surface Water.

Location	Cadmium µg/L	NAWQC µg/L	HQ	COPEC*
SW01	1.0	0.263	4	Yes
SW02	1.0	0.347	3	Yes

SW03	1.0	0.523	2	Yes
SW04	1.0	0.546	2	Yes
SW06	1.0	0.467	2	Yes
SW07	1.0	0.428	2	Yes
SW08	1.0	0.431	2	Yes
SW09	1.0	0.446	2	Yes
SW10	1.0	0.445	2	Yes
SW11	1.0	0.373	3	Yes
SW12	1.0	0.552	2	Yes
SW13	1.0	0.486	2	Yes
SW14	1.0	0.326	3	Yes
SW15	1.0	0.437	2	Yes
SW16	1.0	0.331	3	Yes
SW18	1.0	0.423	2	Yes
SW19	1.0	0.418	2	Yes
SW20	1.0	0.206	5	Yes
SW22	1.0	0.260	4	Yes

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 41. Screening Table for Chromium in Surface Water.

Location	Chromium µg/L	NAWQC µg/L	HQ	COPEC*
SW01	2.0	10	< 1	No
SW02	2.0	10	< 1	No
SW03	2.0	10	< 1	No
SW04	2.0	10	< 1	No
SW06	2.0	10	< 1	No
SW07	2.0	10	< 1	No
SW08	2.0	10	< 1	No
SW09	2.0	10	< 1	No
SW10	2.0	10	< 1	No
SW11	2.0	10	< 1	No
SW12	2.0	10	< 1	No
SW13	2.0	10	< 1	No
SW14	2.0	10	< 1	No
SW15	2.0	10	< 1	No
SW16	2.0	10	< 1	No
SW18	2.0	10	< 1	No
SW19	2.0	10	< 1	No
SW20	2.0	10	< 1	No
SW22	2.0	10	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 42. Screening Table for Cobalt in Surface Water.

Location	Cobalt µg/L	Tier II µg/L	HQ	COPEC*

SW01	1.0	3.0	< 1	No
SW02	1.0	3.0	< 1	No
SW03	1.0	3.0	< 1	No
SW04	1.0	3.0	< 1	No
SW06	1.0	3.0	< 1	No
SW07	1.0	3.0	< 1	No
SW08	1.0	3.0	< 1	No
SW09	1.0	3.0	< 1	No
SW10	1.0	3.0	< 1	No
SW11	1.0	3.0	< 1	No
SW12	1.0	3.0	< 1	No
SW13	1.0	3.0	< 1	No
SW14	1.0	3.0	< 1	No
SW15	1.0	3.0	< 1	No
SW16	1.0	3.0	< 1	No
SW18	1.0	3.0	< 1	No
SW19	1.0	3.0	< 1	No
SW20	1.0	3.0	< 1	No
SW22	1.0	3.0	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 43. Screening Table for Copper in Surface Water.

Location	Copper µg/L	NAWQC µg/L	HQ	COPEC*
SW01	2.0	10.120	< 1	No
SW02	2.0	14.237	< 1	No
SW03	2.0	23.648	< 1	No
SW04	2.0	24.935	< 1	No
SW06	2.0	20.551	< 1	No
SW07	2.0	18.441	< 1	No
SW08	2.0	18.583	< 1	No
SW09	2.0	19.431	< 1	No
SW10	2.0	19.360	< 1	No
SW11	2.0	15.562	< 1	No
SW12	2.0	25.272	< 1	No
SW13	2.0	21.592	< 1	No
SW14	2.0	13.192	< 1	No
SW15	2.0	18.512	< 1	No
SW16	2.0	13.417	< 1	No
SW18	2.0	18.157	< 1	No
SW19	2.0	17.943	< 1	No
SW20	2.0	7.520	< 1	No
SW22	3.1	9.963	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 44. Screening Table for Lead in Surface Water.

Location	Lead µg/L	NAWQC µg/L	HQ	COPEC*
SW01	7	2.791	3	Yes
SW02	1	4.294	<1	No
SW03	7.7	8.043	<1	No
SW04	1	8.580	<1	No
SW06	1	6.772	<1	No
SW07	1	5.925	<1	No
SW08	1	5.982	<1	No
SW09	1	6.321	<1	No
SW10	1	6.292	<1	No
SW11	1	4.799	<1	No
SW12	1.7	8.721	< 1	No
SW13	1	7.196	<1	No
SW14	1	3.902	<1	No
SW15	1	5.954	<1	No
SW16	1	3.986	<1	No
SW18	1	5.813	<1	No
SW19	1	5.728	<1	No
SW20	1	1.910	<1	No
SW22	9.1	2.736	3	Yes

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 45. Screening Table for Manganese in Surface Water.

Location	Manganese µg/L	Tier II µg/L	HQ	COPEC*
SW01	7.3	80	<1	No
SW02	45.3	80	<1	No
SW03	82.1	80	<1	No
SW04	6.5	80	<1	No
SW06	14.9	80	<1	No
SW07	8.4	80	<1	No
SW08	4.7	80	<1	No
SW09	9.9	80	<1	No
SW10	10.5	80	<1	No
SW11	15.5	80	<1	No
SW12	12.9	80	< 1	No
SW13	6.4	80	<1	No
SW14	1.3	80	<1	No
SW15	3.0	80	<1	No
SW16	3.0	80	<1	No
SW18	8.0	80	<1	No
SW19	4.8	80	<1	No
SW20	81.5	80	<1	No
SW22	92.0	80	<1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 46. Screening Table for Nickel in Surface Water.

Location	Nickel µg/L	NAWQC µg/L	HQ	COPEC*
SW01	1.0	56.538	< 1	No
SW02	1.0	79.264	< 1	No
SW03	1.1	131.000	< 1	No
SW04	1.1	138.056	< 1	No
SW06	1.1	114.000	< 1	No
SW07	1.0	102.408	< 1	No
SW08	1.0	103.188	< 1	No
SW09	1.2	107.846	< 1	No
SW10	1.0	107.459	< 1	No
SW11	1.0	86.564	< 1	No
SW12	1.3	139.902	< 1	No
SW13	1.0	119.715	< 1	No
SW14	1.0	73.501	< 1	No
SW15	1.0	102.798	< 1	No
SW16	1.0	74.743	< 1	No
SW18	1.0	100.845	< 1	No
SW19	1.0	99.670	< 1	No
SW20	1.0	42.132	< 1	No
SW22	1.0	55.667	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 47. Screening table for Selenium in Surface Water.

Location	Selenium µg/L	NAWQC µg/L	HQ	COPEC*
SW01	5.0[1]	5	1	No
SW02	5.0[1]	5	1	No
SW03	5.0[1]	5	1	No
SW04	5.0[1]	5	1	No
SW06	5.0[1]	5	1	No
SW07	5.0[1]	5	1	No
SW08	5.0[1]	5	1	No
SW09	5.0[1]	5	1	No
SW10	5.0[1]	5	1	No
SW11	5.0[1]	5	1	No
SW12	5.0[1]	5	1	No
SW13	5.0[1]	5	1	No
SW14	5.0[1]	5	1	No
SW15	5.0[1]	5	1	No
SW16	5.0[1]	5	1	No
SW18	5.0[1]	5	1	No
SW19	5.0[1]	5	1	No
SW20	5.0[1]	5	1	No

SW22	5.0[1]	5	1	No

[1] The detection limit of 5.0 µg/L is equal to the NAWQC.
*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 48. Screening Table for Silver in Surface Water.

Location	Silver µg/L	Tier II SCV µg/L	HQ	COPEC*
SW01	1.0	0.36	3	Yes
SW02	1.0	0.36	3	Yes
SW03	1.0	0.36	3	Yes
SW04	1.0	0.36	3	Yes
SW06	1.0	0.36	3	Yes
SW07	1.0	0.36	3	Yes
SW08	1.0	0.36	3	Yes
SW09	1.0	0.36	3	Yes
SW10	1.0	0.36	3	Yes
SW11	1.0	0.36	3	Yes
SW12	1.0	0.36	3	Yes
SW13	1.0	0.36	3	Yes
SW14	1.0	0.36	3	Yes
SW15	1.0	0.36	3	Yes
SW16	1.0	0.36	3	Yes
SW18	1.0	0.36	3	Yes
SW19	1.0	0.36	3	Yes
SW20	1.0	0.36	3	Yes
SW22	1.0	0.36	3	Yes

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 49. Screening Table for Vanadium in Surface Water.

Location	Vanadium µg/L	TIER II µg/L	HQ	COPEC*
SW01	1.0	19	< 1	No
SW02	1.0	19	< 1	No
SW03	1.0	19	< 1	No
SW04	1.0	19	< 1	No
SW06	1.0	19	< 1	No
SW07	1.0	19	< 1	No
SW08	1.0	19	< 1	No
SW09	1.0	19	< 1	No
SW10	1.0	19	< 1	No
SW11	1.0	19	< 1	No
SW12	1.0	19	< 1	No
SW13	1.0	19	< 1	No
SW14	1.0	19	< 1	No
SW15	1.0	19	< 1	No

SW16	1.0	19	< 1	No
SW18	1.0	19	< 1	No
SW19	1.0	19	< 1	No
SW20	1.0	19	< 1	No
SW22	1.0	19	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

Table 50. Screening Table for Zinc in Surface Water.

Location	Zinc µg/L	NAWQC µg/L	HQ	COPEC*
SW01	23	85.423	< 1	No
SW02	13	119.823	< 1	No
SW03	53	198.185	< 1	No
SW04	5	208.876	< 1	No
SW06	13	172.429	< 1	No
SW07	5	154.871	< 1	No
SW08	24	156.052	< 1	No
SW09	4	163.107	< 1	No
SW10	3	162.521	< 1	No
SW11	31	130.877	< 1	No
SW12	10	211.673	< 1	No
SW13	21	181.087	< 1	No
SW14	3	111.098	< 1	No
SW15	7	155.461	< 1	No
SW16	7	112.978	< 1	No
SW18	9	152.503	< 1	No
SW19	8	150.723	< 1	No
SW20	48	63.629	< 1	No
SW22	56	84.105	< 1	No

*Although a contaminant may be identified as a COPEC at a particular location, it may not be identified as a COPEC for the entire site.

An Eco-SSL has been developed for soil invertebrates based on six suitable studies of toxicity of zinc in soil, to soil invertebrates. These studies identified the maximum acceptable toxicant concentrations and the EC10 for a nematode and *F. candida.* These values ranged from 35 to 305 mg/kg. The Eco-SSL of 120 mg/kg was based on the geometric mean of these values (EPA, 2007e).

The Eco-SSL for mammals is equal to 79 mg/kg based on the geometric mean of the NOAEL values for reproduction and growth. The Eco-SSL for birds is equal to 46 based on the geometric mean of the NOAELs for reproduction and growth (EPA, 2007e)

APPENDIX B: FIGURES
WASHINGTON COUNTY LEAD DISTRICT
POTOSI SITE

Washington County Lead District
Potosi Site - Field Sampling Plan
April 2008

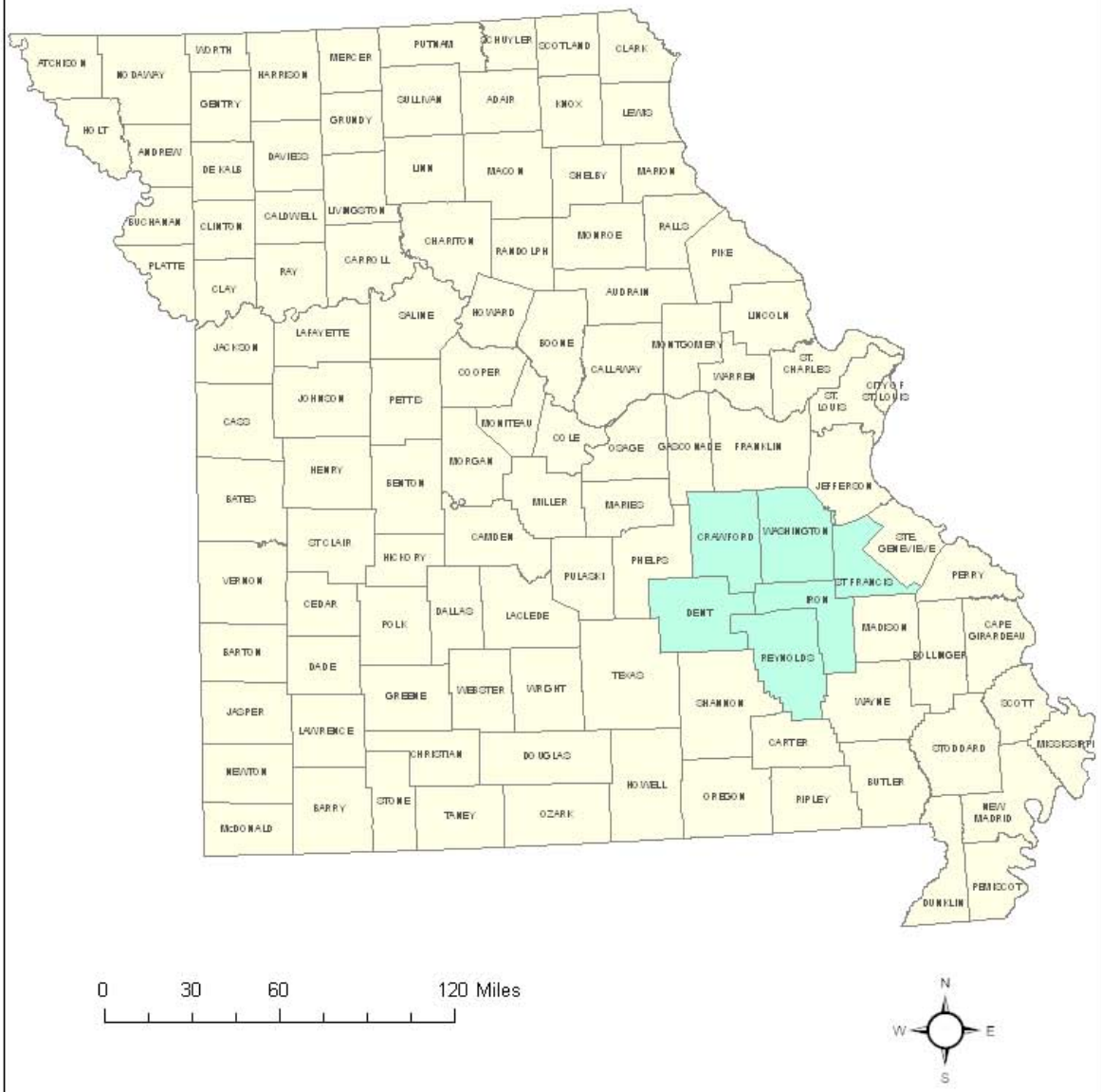


Figure 1. Map of Missouri's Old Lead Belt showing the location of Washington County.

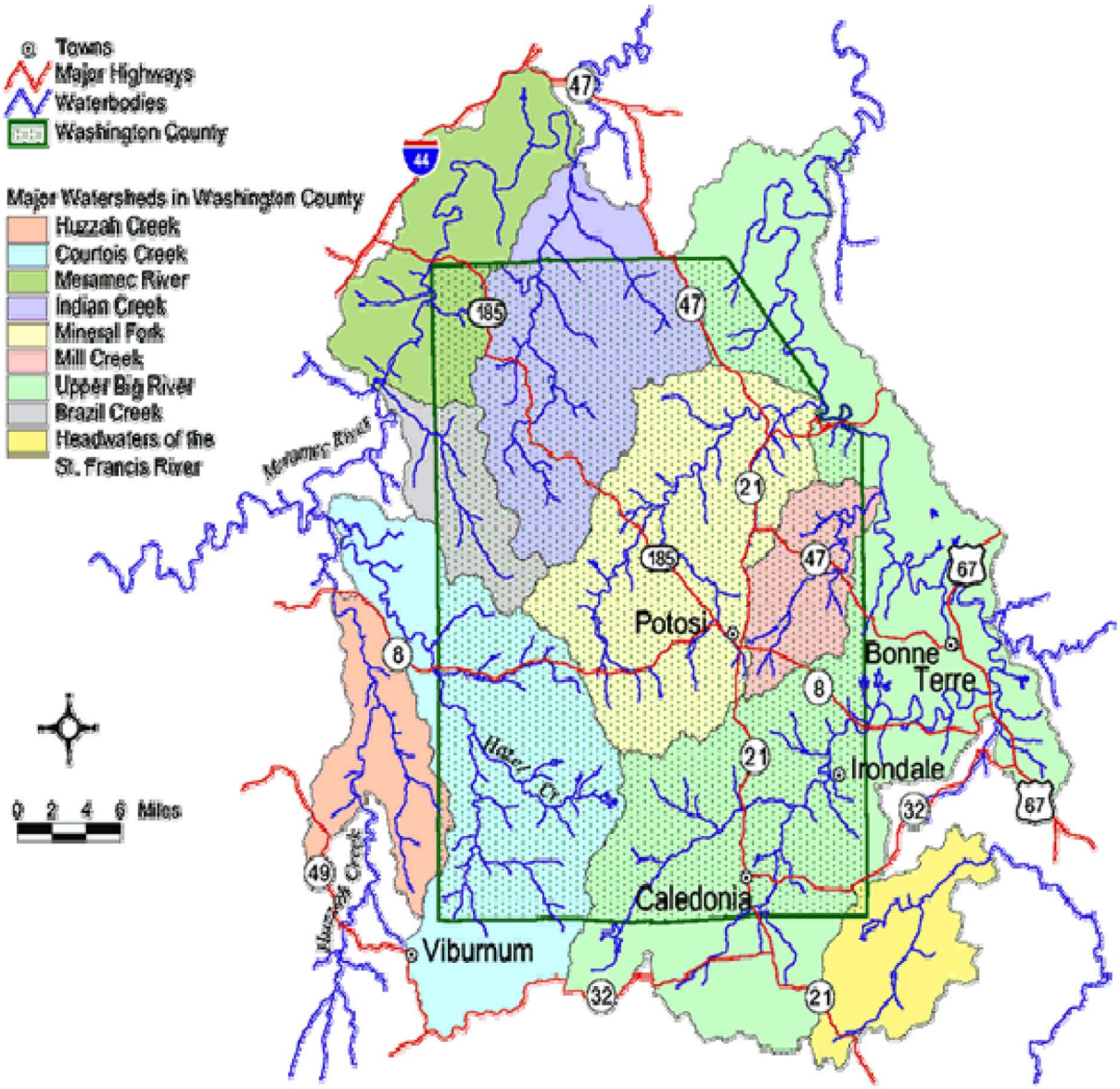
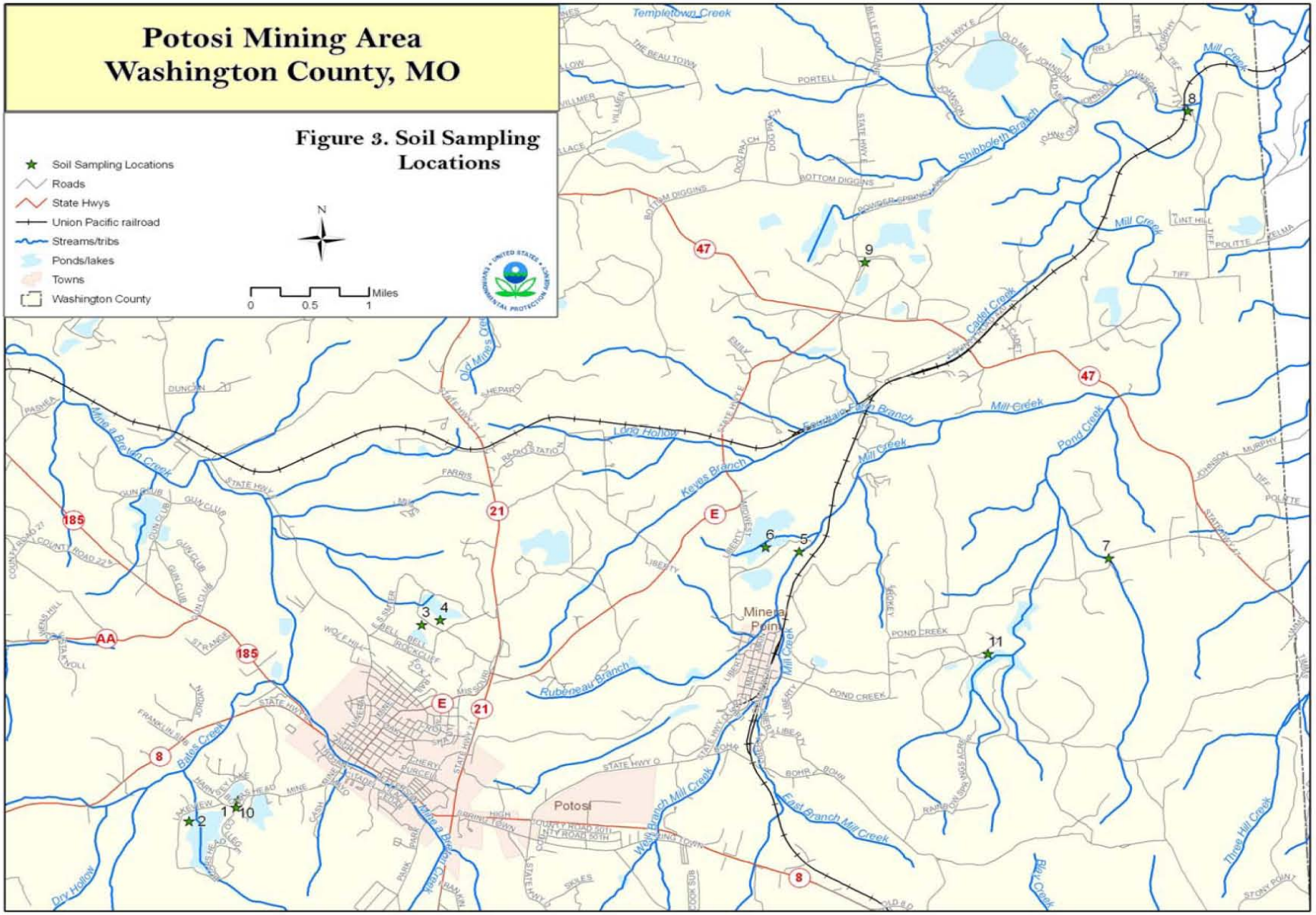


Figure 2. Major waterhseds in Washington County.


Potosi Mining Area
Washington County, MO
Figure 3. Soil Sampling Locations
Soil Sampling Locations
Roads
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Shibboleth Branch
Mill Creek
Cadet Creek
Long Hollow
Keyes Branch
Pond Creek
Rubeneau Branch
Mine a Breton Creek
Bates Creek
Dry Hollow
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
Blay Creek
Minera Point
Potosi
1
2
3
4
5
6
7
8
9
10
11

Potosi Mining Area
Washington & St. Francis County, MO
Figure 4. Sediment & Surface Water Sampling Locations
Sediment & Surface Water Sampling Locations
Roads
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
County boundary
N
0
0.5
1
Miles
JEFFERSON
ST FRANCIS
WASHINGTON
Potosi
Mill Creek
Big River
Three Hill Creek
Pond Creek
Shibboleth Branch
Cadet Creek
Old Mines Creek
Mine a Breton Creek
Bates Creek
Rubeneau Branch
Keyes Branch
West Branch Mill Creek
East Branch Mill Creek
Bear Creek
Cabanne Course
Tiff Creek
Dark Hollow
Clancy Branch
Pond Hollow
Old Mines Creek
Mine a Breton Creek
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
22
30

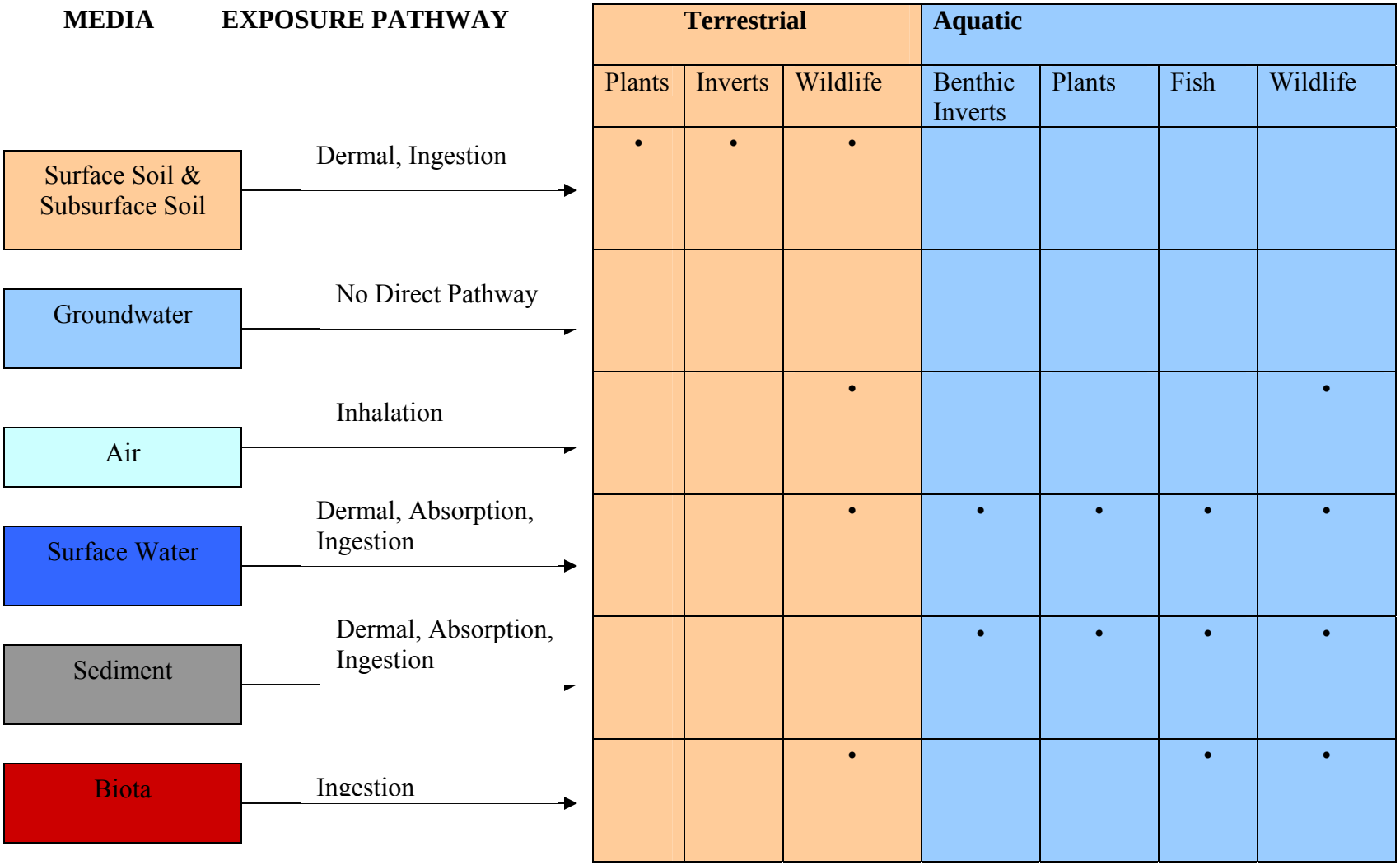
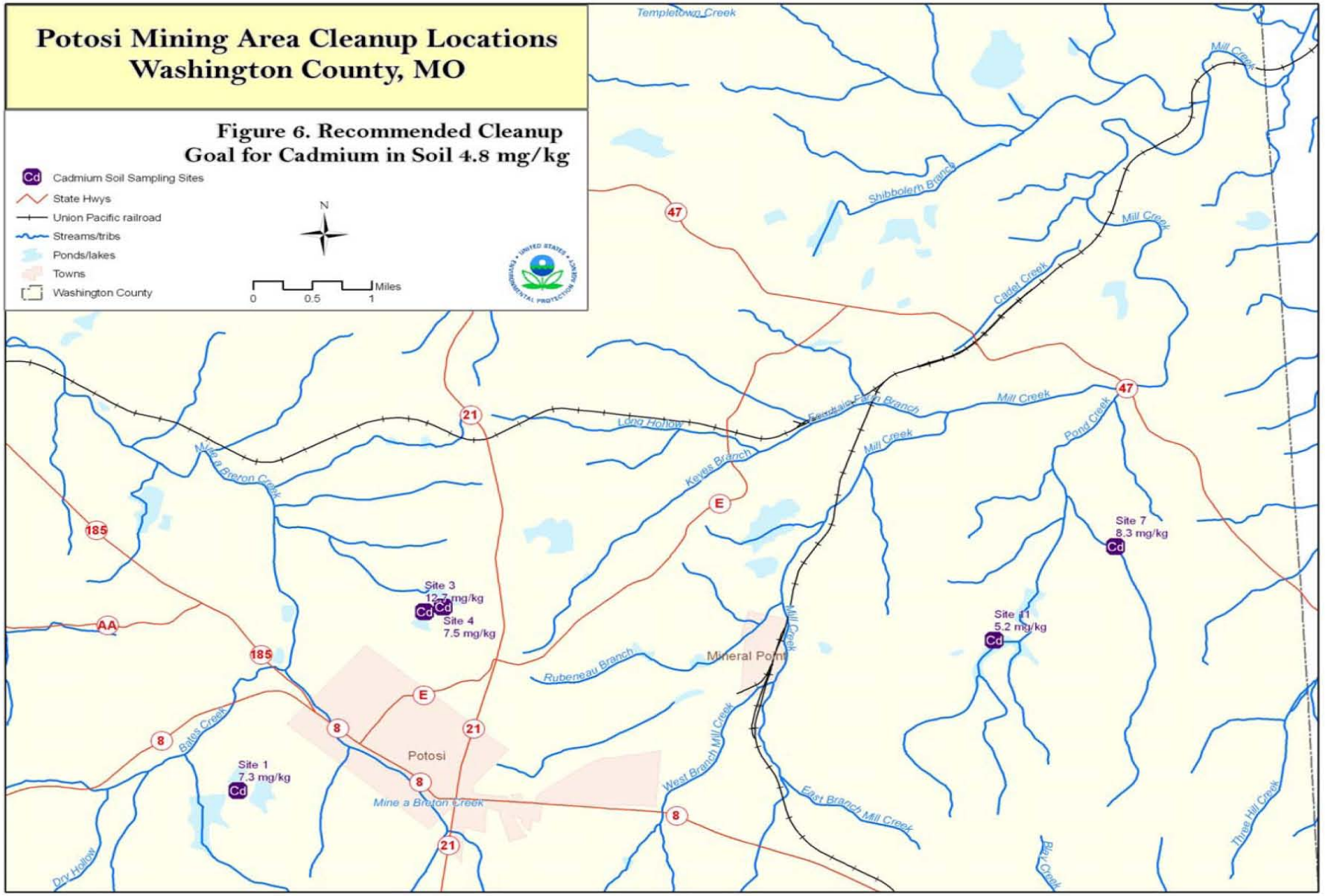
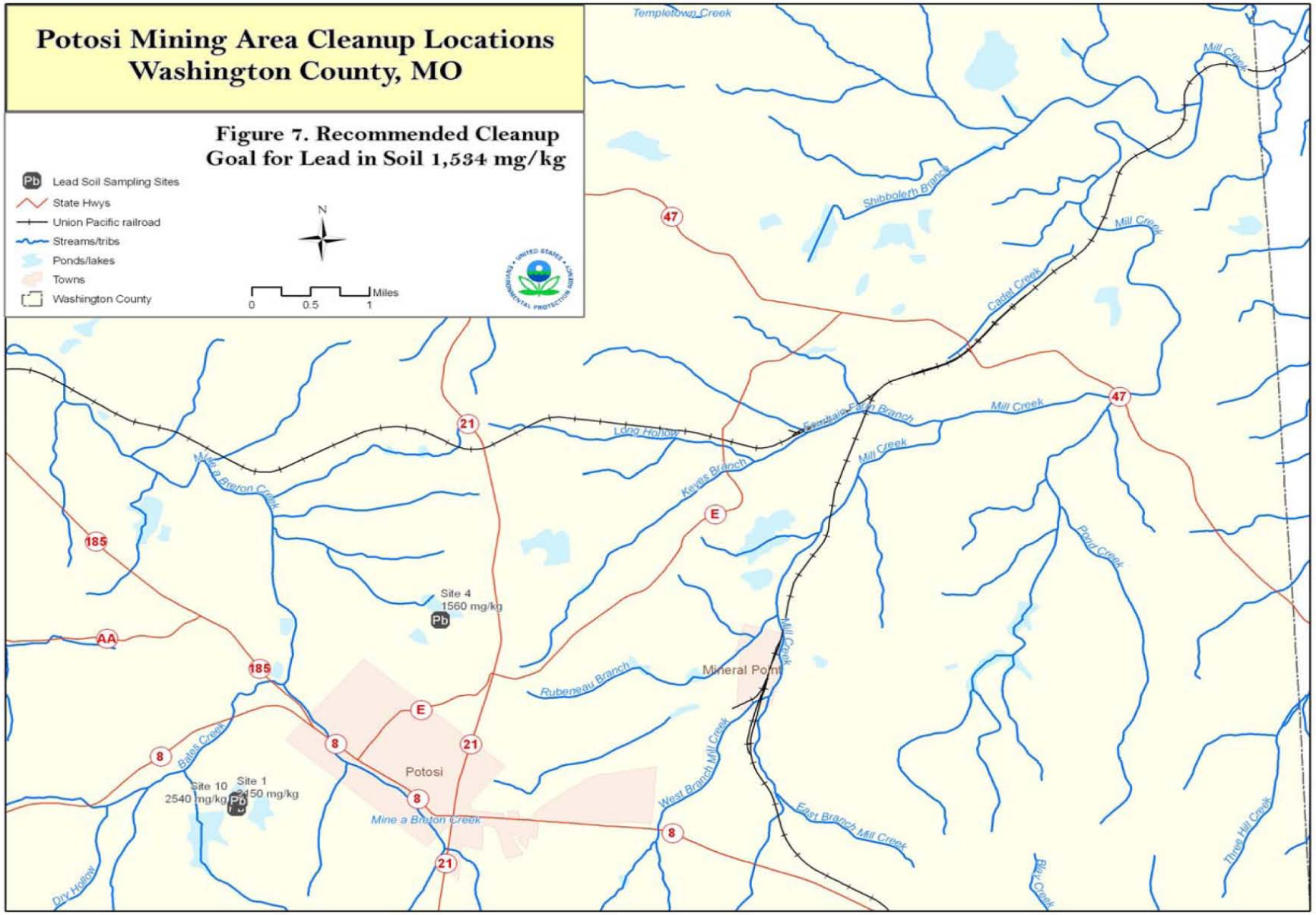
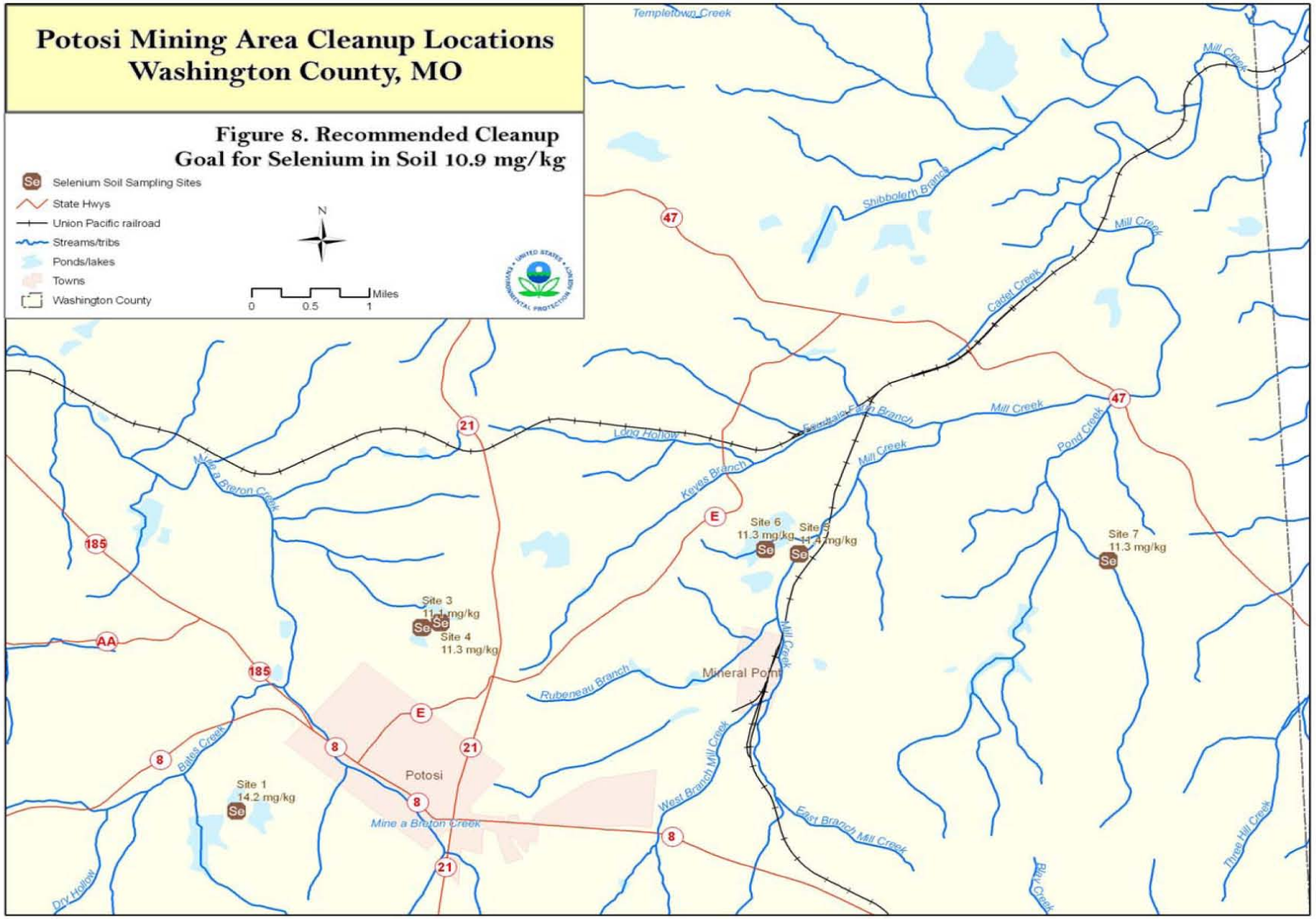
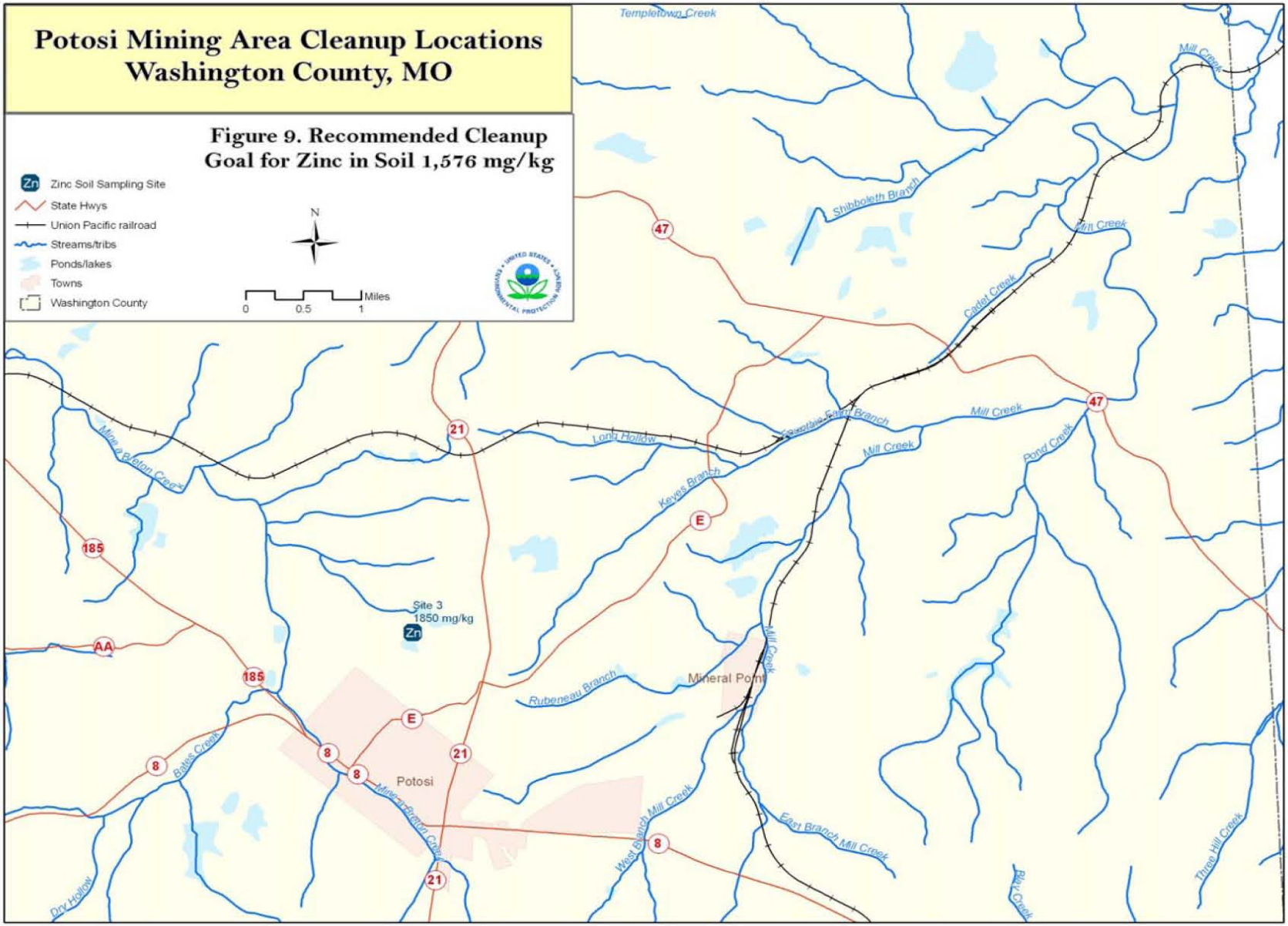


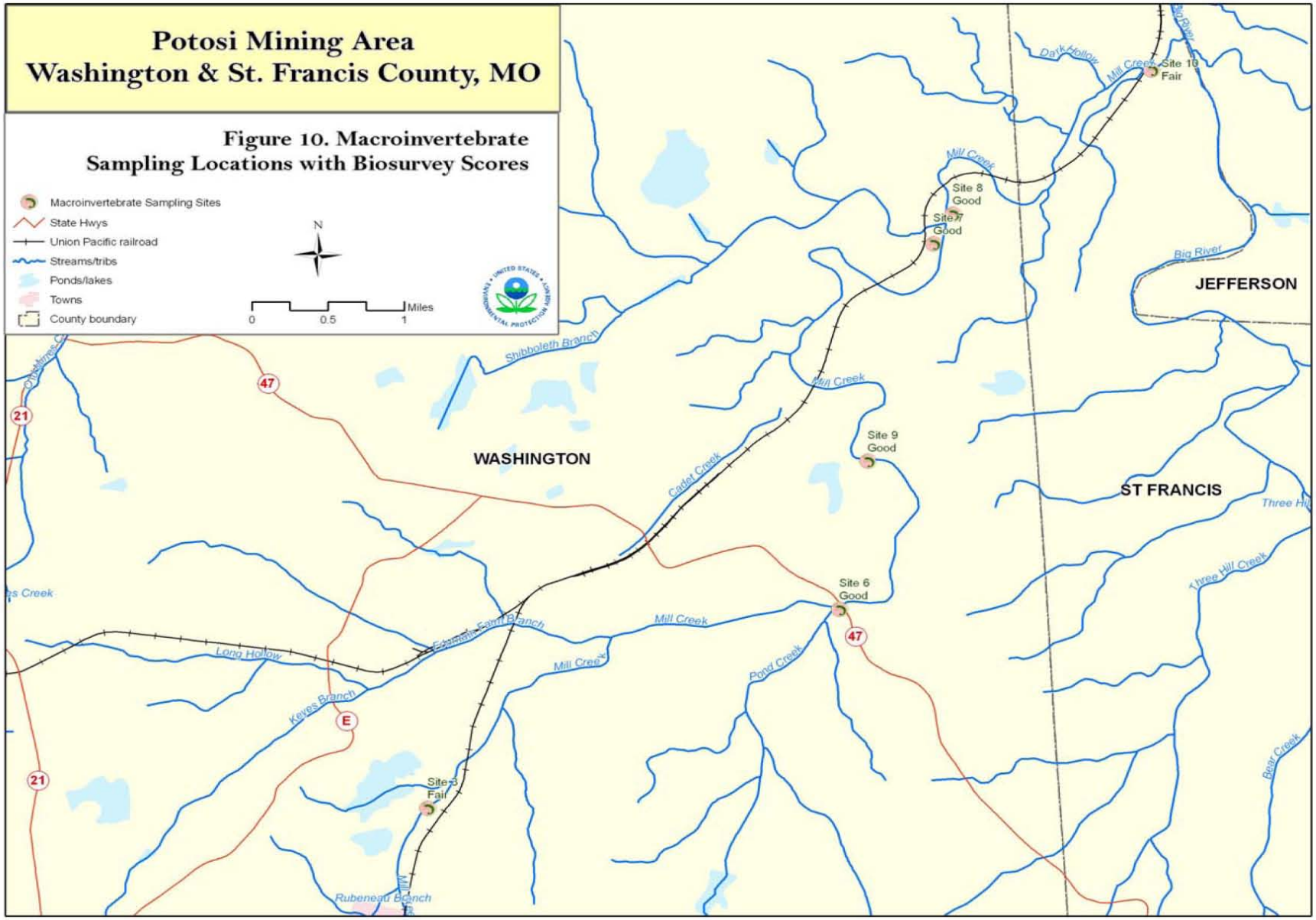
Figure 5. Site Conceptual Model.

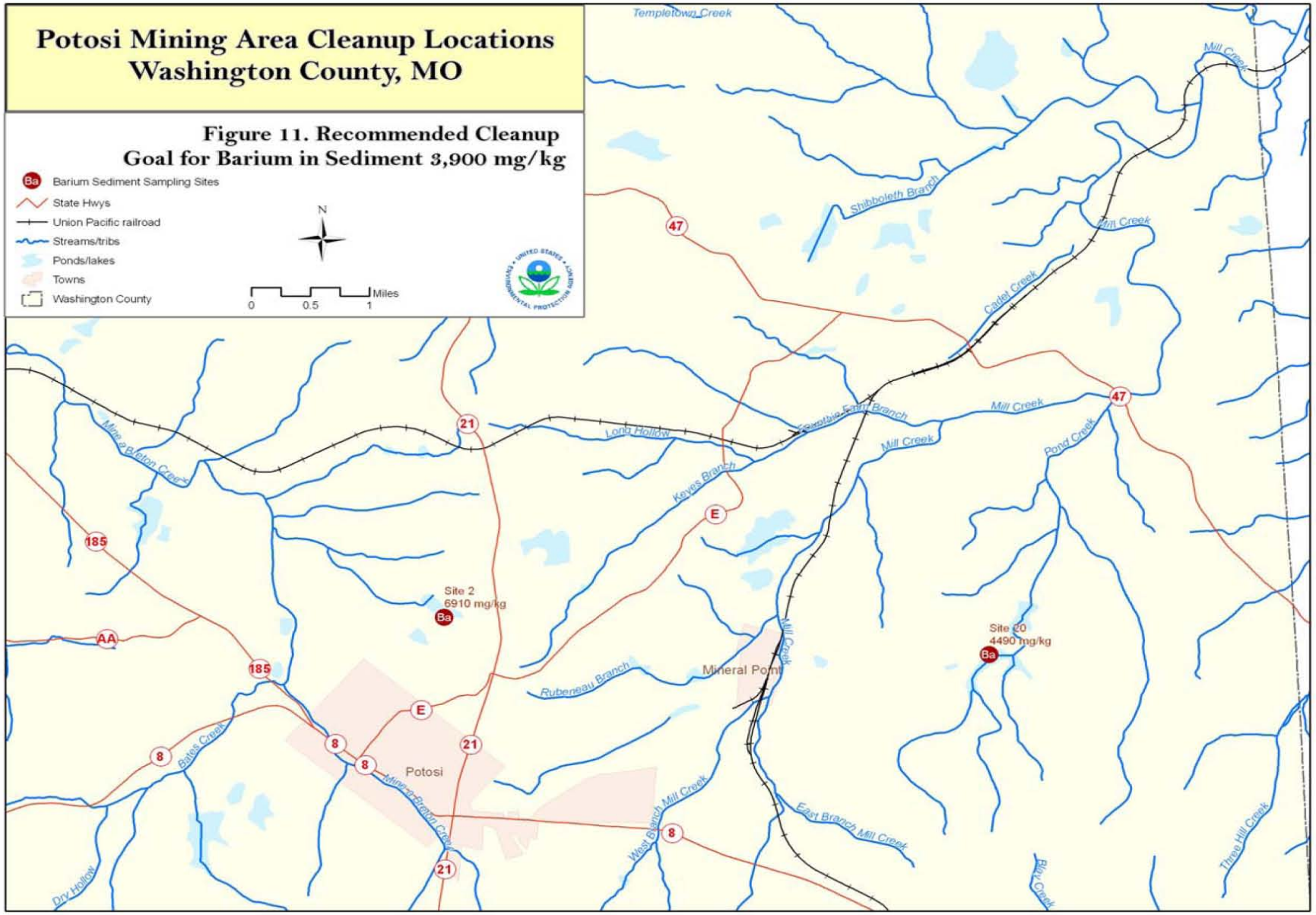

Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 6. Recommended Cleanup Goal for Cadmium in Soil 4.8 mg/kg
Cadmium Soil Sampling Sites
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Mill Creek
Shibboleth Branch
Cadet Creek
Long Hollow
Fountain Farm Branch
Keyes Branch
Pond Creek
Mine a Breton Creek
Site 7
8.3 mg/kg
Site 3
12.7 mg/kg
Site 4
7.5 mg/kg
Site 11
5.2 mg/kg
Mineral Point
Rubeneau Branch
Bates Creek
Potosi
Site 1
7.3 mg/kg
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
Dry Hollow
Bay Creek
47
21
185
AA
E
8

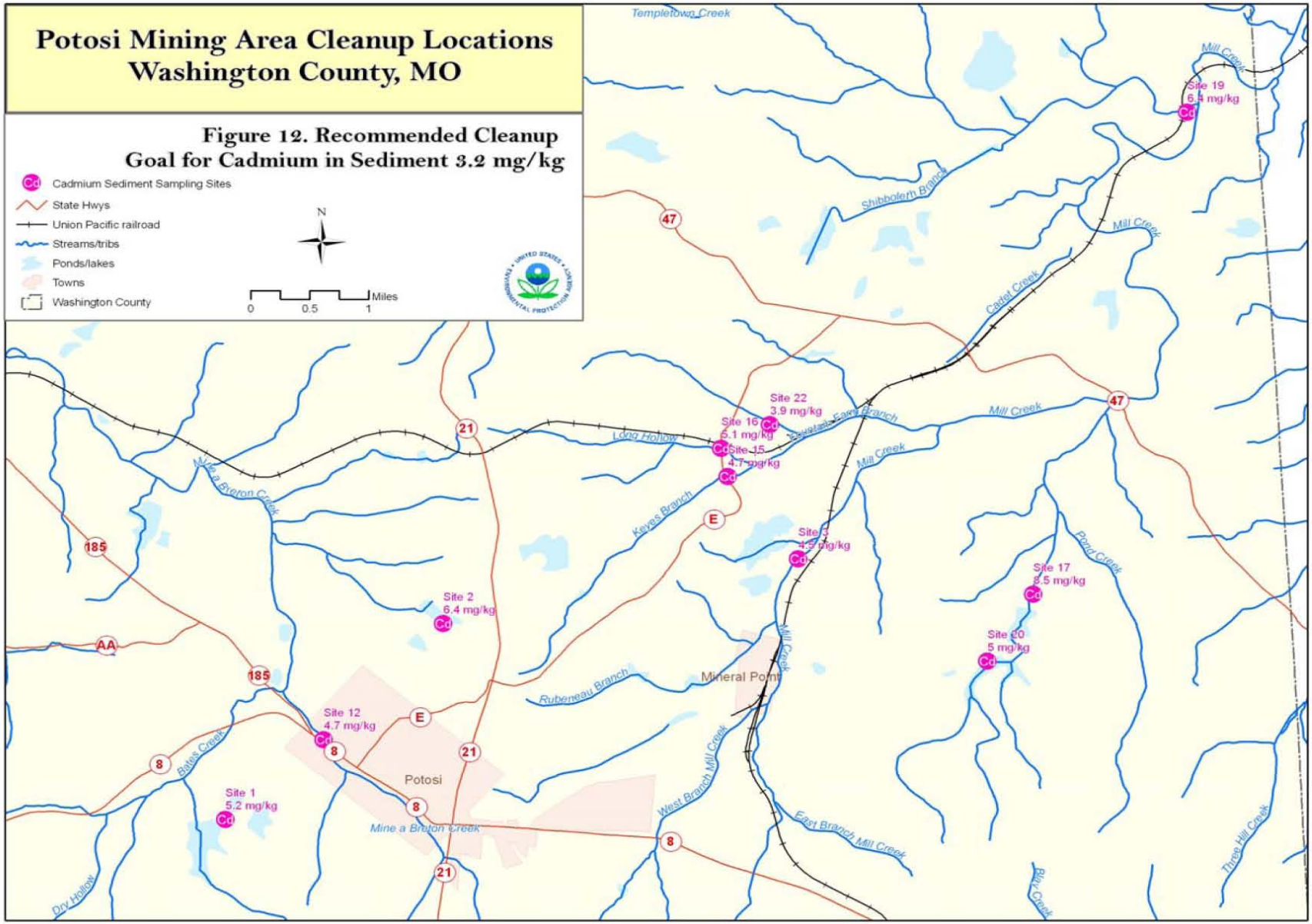

Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 7. Recommended Cleanup Goal for Lead in Soil 1,534 mg/kg
Lead Soil Sampling Sites
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Shibboleth Branch
Mill Creek
Cadet Creek
Long Hollow
Sandtrap Fifteen Branch
Keyes Branch
Mine a Breton Creek
Rubeneau Branch
Mineral Point
Pond Creek
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
Bates Creek
Dry Hollow
Site 4
1560 mg/kg
Site 10
2540 mg/kg
Site 1
2450 mg/kg
Potosi
47
21
185
AA
E
8

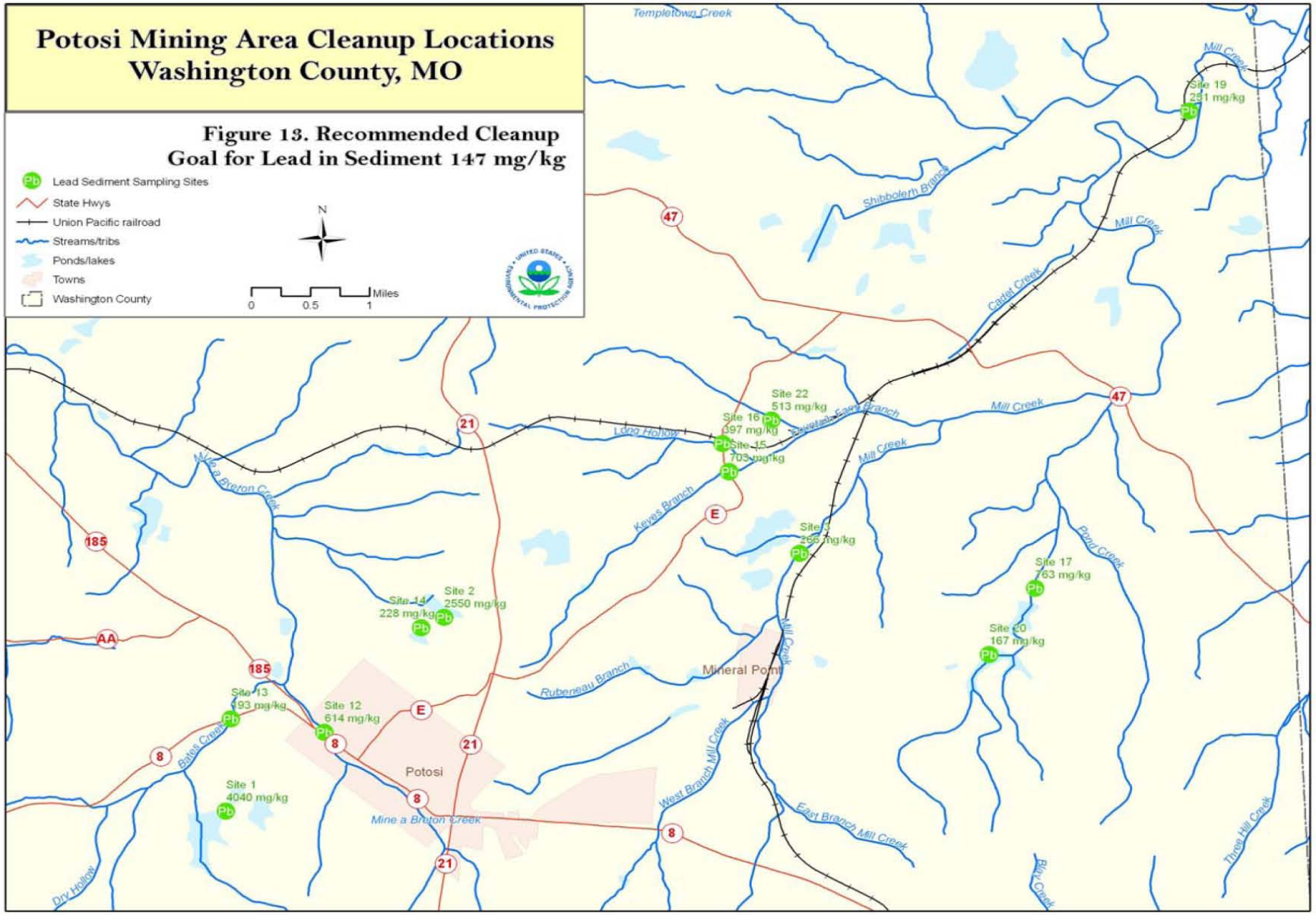

Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 8. Recommended Cleanup
Goal for Selenium in Soil 10.9 mg/kg
Selenium Soil Sampling Sites
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Mill Creek
Shibboleth Branch
Cadet Creek
Long Hollow
Keyes Branch
Pond Creek
Mine a Breton Creek
Site 6
11.3 mg/kg
Site 7
11.3 mg/kg
Site 3
11.1 mg/kg
Site 4
11.3 mg/kg
Mineral Point
Rubeneau Branch
Bates Creek
Potosi
Site 1
14.2 mg/kg
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
Dry Hollow
Blay Creek
47
21
185
AA
E
8

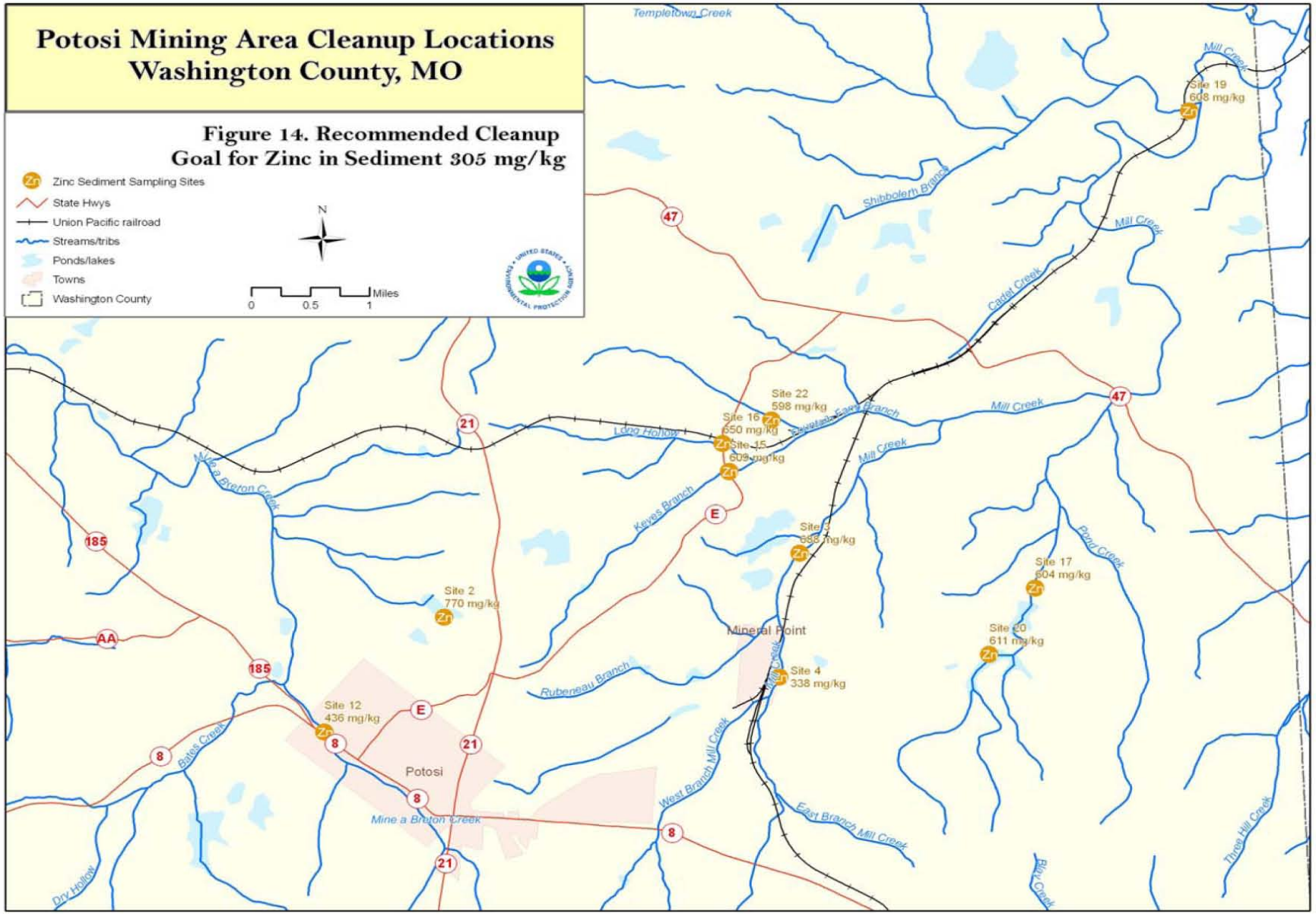

Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 9. Recommended Cleanup Goal for Zinc in Soil 1,576 mg/kg
Zinc Soil Sampling Site
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
Miles
0
0.5
1
Templetown Creek
Mill Creek
Shibboleth Branch
Cadet Creek
Long Hollow
Keyes Branch
Pond Creek
Site 3
1850 mg/kg
Zn
Rubeneau Branch
Mineral Point
Potosi
Bates Creek
Mineral Fork Creek
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
Dry Hollow
Big Creek
Mine a Breton Creek
47
21
185
AA
E
8

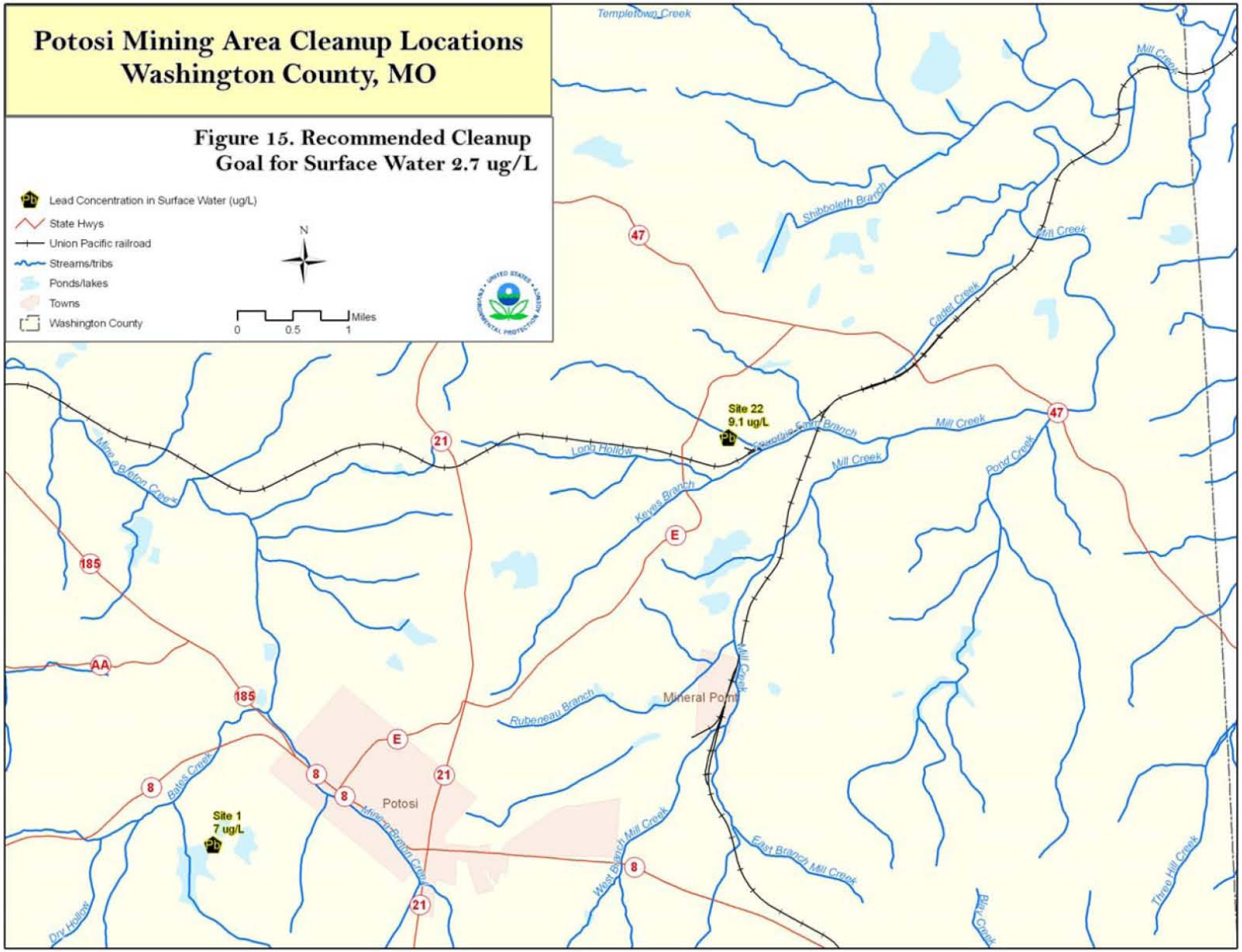

Potosi Mining Area
Washington & St. Francis County, MO
Figure 10. Macroinvertebrate Sampling Locations with Biosurvey Scores
Macroinvertebrate Sampling Sites
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
County boundary
N
0
0.5
1
Miles
Site 10 Fair
Site 8 Good
Site 7 Good
Site 9 Good
Site 6 Good
Site 5 Fair
WASHINGTON
JEFFERSON
ST FRANCIS
Dark Hollow
Mill Creek
Big River
Shibboleth Branch
Cadet Creek
Three Hill Creek
Long Hollow
Keyes Branch
Pond Creek
Bear Creek
Rubeneau Branch
47
21
E


Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 11. Recommended Cleanup Goal for Barium in Sediment 3,900 mg/kg
Barium Sediment Sampling Sites
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Mill Creek
Shibboleth Branch
Cadet Creek
Long Hollow
Keyes Branch
Pond Creek
Site 2
6910 mg/kg
Site 20
4490 mg/kg
Mineral Point
Rubeneau Branch
Potosi
Bates Creek
Dry Hollow
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
47
21
185
AA
E
8


Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 12. Recommended Cleanup Goal for Cadmium in Sediment 3.2 mg/kg
Cadmium Sediment Sampling Sites
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Mill Creek
Site 19
6.4 mg/kg
Shibboleth Branch
Cadet Creek
Site 22
3.9 mg/kg
Site 16
5.1 mg/kg
Site 15
4.7 mg/kg
Long Hollow
Keyes Branch
Site 3
4.9 mg/kg
Site 17
5.5 mg/kg
Site 20
5 mg/kg
Pond Creek
Site 2
6.4 mg/kg
Mineral Point
Rubeneau Branch
Site 12
4.7 mg/kg
Potosi
Bates Creek
Site 1
5.2 mg/kg
Mine a Breton Creek
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
Dry Hollow
47
21
185
AA
E
8


Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 13. Recommended Cleanup Goal for Lead in Sediment 147 mg/kg
Lead Sediment Sampling Sites
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Mill Creek
Site 19
251 mg/kg
Shibboleth Branch
Cadet Creek
Site 22
513 mg/kg
Site 16
397 mg/kg
Site 15
703 mg/kg
Long Hollow
Keyes Branch
Site 3
266 mg/kg
Site 17
763 mg/kg
Site 20
167 mg/kg
Pond Creek
Site 14
228 mg/kg
Site 2
2550 mg/kg
Mineral Point
Rubeneau Branch
Site 13
193 mg/kg
Site 12
614 mg/kg
Bates Creek
Potosi
Site 1
4040 mg/kg
Mine a Breton Creek
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
Dry Hollow
Blay Creek
47
21
185
AA
E
8


Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 14. Recommended Cleanup Goal for Zinc in Sediment 305 mg/kg
Zinc Sediment Sampling Sites
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Mill Creek
Site 19
608 mg/kg
Shibboleth Branch
Cadet Creek
Site 22
598 mg/kg
Site 16
650 mg/kg
Site 15
609 mg/kg
Long Hollow
Keyes Branch
Site 3
588 mg/kg
Site 17
604 mg/kg
Site 20
611 mg/kg
Site 2
770 mg/kg
Mineral Point
Site 4
338 mg/kg
Rubeneau Branch
Site 12
436 mg/kg
Potosi
Bates Creek
Mine a Breton Creek
West Branch Mill Creek
East Branch Mill Creek
Three Hill Creek
Dry Hollow
Pond Creek
47
21
185
AA
E
8


Potosi Mining Area Cleanup Locations
Washington County, MO
Figure 15. Recommended Cleanup Goal for Surface Water 2.7 ug/L
Lead Concentration in Surface Water (ug/L)
State Hwys
Union Pacific railroad
Streams/tribs
Ponds/lakes
Towns
Washington County
N
0
0.5
1
Miles
Templetown Creek
Mill Creek
Shibboleth Branch
Cadet Creek
47
Site 22
9.1 ug/L
Long Holiday
Keyes Branch
Mill Creek
Pond Creek
21
E
185
AA
Mineral Point
Rubeneau Branch
Potosi
Bates Creek
Site 1
7 ug/L
Dry Hollow
West Branch Mill Creek
East Branch Mill Creek
Three Mile Creek
8

APPENDIX C: MACROINVERTEBRATE SURVEY RESULTS
WASHINGTON COUNTY LEAD DISTRICT
POTOSI SITE

ABSTRACT

A sampling effort was conducted by the U.S. EPA Region 7 in June 2008 to determine if mine waste in Mill Creek sediments were decreasing macroinvertebrate diversity and/or density. Six samples were collected at six pre-determined sites. A Biosurvey Metric Score found that most of the sites in Mill Creek have "Good" water quality. However, sensitive taxa percentages may be decreasing. Further analysis of macroinvertebrate metrics and metals in sediment is suggested, as well as correlating habitat data and invertebrate metrics. Future expanded studies which include reference sites are also suggested for the other Washington County Operable Units.

INTRODUCTION

U.S. EPA Region 7 performed a benthic macroinvertebrate survey in the Mill Creek watershed, located in Potosi, Missouri to evaluate aquatic organism diversity after heavy metal exposure. Benthic macroinvertebrates are effective monitors for determining metal effects on aquatic ecosystems. These insects live in close association with stream substrates, where they are exposed to sediment-bound heavy metals (i.e., cadmium, lead, and zinc). Documented community-level effects include a decrease in the abundance of metals-sensitive taxa (i.e., some mayflies) and a corresponding increase in metals-tolerant taxa (i.e., some chironomids) and a decrease in the number of taxa or total abundance (Beltman *et al.* 1999).

Aquatic macroinvertebrates were collected at six sites in the Mill Creek watershed in June 2008. This study was performed by Region 7 as part of the ERA for the Washington County Superfund Site. Specifically, the question to be answered is "Do macroinvertebrate community assemblages exhibit an expected response, at the family or genus level, at sample sites in Mill Creek that have been influenced by elevated levels of mine waste?"

METHODS

Sampling. On June 24, 2008, the EPA sampled six sites on Mill Creek for macroinvertebrate diversity using a D-net. The 500 μm D-net (attached to a wooden pole) is placed on the stream substrate with the water flowing into the net. Rocks directly in front of the net are slightly lifted and brushed off to allow attached insects to flow into the net. The rocks are then placed away from the net and the substrate in front of the net is disturbed by kicking to release the benthos into the net.

One composite sample was taken at each of the six sites for a total of six macroinvertebrate samples (Figure 1). Collected invertebrate samples from each site were placed into Zip-lock bags along with 95% ethanol to a final concentration of 70% for preservation.

Sample Processing and Identifications. Once collected, the sample bags were stored under the hood at room temperature in the EPA Science and Technology Center bioassay lab. Each sample was transferred to a standard soil sieve (500 μm) and flushed with water to rinse off the ethanol. Any large debris was checked for attached insects, rinsed, and removed (Barbour *et al.* 1999).

The complete macroinvertebrate sample was sorted under a dissecting microscope at 20-70X magnification. Merritt and Cummins (1996) were referred to for insect identifications and Thorp and Covich (2001) for other invertebrates. Taxonomic resolution was to family or genus for most groups (Attachment A).

Methods for Analyzing Data

Metrics. The following metrics were used to evaluate whether Mill Creek is being adversely impacted by mine waste.

Total counts- This metric measures the total abundance of all invertebrates. When water quality and habitat are favorable, then invertebrate populations are usually high for all taxonomic groups per sample area (Table 1).

Taxa richness- Macroinvertebrate taxa richness was calculated for each sample (total number of taxonomic groups) (Table 1). Richness measures the number of distinctly different taxa found in a sample. Healthy waters tend to have greater diversity (greater richness) without a dominant taxa. The chart below provides numeric guidance on how to interpret richness values found in Table 1, Results section.

Bioclassification Criteria for Taxa Richness Values (Lenat 1988)

Bioclassification	Richness
Excellent	>31
Good	24-31
Good-Fair	16-23
Fair	8-15
Poor	0-7

EPT Index- This metric represents the number of distinct genera found only among the orders Ephemeroptera, Plecoptera, and Trichoptera (EPT). These three orders are separated from other aquatic taxa because they generally represent the more pollution intolerant organisms present in rivers and streams. The chart below offers a numeric description of the EPT Index and % EPT as it pertains to water quality (PSKF 2000). It should be noted that Plecoptera are not abundant in warm water streams regardless of the water quality and the Big River is a warm water river.

% EPT- Percentage EPT is a ratio of the EPT Index divided by the total number of organisms in a sample. The higher the EPT ratio generally means that the water quality is also higher in the sampled area.

Bioclassification Criteria for EPT Index & % EPT (PSKF 2000).

EPT Index & EPT Ratio WQ-Rating			
EPT Index			
Good	Acceptable	Marginal	Poor
>8	6-8	2-5	0-1
% EPT			
Good	Acceptable	Marginal	Poor
76-100	51-75	26-50	0-25

% Chironomidae- Some Chironomidae species are metal tolerant. A high percentage contribution (greater than 34%) usually indicates poor water quality and/or disturbed habitat.

% Dominance- The contribution a particular taxon has to the total number of individuals represented in a sample provides an indication of relative dominance and is a simple estimator of evenness (Plafkin *et al.* 1989). A healthy and stable community should contain a diverse number of organisms with few dominant taxa. Dominant species greater than 67% indicates poor water quality, between 34-67% indicates fair water quality, and less than 34% indicates good water quality (EPA,1999).

Dominant Taxa*- The dominant taxa was identified at each site and should be viewed along with % dominance. If the dominant taxa is Chironomidae with a 67% dominance or greater, then the site would be considered to have poor water quality and/or disturbed habitat. Below are descriptions of the dominant taxa in found in Table 1, Results section.

- E-*Isonychia*- An Ephemeroptera with low pollution tolerance.
- E-*Baetis*- An Ephemeroptera with moderate pollution tolerance.
- E-*Caenis*- An Ephemeroptera with a higher pollution tolerance than other mayflies.
- D-Chiron = Chironomidae- Many species are pollution tolerant Diptera (Hilsenhoff 1987, Bode *et al.,*1996).

Sensitive Taxa Index/Family Level Hilsenhoff Biotic Index (HBI)- Professor William Hilsenhoff developed this index in the 1970s at the University of Wisconsin-Madison. He assigned tolerance values to macroinvertebrates to represent their tolerance to organic pollution (Hilsenhoff 1977, 1987, 1988), but the HBI may also be sensitive to some other types of chemical pollution (Hilsenhoff 1998, Hooper 1993). The HBI began as a way to evaluate invertebrates at the species level but was later modified to include family level identifications.

(Hilsenhoff, 1987, 1988). The index ranges from 0-10 and the higher the number, the more polluted the stream.

The average tolerance for the sample is calculated by:

$$\Sigma = \frac{(n)(a)}{N}$$

Where:
n-is the number of individuals in each family
a-is the tolerance value of each family
N-is the total number of organisms in the sample

Water quality index for the family-level HBI (Hilsenhoff 1988).

F-HBI Value	Water Quality Rating	Degree of Organic Pollution
0.00-3.75	Excellent	Unlikely
3.76-4.25	Very Good	Possible Slight
4.26-5.00	Good	Some Probable
5.01-5.75	Fair	Fairly Substancial
5.76-6.50	Fairly Poor	Substancial Likely
6.51-7.25	Poor	Very Substancial
7.26-10.00	Very Poor	Severe

Shannon-Weaver Diversity Index- The Shannon diversity index (H') is commonly applied to macroinvertebrate samples to measure the distribution of individual taxa. In theory, a community of many taxa with fairly even distribution is considered more natural than a community dominated by one or a few taxa. H' values range between 0 and 4 with higher values representing higher diversity.

$$H' = 3.322 \left[\log N - \frac{\sum N_i (\log N_i)}{N}\right]$$

Where:
H' = Diversity (0-4)
3.332 = Conversion factor from base 10 to base 2
N = Total number of individuals in all species
N_i = Number of individuals in each species

Biosurvey Metric Worksheet- The metric worksheet (below) is designed to help calculate a total score for each of the six monitored sites in Mill Creek. This score can be used alone or compared to reference conditions to determine the biological condition of the stream at that site (EPA, 2006).

Primary Metrics	(M)	Biosurvey Score		
	Monitored	(Circle the appropriate range for each metric)		
	Site Values	6	3	0
No. of Taxa	.	>15	15-8	<8
No. of EPT Taxa	.	>8	8-4	<4
% Dominance	.	<34%	34-67%	>67%
Sensitive Taxa Index (HBI)	.	<4.8	4.8-6.4	>6.4
COLUMN SCORE		.	.	.
(Multiply no. of circled values by the biosurvey score)				
TOTAL SCORE		.	.	.
(Multiply no. of circled values by the biosurvey score)				

Biosurvey Scoring Guide-The following guide is based on the four primary metrics above. If a score falls on the boundary of two categories, then you consider the site's habitat assessment results and chemical data in confirming your assignment to a particular category.

Total Score from Metrics	Condition Category	Attributes
>18-24	Good	Comparable to the best situation to be expected within an ecoregion. Balanced trophic structure. Optimum community structure (composition and dominance) for stream size and habitat quality.
9-15	Fair	Community structure less than expected. Composition (species richness) and diversity lower than expected due to loss of some pollution-intolerant forms. Percent contribution of tolerant forms increased. Reduction in EPT index.
0-6	Poor	Few species present. If high densities of organisms, then dominated by one or two pollution-tolerant taxa.

RESULTS

Table 1. Macroinvertebrate Metrics for Mill Creek (June 2008).

SITE	Mill Creek 3	Mill Creek 6	Mill Creek 7	Mill Creek 8	Mill Creek 9	Mill Creek 10
METRIC						
Total invertebrates counted	510	540	206	210	653	376
Richness	15	22	15	16	28	13
EPT Index	6	10	7	8	9	7
% EPT	61	67	70	55	51	94
% Chironomidae	5.4	5.9	21	11	13	5
% Dominance	55	26	25	35	31	54
Dominant taxa*	E-*Baetis*	D-Chiron	E-*Isonychia*	E-*Baetis*	E-*Baetis*	E-*Caenis*
Family- HBI**	4.84	4.47	3.63	4.50	4.77	4.45
H' Diversity Index	2.11	2.91	2.87	2.85	3.08	2.28

**HBI's are seasonally dependent and Hilsenhoff (1988) recommends sampling warm water streams in the spring. Given that Mill Creek was sampled in the summer Hilsenhoff (1988) suggests subtracting 0.50 units from the reported HBI to compensate for the bias.

Table 2. Biosurvey Metric Worksheet Results (see attached Appendix A for worksheets).

SITE	Mill Creek 3	Mill Creek 6	Mill Creek 7	Mill Creek 8	Mill Creek 9	Mill Creek 10
SCORE	12	24	18	18	24	15
CONDITION CATAGORY	FAIR	GOOD	GOOD	GOOD	GOOD	FAIR

Table 3. Mill Creek Sites placed in order of descending water quality.

Order of Descending Water Quality		**Site No**.
"Higher Water Quality"	1	Site 6
	2	Site 9
	3	Site 7
	4	Site 8
	5	Site 3
"Lower Water Quality"	6	Site 10

DISCUSSION

The analysis of the macroinvertebrate diversity in Mill Creek finds that the creek supports a good diversity of macroinvertebrates, but the quality may be declining. However, it is not clear if the decline is due to heavy metal or organic pollution. It will be important to correlate macroinvertebrate data with habitat and sediment data. Future studies (studies in the other Operable Units of Washington County) should include spring sampling and two or three reference sites to compare to test sites since the macroinvertebrate data does not produce clear cut evidence that metal contaminated sediment is leading to a decline in sensitive taxa.

It is clear that sensitive taxa are found in Mill Creek. Looking at the taxa list in Attachment A, all of the sites sampled in Mill Creek have several families of Ephemeroptera (mayflies). Though, Baetidae and Caenidae are more tolerant mayflies and their percentages are much greater than the more sensitive mayflies which are the Isonychidae and Heptageniidae families. Other sensitive taxa, including the hellgrammite *Nigronia* and the stonefly Leuctridae, were found in Mill Creek, but both were found in low percentages. Without having years of data, it is not known if sensitive populations are declining or increasing.

The following discussion is a site by site explanation of the water quality rating for each site.

Mill Creek Site 3- The Biosurvey score for Site 3 was given a "Fair" water quality rating (Table 2). Taxa richness and dominance were also fair, the EPT index and % EPT was on the lower side of acceptable. Therefore, a fair water quality rating is justified for Site 3.

Mill Creek Site 6- Site 6 had a "Good" Biosurvey score. The richness and EPT Index was good, but the % EPT was just acceptable. The dominant taxa was Chironomidae, which is a pollution tolerant insect larvae, however the 26 % dominance is low and that means that this site had a more desirable evenness of all taxa. Therefore, a good water quality rating is justified for Site 6.

Mill Creek Site 7- Site 7 also has a "Good"water quality rating score. The richness is only fair, but the EPT Index and % EPT is on the higher side of acceptable, plus the dominant taxa is a pollution sensitive mayfly "Isonychidae". This site warrants the good water quality rating.

Mill Creek Site 8- The score for Site 8 is 18 and that's considered "Good" water quality. Richness, EPT Index and %EPT are all acceptable and the % Chironomidae is fairly low. A good water quality rating is justified for Site 8.

Mill Creek Site 9- This site is very similar to Site 8 for all the same reasons. Plus, this site had the most macroinvertebrates counted. Although diversity is more informative, density can also be important, however, this was a qualitative not quantitative study. Region 7 agrees with the Biosurvey Score, Site 9 has good water quality.

Mill Creek Site 10- This site only had a score of 15 and was considered to have a "Fair" water quality rating. However, the % EPT was 94%, which is very high (good) and the diversity index

is next to the highest, which is also considered good. Caenidae is a more pollution tolerant mayfly, so this site needs a little more investigation before Region 7 would only rate it a "Fair".

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Attachment A

Biosurvey Score Sheets

Site 3

Primary Metrics	(M) Monitored Site Values	Biosurvey Score (Circle the appropriate range for each metric)		
		6	**3**	**0**
No. of Taxa	15	>15	15-8	<8
No. of EPT Taxa	6	>8	8-4	<4
% Dominance	55	<34%	34-67%	>67%
Sensitive Taxa Index	4.84	<4.8	4.8-6.4	>6.4
COLUMN SCORE *(Multiply no. of circled values by the biosurvey score)*			3 x 4=12	
TOTAL SCORE *(Sum all the column scores)*		**12**		

Site 6

Primary Metrics	(M) Monitored Site Values	Biosurvey Score (Circle the appropriate range for each metric)		
		6	**3**	**0**
No. of Taxa	22	>15	15-8	<8
No. of EPT Taxa	10	>8	8-4	<4
% Dominance	26	<34%	34-67%	>67%
Sensitive Taxa Index	4.47	<4.8	4.8-6.4	>6.4
COLUMN SCORE *(Multiply no. of circled values by the biosurvey score)*		4 x 6 = 24		
TOTAL SCORE *(Sum all the column scores)*		**24**		

Site 7

Primary Metrics	(M) Monitored Site Values	Biosurvey Score (Circle the appropriate range for each metric)		
		6	3	0
No. of Taxa	15	>15	15-8	<8
No. of EPT Taxa	7	>8	8-4	<4
% Dominance	25	<34%	34-67%	>67%
Sensitive Taxa Index	3.63	<4.8	4.8-6.4	>6.4
COLUMN SCORE *(Multiply no. of circled values by the biosurvey score)*		2 x 6 = 12	2 x 3 = 6	
TOTAL SCORE *(Sum all the column scores)*		**18**		

Site 8

Primary Metrics	(M) Monitored Site Values	Biosurvey Score (Circle the appropriate range for each metric)		
		6	3	0
No. of Taxa	16	>15	15-8	<8
No. of EPT Taxa	8	>8	8-4	<4
% Dominance	35	<34%	34-67%	>67%
Sensitive Taxa Index	4.50	<4.8	4.8-6.4	>6.4
COLUMN SCORE *(Multiply no. of circled values by the biosurvey score)*		2 x 6 = 12	2 x 3 = 6	
TOTAL SCORE *(Sum all the column scores)*		**18**		

Site 9

Primary Metrics	(M) Monitored Site Values	Biosurvey Score (Circle the appropriate range for each metric)		
		6	3	0
No. of Taxa	28	>15	15-8	<8
No. of EPT Taxa	9	>8	8-4	<4
% Dominance	31	<34%	34-67%	>67%
Sensitive Taxa Index	4.77	<4.8	4.8-6.4	>6.4
COLUMN SCORE *(Multiply no. of circled values by the biosurvey score)*		4 x 6 = 24		
TOTAL SCORE *(Sum all the column scores)*		**24**		

Site 10

Primary Metrics	(M) Monitored Site Values	Biosurvey Score (Circle the appropriate range for each metric)		
		6	3	0
No. of Taxa	13	>15	15-8	<8
No. of EPT Taxa	7	>8	8-4	<4
% Dominance	54	<34%	34-67%	>67%
Sensitive Taxa Index	4.45	<4.8	4.8-6.4	>6.4
COLUMN SCORE *(Multiply no. of circled values by the biosurvey score)*				
TOTAL SCORE *(Sum all the column scores)*		**15**		

Washington County Superfund Site--June 24, 2008						
	Mill Creek					
	3	**6**	**7**	**8**	**9**	**10**
Taxonomic List						
Acari	2	6	1	5	21	4
Amphipoda						
Crangonyx						
Gammarus						
Bivalvia						
Pelecypoda						
Sphaeriidae						
Corbiculacea corbicula					1	
Collembola Isotomidae						
Cladoceran *Chydorus*						
Coleoptera						
Larvae Elmidae *Stenelmis*	1	1	5	6	23	
Adult Elmidae *Stenelmis*	1	2	1	6	16	7
Larvae Elmidae *Optioservus*						
Adult Elmidae *Optioservus*						
Psephenidae *Acneus*	1					
Psephenidae *Psephenus*		2	1			
Hydrophilidae		2	7		8	
Hydrophilidae larvae		12			1	
Halipidae *Peltodytes*						
Elmidae						
Gyrinidae *Dineutus sp.*						3
Decapoda						
Orconectes					1	
Orconectes hylas						
Diptera						
Chironomidae	73	**143**	43	66	47	7
Ephydridae						
Chiron. pupae *Tanytarsus*						
Simuliidae *Simulium*	44		3	6	179	

Tipuliidae				1	2	
Tipuliidae cranefly						
Empididae	70					
Tabinidae						
Ephemeroptera						
Baetidae *Baetis*	**280**	26	35	**73**	**201**	58
Trichorythidae*Tricorythodes*		45	1	5		1
Heptageniidae *Stenacron*		1				
Heptageniidae *Stenonema*	2	15	20	7	4	30
Isonychidae *Isonychia*		5	**51**	10	17	46
Ephemeridae *Ephemera*						
Leptophelbiidae *Choroterpes*						
Caenidae *Caenis*	8	125	3	7	49	**203**
Ephemerellidae *Serratella*						
Baetiscidae						
Gastropoda	4	2				
Pleuroceridae *Goniobasis*						
Pleuroceridae *Pleurocera*						
Ancylidae *Ferrissia*					1	
Lymnaeidae *Lymnaea*					9	
Physidae *Physa*						
Planorbidae					1	
Physella "pouch snail"					1	
Gordiidae						
Leeches						
Hirudinoidea						
Lepidoptera						
Pyralidae *Petrophila*						
Hemiptera						
Saldidae						
Notonectidae						
Heteroptera Gerridae						
Mesovellidae						
Isopoda						
Assellidae *Lirceus*					1	
Megaloptera						

Sialidae *Sialis*						
Corydalidae *Corydalis*		1		1	2	
C. Nigronia		4		3	1	1
Odonata						
Coenagrionidae					2	
Gomphidae		1	1			1
Olighochaeta					1	
Ostracoda						
Plecoptera						
Leuctriade *Leuctra*	1	5		1	1	
Perlidae *Acroneuria*						
Perlodidae						
Trichoptera						
Hydrospychidae *Cheumatopsyche*	16	122	32	8	50	5
Hydrospychidae *Hydropsyche*					9	
Hydroptilidae *Hydroptila*	6	9	2	5	3	
Brachycentridae						
Leptoceridae *Ceroclea*						
Glossosomatidae						
Helicopsyche *Helicopsyche*					1	
Philopotamidae *Chimarra*		10				10
Limnephilidae						
Psychomyiidae *Psychomyia*						
Turbellaria						
Planaria	1	1				
Total counted	510	540	206	210	653	376
Taxa richness	15	22	15	16	28	13
% EPT	0.61	0.67	0.70	0.55	0.51	0.94
EPT Index	6	10	7	8	9	7
% dominance	0.55	0.26	0.25	0.35	0.31	0.54
% chironomids	0.14	0.26	0.21	0.31	0.07	0.02

APPENDIX D: STATISTICAL RESULTS USING PRO-UCL VERSION 4.0 WASHINGTON COUNTY LEAD DISTRICT POTOSI SITE

Table 59. Soil Statistical Results.

Soil	Number of valid Samples	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	Median (mg/kg)	SD	95% UCL (mg/kg)	Method
Barium	11	2,310	5,030	3,955	3,760	855.9	4,062	Student's-t
Cadmium	11	2.0	12.7	5.4	4.2	3.2	7.195	Student's-t
Copper	11	10.2	58.2	32.9	31.9	18.5	42.98	Student's-t
Lead	11	150	2,540	876.9	386	845.6	2,145	H-UCL
Selenium	11	8.9	14.2	10.9	11.1	1.4	11.67	Student's-t
Zinc	11	201	1,850	697.2	481	584.4	1,131	Approximate Gamma

Table 60. Sediment Statistical Results.

Sediment	Number of valid Samples	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	Median (mg/kg)	SD	95% UCL (mg/kg)	Method
Barium	22	35.7	6,910	1,669	1,042	1,736	2,599	Approximate Gamma
Cadmium	22	1.1	8.5	3.7	3.6	2.0	4.4	Student's-t
Lead	22	37.5	4040	537.8	210.5	948.3	896.4	Approximate Gamma
Selenium	22	6.8	22.3	10.5	10.1	3.4	11.69	Approximate Gamma
Vanadium	22	15.2	80	31.4	26.1	15.6	37.4	Approximate Gamma
Zinc	22	131	770	385.2	301	213.4	583.5	Chebyshev (mean.SD)

Table 61. Surface Water Statistical Results.

Surface Water	Number of valid Samples	Minimum (µg/L)	Maximum (µg/L)	Mean (µg/L)	Median (µg/L)	SD	95% UCL (µg/L)	Method
Barium	19	259	1,190	600.6	530	264.6	713.9	Approximate Gamma
Cadmium	19	1.0	1.0	1.0	1.0	0	1.0	NA
Lead	19	1.0	9.1	2.1	1	2.61	4.74	Chebyshev (mean.SD)
Selenium	5.0	5.0	5.0	5.0	5.0	0	5.0	NA
Vanadium	1.0	1.0	1.0	1.0	1.0	0	1.0	NA
Zinc	19	3	55.5	17.86	10.4	17.2	26.44	Approximate Gamma

Table 62. Biota Statistical Results.

Biota	Number of valid Samples	Minimum (mg/kg ww)	Maximum (mg/kg ww)	Mean (mg/kg ww)	Median (mg/kg ww)	SD	95% UCL (mg/kg ww)	Method
Cadmium (fish/crayfish)	14	0.1	0.12	0.115	0.12	0.007	0.118	Student's-t
Lead (fish/crayfish)	14	0.61	3.58	1.2	0.68	1.0	2.36	Chebyshev (mean.SD)
Selenium (fish/crayfish)	14	1.96	2.24	2.14	2.16	0.08	2.2	Student's-t
Cadmium (plants)	10	0.11	1.72	0.426	0.12	0.6	2.2	Chebyshev (mean.SD)
Lead (plants)	10	2.19	105	23.03	8.19	32.04	51.2	Approximate Gamma
Selenium (plants)	10	1.88	2.23	2.1	2.2	0.131	2.2	Student's-t

Table 63. Biota modeled results.

Barium		Formula	
Soil Invertebrates	369.6	= 0.091 * 4062	EPA, 2005i
Emergent Insects	2,471.7	= 0.951 * 2599	USACE, 2006
Cadmium			
Soil Invertebrates	39.8	= 0.795 * In(7.2) + 2.114	EPA, 2005i
Emergent Insects	13.5	= 0.191 + 0.688[log(4.4)]	Bechtel, 1998
Lead			
Soil Invertebrates	392.5	= 0.807 * In(2,145) - 0.218	EPA, 2005i
Emergent Insects	59.2	= 0.066 * 896.4	Bechtel, 1998
Small Mammals	32.1	= 0.4422 * In(2,145) + 0.0761	EPA, 2005i
Selenium			
Soil Invertebrates	2.9	= 0.733 * In(11.67) - 0.075	EPA, 2005i
Emergent Insects	16.6	= 1.422 * 11.69	USACE, 2006
Small Mammals	1.7	= 0.004 * 11.67	EPA, 2005i
Zinc			
Soil Invertebrates	858.4	= 0.328 * In(1,131) + 4.449	EPA, 2005i
Emergent Insects	515.8	= 0.884 * 583.5	USACE, 2006

APPENDIX E: PHOTOGRAPHS
WASHINGTON COUNTY LEAD DISTRICT
POTOSI SITE

Apex Lake. Sediment and Surface water sampling location 20. Soil sampling location 11.

Apex Lake. Sediment and Surface water sampling location 20. Soil sampling location 11.

Mill Creek at Highway 47. Sediment and Surface water sampling location 6.

Mill Creek at Highway 47. Sediment and Surface water sampling location 6.

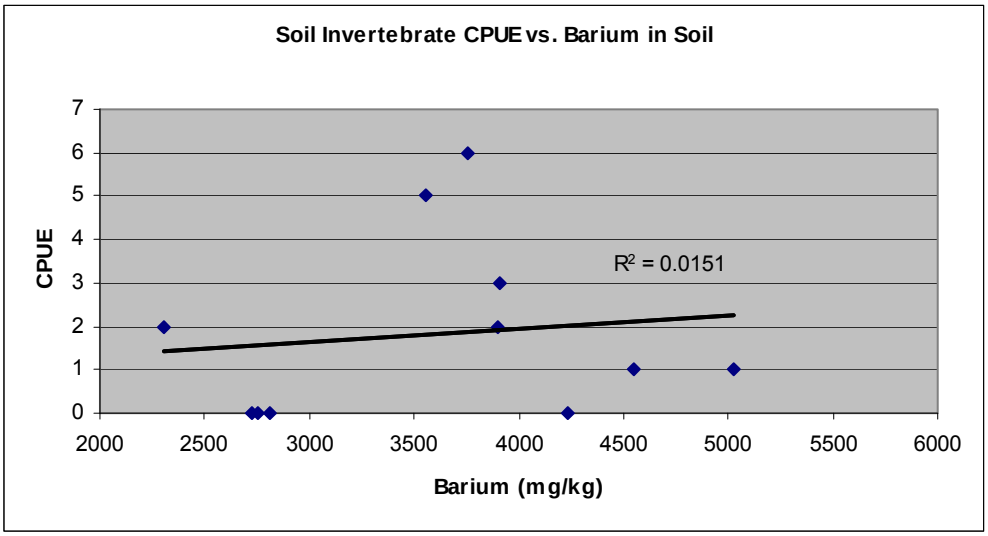
Long Hollow Branch. Sediment and Surface water sampling location 16.

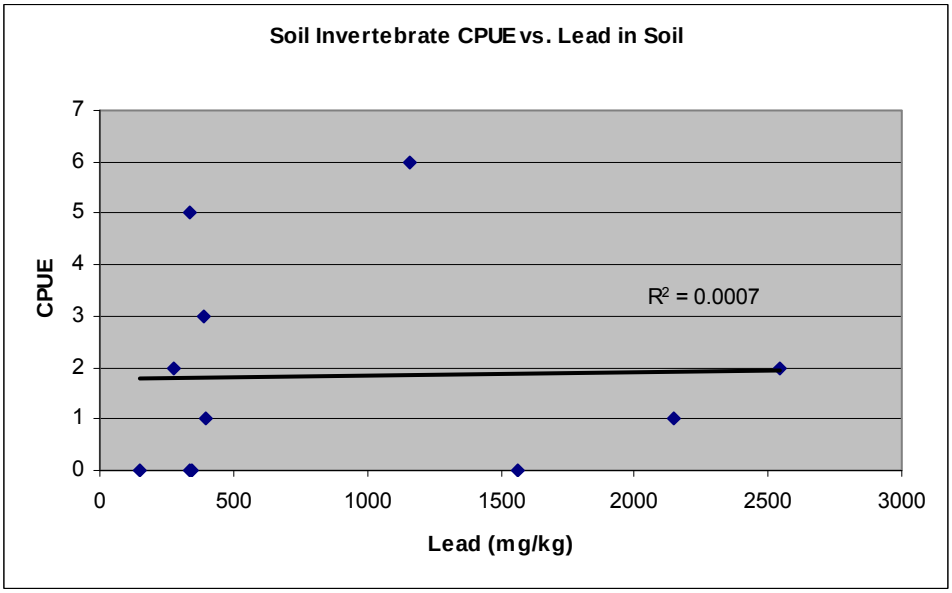
Keyes Branch. Sediment and Surface water sampling location 15.

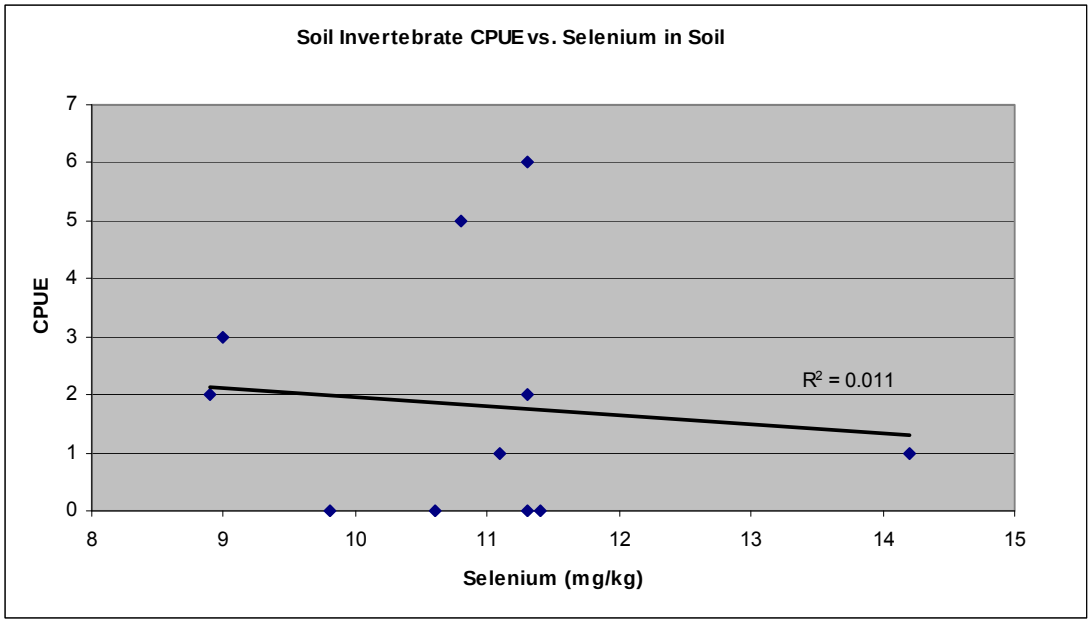
Mill Creek. Sediment and Surface water sampling location 7.

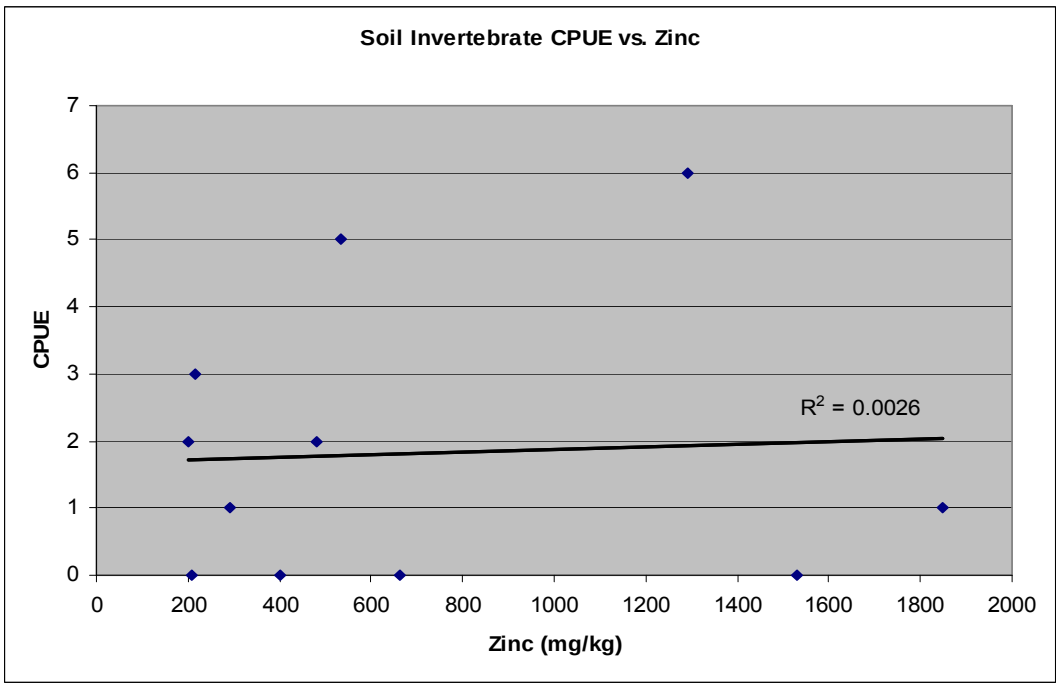
Mill Creek showing cave habitat along the bank.

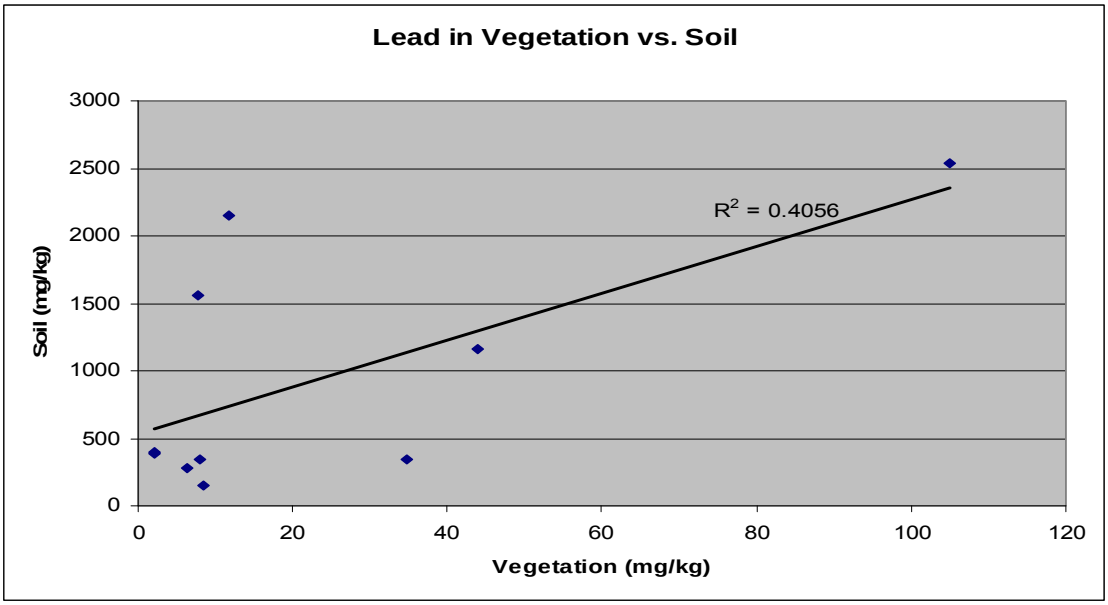
APPENDIX F: GRAPHS
WASHINGTON COUNTY LEAD DISTRICT
POTOSI SITE

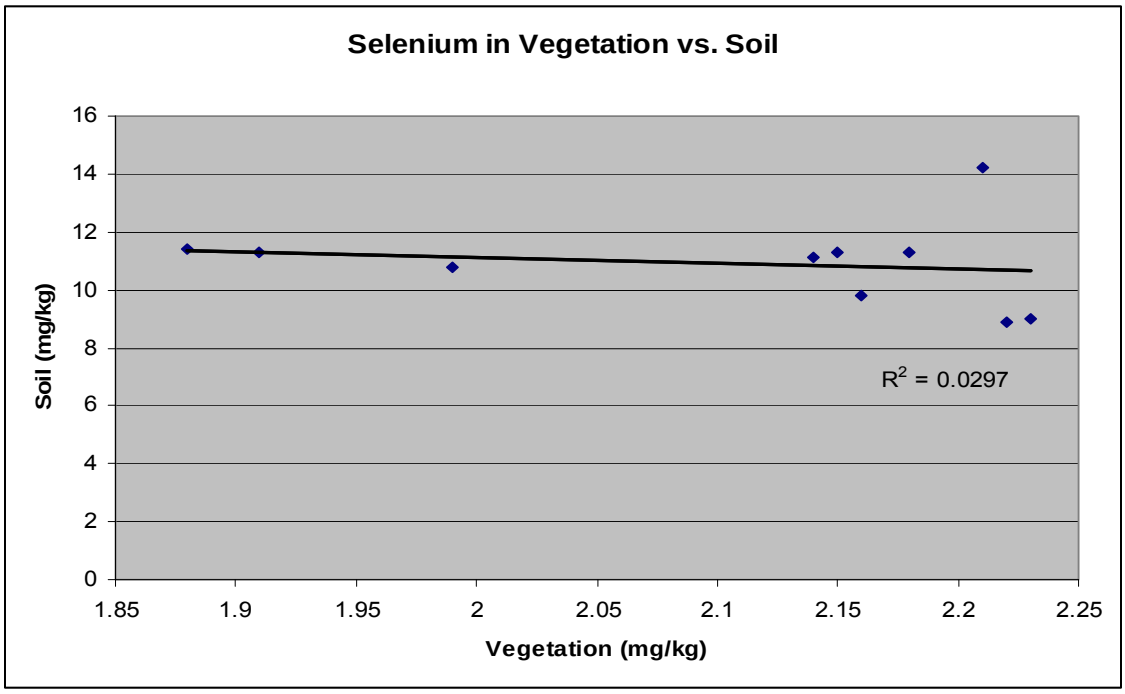

Soil Invertebrate CPUE vs. Barium in Soil
CPUE
Barium (mg/kg)
R² = 0.0151
0
1
2
3
4
5
6
7
2000
2500
3000
3500
4000
4500
5000
5500
6000


Soil Invertebrate CPUE vs. Lead in Soil
CPUE
Lead (mg/kg)
R² = 0.0007
0
1
2
3
4
5
6
7
0
500
1000
1500
2000
2500
3000


Soil Invertebrate CPUE vs. Selenium in Soil
CPUE
Selenium (mg/kg)
R² = 0.011
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15


Soil Invertebrate CPUE vs. Zinc
CPUE
Zinc (mg/kg)
R² = 0.0026
0
1
2
3
4
5
6
7
0
200
400
600
800
1000
1200
1400
1600
1800
2000


Lead in Vegetation vs. Soil
Soil (mg/kg)
3000
2500
2000
1500
1000
500
0
0
20
40
60
80
100
120
Vegetation (mg/kg)
R2 = 0.4056


Selenium in Vegetation vs. Soil
Soil (mg/kg)
16
14
12
10
8
6
4
2
0
1.85
1.9
1.95
2
2.05
2.1
2.15
2.2
2.25
Vegetation (mg/kg)
R2 = 0.0297

APPENDIX G: TOXICOLOGICAL PROFILES WASHINGTON COUNTY LEAD DISTRICT POTOSI SITE

BARIUM

Barium is a yellowish-white, soft metal that is strongly electropositive. In nature, barium occurs in a combined state, the principal forms being barite (barium sulfate) and witherite (barium carbonate). Barium is also present in small quantities in igneous rocks such as feldspar and micas and may also be found as a natural component of fossil fuel. The production and use of various barium compounds in pyrotechnic devices, ceramics, paints, enamels, optical glasses, and as a getter to remove traces of gas from vacuum and television tubes may result in its release to the environment through various waste streams. Barium is emitted into the atmosphere mainly by the industrial processes involved in the mining, refining, and production of barium and barium-based chemicals and as a result of combustion of coal and oil.

The solubility and mobility of barium is greater in sandy soil increasing with decreasing pH and decreased organic matter content. Barium can react with metal oxides and hydroxides in soils, thus limiting its mobility and increasing absorption. Barium mobility decreases in soils with high sulfate and calcium carbonate content. In biological organisms, barium possesses chemical and physiological properties that allow it to compete with and replace calcium in processes normally mediated by calcium, particularly those relating to the release of adrenal catecholamines and neurotransmitters, such as acetycholine and noradrenaline. Elevated levels of barium can induce a wide range of effects in mammals including gastrointestinal distress, muscular paralysis, and cardiovascular effects. Barium does not bioaccumulate in mammals, and concentrations in higher species rarely exceed 10 mg/kg (Moore, 1991).

Relative to the amount of barium found in soils, little is typically bioconcentrated by plants (Schroeder, 1970). For example, a bioconcentration factor of 0.4 has been estimated for plants in a Virginia floodplain with a barium soil concentration of 104.2 mg/kg (Hope *et al*., 1996). However, there are some plants, such as legumes, forage plants, Brazil nuts, and mushrooms that accumulate barium (Aruguete *et al*., 1998; IPCS, 1991; WHO, 2001). Bioconcentration factors from 2 to 20 have been reported for tomatoes and soybeans (WHO, 2001). An Ecological Soil Screening Level (Eco-SSL) for plants is not available because only one paper met the acceptance criteria. However, the results of this study found growth effects in bush bean at 1,414 mg/kg barium in soil.

An Eco-SSL of 330 mg/kg for soil invertebrates is available. This barium concentration is based on the geometric mean NOAEL concentration of EC20s, with reproduction as the ecological endpoint. The NOAELs in these studies ranged from 165 mg/kg for the springtail to 585 mg/kg for the potworm. For mammals, the NOAELs for growth and reproduction were used to calculate a geometric mean NOAEL of 51.8 mg/kg-bw/day. The calculated Eco-SSL based on this NOAEL is 2,000 mg/kg for a ground insectivore (shrew).

CADMIUM

Cadmium is a naturally occurring element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide). It does not have a definite taste or odor. All soils and rocks, including coal and mineral fertilizers, have some cadmium in them. Cadmium is often extracted during the production of other metals such as zinc, lead, and copper.

Cadmium is highly toxic to wildlife; it is cancer-causing and teratogenic and potentially mutation-causing, with severe sublethal and lethal effects at low environmental concentrations (Eisler, 1985). It is associated with increased mortality, and it affects respiratory functions, enzyme levels, muscle contractions, growth reduction, and reproduction. It bioaccumulates at all trophic levels, accumulating in the livers and kidneys of fish (Sindayigaya, *et al*., 1994; Sadiq, 1992). Crustaceans appear to be more sensitive to cadmium than fish and mollusks (Sadiq, 1992). Cadmium can be toxic to plants at lower soil concentrations than other heavy metals and is more readily taken up than other metals (EPA, 1981). However, it has been shown that some insects can accumulate high levels of cadmium without adverse effects (Jamil and Hussain, 1992).

Orally ingested cadmium and its salts are poorly absorbed by the gastrointestinal tract in wildlife. In general, less than three percent of ingested cadmium is absorbed by the gastrointestinal tract of animals. Once in the blood, cadmium is distributed to all internal organs with the highest concentrations found in the liver and kidneys. Cadmium is not known to undergo metabolic conversion; however, it does bind with, and adversely affect the function of proteins such as metallothionein. Most cadmium ingested is rapidly cleared from the body, primarily through feces because its absorption efficiency is so low (ATSDR, 1993).

A soil-to-invertebrate biotransfer factor (BTF) of 0.96 has been developed for cadmium based on the geometric mean of 22 laboratory studies using acute and chronic exposure (EPA, 1999). A soil-to-plant BTF of 0.364 has been developed for cadmium based on empirical data from the EPA (EPA, 1999). A water-to-invertebrate BTF of 3,461 has been developed for cadmium based on the geometric mean of data from eight field studies (EPA, 1999). A water-to-fish BTF of 907 has been developed for cadmium based on the geometric mean of data from four field studies (EPA, 1999). A sediment-to-invertebrate BTF of 3.4 has been developed for cadmium based on the geometric mean of data from eight field studies (EPA, 1999).

Cadmium is not essential for plant growth. Exposure to cadmium can result in adverse growth effects. The lowest chronic value of 2.0 µg/L was established for aquatic plants by Conway (1977). A relatively low cadmium concentration reduced the population growth rate of *Asterionella formosa* by an order of magnitude. In aquatic macroinvertebrates, a lowest chronic value of 0.15 µg/L was established for daphnids as a result of life-cycle tests performed by Chapman *et al.* (no date). A test EC20 value of 0.75 µg/L was established for daphnids by Elnabarawy *et al*. (1986). A substantial toxicological database for effects on freshwater biota exposed to cadmium demonstrates that ambient cadmium concentrations in water exceeding 10 µg/L are associated with high mortality, reduced growth, inhibited reproduction, and other adverse effects. Several species of freshwater aquatic insects, crustaceans, and teleosts exhibited

significant mortality at cadmium concentrations of 0.8 to 9.9 µg/L during exposures of 4 to 33 days; mortality generally increased as exposure time increased, water hardness decreased, and organism age decreased. A lowest chronic value of 1.7 µg/L was established for fish by Sauter *et al*. (1976) and was based on early life stage tests performed on brook trout. A test EC20 value of 1.8 µg/L was established by Carlson *et al.* (1982) based on freshwater fish studies.

If present in a bioavailable form, cadmium can be taken up by roots, translocated within the plant, and accumulated (Efroymson *et al*., 1997a). Cadmium is chemically similar to zinc, an essential element. Competition between the two for organic ligands and enzyme binding sites may explain some of the toxic effects of cadmium and the ameliorative effects of zinc on cadmium toxicity. Cadmium depresses uptake of Fe, Mn, and likely depresses uptake of Ca, Mg, and Ni. Cadmium is toxic at low concentrations. Symptoms resemble Fe chlorosis and include necrosis, wilting, reduced zinc levels, and reduction in growth. The mechanisms of toxicity include reduced photosynthetic rate, poor root system development, reduced conductivity of stems, and ion interactions in the plant. A benchmark value of 4 mg/kg was established for cadmium based on 74 studies. Approximately 40% of the concentrations responsible for greater than 20% reductions in plant growth parameters fall between 1 and 10 mg/kg cadmium added to soil. This range includes wild and cultivated plants such as legumes, trees, grasses, leafy vegetables and other dicotyledonous plants in soils with a relatively wide range of physical and chemical characteristics (Effroymson *et al*., 1997a). In addition, an Eco-SSL for plants of 32 mg/kg has been developed based on a review of 62 studies (EPA, 2003).

Cadmium in surface soil has been shown to affect earthworm growth and survival, as well as reduce the number of earthworm cocoons produced. An Eco-SSL has been developed for cadmium based on ten suitable studies of toxicity of cadmium in soil to soil invertebrates. These studies identified the maximum acceptable toxicant concentrations and the EC20 for springtails and the earthworms. These values ranged from 6 to 600 mg/kg. The Eco-SSL of 140 mg/kg was based on the geometric mean of these values (EPA, 2003).

Cadmium has been shown to adversely effect reproduction in birds (Sample *et al*., 1996). An Eco-SSL for birds of 0.77 mg/kg is based on the geometric mean of the NOAELs for reproduction and growth, and is calculated based on exposure to a ground feeding insectivore (woodcock). In mammals, the Eco-SSL for cadmium is based on a number of studies, many of which identify thresholds for reproductive effects. The Eco-SSL of 0.36 mg/kg is based on the geometric mean of the NOAELs for reproduction and growth, and is calculated based on exposure to a ground insectivore (shrew).

LEAD

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. It has no taste or smell. Lead is the product of many activities such as mining, manufacturing, and burning of fossil fuels. In general, lead does not biomagnify in food chains. EPA (2000) considers lead to be an important bioaccumulative compound in sediment. Older organisms usually contain the greatest body burdens, and lead accumulations are highest in bony tissues (USGS, 1988).

Lead is cancer-causing, and adversely effects reproduction, liver and thyroid function, and disease resistance (Eisler, 1988). The main potential ecological impacts of wetland contaminants result from direct exposure of algae, benthic invertebrates, and embryos and fingerlings of freshwater fish and amphibians to lead. It can be bioconcentrated from water, but does not bioaccumulate and tends to decrease with increasing trophic levels in freshwater habitats (Wong *et al*., 1978; Eisler, 1988b). Lead adversely affects algae, invertebrates, and fish. There are also limited adverse effects in amphibians, including loss of sodium, reduced learning capability, and developmental problems (Horne and Dunson, 1995; Freda, 1991). Fish exposed to high levels of lead exhibit a wide-range of effects including muscular and neurological degeneration and destruction, growth inhibition, mortality, reproductive problems, and paralysis (Eisler, 1988; EPA, 1976). Lead adversely affects invertebrate reproduction, and algal growth is affected. Lead partitions primarily to sediments, but becomes more bioavailable under low pH, low hardness and low organic matter content (among other factors). Lead bioaccumulates in algae, macrophytes and benthic organisms, but the inorganic forms of lead do not biomagnify.

At elevated levels in plants, lead can cause reduced growth, photosynthesis, mitosis, and water absorption (Eisler, 1988). Birds and mammals suffer effects from lead poisoning such as damage to the nervous system, kidneys, liver, sterility, growth inhibition, developmental retardation, and detrimental effects in blood (Eisler, 1988; Amdur *et al*., 1991).
Lead poisoning in higher organisms has been associated with lead shot and organolead compounds, but not with food chain exposure to inorganic lead (other than lead shot, sinkers or paint) (Eisler, 1988). There are complex interactions with other contaminants and diet. Lead poisoning in higher organisms primarily affects hematologic and neurologic processes.

A soil-to-invertebrate biotransfer factor (BTF) of 0.03 has been developed for lead based on the geometric mean of six laboratory values (EPA, 1999). A soil-to-plant BTF of 0.045 has been developed for lead based on empirical data from Baes, Sharp, Sjoreen, and Shor (EPA, 1999). A water-to-invertebrate BTF of 5,059 has been developed for lead based on the geometric mean of six field values (EPA, 1999). A water-to-fish BTF of 0.09 has been developed for lead based on the geometric mean of three laboratory values (EPA, 1999). A sediment-to-invertebrate BTF of 0.63 has been developed for lead based on the 14-day exposure *Chironomus tentans* study conducted by Harrahy and Clements (EPA, 1999).

For aquatic plants, the lowest chronic value of 500 µg/L was based on studies of growth inhibition in *Chlorella vulgaris* (EPA, 1985). Among aquatic biota, lead concentrations are usually highest in algae although no significant biomagnification occurs in aquatic food chains

(Demayo *et al.,* 1982). The effects of lead contamination on sensitive species were most pronounced at elevated water temperatures, reduced pH, in comparatively soft waters, in younger life stages, and after long exposures. For aquatic macroinvertebrates, a lowest chronic value of 2.6 µg/L was established for daphnids based on studies by Nebeker *et al*. (1983). A test EC20 value of <0.56 µg/L for daphnids was established by Elnabarawy *et al*. (1986). For fish, the lowest chronic value of 1,888 µg/L was established by Davies *et al.* (1976) based on an early life stage tests on rainbow trout. The effect concentration (EC) value for fish is from Sauter *et al*. (1976). Lethal solutions of lead cause increased mucus formation in fishes. The excess mucus coagulates over the entire body and is particularly prominent over the gills, interfering with respiratory function and resulting in death by anoxia (Aronson, 1971). Increasing waterborne concentrations of lead over 10 µg/L are expected to provide increasingly severe long-term effects on fish and fisheries (DeMayo *et al.*, 1982).

Uptake of lead by terrestrial plants is limited by the low bioavailability of lead from soils. An Eco-SSL has been developed for lead based on five suitable studies of toxicity of lead in soil to plants. These studies identified the maximum acceptable toxicant concentrations, which ranged from 22 to 316 mg/kg. The Eco-SSL of 110 mg/kg was based on the geometric mean of these values (EPA, 2003). For soil invertebrates, an Eco-SSL has been developed for lead based on four suitable studies of toxicity of lead in soil to *Collembola*. The Eco-SSL of 1,700 mg/kg was based on the geometric mean of these values (EPA, 2003).

Lead has been shown to adversely affect reproduction in birds. An Eco-SSL of 11 mg/kg is based on the geometric mean of the NOAELs for reproduction and growth, and is calculated based on exposure to a ground feeding insectivore (woodcock). In mammals, the Eco-SSL for lead is based on a number of studies, many of which identify thresholds for reproductive effects. The Eco-SSL of 56 mg/kg is based on the geometric mean of the NOAELs for reproduction and growth, and is calculated based on exposure to a ground insectivore (shrew).

SELENIUM

Selenium is a naturally occurring element found in all environmental media: air, soil, sediment, and water. In nature it is found in the sulfide ores of heavy metals and predominates in approximately 40 minerals including clausthalite, naumannite, tiemannite, and berzelianite (Budavari, 1996; Fishbein, 1991). Selenium is also found in volcanic rock, sandstone, shale, carbonates, bedrock, coal oil, and mineral oil (Kent and Spycher, 1994; Langer, 1993). Selenium may be released to the environment from natural sources such as volcanic eruptions, leaching and weathering of rocks, and volatilization as a result of biomethylation by plants and bacteria (ATSDR, 1996). Anthropogenic releases of selenium may result from use in the manufacture and production of glass, pigments, rubber, metal alloys, textiles, petroleum, medical therapeutic agents, anti-dandruff shampoos, veterinary medicines, fungicides, gaseous insulators, and photographic emulsions (USDOI, 1985; ATSDR, 1996). The burning of coal, oil and solid waste may also contribute to selenium in the environment (NRC, 1976; ATSDR, 1996).

Speciation of selenium in soils is also influenced by the chemical and mineralogical composition of the soil, microbial intervention, and the nature of the adsorbing surfaces (Neal,1990). Selenium has a sorptive affinity for hydrous metal oxides, clays, and organic materials. In well-aerated alkaline soils, inorganic selenium exists primarily as the oxyanions selenite (Se(4+)) and selenate (Se(6+)). Selenite is soluble, but can strongly adsorb to soil minerals and organic material (Tokunaga *et al*., 1997), while selenate is the most mobile of selenium compounds because of its high water solubility and inability to adsorb to soil particles (ATSDR 1996). Alkaline soils formed from parent materials high in selenium are also high in biologically available selenium (Mayland *et al.*,1989). In poorly aerated soils, inorganic selenium predominates as the relatively soluble selenide elemental forms (Mayland *et al*.,1989).

Transformations of selenium in soils appear to be microbially mediated. Many fungi, bacteria, and actinomycetes that occur in soils are capable of reducing inorganic selenium salts either to elemental forms or to organic compounds (Neal, 1990). Oxidized forms of selenium are affiliated with increased availability and toxicity. Immobilization of selenium involves the formation of many organic compounds including amino acids, proteins, selenium compounds and selenides (Neal, 1990). Selenium is also transformed by mineralization and methylation. Volatilization of selenium from soils is influenced by a variety of factors including microbial activity, temperature, moisture, time, and the concentration of water soluble selenium (HSDB).

In plants, selenium is an essential element for growth. In the environment, uptake and accumulation by plants is influenced by the concentration and form of selenium present in soils (Neal, 1990). The most bio-available forms of selenium are considered to be those fractions which are soluble (McNeal and Balistrieri, 1989). Other factors that influence selenium content in plants include pH, soil mineralogical composition, and plant species (Neal, 1990). Some species that readily absorb selenium from soils include many species of Astragalus, Machaeranthera, Haploapappus, and Stanleya. These plants are often regarded as primary selenium indicators as their growth is restricted to seleniferous areas (Rosenfeld and Beath, 1964). Primary indicator plants often demonstrate an offensive odor, the intensity of which may be a qualitative indicator of selenium concentration (Rosenfeld and Beath, 1964). Other species

of plants including grains and grasses accumulate surprisingly low levels of selenium (Mayland *et al*., 1989). In general, agricultural crops have a low tolerance for selenium (Mikkelsen et al., 1989). Phytotoxicity from Se(4+) and Se (6+) occurs when selenium is absorbed, translocated, and incorporated into selenium analogs of essential sulfur compounds (Mikkelsen et al., 1989). Toxicity is demonstrated by stunted growth, chlorosis, pink leaf veins, and pink root tissue (Mikkelsen *et al*. 1989). Younger plants demonstrate increased susceptibility to selenium toxicity compared to mature plants (Rosenfeld and Beath, 1964).

Selenium is an essential trace element in animals and has been shown to be a natural component in the enzyme glutathione peroxidase and other proteins. Selenium toxicity is most likely to occur in animals grazing on seleniferous forage, or as a result of including seleniferous grain in their diet (James *et al.,* 1989). Acute effects in animals following the ingestion of plants containing high levels of selenium include abnormal posture and movement, watery diarrhea, labored respiration, abdominal pain, prostration, and death (James *et al.,* 1989). Chronic effects in animals include alkali disease and bind staggers. In wildlife, elevated selenium concentrations in the diet are associated with adverse reproductive and developmental effects including reduced growth or survival of young (Ohlendorf, 1989).

Eco-SSL values were derived for all receptor groups. The Eco-SSL values for selenium range from 0.52 mg/kg dry weight (dw) for plants to 4.1 mg/kg dw for soil invertebrates. With the exception of the plant and mammalian values, these values are higher than the 95th percentile of reported background soil concentrations of selenium in eastern and western U.S. soils. The avian Eco-SSL is based on the highest bounded NOAEL that is lower than the lowest bounded LOAEL for reproduction, growth and survival. The mammal Eco-SSL is also based on the highest bounded NOAEL that is lower than the lowest bounded LOAEL for reproduction, growth and survival.

Selenium induced fish kills in the late 1970's resulted in a substantial amount of research on selenium effects to aqautic life. Similarly, selenium-induced teratogenesis in aquatic birds in the mid-1980's resulted in extensive research on the effects to aquatic birds. Selenium ecotoxicity is driven primarily by bioaccumulation in invertebrates and exposure to birds and fish via diet. Both the USFWS and USEPA have focused on fish tissue-based toxicity thresholds. The USFWS threshold for selenium in whole body fish tissue is 4 mg/kg (dw), The draft EPA tissue based criteria is 7.91 mg/kg (dw).

ZINC

Zinc is one of the most common elements in the earth's crust. It is found in air, soil, and water, and is present in all foods. Pure zinc is a bluish white shiny metal and combines with other elements to form zinc compounds. Common zinc compounds found at hazardous waste sites include zinc chloride, zinc oxide, zinc sulfate, and zinc sulfide. Zinc compounds are widely used in industry to make paint, rubber, dye, wood preservatives, and ointments.

Zinc is essential for normal metabolism in animals. Under normal conditions, 20 to 30 percent of ingested zinc is absorbed through the gastrointestinal tract. Once absorbed, zinc is widely distributed throughout the body with highest content in the muscle, bone, gastrointestinal tissue, kidney, and the brain. Zinc is excreted both in feces and urine (ATSDR, 1994).

Zinc accumulates in aquatic organisms, however, microcosm studies indicate that it does not biomagnify through aquatic food chains. Bioconcentration of zinc from soil by terrestrial wildlife and plants is insignificant. This indicates that zinc does not biomagnify through terrestrial food chains (ATSDR, 1994). EPA (2000) considers zinc to be an important bioaccumulative compound in sediment.

In aquatic invertebrates, the lowest chronic value of 46.73µg/L was established for daphnids by Chapman *et al*. (no date) based on life-cycle tests on *Jordanella floridae* and *Daphnia magna*. Zinc is important in pH regulation of sperm of marine invertebrates. Zinc reduction in semen to < 6.5 g/L adversely affected sperm pH and motility in sea urchins (*Strongylocentrotus purpuratus, Lytechnicus pictus*), horseshoe crab (*Limulus polyphemus*), and starfish (Clapper *et al.*, 1985a, 1985b).

In fish, a chronic value of 36.41 µg/L and test EC20 value of 47 µg/L for fish has been identified by Spehar (1976). Rainbow trout fry fed diets containing 1-4 mg/kg ration had poor growth, increased morality, cataracts, and fin erosion; supplementing the diet to 15-30 mg/kg alleviating these signs. Spry *et al*. (1988) also fed rainbow trout fry diets containing a 1, 90, or 590 mg/kg ration and simultaneously exposed them to a range of waterborne zinc concentrations of 7, 39, 148, or 529 µg/L. After 16 weeks, the 7 µg/L plus 1 mg/kg diet group showed clear signs of deficiency including a significantly reduced plasma zinc concentration (which was evident as early as the first week of exposure), reduced growth (with no growth after week 12), decreased hematocrit, and reduced plasma protein and whole body zinc concentration.

Zinc is an essential element for plant growth. It is actively absorbed by the roots and then widely distributed throughout the roots and shoots. Information concerning the ecological effects of zinc to plants is extensive. Excessive zinc in the soil may result in chlorosis and depressed plant growth by inhibiting CO_2 fixation, carbohydrate transport, and membrane permeability (Efroymson *et al*., 1997a). A review of EPA's Ecotox database indicated no-effect thresholds for phytotoxicity ranging from 2.92 to 189 mg/kg; low-effect thresholds ranged from 58.8 to 1087 mg/kg. The Eco-SSL for plants is 160 mg/kg, based on the results of 26 studies that met the acceptance criteria (EPA, 2007e).

An Eco-SSL has been developed for soil invertebrates based on six suitable studies of toxicity of zinc in soil, to soil invertebrates. These studies identified the maximum acceptable toxicant concentrations and the EC10 for a nematode and *F. candida.* These values ranged from 35 to 305 mg/kg. The Eco-SSL of 120 mg/kg was based on the geometric mean of these values (EPA, 2007e).

The Eco-SSL for mammals is equal to 79 mg/kg based on the geometric mean of the NOAEL values for reproduction and growth. The Eco-SSL for birds is equal to 46 based on the geometric mean of the NOAELs for reproduction and growth (EPA, 2007e)

HUMAN HEALTH RISK ASSESSMENT REPORT

Washington County Lead District

Washington County, Missouri

Black & Veatch Project No. 044756.01.07

Prepared Under
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Acronyms

ABA	Absolute Bioavailability
ABSGI	Oral to Dermal Adjustment Factor
AF	Absolute Gastrointestinal Absorption Fraction
AFs	Absolute Gastrointestinal Absorption Fraction for Lead in Soil
ALM	Adult Lead Methodology
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
B	Detected in Blank
bgs	below ground surface
C_{air}	Concentration in air
CalEPA	California Environmental Protection Agency
CDI	Chronic Daily Intake
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
C_{soil}	Concentration in soil
CTE	Central Tendency Exposure
EPA	Environmental Protection Agency
EPC	Exposure Point Concentration
FR	Federal Register
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
ICP	Inductively Coupled Plasma
IEUBK	Integrated Exposure Uptake Biokinetic
IR	Intake Rate
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk
IVBA	*In Vitro* Bioaccessibility
K_d	soil-water partition coefficient
kg	kilograms
L	Liters
L/kg	Liters per kilogram

Acronyms (cont.)

LOAEL	Lowest Observed Adverse Effect Level
m^3/day	cubic meters per day
MDL	Method Detection Limit
MDNR	Missouri Department of Natural Resources
mg/kg/day	milligrams per kilogram per day
mg/m^3	milligrams per cubic meter
MRL	Minimal Risk Level
M_{sd}	Mass Fraction of soil in dust
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effect Level
NPL	National Priorities List
OAE	oral to dermal adjustment factor
OSRTI	Office of Superfund Remediation and Technology Innovation
OU	Operable Unit
P10	Probability that the blood lead level of an exposed individual exceeds 10 ug/dL
PbB	Blood Lead
PbB0	Baseline Blood Lead
Pb_{dust}	Concentration of Lead in indoor dust
Pb_{soil}	Concentration of Lead in outdoor soil
PEF	Particulate Emission Factor
PM_{10}	Respirable dust in air
PPRTV	Provisional Peer Reviewed Toxicity Value
PRG	Preliminary Remediation Goal
QA/QC	Quality Assurance/Quality Control
R	Rejected
RAGS	Risk Assessment Guidance for Superfund
RBA	Relative Bioavailability
RfC	Reference Concentration
RfD	Reference Dose
RfDABS	Absorbed Reference Dose
RfDi	Inhalation Reference Dose
RfDo	Oral Reference Dose

Acronyms (cont.)

RI	Remedial Investigation
RME	Reasonable Maximum Exposure
SFABS	Slope Factor for Dermal Contact
SFd	Dermal Slope Factor
SFi	Inhalation Slope Factor
SFo	Oral Slope Factor
95% UCL	95th percent upper confidence limit
UF	Uncertainty Factor
ug/day	micrograms per day
ug/dL	micrograms per deciliter
UR	Unit Risk
URF	Unit Risk Factor
USGS	United States Geological Survey

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

This Human Health Risk Assessment (HHRA) Report presents the results of the human health risk evaluation for Operable Unit 1 (OU1) of the Washington County Lead District Site, located in Washington County, Missouri. OU1 is limited to residential soils at the Washington County Lead District Site. Consequently, the focus of this HHRA is on residential soils. This report is based primarily on the available information collected as part of the ongoing Remedial Investigation (RI) being performed by the U.S. Environmental Protection Agency (EPA). Information concerning background data, site description, site history, previous investigations, and the scope of these investigations is provided in detail in the RI Report (Black & Veatch, 2009).

The purpose of the HHRA is twofold. First, the HHRA provides an evaluation of the potential threat to human health associated with the release or potential release of chemicals of concern (COCs) from the identified Washington County Lead District. The primary objective of this evaluation is to identify the final list of chemicals of potential concern (COPCs) and their exposure pathways, conduct a toxicity assessment for each chemical of potential concern, conduct an exposure assessment, and characterize potential risks to human receptors. The HHRA summarizes and interprets data collected during the RI to characterize the COPCs, describe chemical migration pathways, identify potential human exposure pathways, and assess current and future adverse effects on human health under the no action alternative. The second purpose of the HHRA is to evaluate the need for remedial action. This evaluation focuses on a determination of whether or not the site presents risks greater than the acceptable range. This analysis will identify those COCs and the affected media that drive the need for remedial action.

The methods used in conducting the HHRA are those presented in the EPA Risk Assessment Guidance for Superfund (RAGS) – Volume I Human Health Evaluation Manual (EPA, 1989). Other guidance documents used in the preparation of this report include Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors" (EPA, 1991b); Exposure Factors Handbook (EPA, 1997a), and; Risk Assessment Guidance for Superfund Volume I (Human Health Evaluation Manual) Part E Supplemental Guidance for Dermal Risk Assessment (EPA, 2004). These and other appropriate guidance documents and information sources used in the preparation of the HHRA are referenced throughout this HHRA.

1.2 SITE BACKGROUND

The physical characteristics of the Washington County Lead District are described in the 2009 Remedial Investigation Report (Black & Veatch, 2009). The following subsections summarize the information in the RI Report as it relates to the risk assessment.

1.2.1 SITE DESCRIPTION

The Washington County Lead District site is located in Washington County, Missouri. The Washington County Lead District has been divided into three (3) subareas:

- Potosi Site Area
- Richwoods Site Area
- Old Mines Site Area

The Potosi Site is the southernmost of the three sites, located in the southeastern portion of Washington County and includes the towns of Potosi, Mineral Point, Cadet and other smaller communities. The Richwoods Site is the northernmost site and is in the town of Richwoods in the northeast corner of Washington County. The Old Mines Site is located between Potosi and Richwoods along the eastern edge of the county and includes the towns of Old Mines, Bellefontaine, Fertile, and other smaller communities. The general site location and mine waste areas are presented in Figure 1-1.

1.2.1.1 Potosi Site

The Potosi Site encompasses an area of about 45 square miles in the eastern portion of Washington County, Missouri. It primarily includes mine waste and residential areas within and around the communities of Potosi, Cadet, Mineral Point, Springtown, Happy Hollow, Shibboleth, Summit, and other smaller communities, and is a portion of the larger Washington County Lead District. The Potosi Site is mostly residential, although a number of commercial businesses are present. Soil and groundwater contamination by arsenic, barium, cadmium and lead at the Potosi Site is the result of lead and barite mining, milling and smelting activities. The Potosi Site study area is presented in Figure 1-2.

1.2.1.2 Richwoods Site

The Richwoods site encompasses an area of 45 square miles in the northeastern portion of Washington County, Missouri. It primarily includes residential areas within and around the community of Richwoods and is a portion of the larger Washington County Lead Mining District. Remnants of mining activities throughout the area include strip mines, mineshafts,

mine dumps, tailing areas, tailings ponds and associated dams. There are several large tailings impoundments, associated dams, and leachate ponds with elevated levels of lead present at the site. Commercial and industrial land uses around the Richwoods site include: a body shop, a gas station, motor cross race tracks, and an active landfill. The Richwoods Site study area is presented in Figure 1-3.

1.2.1.3 Old Mines Site

Old Mines includes an area greater than 90 square miles in the northeastern portion of Washington County, Missouri. It primarily consists of residential areas within and around the communities of Old Mines, Bellefontaine, Fertile, and other smaller communities. Although the Old Mines Site is mostly residential, a number of commercial businesses are present. Soil and groundwater contamination by arsenic, barium, cadmium and lead at the Old Mines Site is most likely the result of lead and barite mining, milling and smelting activities. The Old Mines Site study area is presented in Figure 1-4.

1.2.2 SITE HISTORY

In Washington County, Mine Au Breton (current day 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 this time was shipped to Spain. Galena, the main lead ore, was mined in both the red clay residuum, which generally ranged from a few feet to over 30 feet thick, and the underlying dolomite bedrock. 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. By mid 1980, barite production started to decline in Washington County. Records indicate that 1,426 mines or prospects have been identified in Washington County.

1.3 ORGANIZATION OF RISK ASSESSMENT REPORT

This HHRA summarizes and interprets data collected during the RI to identify and characterize chemicals; describe chemical exposure pathways and receptors; and assess

potential adverse impacts on human health associated with the Washington County Lead District Site. This HHRA report includes the following major sections:

- Identification of Chemicals of Potential Concern (Section 2.0)
- Exposure Assessment (Section 3.0)
- Toxicity Assessment (Section 4.0)
- Risk Characterization (Section 5.0)
- Uncertainty Analysis (Section 6.0)
- Risk Assessment Summary (Section 7.0)
- References (Section 8.0)

Section 2.0, Identification of Chemicals of Potential Concern, presents a summary of the evidence of environmental contamination at the site and identifies the COPCs to be evaluated in this HHRA. The available data are reviewed for each environmental medium (e.g., soils, groundwater, surface water, sediment) at the site to determine useability in the quantitative risk assessment.

The exposure assessment, Section 3.0, presents the important chemical migration pathways, exposure routes, and estimated chemical intakes for each human receptor group. The site characteristics affecting the migration of chemicals are discussed first, followed by a description of population demographics and local land/water uses. This information is then combined to develop a conceptual exposure model for the site and to select exposure pathways for detailed evaluation. Section 3.0 also presents a series of mathematical exposure equations which are used to quantify exposures to the COPCs.

Section 4.0 presents the results of the toxicity assessment. Human toxicity data are presented for the chemicals of potential concern. Dose-response criteria are identified for both carcinogenic and noncarcinogenic human health effects for each chemical and for each potential exposure route (i.e., oral, inhalation, dermal).

Section 5.0, includes both a quantitative and qualitative evaluation of risks associated with the site. The quantitative risk characterization, integrates the information developed in the toxicity assessment and exposure assessment sections. Carcinogenic and noncarcinogenic human health risks are quantified and presented for the chemicals of potential concern. A qualitative evaluation of risks associated with the site is also presented.

Section 6.0, Uncertainty Analysis, discusses issues related to the certainty associated with the risk estimates. Uncertainties related to the selection of chemicals of potential concern,

the quantitation of exposure and chemical intake, toxicity and risk characterization are discussed.

The summary (with conclusions) of the HHRA is presented in Section 7.0.

The references used throughout the report are provided in Section 8.0.

2.0 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

The results of the RI investigations conducted at the Washington County Lead District Site are presented in the RI Report (Black & Veatch, 2009). The degree and extent of site-related chemical contamination has been characterized by multimedia sampling including soil, mine waste, surface water, sediment, groundwater, and fish tissue. Samples of indoor dust (vacuum and wipe samples) and paint chip samples were also collected to support this risk assessment; however these results were evaluated for use in developing site specific exposure assumptions and are presented later in Section 3.0. The chemicals analyzed and detected in the various media are limited to metals (primarily arsenic, barium, cadmium and lead, although other metals were analyzed and detected). In the following sections, an assessment of the chemicals detected in the various media will be made. Chemicals will be characterized for the Washington County Lead District Site [i.e., the chemicals detected in each media at each sub-area (Potosi, Richwoods, Old Mines) will be summarized, chemicals will be screened, and the COPCs will be identified]. COPCs are those constituents that are most likely to present a potential risk to human health receptors at the Washington County Lead District Site.

2.1 CONTAMINATION ASSESSMENT

The complete discussion of sampling methods and analytical results is presented in the RI report (Black & Veatch, 2009). In this section, sampling results are presented for each environmental matrix sampled at the Washington County Lead District Site. The constituents detected are summarized by frequency of detection (i.e., the number of samples in which the constituent was positively detected in relation to the number of samples analyzed for that constituent), and the minimum and maximum values of the constituent that were detected. Only those constituents positively detected in at least one sample were included in this summary.

The complete raw analytical data is presented in Appendix A. Data were grouped according to type of analysis conducted and the medium sampled. Data were also separated by the location or area sampled (i.e., Potosi, Richwoods, Old Mines). Samples for which location information was not available were not used in the quantitative risk analysis. Sample values that were estimated, identified through secondary dilution, or qualified in any other manner were included as positive values. The only exception to this was data that was either qualified with an "R" (rejected) or qualified with a "B" due to blank contamination.

In the following sections, a summary of the nature of the constituents present in the various environmental media is presented for the Washington County Lead District Site.

2.1.1 Surface Water

A total of 54 surface water samples were identified from the Washington County Lead District database. This includes samples that were collected during site investigation efforts as well additional samples collected to support the Baseline Ecological Risk Assessment (BERA) for the Washington County Lead District Site. A total of 19 surface water samples were collected from the Potosi Site; 14 surface water samples were collected from the Richwoods Site; and 21 surface water samples were collected from the Old Mines Site. The surface water sample locations are presented in Figure 2-1. The samples collected were only analyzed for metals. The constituents detected in the selected surface water samples are presented in RAGS D Tables 2.1 thru 2.3 (see Appendix B). The detected constituents include arsenic (As), barium (Ba), cadmium (Cd), copper (Cu), lead (Pb), manganese (Mn), nickel (Ni) and zinc (Zn).

2.1.2 Sediment

A total of 71 sediment samples were identified from the Washington County Lead District database. This includes samples that were collected during site investigation efforts as well additional samples collected to support the Baseline Ecological Risk Assessment (BERA) for the Washington County Lead District Site. A total of 33 sediment samples were collected from the Potosi Site; 16 sediment samples were collected from the Richwoods Site; and 22 sediment samples were collected from the Old Mines Site. The sediment sample locations are presented in Figure 2-1. The samples collected were analyzed for inorganics including metals and nutrients. The constituents detected in the selected sediment samples are presented in RAGS D Tables 2.4 thru 2.6 (see Appendix B). The detected constituents include aluminum (Al), As, Ba, beryllium (Be), Cd, calcium (Ca), chromium (Cr), cobalt (Co), Cu, iron (Fe), Pb, magnesium (Mg), Mn, Ni, potassium (K), sodium (Na), vanadium (V) and Zn.

2.1.3 Mine Waste Soil

A total of 283 soil samples from mine waste areas (strip mines, mine dumps, tailings areas) were identified from the Washington County Lead District database. This includes soil samples that were collected during site investigation efforts that were submitted for laboratory analysis as well samples that were analyzed for lead in situ with an X-ray Fluorescence (XRF) Spectrometer. A total of 219 mine waste soil samples were collected

from the Potosi Site; 22 mine waste soil samples were collected from the Richwoods Site; and 42 mine waste samples were collected from the Old Mines Site. The mine waste soil sample locations are presented in Figure 2-2 (Potosi Site), Figure 2-3 (Richwoods Site), and Figure 2-4 (Old Mines Site). The samples collected were analyzed for metals. The constituents detected in the selected mine waste soil samples are presented in RAGS D Tables 2.7 thru 2.9 (see Appendix B). The detected constituents include As, Ba, Cd, and Pb.

2.1.4 Historical Soil

A total of 1746 soil samples from property locations at the Potosi, Richwoods, and Old Mines areas were identified from the Washington County Lead District database. This includes soil samples that were collected during site investigation efforts that were submitted for laboratory analysis. A total of 989 soil samples were collected from the Potosi Site; 191 soil samples were collected from the Richwoods Site; and 566 soil samples were collected from the Old Mines Site. The historical soil sample locations are presented in Figure 2-5 (Potosi Site), Figure 2-6 (Richwoods Site), and Figure 2-7 (Old Mines Site). The samples collected were analyzed for metals. The constituents detected in the selected soil samples are presented in RAGS D Tables 2.10 thru 2.12 (see Appendix B). The detected constituents include As, Ba, Cd, and Pb.

2.1.5 Residential Soil

A total of 307 soil samples from a total of 48 residential property locations at the Potosi, Richwoods, and Old Mines areas were collected to support this HHRA for the Washington County Lead District RI. This includes soil samples that were collected during site investigation efforts that were submitted for laboratory confirmation analysis as well samples that were analyzed for lead in the field with an X-ray Fluorescence (XRF) Spectrometer. A total of 307 soil samples were analyzed in the field and 27 samples were submitted for laboratory confirmation. The residential soil sample locations are presented in Figure 2-8 (Potosi Site), Figure 2-9 (Richwoods Site) and Figure 2-10 (Old Mines Site). Although lead was the only constituent analyzed in the field, laboratory confirmation samples were analyzed for inorganics including metals and nutrients. The constituents detected in the selected soil samples are presented in RAGS D Table 2.13 (see Appendix B). The detected constituents include Al, antimony (Sb) As, Ba, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, molybdenum (Mo), Ni, K, Na, V, and Zn.

2.1.6 Groundwater

A total of 22 samples from potable wells at residential property locations at the Potosi, Richwoods, and Old Mines areas were collected to support this HHRA for the Washington County Lead District RI. This includes potable well water samples that were collected during site investigation efforts that were submitted for laboratory analysis. The residential well sample locations are presented in Figure 2-11. Each of these wells was sampled only once. Potable well water samples were analyzed for inorganics including metals and nutrients. The constituents detected in the selected potable well samples are presented in RAGS D Table 2.17 (see Appendix B). The detected constituents include Ba, Cd, Ca, Cu, Fe, Pb, Mg, Mn, Ni, Na and Zn.

In addition, a total of 2603 groundwater samples from potable wells at property locations in the Potosi, Richwoods, and Old Mines areas were identified from the Washington County Lead District database. This includes groundwater samples that were collected during previous site investigation efforts that were submitted for laboratory analysis. A total of 1102 groundwater samples were collected from the Potosi Site; 395 groundwater samples were collected from the Richwoods Site; and 1106 groundwater samples were collected from the Old Mines Site. The groundwater sample locations for the Potosi and Richwoods areas are presented in Figures 2-12 and 2-13, respectively. A historical groundwater sample location map for the Old Mines area was not available. Each well was assumed to be sampled only once. The samples collected were analyzed for metals. The constituents detected in the selected groundwater samples are presented in RAGS D Tables 2.14 thru 2.16 (see Appendix B). The detected constituents include As, Ba, Cd, Pb as well as radium 226 and radium 228.

2.1.7 Fish Tissue (Fillets)

A total of two samples of fish tissue (fillets) were collected by the EPA during site investigation efforts to support the Baseline Ecological Risk Assessment (BERA) for the Washington County Lead District Site. The fish fillet sample locations for the Potosi area are presented in Figure 2-14. Although samples of crayfish and whole fish were also analyzed, only fish fillets are appropriate for consideration in the human health risk assessment. The samples collected were only analyzed for lead. The data for the fish fillet samples are presented in RAGS D Tables 2.18 (see Appendix B). Lead was detected in one of the two fish fillet samples submitted for analysis.

2.2 CONSTITUENT SCREENING

Over 20 inorganic constituents have been detected in soil, mine waste, groundwater, surface water, sediment, and fish fillet tissue at the Washington County Lead District Site. Although this number of constituents would not preclude a detailed risk analysis for each constituent detected or suspected of being present, it is not necessary to quantify risks associated with every chemical detected (especially any chemicals detected infrequently and below established levels of concern). At the same time, it is important that the risk analysis evaluate 99 percent of the potential risks and hazards associated with the Washington County Lead District Site (EPA, 1989). As a result, it is necessary to identify a list of constituents that will be used to estimate exposures and to characterize the potential risk associated with the Washington County Lead District Site.

In accordance with EPA guidance (EPA, 1989), the list of constituents selected for the quantitative HHRA for the Washington County Lead District Site includes those that were:

- Positively identified in at least one sample in a given medium, including (a) constituents with no qualifiers attached and (b) constituents with qualifiers attached that indicate known identity but uncertain concentration.
- Detected at levels significantly elevated above levels of the same chemicals detected in associated blank samples.

The following subsections describe the constituent screening process for the Washington County Lead District Site and present the final list of COPCs for quantitative analysis in the HHRA.

2.2.1 Selection of Data

Once the analytical data are obtained, the first step in selecting COPCs is to evaluate the data following the procedures described in the EPA Guidance for Data Usability in Risk Assessments (EPA, 1992). Evaluation under this guidance involves gathering the analytical data generated during site investigations and sorting the data by medium; evaluating analytical methods; evaluating the quality of data with respect to sample quantitation limits, qualifiers, and blanks; and producing a set of data that qualifies for use in the HHRA. The major emphasis of this section is to determine whether or not samples are representative of potential exposures and meet data quality requirements for inclusion in the quantitative risk analysis.

The raw analytical data is provided in electronic format in Appendix A. Following is a discussion of the available data for each media, and whether samples are representative of potential exposures and are of adequate quality to include in the quantitative risk assessment.

2.2.1.1 Surface Water

A total of 54 surface water samples were evaluated for use in this risk assessment (see Figure 2-1). The samples were collected from a variety of ponds, creeks, streams and rivers throughout the Potosi, Richwoods and Old Mines areas. When evaluating surface water in a risk assessment, exposure units should generally be based on specific creeks, streams, rivers, ponds or lakes. When grouping the data by specific surface water body, there are an insufficient number of samples available that fall within an area that could be considered a reasonable exposure unit. In most cases there is only one sample, and at most between 1 and three samples available for each reasonable exposure unit. Consequently, risks to surface water will not be quantified. Risks to surface water will only be evaluated qualitatively.

2.2.1.2 Sediment

A total of 71 sediment samples were evaluated for use in this risk assessment (see Figure 2-1). The samples were collected from a variety of ponds, creeks, streams and rivers throughout the Potosi, Richwoods and Old Mines areas. When evaluating sediment in a risk assessment, exposure units should generally be based on specific creeks, streams, rivers, ponds or lakes. When grouping the data by specific surface water body, there are an insufficient number of sediment samples available that fall within an area that could be considered a reasonable exposure unit. In most cases there is only one sediment sample, and at most between 1 and three samples available for each reasonable exposure unit. Consequently, risks to sediment will not be quantified. Risks to sediment will only be evaluated qualitatively

2.2.1.3 Mine Waste Soil

A total of 283 mine waste soil samples were evaluated for use in this risk assessment (see Figures 2-2, 2-3 and 2-4). The samples were collected from a variety of strip mines, mine dumps, and tailings areas spread out over the Potosi, Richwoods and Old Mines areas. When grouping the data by specific mine waste area, there are an insufficient number of soil samples available that fall within an area that could be considered a reasonable exposure unit. For purposes of this risk assessment, a reasonable exposure unit is defined as an area

about the size of a typical residential lot. An adequate sample size for a typical residential lot would consist of two to four five-point composite samples. When breaking the mine waste areas into exposure units the size of a residential lot, many of the exposure units would have no samples at all. In those remaining cases where a sample was collected, there is only a single sample available to characterize the entire exposure unit. Consequently, risks to mine waste soil will not be quantified. Risks to mine waste soil will only be evaluated qualitatively.

2.2.1.4 Historical Residential Soil

A total of 1746 historical residential soil samples were evaluated for use in this risk assessment (see Figures 2-5, 2-6 and 2-7). The samples were collected mostly from residential properties spread out over the Potosi, Richwoods and Old Mines areas. In most cases, several samples were collected from each residence and thus would be considered to be representative of a residential exposure unit. However, the historical residential soil did not meet data quality requirements for useability in the quantitative risk assessment (insufficient data to support verification of adequate validation). Consequently, risks to historical residential soil will only be evaluated qualitatively.

2.2.1.5 Residential Soil

A total of 307 soil samples from a total of 48 residential property locations were collected to support this HHRA for the Washington County Lead District RI. At each property, up to eight 5-point composite samples were collected: four samples from quadrants (front and back halves of the yard divided into equal areas); one sample from the drip zone; and additional samples from gardens, play areas, and unpaved driveways, if present. Smaller yards or yards with odd geometries were divided into fewer quadrants if necessary. Each soil aliquot was collected from the upper 1-inch soil horizon at randomly selected locations in the quadrant, away from influences of the drip zone. In accordance with the EPA Handbook, a composite drip zone sample was collected from each residence which consisted of a minimum of four aliquots collected between 6 inches and 36 inches from the exterior wall of the house. An aliquot was collected from the midpoint of each side of the house.

All samples were analyzed for lead in the field with an XRF instrument. A total of 27 of these samples were selected for laboratory confirmation analysis and were analyzed for lead and several additional metals Given that these laboratory confirmation samples were distributed among all of the 307 residential soil samples, there was at most a single

confirmation sample collected from one quadrant of a residential yard. These confirmation samples were collected for the purpose of assessing the accuracy of the XRF data and were not originally intended for assessing the nature and extent of non-lead contamination in residential yards. Consequently, there is a high degree of uncertainty associated with the use of the non-lead data in the quantitative risk assessment. Refer also to Section 6 (Uncertainty Analysis).

Numerous samples have been collected from residential soils in the Potosi, Richwoods and Old Mines areas, providing good coverage of potential areas of exposure. The residential soil data was determined to be useable for purposes of evaluating exposure conditions at each of the residential properties sampled, and was selected for use in the quantitative risk assessment.

The samples used to characterize the residential soils were predominantly collected from depths less than 2 feet below ground surface (bgs).

2.2.1.6 Groundwater

A total of 22 samples from potable wells at residential property locations at the Potosi, Richwoods, and Old Mines areas were collected to support this HHRA. Potable (residential) groundwater was collected directly from the tap. The sample was collected from the well head or an outside faucet. The water was allowed to purge for at least 5 minutes prior to sample collection.

The data collected are suitable for evaluating exposure conditions at each of the residential properties sampled. The residential potable well water data was determined to be useable. Risks associated with exposure to these 22 residential groundwater samples will be evaluated quantitatively.

In addition, a total of 2603 historical groundwater samples from potable wells at property locations in the Potosi, Richwoods, and Old Mines areas were identified from the Washington County Lead District database. In most cases, these groundwater samples were collected at the tap from each residential property and thus would be considered to be representative of a residential exposure unit. However, the historical residential groundwater data did not meet data quality requirements for useability in the quantitative risk assessment (insufficient data to support verification of adequate validation). Consequently, risks to historical residential groundwater will only be evaluated qualitatively.

2.2.1.7 Fish Fillet Tissue

Samples of fish fillet tissue were only obtained from two samples. Two fish fillet tissue samples are not adequate for characterizing representative levels of contaminants in fish, especially given the size of the site and that there are numerous surface water bodies present within the Washington County Mines site where surface water and sediment contamination may vary. Consequently, this data is not useable for the quantitative risk assessment. Risks to the fish tissue will only be evaluated qualitatively.

2.2.2 General Data Evaluation

2.2.2.1 Constituent Qualifiers/Data Validation Data Usability Evaluation.

This section discusses the relevant data evaluation issues associated with the data selected for quantitative risk assessment.

Quality assurance and quality control (QA/QC) measures were incorporated into the site investigation methods and procedures to help ensure quality, precision, accuracy, and completeness of data and sample analysis. Field and laboratory quality checks were incorporated into sample collection and analysis procedures as part of the QA/QC measures. Field quality checks were implemented into the sample collection procedures to minimize the potential for interference or introduction of contaminants during sample collection and processing, storage, transport, and equipment decontamination. These measures included collection of blank and duplicate samples among others. Laboratory quality checks were implemented to ensure laboratory systems operated within acceptable guidelines and to minimize or document the occurrence of laboratory contamination and variability in analytical results, and included method blanks among other measures.

Only those samples with corresponding supporting documentation, including custody records and field notes, were included in the quantitative analysis. QA/QC measures associated with each of these samples were reviewed to ensure that the quality of the data met requirements for risk assessment purposes.

RAGS D Data Useability Worksheets and an evaluation of analytical detection limits are provided in Appendix C. Generally all of the analytical data generated during the 2008 remedial investigation field effort were acceptable and useable in the HHRA. Detection limits were adequate for most analytes in residential soil samples except for arsenic and

thallium. Detection limits were adequate for most analytes in residential groundwater samples except for antimony, arsenic, cobalt and thallium. While standard matrix spikes and/or sample matrix spikes for some constituents may have been higher or lower than the acceptable range for the method, the method detection limits (MDLs) for the constituents analyzed were reasonably low. There is generally good confidence in the data set. In some cases, a number of samples were duplicated. In those instances of raw data uncertainty (i.e., when the concentration of sample duplicates were not in agreement), the more conservative or larger value was used in the risk calculations. In a few cases, only one sample may have been analyzed for a particular constituent. If the sample size was a single sample, then the reported value was used in the HHRA for both the mean and 95 percent confidence interval concentration. A thorough discussion of the data limitations is presented within the uncertainty assessment section of this report (refer to Section 6.0).

2.2.2.2. Constituents in Blanks.

To prevent the inclusion of non-site related constituents in the HHRA, the Washington County Lead District Site data set was reviewed to identify constituents detected in field and/or laboratory blanks. In accordance with RAGS (EPA, 1989) sample results for common laboratory contaminants were considered positive only if the concentration in the sample exceeded ten times the maximum concentration detected in any blank. In addition, sample results for uncommon laboratory contaminants were considered positive only if the concentration in the sample exceeded five times the maximum concentration detected in any blank. After a complete review of the data, no constituent concentrations meeting these criteria were identified, and consequently no data was eliminated from use in this risk assessment on the basis of blank contamination.

2.2.2.3. XRF Data Quality Assessment.

A quality assessment of the XRF soil data obtained from the Washington County Lead District Site in 2008 was performed. During the 2008 field investigation, all residential soil samples were sieved with the 60 mesh sieve and the fine soil fractions were analyzed in the field using an Innov-X XRF instrument. A subset of these same soil samples analyzed using the XRF (termed as confirmation samples) were sent to the EPA laboratory and were analyzed for lead and other metals using Inductively Coupled Plasma (ICP) analysis. Confirmation samples were collected at a rate of 10 percent (one confirmation sample per 10 XRF samples). The lead concentrations from XRF (fine fraction) analysis and the EPA laboratory confirmation data were compared to determine if the data satisfied the quality control goals specified in the Quality Assurance Project Plan (QAPP).

The XRF (fine fraction) data and the EPA laboratory (ICP-fine) data from the confirmation samples were used to calculate the Relative Percent Difference (RPD) between the two sets of data. The RPD was compared to the goal of 25 percent RPD for confirmation samples specified in the QAPP. During the 2008 field investigation a total of 27 laboratory confirmation samples were analyzed by the EPA laboratory. The RPD for these 27 samples exceeded the 25 percent goal in only one sample.

For the field XRF (fine fraction) data to be useable, the correlation between the XRF field analysis and the laboratory confirmation (ICP-fine) results must also be acceptable. A regression analysis was also performed on the paired XRF (fine fraction) and laboratory confirmation data (ICP-fine). Figure 2-15 presents the regression analysis of XRF (fine fraction) data and laboratory confirmation (ICP-fine) samples. The results of the regression analysis indicated that the coefficient of determination (r^2) is 0.9746, suggesting a very strong correlation. Outliers (samples with concentrations greater than 2000 mg/kg) were omitted from this analysis to provide a better estimate of the correlation between XRF (fine fraction) and ICP-fine data within the range of cleanup goals. The results of the regression analysis were used to deveolop a regression equation for estimating the ICP fine fraction from the XRF fine fraction data (see Figure 2-15). This equation is key in estimating exposure point concentrations for lead and is:

$$y = 0.8886x + 44.142$$

Where: y = ICP (fine fraction)
x = XRF (fine fraction)

In addition to comparing the XRF data with the laboratory confirmation samples, the XRF data from bulk soil was also compared to the XRF data for the fine fraction. It should be noted that that the XRF data reported for each residential property represents the fine fraction (all residential soil samples were sieved with the 60 mesh sieve prior to XRF analysis). Consequently, a bulk to fine fraction adjustment is not needed for this data set. However, the following comparison of the XRF data from bulk and fine fractions is presented to fully describe data quality.

A total of 30 samples were sieved with both a 10 mesh (bulk soil) and a 60 mesh (fine soil) sieve, and the soil in both samples was analyzed with the XRF instrument. The XRF data from the bulk soil and fine soil fractions were used to calculate the Relative Percent Difference (RPD) between the two sets of data. The RPD was compared to the goal of 25

percent RPD. The results of this analysis indicated that 6 of the 30 sample pairs had RPD values exceeding the 25 percent goal.

A regression analysis was also performed on the paired bulk and fine fraction data. Figure 2-16 presents the regression analysis of XRF bulk and fine fraction data. The results of the regression analysis indicated that the coefficient of determination is 0.0.894, suggesting a high correlation between the results from the two sieved fractions. The results of the regression analysis were used to deveolop a regression equation for estimating the XRF fine fraction from the XRF bulk data (see Figure 2-16). This equation is:

$$y = 0.9276x + 33.745$$

Where: y = XRF (fine fraction)
x = XRF (bulk fraction)

Based on this analysis, it was determined that the XRF data collected during the 2008 field investigation is acceptable for use in the quantitative risk assessment.

2.2.2.4. *Lead Bioaccessibility Data Quality Assessment.*

A quality assessment of the Lead Bioaccessibility data obtained from the Washington County Lead District Site in 2008 was performed. During the 2008 field investigation, lead bioaccessibility samples were collected from 15 of the 48 residential properties investigated. Quality control samples were also collected in accordance with the QAPP. All of the data quality objectives specified in the QAPP were met (see Appendix C). All of the laboratory duplicate (LD) precision results were within control limits. Based on this analysis, it was determined that the lead bioacessibility data collected during the 2008 field investigation is acceptable for use in the quantitative risk assessment.

2.2.3 Screening Results

The second step in the identification of COPCs is to use the results of a risk-based screening. Maximum detected concentrations were compared to Regional Screening Levels (EPA, 2008b) in accordance with EPA Region 7 guidance (EPA, 2007b).

For purposes of this report, all data selected for both qualitative and quantitative risk assessment were included in this screening.

For groundwater (residential potable well water) and surface water, maximum detected concentrations were compared to EPA Regional Screening Levels for Tapwater. Regional Screening Levels for non-carcinogens were modified such that the screening level was based on a noncancer hazard quotient (HQ) of 0.1 (i.e., the noncancer Regional Screening Value was divided by 10 to account for the presence of multiple non-carcinogens). The Regional Screening Level for carcinogens was based on a cancer risk of 1E-06 and accounts for the presence of multiple carcinogens. Consequently, the cancer screening level was not modified for the screening.

For soil (mine waste, historical soil and residential properties) and sediment data, maximum detected concentrations were compared to EPA Regional Screening Levels for residential soil. Regional Screening Levels for non-carcinogens were modified such that the screening level was based on a noncancer HQ of 0.1 (i.e., as with groundwater, the noncancer screening level was divided by 10 to account for the presence of multiple non-carcinogens). The Regional Screening Level for carcinogens was based on a cancer risk of 1E-06 and accounts for the presence of multiple carcinogens. Consequently, the cancer screening was not modified for the screening.

For fish fillet tissue data, lead was the only constituent analyzed and detected. There is no risk based screening level available for fish tissue. Consequently, lead was retained as a COPC for fish tissue.

RAGS D Tables 2.1 through 2.18 (Appendix B) present the selection of COPCs for the Washington County Lead District Site. The rationale for the selection or elimination of each constituent in each media is provided in these RAGS D Tables (Appendix B). The selected COPCs are summarized in Tables 2-1 and 2-2. The COPCs selected for the quantitative risk assessment (see Table 2-1) include aluminum, antimony, arsenic, barium, cadmium, cobalt, iron, lead, manganese vanadium and zinc. The COPCs selected for qualitative evaluation include aluminum, arsenic, barium, cadmium, cobalt, iron, lead, manganese, and vanadium.

It is important to note that arsenic was selected as a COPC for the quantitative risk assessment of potable well water from residential properties on the basis of inadequate detection limits. Arsenic was reported as non-detect in all samples of this data set, but the detection limits were greater than the risk based screening level (see Appendix C).

Constituents not selected as COPCs for the quantitative risk assessment due to inadequate detection limits include antimony, cobalt and thallium in groundwater as well as thallium in

soil. The uncertainty associated with the COPC selection process (including inadequate detection limits) is described in detail in Section 6.

3.0 EXPOSURE ASSESSMENT

The exposure assessment uses the site description and constituent characterization presented in the previous sections to identify potentially exposed human receptor populations, identify potential exposure pathways, and calculate estimated daily intakes of the chemicals of potential concern.

The human health conceptual exposure model for the HHRA at the Washington County Lead District Site integrates and summarizes the information concerning sources, constituent migration pathways, and exposure routes into a combination of exposure pathways. The conceptual exposure model for the Washington County Lead District Site is presented as RAGS D Table 1 (Appendix B) and Figures 3-1a and 3-1b. This model identifies the key potential release mechanisms, transport media, exposure points, exposure media, exposure routes, and potential receptors for the Washington County Lead District Site.

Behavioral and physiological factors influencing exposure frequency and levels are presented in a series of exposure scenarios as a basis for quantifying constituent intake levels by receptor populations for each identified exposure pathway. The results of the exposure analysis are applied in the assessment of health risks in subsequent sections.

This section incorporates information from each of the preceding sections with site-specific information such as climate, geology, soils, groundwater, surface water, population demographics, land use, water use, the relationship between lead concentrations in indoor dust to outdoor soil, the relative bioavailability of lead in soil, etc. to predict the constituent levels to which receptors would be exposed. Once these exposure levels are determined, they will be compared with the appropriate health effects criteria in Section 4.0 to characterize human health risks in Section 5.0.

The approach taken in the actual calculation of exposure is to provide a discussion of each of the exposure routes that has been determined to be potentially significant at the Washington County Lead District Site, identify the exposure algorithm, and present the key variables in a tabular format. The exposure calculations are presented in the appendices. This approach is intended to assist the reader in understanding the methodology and rationale used in the analysis without burdening the text with numerous calculation tables. However, the selection of exposure pathways and justification for the exposure assumptions used in the calculations are discussed within this section of the HHRA.

3.1 CHARACTERIZATION OF EXPOSURE SETTING

The physical characteristics of the Washington County Lead District Site that relate to the potential for constituent migration are presented in detail in the RI (Black & Veatch, 2009). Summary information concerning site physiography, local and regional topography, soils, geology, hydrology, demographics and climatology are presented in the following subsections.

3.1.1 Physical Setting

This section describes the physical characteristics of the Washington County Lead District Site that relate to the potential for constituent migration. Emphasis is placed on local and regional climatology, geology, soils, and hydrology.

3.1.1.1 Climatology

The southeastern portion of Missouri, where Washington County is located, is about 70 miles southwest of St. Louis; the closest metropolis. The total annual rainfall for Washington County is about 43 inches; snowfall about 15 inches. Precipitation falls regularly throughout the entire year with the month of May being the most active. Washington County can be characterized by hot summers and cold winters with average summer high temperatures at 89 degrees and the average low winter temperatures at 21 degrees. The growing season for Washington County falls between the months of May through September when there are no days above freezing.

Prevailing winds are generally 7.67 to 11.02 miles per hour (mph) however wind speeds may increase drastically during severe weather events. On average, there are over 200 sunny days and approximately 89 days of cloud cover and/or precipitation in Washington County (NOAA, 2008).

3.1.1.2 Soils

Parent material is the unconsolidated mass in which a soil forms. The formation or the deposition of this material is the first step in the development of a soil profile. The parent material in Washington County is alluvium (material deposited by water), colluvium (material transported by gravity), loess (silty material deposited by wind), and residuum (material weathered from bedrock). (USDA, 2002)

Alluvium

The soils on the flood plains in Washington County formed in alluvial deposits ranging in thickness from about 5 feet to more than 30 feet. These soils differ widely in texture and chemical composition, reflecting a diversity of origin, varying floodwater velocity, distance traveled down the watershed, and various kinds of primary source material. The Big and Meramec River flood plains formed mainly in silty alluvium. Tributary streams are progressively coarser in texture upstream. The gravelly Bloomsdale and Cedargap soils are on narrow upstream reaches, and the silty Haymond and loamy Kaintuck soils dominate the broader flood plains farther downstream. The abundance of loess as a source material and predictable decreases in stream velocity and gradient along descending watercourses cause this gradation in material sizes. (USDA, 2002)

Colluvium

Colluvium is material transported by gravity and it contributes to several soils in the survey area. Soils such as Alred, Coulstone, Goss, Ocie, and Rueter, have colluvium comprising the upper part of the profile while residuum comprises the lower part of the profile. These soils have colluvium with a high content of rock fragments while Hartville and Lecoma soils occur on footslopes, and the colluvial material is thicker with few rock fragments.

Loess

Loess probably once covered all of Washington County. It was deposited during the most recent postglacial period. The sources of this material were the flood plains along the Mississippi and Missouri Rivers and their tributaries. Filled with sediment deposited by glacial meltwater and nearly barren in the still frigid climate, these valleys were the focus of violent dust storms. These windblown deposits blanketed the landscape to depths that were greatest on the river hills and decreased with distance from the source. Erosion removed the loess at widely varying rates. It apparently kept pace with deposition on the steep, sun-warmed south and west exposures where stripping has been complete. North and east aspects, in contrast, remained frozen longer and retained an appreciable amount of the loess, as did the ridgetops. Stable landforms farther from the Missouri River only retain 20 to 40 inches of loess. The upper solum of Aaron, Crider, Fourche, Glensted, Gravois, Hildebrecht, Knobtop, Useful, Wrengart, and Yelton soils formed in loess. The pattern of loess distribution indicates that no major alterations of landforms have occurred since the loess was deposited (Brown, 1981).

Residuum

Most of the residuum in Washington County is derived from dolostone and sandstone formations of the Cambrian and Ordivician Systems. Generally, the mantle rock, or regolith, forms the surface appearance of the land. The thickness of the bedding, degree of cementation, chemical composition, and proximity to geologic faulting have affects on the rate of residual weathering. Depth to bedrock can vary from less than 10 inches to over 10 feet. There are eight geologic formations contributing to the make up of residual soil materials in Washington County. They are listed from youngest to oldest with the dominant soil(s) that formed in them. The youngest residual parent materials in the county are areas of the Roubidoux Formation. These materials are primarily skeletal coarse-grained sands. The Bender soils formed in this geologic material. The Gasconade Formation is composed of thinly bedded dolostone and cherts. The lower layers of Alred and Rueter soils formed in this material. The Eminence Formation is dominated by medium to massive beds of dolostone with small amounts of chert. The Sonsac soils formed in this material. The Potosi Formation is dominated by massive beds of dolostone with an abundance of quartz druse also called mineral blossom. The Goss, Moko, and Sonsac soils dominate these areas. The Derby-Doerun Formation is composed of thinly bedded dolostone that is interbedded with siltstone and shale. The Aaron and Gatewood soils dominate these areas. The Bonneterre Formation is composed of dolostone in which the moderately deep Caneyville soils formed. The Lamotte Formation is composed of quartzose sandstone in which the moderately deep Lily soils formed. The Precambrian strata are dominated by rhyolites, which formed the Irondale and Taumsauk soils. (USDA, 2002)

3.1.1.3 Geology.

The geology in Washington County is Precambrian to Quaternary in age. The Precambrian rocks are typically ash-flow tuffs related to caldera collapse events. Most of these igneous rocks are rhyolitic in composition and are locally called porphyry or traprock. During the late Cambrian period, alluvial-fluvial sands and gravel were deposited on the then eroded Precambrian terrain; this was then followed by carbonate-dominated marine sediments deposits in the Upper Cambrian period. The Upper Cambrian sequence of carbonate deposits in Washington County are comprised of six formations; Lamotte Sandstone, Bonneterre Formation, Davis Formation, Derby-Doe Run Dolomite, Potosi Dolomite, and Eminence Dolomite. These Upper Cambrian deposit are overlain by two Lower Ordovician strata; the Gasconade Dolomite and the Roubidoux Formation. Quaternary-Pleistocene deposits of loess are also present on some upland ridges. (USDA, 2002).

3.1.1.4 Hydrology.

Washington County has two major regional aquifers, the St. Francois and Ozark, separated by the St. Francois confining unit. The Davis Formation and the Derby-Doe Run Dolomite are approximately 300 feet thick and comprise the strata which act as a barrier separating the two aquifers. The Lamotte Sandstone and Bonneterre Formation have a combined thickness that varies from 0 to 800 feet and are the geologic units of the semi-confined St. Francois aquifer. The Potosi, Eminence, Gasconade, and Roubidoux Formations comprise the unconfined Ozark aquifer and have a total thickness of approximately 900 feet. Where erosion and faulting have exposed portions of the aquifers to the surface water regime, ground water becomes surface water and vice-versa. Solution weathering and fractures create local channels and conduits within the aquifers, which affect both recharge and discharge. They also impact and influence the amount of water available to open boreholes, shafts, and excavations. The Ozark aquifer is a relatively open system that can be readily influenced by nature and man. In the past, pumping to dewater mining excavations has been a major influence on some portions of the aquifers, but such activities have ceased in recent years. Large underground reservoirs in the abandoned mines may provide storage and/or pumping resources for energy/public utilities. Water yields to wells in the St. Francois aquifer vary from 10 to 100 gallons per minute. The Ozark aquifer typically yields water 50 to 1,000 gallons per minute depending on the number of formations intercepted by the well. (USDA, 2002)

Washington County lies within two main surface water drainages; the Big River Watershed and the Meramec River Watershed. Several major tributaries, within the Washington County Lead District Site, drain into the Big River with Mineral Fork being the largest. Mineral Fork passes through the Old Mines Study Area. Mine Breton Creek and Mill Creek both flow in a north to south direction in the Potosi Study Area. The largest creek to flow through the Richwoods site is Little Indian Creek.

The Big River Watershed contains many large, privately-owned dams, with the largest dam located in Washington County; 360-acre Sunnun Lake. The dams retain finely-ground (tailings) and coarsely-ground (chat) lead and barite mine waste. Most of these dams were poorly constructed which has led to erosion of the mine waste.

3.1.2 Human Population Characteristics

According to the 2008 United States census data, Washington County has a population of approximately 24,146, which includes 10,678 households. The population of Washington County accounts for less than 10% of the entire Missouri state population. On average, the median age of residents in Potosi, Richwoods and Old Mines is between 32 and 33 with the majority of residents over 18 years of age. The fewest amounts of people in Washington County are under 5 years and over 65 years of age. Children under 5 years account for about 5% of Washington County's population. (U.S. Census Bureau, 2008.)

Potential receptors in the vicinity of the Washington County Lead District Site include residents (adult and child), workers (both industrial/commercial and construction), and recreational visitors (adult and child). Sensitive subpopulations in the vicinity of the site may include infants, children, and the elderly. Due to age, body weight, and other physiological factors (especially for children exposed to lead), these subpopulations typically represent a higher risk potential than the general population. However, there are no known population centers of disproportionately high numbers of these sensitive subgroups in the Washington County Lead District area.

3.1.3 Land Use

Washington County is bound by Franklin County to the north, Jefferson and St. Francois Counties to the east, Iron County to the south, and to the west by Crawford County. It has abundant mineral resources which drew early settlers to the land. Lead, iron ore, barite, and silver have been heavily mined in the past. Currently, there are no active mines that exist in the area and Washington County is predominantly forested and rural. The primary land use within the county is residential and agricultural (mostly cropland). Many residential properties are also known to include backyard vegetable gardens. Industrial and commercial properties are common in towns and cities throughout the county.

3.1.4 Water Use

Groundwater is currently used as the source of drinking water throughout most of Washington County. Drinking water is supplied by a combination of private wells and municipal water supply systems (e.g. Washington County Water Supply Districts, Potosi Public Water Supply).

Surface water in the Washington County Lead District is generally used only for recreational purposes. Most creeks and streams are shallow and are primarily used for wading or fishing.

3.1.5 Exposure Setting Summary

The Washington County Lead District Site has been extensively investigated for contamination in soil and groundwater. Lead contamination in surface soil at levels exceeding health-based screening levels has been identified at residential properties throughout the Potosi, Richwoods and Old Mines areas. Elevated levels of arsenic, barium, and cadmium have also been identified in soils. Private drinking water wells have been identified with lead levels exceeding the drinking water standard.

In addition, surface water, sediment and fish tissue have been identified with lead contamination.

3.2 IDENTIFICATION OF POTENTIAL EXPOSURE PATHWAYS

This subsection of the exposure assessment uses the characterization of the exposure setting and population data presented in the previous subsections to identify potential or suspected exposure pathways at the Washington County Lead District Site.

This step of the risk assessment identifies those pathways that are complete (i.e., pathways where COPCs are expected to reach receptors). For an exposure pathway to be complete, the following four elements must be present:

- A source area or a release from a source;
- A likely environmental migration route (i.e., leaching or partitioning from one medium to another);
- An exposure point where receptors may come into contact with site-related COPCs; and
- An exposure route by which potential receptors may be exposed.

A pathway can only be considered incomplete when at least one of the four elements of a complete exposure pathway is missing.

Factors that have been considered in the exposure pathway selection process include:

- Regional importance of site resources;
- Local topography;
- Current local land/water use;
- Future land re-use planning;
- Qualitative prediction of constituent migration; and
- Persistence and mobility of migrating constituents.

The assessment of pathways by which potential human receptors may be exposed to COPCs from the Washington County Lead District Site includes an examination of the source areas, existing migration pathways, and potential exposure routes as well as those that may be reasonably expected in the future. The determination of exposure pathways is made by a careful evaluation of the current extent of affected media at the site in relation to local land and water uses, and the results of a fate and transport assessment that evaluates constituent migration pathways. The exposure pathways are developed only for those COPCs identified in Section 2.0.

3.2.1 Source Areas

Site investigations at the Washington County Lead District Site have confirmed the presence of COPCs in soils, groundwater, surface water, sediment and fish tissue. Details of the constituent characterization are presented in Section 2.0 of this report. The sources of the COPCs in the Washington County Lead District Site that have been identified include the remnants of mining activities such as strip mines, mineshafts, mine dumps, tailings piles, tailings ponds and associated dams.

This HHRA will consider exposure to soils, groundwater, surface water, sediment and fish tissue at the Washington County Lead District Site.

3.2.2 Migration Routes

COPCs present at the Washington County Lead District Site may migrate offsite or may remain persistent at the site. The COPCs at the Washington County Lead District Site are all metals, and are expected to be relatively persistent in the source areas however they may migrate from the source through several mechanisms. The following subsections briefly summarize the fate and transport properties of the COPCs and the migration routes at the Washington County Lead District Site.

3.2.2.1 Fate and Transport Properties of the COPCs

Some of the important physicochemical properties of the COPCs at the Washington County Lead District Site are summarized in Table 3-1. While the pure metallic forms are insoluble in water, many of the salts are soluble in varying degrees. The primary fate process for these inorganics in relation to groundwater is adsorption. These constituents may be released into solution depending on pH, the particular chemical state present, and the presence of aerobic or anaerobic conditions at the site. Values of the soil-water partition coefficient (K_d) have been reported to range from 6.5 (cadmium) to as high as 1500 (aluminum) liters per kilogram (L/kg) for these inorganic constituents and suggest that they are likely to be primarily distributed to the soil phase. The important fate and transport characteristics of some of the more toxic inorganic constituents are discussed below.

Aluminum partitions between solid and liquid phases by reacting and complexing with water molecules and anions such as chloride, fluoride, sulfate, nitrate, phosphate, and negatively charged functional groups on humic materials and clay. The mobilization of aluminum is primarily controlled by pH (decreasing pH results in an increase in mobility).

Sorption to clays and minerals is normally the most important mechanism resulting in the removal of antimony from solutions, although antimony may be reactive with other heavy metals to form insoluble compounds. However, antimony in natural water is typically soluble and quite mobile.

Arsenic is generally quite mobile and may be leached from soil depending on the specific oxidation state.

Barium is generally present in solution in surface water or groundwater only in trace amounts. Barium is not soluble at more than a few parts per million in water that contains sulfate; however, barium sulfate may become considerably more soluble in the presence of chloride and other ions.

Cadmium is relatively mobile in the aquatic environment, but is expected to move slowly through soil. Cadmium is removed from aqueous media by complexing with organic materials and subsequent adsorption to the sediment.

Very little cobalt appears to occur in soluble form in natural aquatic systems. The most important control on the mobility of cobalt is probably adsorption to clay minerals and hydrous oxides of iron, manganese, and aluminum. Adsorption and desorption processes

are typically controlled by pH, redox potential (Eh), and the concentrations of cobalt and competing compounds.

Elemental iron and many iron compounds, including iron hydroxide and the iron oxides, are insoluble in water. Iron also tends to chelate with organic and inorganic matter. Consequently, much of the iron present in aquatic systems tends to partition to the bottom sediments. In addition, iron has relatively low mobility in soil.

Lead may exist in either organic or inorganic forms, however most of the lead present at the Washington County Lead District Site is most likely inorganic due to the source materials (mining wastes). Inorganic lead is relatively insoluble and not very mobile. Sorption processes exert a dominant effect on the distribution of lead in the environment.

In freshwater systems, manganese can occur as a soluble ion, in complex organic ions, or in colloidal suspensions. In soil, the solubility of manganese is increased at low pH and under reducing conditions. The presence of high concentrations of chlorides, nitrites, or sulfates may also increase solubility

The extent to which vanadium is mobile in the environment is largely determined by the chemical species present and by environmental factors determining its solubility and ability to bind to organic materials.

The relative mobility of zinc in soil and water is determined by pH, salinity, the concentration of complexing liquids, and the concentration of zinc. Zinc normally partitions to soil (sediments) to a greater degree than to solution.

3.2.2.2 Constituent Migration Pathways

The COPCs at the Washington County Lead District Site may potentially migrate toward down gradient receptor locations and may be transported to other environmental media. COPCs in the soil may remain persistent in the source areas or may be transported via the following major migration pathways:

- Soil to groundwater;
- Soil to surface water;
- Soil to sediment;
- Soil to air, and;
- Soil to agricultural products/homegrown produce.

Once the COPCs have migrated from soil, additional transport may potentially occur. For the Washington County Lead District Site, this additional transport is expected to include the surface water to fish pathway. The following subsections summarize the potential constituent migration pathways at the Washington County Lead District Site.

Soil-to-Groundwater Pathway

Based on the evaluation of site characteristics and monitoring data, groundwater is a major mode of transport for COPCs at the Washington County Lead District Site. During periods of rainfall, water infiltrates the onsite soils containing site-related constituents and carries with it dissolved constituents. A portion of the dissolved constituents are adsorbed by the soils underneath the affected surface soil zone. The remaining portion of the constituents, which is desorbed from the soil particles, continues to move downward and reaches the groundwater.

Site related COPCs have been observed in potable groundwater samples collected at the Washington County Lead District Site. The impact of site related COPCs on the groundwater is known to be widespread throughout Washington County due to the historic mining activity and as evidenced by the groundwater sampling results. Constituent migration is expected to be slower than groundwater flow due to retardation as a result of adsorption. Constituents also disperse laterally as they are transported down gradient, resulting in dilution as affected groundwater mixes with laterally adjacent, uncontaminated groundwater. Fate processes, other than dispersion and adsorption, are presumed to be insignificant in groundwater at the Washington County Lead District Site.

Soil-to-Surface Water Pathway

Typically, when precipitation falls, any surface water runoff may contain some constituents in solution that may be transported along with the surface water to offsite locations. The soil-to-surface water pathway is potentially important when COPCs are present in surface soils as they are at the Washington County Lead District Site. Site related COPCs have been observed in surface water samples collected from the Potosi, Richwoods, and Old Mines areas.

Soil-to-Sediment Pathway

The migration of site-related COPCs via surface water may also lead to the migration of sediments. Surface water leaving the site may contain soil particulates that may be

transported along with the surface water in a dissolved or suspended form or may remain in the sediment and may be eventually deposited in down gradient drainages and waterways. The soil-to-sediment pathway is potentially important when COPCs are present in surface soils as they are at the Washington County Lead District Site. Site related COPCs have been observed in sediment samples collected from the Potosi, Richwoods, and Old Mines areas.

Soil-to-Air Pathway

The presence of site-related COPCs in surface soils at the Washington County Lead District Site may result in a release of these constituents to the atmosphere via dust entrainment. Air monitoring has not been conducted at any on-site or off-site locations to determine the potential for dusts generated from source areas.

Constituents bound to surface soils may be transported as suspended particulates or dust, and may migrate from a site when environmental conditions are favorable. Factors influencing the potential for dust entrainment into the atmosphere include surface roughness, surface soil moisture, soil particle sizes, type and amount of vegetative cover, amount of soil surface exposed to the eroding wind force, physical and chemical properties of the soil, wind velocity, and other meteorological conditions (EPA, 1983). While most residential properties are covered with grass or other vegetation, some of the mine waste areas are less vegetated and may become dusty, especially during dry periods. Dust formation may be significant during extended periods of dry weather. In addition, certain recreational activities at mine waste areas, such as dirt bike or All Terrain Vehicle (ATV) riding, may enhance the potential for dust formation. As a result, concentrations of COPCs bound to the soil matrix may be expected to be present in the air or dusts at certain times of the year.

Soil-to-Agricultural Products/Homegrown Produce Pathway

Constituents in soil may be taken up by plant roots and become concentrated in plant tissues of agricultural crops and/or homegrown produce. No samples of agricultural crops or homegrown produce have been collected, and consequently, the extent and magnitude of constituent uptake into plants is unknown.

Surface Water-to-Fish Pathway

Once in the surface water, site related COPCs may bioconcentrate in aquatic organisms that live in the creeks and streams impacted by past mining activities in the Washington County

Lead District. Bioconcentration occurs over time as the aquatic organisms (e.g. fish) are continually exposed to dissolved concentrations in the surface water. Uptake of COPCS may occur both through the food-chain and direct exposure to the surface water. Lead has been detected in fish fillet samples collected from the Washington County Lead District Site.

3.2.3 Exposure Points

This section briefly presents the exposure points associated with each media. For each media, the timeframe (current or future), the location (where exposure occurs), and how receptors will be exposed to COPCs are presented. The type of evaluation conducted (quantitative or qualitative) is also noted.

- Current/Future Qualitative Evaluation of Exposure to Surface Water in Potosi, Richwoods and Old Mines areas through incidental ingestion and dermal absorption (Adult and Child Recreational Users)
- Current/Future Qualitative Evaluation of Exposure to Sediment in Potosi, Richwoods and Old Mines areas through incidental ingestion and dermal absorption (Adult and Child Recreational Users)
- Current/Future Qualitative Evaluation of Exposure to Mine Waste Soil in Potosi, Richwoods and Old Mines areas through incidental ingestion and dermal absorption (Adult and Child Residents, Industrial/Commercial Workers, Construction Workers, ATV Riders, Adult and Child Recreational Users)
- Current/Future Qualitative Evaluation of Exposure to Historical Soil in Potosi, Richwoods and Old Mines areas through incidental ingestion and dermal absorption (Adult and Child Residents, Industrial/Commercial Workers, Construction Workers, Adult and Child Recreational Users)
- Current/Future Quantitative Evaluation of Exposure to Soil at Residential Exposure Units (48 Residential Properties) in the Washington County Lead District Site though incidental ingestion and dermal absorption (Adult and Child Residents)
- Current/Future Qualitative Evaluation of Exposure to Historical Groundwater in Potosi, Richwoods and Old Mines areas through ingestion (Adult and Child Residents, Industrial Workers, Construction Workers)
- Current/Future Quantitative Evaluation of Exposure to Potable Well Water at Residential Exposure Units (22 Residential Properties) in the Washington County Lead District Site through incidental ingestion and dermal absorption (Adult and Child Residents)

- Current/Future Qualitative Evaluation of Exposure to Fish Tissue in the Washington County Lead District Site through fish consumption (Adult and Child Recreational Users)

The determination of exposure routes is based on the media contaminated and the anticipated activities at the exposure point. Exposure routes for each receptor at the Washington County Lead District Site are provided below.

- Residents – Quantitative evaluation of ingestion and dermal contact with soil as well as ingestion and dermal absorption of groundwater at residential exposure units (48 residential properties.
- Industrial/Commercial Workers – Qualitative evaluation of ingestion and dermal contact with soil and groundwater.
- Construction Workers – Qualitative evaluation of ingestion and dermal contact with soil and groundwater.
- Recreational Users – Qualitative evaluation of ingestion and dermal contact with soil, surface water and sediment. Qualitative evaluation of ingestion of fish tissue.
- ATV Riders – Qualitative evaluation of ingestion and dermal contact with soil.

3.2.4 Conceptual Model

The human health conceptual exposure model for the HHRA at the Washington County Lead District Site integrates and summarizes the information concerning sources, constituent migration pathways, and exposure routes into a combination of exposure pathways. The conceptual exposure model for the Washington County Lead District Site is presented as RAGS D Table 1 (Appendix B) and Figures 3-1a and 3-1b. This model identifies the key potential release mechanisms, transport media, exposure points, exposure media, exposure routes, and potential receptors for the Washington County Lead District Site.

3.3 EXPOSURE PATHWAY SUMMARY

This section integrates the information provided and summarizes all complete exposure pathways that will be quantified in the Washington County Lead District HHRA.

3.3.1 Soil Exposure Pathways

An important exposure pathway of concern at the Washington County Lead District Site exists as a result of the environmental persistence of the COPCs in the soil. Site-related COPCs have been detected in surface soil samples collected from the Potosi, Richwoods and Old Mines areas. COPCs in the soil may be either ingested directly or absorbed through the skin. COPCs in the soil may also be emitted via dust and may be inhaled. Current and future workers (industrial and construction), current and future recreational users (adult and child), current and future ATV riders (adolescents) as well as current and future residents (adult and child) are the primary human receptors of interest.

COPCs may be absorbed through the skin as a result of direct contact with soil. The degree of exposure is largely dependent on the concentration of the constituent in the soil, the exposed skin area, the absorption rate, and the frequency of contact. Receptors are expected to receive dermal exposures when coming into contact with site soils. Because of the known presence of COPCs in the soil and the potential for direct contact, dermal absorption was included in the detailed quantitative exposure analysis for the 48 residential properties. However, since the historical soil and mine waste data was determined to be inadequate for purposes of quantitative risk assessment, exposures to historical soil and mine waste were only evaluated qualitatively in this risk assessment.

COPCs in soil may also be directly ingested by receptors. Incidental soil ingestion is likely to be minimal for adults, but may be greater for children. Because of the known presence of COPCs in the soil at the Washington County Lead District Site, the soil ingestion pathway was included in the detailed quantitative exposure analysis for the 48 residential properties. However, since the historical soil and mine waste data was determined to be inadequate for purposes of quantitative risk assessment, exposures to historical soil and mine waste were only evaluated qualitatively in this risk assessment.

Human receptors at the site may be exposed to COPCs transported to the air as suspended particulates (dust). Portions of the site (i.e., mine waste areas) are sparsely vegetated which may provide a source of dust emissions when environmental conditions are favorable. There is some potential that COPCs in surface soil may become suspended as dust in the air due to wind erosion; however the greatest potential for dust formation may occur during construction activities or certain recreational activities such as dirt bike or ATV riding. However, the available data is considered inadequate to evaluate this scenario quantitatively.

In addition, the inhalation of dust pathway is not expected to contribute significantly to the total risks associated with the COPCs in soil at the residential properties at the Washington County Lead District Site. Residential yards are predominantly grass covered and are not expected to generate high levels of dust. In addition, exposures via ingestion and dermal are expected to account for 99 percent of the risk. For example, if the dust inhalation pathway is removed from the residential soil screening levels for the COPCs, the cancer and non-cancer screening levels would not change significantly. Consequently, a detailed quantitative evaluation of the dust inhalation pathway was not included in this report.

3.3.2 Groundwater Exposure Pathways

Site-related COPCs have been detected in private potable drinking water wells at the Washington County Lead District Site. Current and future workers and residents using groundwater may be exposed through direct ingestion of groundwater (drinking water and cooking). Because of the known presence of COPCs in the groundwater at the Washington County Lead District Site, the groundwater ingestion pathway was included in the detailed quantitative exposure analysis for the 48 residential properties. However, since the data for historical groundwater was determined to be inadequate for purposes of quantitative risk assessment, exposures to historical groundwater were only evaluated qualitatively in this risk assessment.

The use of groundwater for showering or other general washing and bathing activities could result in either whole or partial body contact with contaminated water, potentially resulting in absorption of constituents through the skin. Because of the known presence of COPCs in the groundwater and the potential for direct contact, dermal absorption was included in the detailed quantitative exposure analysis for the 48 residential properties. However, since the data for historical groundwater was determined to be inadequate for purposes of quantitative risk assessment, exposures to historical groundwater were only evaluated qualitatively in this risk assessment.

The detailed quantification of exposure included analysis of water ingestion and dermal absorption. Since groundwater at the site is currently used, these exposures are considered for both a current and future scenario. Receptors may include residents (adult and child).

3.3.3 Surface Water Exposure Pathways

Direct exposure to surface water is also an important exposure pathway at the Washington County Lead District Site. Human receptors may be exposed to surface water through

incidental ingestion and dermal absorption. COPCs have been detected in surface water samples collected from Potosi, Richwoods, and Old Mines areas. Human receptors that walk or wade through surface water may be potentially exposed through dermal absorption of constituents present in the water. In addition, a receptor may unintentionally ingest small quantities of surface water.

Surface water runoff from mine waste areas at the Washington County Lead District Site may occur during precipitation events. Several major tributaries, within the Washington County Lead District Site, drain into the Big River with Mineral Fork being the largest. Mineral Fork passes through the Old Mines Study Area. Mine Breton Creek and Mill Creek both flow in a north to south direction in the Potosi Study Area. The largest creek to flow through the Richwoods site is Little Indian Creek. However, since the data for surface water was determined to be inadequate for purposes of quantitative risk assessment, exposures to surface water were only evaluated qualitatively in this risk assessment.

3.3.4 Sediment Exposure Pathways

Direct exposure to sediment is also an important exposure pathway at the Washington County Lead District Site. Human receptors may be exposed to sediment through incidental ingestion and dermal absorption. COPCs have been detected in sediment samples collected from Potosi, Richwoods, and Old Mines areas. Human receptors that walk or wade through surface water may be potentially exposed through dermal absorption of constituents present in the stream or creek sediments. In addition, a receptor may unintentionally ingest small quantities of sediment.

Surface water runoff from mine waste areas at the Washington County Lead District Site may carry sediments to downstream locations. Several major tributaries, within the Washington County Lead District Site, drain into the Big River with Mineral Fork being the largest. Mineral Fork passes through the Old Mines Study Area. Mine Breton Creek and Mill Creek both flow in a north to south direction in the Potosi Study Area. The largest creek to flow through the Richwoods site is Little Indian Creek. However, since the data for sediment was determined to be inadequate for purposes of quantitative risk assessment, exposures to sediment were only evaluated qualitatively in this risk assessment.

3.3.5 Fish Tissue Exposure Pathway

Exposure to COPCs in fish tissue via direct consumption is also an important pathway at the Washington County Lead District Site. Human receptors may be exposed to fish tissue

through ingestion. Lead has been detected in fish tissue (fillet) samples collected from the Washington County Lead District Site. Human receptors that consume recreationally caught fish may be potentially exposed through this pathway. However, since the data for fish tissue was determined to be inadequate for purposes of quantitative risk assessment, exposures to fish tissue were only evaluated qualitatively in this risk assessment.

3.3.6 Agricultural Products/Homegrown Produce Exposure Pathway

Exposure to COPCs in agricultural products or homegrown produce via direct consumption is also an important pathway at the Washington County Lead District Site. Agricultural crops grown in contaminated soils or irrigated with contaminated water may take up contaminants through the roots and concentrate them into edible portions. Contaminated crops could be used as food for livestock or may be distributed directly for human consumption. In addition, homegrown produce from backyard vegetable gardens grown in contaminated soils or irrigated with contaminated water may similarly become contaminated. Human receptors consuming contaminated agricultural products and/or homegrown produce may thus be exposed. However, since data for agricultural products and homegrown produce are not available for this project, this pathway was not evaluated in this report.

3.4 EXPOSURE POINT CONCENTRATIONS

In the risk assessment process, potential risk is estimated as a function of exposure with the potential risk of adverse effects increasing as exposure increases. Information on the levels of exposure experienced by different members of the population is a key to understanding the range of potential risks that may occur. In order to describe the range of potential risks, both high and central tendency descriptors are used to convey the variability in potential risk levels experienced by different individuals in the population. For purposes of this risk assessment, an estimate of the high end risk descriptor is the reasonable maximum exposure (RME) and the estimate of the central tendency descriptor is the central tendency exposure (CTE).

An exposure point concentration (EPC) is the concentration of a COPC in an environmental medium that may reach the potential receptor. The exposure concentration is typically defined as the average concentration contacted by the receptor at the exposure point. Under EPA guidance, a conservative estimate of this average concentration is the 95th percent upper confidence limit (95% UCL) of the arithmetic mean (EPA, 2002a). The 95 % UCL concentration was used as the RME concentration for the Washington County Lead District

Site. In the event that the calculated 95% UCL concentration exceeded the maximum detected concentration at the exposure area, then the maximum detected concentration was used as the RME concentration. Typically, the CTE concentration is the arithmetic mean exposure (the average estimate) or the median exposure (the median estimate). For purposes of this HHRA, the arithmetic mean concentration was selected as the CTE exposure point concentration.

The 95% UCL and arithmetic mean concentrations for each COPC were derived for each non-lead COPC. Since only one sample was available for each residential property, the CTE and RME exposure concentrations were equal to the detected concentration. For lead, the CTE exposure concentration was equal to the average XRF concentration at each property. The raw analytical data for the Washington County Lead District Site is presented in Appendix A. A summary of the EPCs for each COPC in each exposure medium are provided in RAGS D Tables 3.1 and 3.2 (Appendix D).

Exposures at the Washington County Lead District Site were quantitatively evaluated for soil and groundwater at each of the 48 residential properties. The EPCs for these media were based on measured concentrations.

EPCs for lead were adjusted to account for the difference between the XRF (fine fraction) and ICP (fine fraction) analysis presented in Figure 2-15 (see Section 2.2.2.3). The lead EPC is equal to the average adjusted XRF fine fraction concentration.

3.5 QUANTIFICATION OF PATHWAY-SPECIFIC CONSTITUENT INTAKES

Exposure estimates are calculated for each of the potentially exposed human receptors identified for each exposure pathway selected in the preceding analysis. Generally, the human exposure assumptions for each pathway were selected in accordance with the guidance provided by EPA RAGS Volume I Part A Human Health Evaluation Manual (EPA, 1989), the Exposure Factors Handbook (EPA, 1997a), or the EPA *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA, 2002b). Receptor intakes were calculated separately for carcinogenic and noncarcinogenic effects.

The degree of potential exposure via each pathway is determined by behavioral, chemical, and physiological factors. Behavioral factors include the amount of time spent in contact with the COPCs in soil, water, or air, and the volume of material ingested, inhaled or in contact with the exposed skin. Chemical factors affecting the degree of exposure relate to

the tendency for a chemical to be absorbed through the skin as well as the physical state of the constituent in the environment (e.g., solubilized in water). Physiological parameters such as the condition of the skin (i.e., degree of hydration and skin breaks) and the ability of the body to metabolize and eliminate the constituent(s) also determine the amount and type of exposure that may occur. To quantify potential exposures in the risk assessment process, it is necessary to make assumptions regarding each of these factors. These assumptions, expressed as exposure factors and equations, are presented in RAGS D Tables 4.1 and 4.2 (Appendix E) for each identified complete exposure route.

As discussed previously, potential risk is estimated as a function of exposure and toxicity, with the potential risk of adverse effects increasing as exposure increases. Information on the levels of exposure experienced by different members of the population is key to understanding the range of potential risks that may occur. In order to describe the range of potential risks associated with exposure to non-lead COPCs, both the high end or RME and the CTE estimates of exposure are used to convey the variability in potential risk levels experienced by different individuals in the population.

For each factor involved in the calculation of an exposure estimate, there is a range of values that may describe the magnitude of exposure that may occur to a given individual. In many cases, the state of the science in not yet adequate to define the distributions of all exposure factors used in the calculation of the exposure estimates. Consequently, the RME and CTE should be viewed as best approximations of the high end and central tendency (average) exposures, respectively. The RME exposure estimate has been developed using a combination of high end and average values for most of the exposure factors (see Appendix E). Using a combination of high end (e.g., above the 90th and 95th percentile) and average value estimates for the exposure variables is expected to provide an adequately conservative estimate for the purpose of characterizing human health risks associated with the Washington County Lead District Site.

Most of the exposure assumptions used in this risk assessment are EPA default values as recommended in the various guidance: EPA RAGS Volume I Part A Human Health Evaluation Manual (EPA, 1989), the Exposure Factors Handbook (EPA, 1997a), or the EPA *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA, 2002b). However, as discussed in the sections below, some exposure assumptions are based on site-specific data and best professional judgment.

3.5.1 Quantitation of Human Exposure to Non-Lead COPCs

The amount of a chemical which is ingested or inhaled is referred to as "intake" or "dose". For all COPCs except lead, which is evaluated differently as discussed in Section 3.5.2, exposure is quantified using an equation of the following general form:

$$CDI = C \times IR \times EF \times ED / (BW \times AT)$$

Where:

CDI = Chronic Daily Intake of COPC (milligram of chemical per kilogram of body weight per day)

C = Concentration of the COPC in the environmental medium to which the receptor is exposed (milligram per Liter for water; milligram per kilogram for soil)

IR = Intake rate of the contaminated environmental media (Liter per day for water; kilogram per day for soil)

EF = Exposure frequency (days per year). This factor describes how often a receptor is likely to be exposed to the environmental media over the course of a typical year.

ED = Exposure duration (years). This factor describes how long a person is likely to be exposed to the environmental media during their lifetime.

BW = Body weight (kilograms). This factor describes the typical age adjusted body weight of the exposed receptor.

AT = Averaging time (days). This factor specifies the length of time over which the average dose is calculated.

For mathematical convenience, the general equation for calculating dose can be written as:

$$CDI = C \times HIF$$

Where:

HIF = Human Intake Factor. This factor describes the average amount of an environmental media contacted by the exposed receptor each day. The value of HIF is typically given by:

$$HIF = (IR \times EF \times ED) / (BW \times AT)$$

The units of HIF are kg/kg-day for soil and L/kg-day for water.

Because one or more exposure parameters (e.g., intake rates, body weight, and exposure frequency) may change as a function of age, exposure calculations are often performed separately for children and adults. The current conservative linear cancer potency models that the EPA uses in cancer risk assessments consider the expression of carcinogenic effects to be a function of cumulative dose over a lifetime of exposure. Since a child has a higher ingestion rate and a lower body weight compared to an adult, childhood exposures may be greater than those received as an adult. Therefore, carcinogenic exposures for residents were estimated separately for a child and adult, and then combined to account for cumulative lifetime exposures. Noncarcinogenic exposures are also calculated separately for children and adults.

The assumptions for each specific receptor evaluated at the Washington County Lead District Site are presented in RAGS D Tables 4.1 and 4.2 (Appendix E) for each identified complete exposure route.

3.5.2 Quantitation of Human Exposure to Lead

Exposures to lead are evaluated using a different approach than for most other chemicals. This is because lead is widespread in the environment and exposures can occur by many different pathways and because studies of lead exposures and resultant health effects in humans have traditionally been described in terms of blood lead level. Consequently, lead exposures and risks are typically assessed using an uptake-biokinetic model rather than calculating an estimated dose. Therefore, calculating the level of exposure and risk from lead in soil also requires assumptions about the level of lead in other media, and also requires use of pharmacokinetic parameters and assumptions that are not needed in traditional methods.

3.5.2.1 Children

For residential lead exposures, the sub-population of primary concern is young children. This is because young children tend to have higher exposures to lead in soil, dust and paint and are more sensitive to the toxic effects of lead than are older children or adults.

The USEPA has developed an Integrated Exposure Uptake Biokinetic (IEUBK) model for predicting the likely range of blood lead levels in a population of young children (age 0-7 years or 0-84 months) exposed to a specified set of environmental lead levels (USEPA, 1994). This model requires as input data on the levels of lead in soil, dust, water, air, and

diet at a particular location. All of these inputs to the IEUBK model are central tendency estimates. These inputs are used to calculate an estimate of the central tendency (the geometric mean) of the distribution of blood lead values that might occur in a population of children exposed to the specified conditions. Assuming the distribution is lognormal, and given (as input) an estimate of the variability between different children (this is specified by the geometric standard deviation or GSD), the model calculates the expected distribution of blood lead levels and estimates the probability that any exposed child might have a blood lead level greater than 10 micrograms per deciliter (ug/dL).

Soil to Dust Transfer Factor (M_{sd})

Soil can be a dominant source of lead in indoor dust at residences. The IEUBK model incorporates a soil-to-dust transfer factor to describe the potential for lead in soil to be transported indoors and contribute to the concentration of lead in dust. This transfer factor is called the M_{sd} and it is defined as the mass fraction of soil-derived particles in indoor dust (gram soil/gram dust) (USEPA, 1998):

$$Pb_{dust} = M_{sd} \times Pb_{soil}$$

Where:

Pb_{dust} = concentration of lead in indoor dust (ug Pb/g dust)

Pb_{soil} = outdoor soil lead concentration (ug Pb/g soil)

M_{sd} = mass fraction of soil in dust (g soil/g dust)

M_{sd} values can range from 0 to 1, with low values reflecting a scenario where the contribution of outdoor soil to indoor dust is minimal and high values suggesting that soil is a dominant source of lead in indoor dust. The IEUBK model generally assumes that the concentration lead in indoor dust is 0.70 (70%) of the concentration in outdoor soil. Measurements of lead in outdoor soil and indoor dust can be used to derive a site-specific M_{sd} value. Paired soil and dust data collected from 48 residences at the Washington County Lead District Site were evaluated for use in developing a site-specific value for use in the model using linear regression of the mean lead concentration in outdoor soil and the mean lead concentration in indoor dust. The XRF data was adjusted to the corresponding ICP concentration based on the regression analysis presented in section 2.2.2.3 (see Figure 2-15). The results of this analysis are shown in Figure 3-2. This linear regression excluded three outliers (sample points with greater than 1,510 mg/kg lead in outdoor soil). As seen, the slope of the line (or the M_{sd}) in the first regression was 0.105. The intercept was significantly different than zero ($p<0.05$), however the regression was re-run with an

intercept value of 0. The slope of the line (M_{sd}) in the second regression was 0.159. The results of this analysis indicate that mean lead concentrations in outdoor soil are poorly correlated with the mean lead concentration in indoor dust for the Washington County Lead District dataset. The estimate of the M_{sd} using regression may be biased low due to the effects of measurement error in fitting the regression model. When there is significant error in the independent variables, regression slopes tend to underestimate the true relationship and the intercept is artificially elevated (EPA, 1998).

Based on a detailed review of the property information sheets, a majority of the residents did not specify whether children under 7 actually lived in the household. Of those who replied, there were 7 "yes" and 12 "no" replies. Of the "yes" replies, four households listed grandchildren who may not be primary residents. Based on the available information and assuming that the households with no response should be interpreted as a "no", the site-specific M_{sd} is not likely to be representative of homes containing children under 7 years of age, and the resulting M_{sd} is biased toward homes with low soil to indoor dust transfer. Consequently, indoor dust concentrations will be significantly underestimated for those homes with young children. Since the presence of children under the age of 7 is considered to be one of the main factors affecting soil deposition rates in homes (USEPA, 1998), the use of an M_{sd} that does not reflect the conditions and assumptions of the IEUBK model is not appropriate and should not be used. Therefore, the IEUBK model default value for M_{sd} of 0.7 was used in this risk assessment.

Relative Bioavailability (RBA)

Accurate assessment of the human health risks resulting from oral exposure to lead requires knowledge of the amount of lead absorbed from the gastrointestinal tract into the body. This information is especially important for environmental media such as soil or mine waste, because lead in these media may exist in a variety of forms that are absorbed at different levels.

The preferred method for obtaining site-specific estimates of RBA of lead in soil is to measure the gastrointestinal absorption in animals dosed with site soils compared to that for a fully soluble form of lead (e.g., lead acetate). However, such tests are costly and take considerable time to perform, and no such animal data are available for any soil samples for this site. An alternative approach is to measure the *in vitro* bioaccessibility (IVBA) of lead in soil under specific test conditions. The IVBA results for lead are well correlated with the

in vivo RBA results for lead and can be used to estimate RBA values using the following equation (USEPA 2007):

$$RBA = 0.878 \times IVBA - 0.028$$

USEPA Region VII conducted IVBA testing on site soils collected from 15 residential properties at the Washington County Lead District Site. The IVBA and estimated RBA values for residential soils at the Washington County Lead District Site are presented in Table 3-3. As seen, in residential soils, lead is estimated to have an RBA of about 40 – 74% (average = 53.9%). While RBA is thought to be independent of soil lead concentration, inspection of Table 3-3 and Figure 3-3 shows that there is a tendency for RBA values to increase as soil lead concentration increases. The reason for this is not certain, and for the Washington County Lead District dataset, this tendency is inconsequential.

As mentioned above, the relative bioavailability of lead in residential soil was estimated to be around 53.9% (0.539). Based on a default absolute absorption fraction of 50% for lead in water and food, this RBA corresponds to an absolute bioavailability (ABA) of 26.95% (0.2695) which is the site-specific value used for input in the IEUBK model.

Summary of Model Inputs

The default and site-specific inputs to the IEUBK model for evaluation of risks from lead to residential children are presented in Table 3-4.

3.5.2.2 Adults

Since residential children are expected to be more sensitive to the effects associated with lead exposure compared to adults, adult residents exposed to the residential properties are expected to have lower risks compared to children. Therefore, exposures and risks to the residential child are protective of adult residents.

The Adult Lead Methodology (ALM) has been identified by USEPA's Technical Workgroup for Lead (USEPA 2003) as a reasonable approach for quantifying risks to adults from exposure to lead and for establishing risk-based concentration goals that protect older children and adults from nonresidential exposures to lead. When adults are exposed, the subpopulation of primary concern is pregnant women and women of child-bearing age, since the blood lead level of a fetus is nearly equal to the blood lead level of the mother (Goyer, 1990). However, because of data quality issues for the Washington County Lead

District Site, the risks associated with exposure to lead by nonresidential receptors will only be evaluated qualitatively.

3.6 SUMMARY OF EXPOSURE ASSESSMENT

The exposure assessment included a characterization of the exposure setting and population demographics, as well as an identification of exposure pathways and quantification of exposure intakes for each receptor group at the Washington County Lead District Site.

A fate and transport analysis of the COPCs was conducted, and in conjunction with the source area characteristics, the potential constituent migration and exposure pathways at the Washington County Lead District Site were identified. An exposure pathway analysis was then conducted to identify those pathways to be included in the detailed quantitative analysis. Through this exposure assessment process, the complete exposure pathways (i.e., those pathways in which COPCs are expected to reach receptors) at the Washington County Lead District Site have been identified. The complete exposure pathways to be quantitatively evaluated in this HHRA are:

- Current/Future Ingestion of COPCs in Residential Surface Soil by Adult and Child Residents
- Current/Future Dermal Absorption of COPCs in Residential Surface Soil by Adult and Child Residents
- Current/Future Ingestion of COPCs in Residential Potable Wells by Adult and Child Residents
- Current/Future Dermal Absorption of COPCs in Residential Potable Wells by Adult and Child Residents

Exposures to Residents, Recreational Users, ATV Riders, Industrial/Commercial Workers and Construction Workers to surface water, sediment, mine waste, as well as historical soil and groundwater data will be qualitatively evaluated.

4.0 TOXICITY ASSESSMENT

The purpose of the toxicity assessment is to identify the types of adverse health effects that a COPC may potentially cause and to define the relationship between the dose of a compound and the likelihood and magnitude of an adverse effect (response). Adverse effects are characterized by the EPA as carcinogenic or noncarcinogenic. Dose-response relationships are defined by the EPA for oral and inhalation exposures. Oral dose-response values were used to derive appropriate dermal toxicity values.

The dose-response assessment evaluates the available toxicity information and quantitatively describes the relationship between the level of exposure (either from animal or human epidemiological studies) and the occurrence of an adverse health effect. This relationship is described by a cancer slope factor (CSF) or unit risk factor (URF) for carcinogens and a reference dose (RfD) or reference concentration (RfC) for systemic toxicants, collectively called toxicity values.

Toxicity values were obtained from the following hierarchy of sources in accordance with the EPA Office of Superfund Remediation and Technology Innovation (OSRTI) (EPA, 2003a):

- Tier 1 - Integrated Risk Information System (IRIS)
- Tier 2 - Provisional Peer-Reviewed Toxicity Values (PPRTVs)
- Tier 3 - Other (Peer-Reviewed) Values, including: Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs); California Environmental Protection Agency (CalEPA) and EPA Health Effects Assessment Summary Tables (HEAST) values.

4.1 NONCARCINOGENIC HEALTH EFFECTS

EPA generally assumes a dose exists below which no non-carcinogenic adverse health effects will be seen (EPA, 1989). Below this "threshold" it is believed exposure to a constituent can be tolerated without adverse effects. Adverse effects become manifest only when physiologic protective mechanisms are overcome by exposure doses above the threshold.

The RfD, expressed in units of milligrams per kilogram body weight-day (mg/kg-day), represents the daily exposure level for the human population, including sensitive subpopulations, that is likely to be without appreciable risk of deleterious effects. Chronic RfDs are specifically developed to be protective for lifetime exposures. RAGS Part A indicates that chronic RfDs should be used for evaluating exposure durations of 7 years or greater.

EPA reviews all relevant human and animal studies for each constituent and selects the studies pertinent to the derivation of specific RfDs. Studies are evaluated to determine the no-observed-adverse-effect-level (NOAEL) or lowest-observed-adverse-effect-level (LOAEL). The NOAEL corresponds to a dose that can be administered over a lifetime without inducing observable adverse effects. The LOAEL corresponds to the lowest daily dose that can be administered over a lifetime that induces an observable adverse effect. The adverse effect characterized by the LOAEL is referred to as the "critical effect".

RfDs are derived by dividing NOAELs, LOAELs, or benchmark doses by uncertainty factors to ensure they will be protective of human health. Depending on the available data, uncertainty factors (UFs) may account for interspecies extrapolation, intraspecies differences, derivation of a chronic RfD based on a subchronic study, and use of a LOAEL rather than a NOAEL. Each uncertainty factor usually represents a factor of 10. In addition to UFs, modifying factors between 0 and 10 may be applied to reflect a qualitative professional assessment of additional uncertainties (EPA, 1989).

In order to assess non-carcinogenic effects from dermal exposure, it may be necessary to convert oral reference doses (RfDo) to absorbed reference doses (RfDABS) by use of an Oral to Dermal Adjustment Factor (ABSGI). The formula used to adjust oral toxicity values to dermal toxicity values is:

$$RfDABS = RfDo \times ABSGI$$

Where:

RfDABS = Reference Dose for dermal contact (mg/kg-day)
ABSGI = Gastrointestinal Absorption Efficiency (see Appendix G)

The toxicological data for inhalation exposure is often presented as a RfC rather than a RfD. The RfC is usually expressed in milligrams per cubic meter (mg/m^3).

Where oral or inhalation toxicity values are unavailable, this risk assessment does not extrapolate from one route to another because there is significant uncertainty with this practice. Reference doses and other relevant toxicity information, including primary target organ(s) or "critical effect" can be found in RAGS D Tables 5.1 and 5.2 (see Appendix G).

4.2 CARCINOGENIC HEALTH EFFECTS

EPA evaluates all available scientific information, using a weight-of-evidence approach to determine whether a chemical poses a carcinogenic hazard in humans. EPA groups constituents according to their potential for carcinogenic effects based on clinical evidence (EPA, 1989):

Group A	Human Carcinogen
Group B	Probable Human Carcinogen
Group C	Possible Human Carcinogen
Group D	Insufficient data to classify as a human carcinogen
Group E	Not a Human Carcinogen

In addition, constituents may have been assessed for carcinogenicity using EPA's 2005 Guidelines for Carcinogen Risk Assessment (EPA, 2005a). Under the updated guidance, standard descriptors are used as part of the hazard narrative to express the conclusion regarding the weight of evidence for carcinogenic hazard potential. There are five recommended standard hazard descriptors:

- "Carcinogenic to Humans"
- "Likely to be Carcinogenic to Humans"
- "Suggestive Evidence of Carcinogenic Potential"
- "Inadequate Information to Assess Carcinogenic Potential"
- "Not Likely to be Carcinogenic to Humans"

CSFs and inhalation unit risks (IURs) are the toxicity values used in quantitatively assessing carcinogenic effects from exposure. CSFs are defined as the plausible upper bound, approximating a 95% confidence limit, of the increased cancer risk from a lifetime exposure to a given level of a carcinogen. This estimate, usually expressed in units of proportion (of a population) affected per mg/kg-day, is generally reserved for use in the low-dose region of the dose-response relationship, that is, for exposure corresponding to risks less than 1 in 100 (EPA, 2007b).

In order to assess carcinogenic effects from dermal exposure, it may be necessary to convert oral slope factors (SFo) to dermal slope factors (SFd) by use of an oral to dermal adjustment factor (OAE). The formula used to adjust oral toxicity values to dermal toxicity values is:

$$SFABS = SFo/ABSGI$$

Where:

SFABS = Slope factor for dermal contact $(mg/kg\text{-}day)^{-1}$
ABSGI = Gastrointestinal Absorption Efficiency (Appendix G)

The toxicological data for inhalation exposure is often presented as an IUR rather than an inhalation slope factor (SFi). The IUR is expressed in milligrams per cubic meter $(mg/m^3)^{-1}$.

Where oral or inhalation toxicity values are unavailable, this risk assessment did not extrapolate from one route to another because there is significant uncertainty with this practice. The cancer slope factors and weight-of-evidence classifications are provided in RAGS D Tables 6.1 and 6.2 (see Appendix G).

4.3 POSSIBLE SYNERGISTIC AND ANTAGONISTIC INTERACTIONS

An important issue to consider is possible synergistic and antagonistic interactions between metals. In synergistic interactions, one metal enhances the bioavailability or toxicity of another, while in antagonistic interactions, one metal decreases the bioavailability or toxicity of another. Therefore, a metal can either enhance or decrease the toxicity potential of another metal. Metal interactions have been summarized by various authors (Miller and Groziak, 1997; Gochfeld, 1997; Peraza et al., 1998).

Overall, interactions between metals may be both synergistic and antagonistic, depending on a variety of factors. Some researchers have suggested that intake of adequate levels of essential elements (such as copper and iron) may offer protection against the toxicity of other non-essential metals (such as arsenic, cadmium, and lead), and that conversely, a deficiency of certain essential elements may predispose individuals to toxicity from non-essential metals (Peraza et al., 1998; Chowdhury and Chandra, 1987). In addition, while some mixture research has provided evidence suggesting that simultaneous exposure to toxic doses of several chemicals can result in enhanced toxicity; combined exposure to a mixture of chemicals, each present at their individual no-effect level, typically does not

result in a clearly increased risk of adverse health effects (Jonker et al., 1990; Simmons et al., 1994).

ATSDR (2004a and 2004b) has summarized information regarding potential interactions among arsenic, cadmium and lead, as well as lead, manganese and zinc following oral exposure. Sensitive endpoints for which there is a potential for synergistic or antagonistic interactions between these metals include neurological, renal, cardiovascular and testicular effects. ATSDR (2004a) concluded there is potential for a greater than additive (i.e., synergistic) interaction among lead, arsenic and cadmium on neurological effects in children (e.g., reading, spelling, classroom behavior). However, this conclusion was based primarily on a study that estimated exposure using hair analysis, which is not considered a reliable biomarker of exposure for these metals (Harkins and Susten, 2003). Hence, the conclusions from this study may not be reliable. A study in mice, using relatively high doses (8 mg/kg-day arsenic, 74 mg/kg-day lead), showed that exposure to arsenic increased levels of lead in the brain. ATSDR (2004a) also concluded that there may be synergistic interactions between cadmium and lead on testicular effects (e.g., sperm count, damage to seminiferous tubules). For renal and hematological effects, ATSDR (2004a) concluded that potential interactions are likely to be less than additive (i.e., antagonistic), and that there would be no interaction among arsenic, cadmium and lead for cardiovascular effects (i.e., effects are simply additive). ATSDR (2004b) concluded there is potential for a greater than additive (i.e., synergistic) interaction among lead and manganesse on neurological effects however there is a potential for a less than additive (i.e., antagonistic) interaction among lead and zinc and no effect (i.e., additive) interaction among lead and zinc on manganese. Hence, ATSDR concluded that uncertainty is high when manganese accounts for a great portion of the apparent neurological hazard. For hematological effects, ATSDR (2004b) concluded that potential interactions are likely to be greater than additive (i.e., synergistic) among manganese and lead; less than additive (i.e., antagonistic) among lead and zinc; and that there would be no interaction among manganese and zinc for hematological effects (i.e., effects are simply additive). In any case, as noted by ATSDR (2004a and 2004b), potential interactions are dose-dependent, and may only occur when exposure levels are above a threshold dose.

4.4 CHEMICALS WITH NO TOXICITY VALUES

Toxicity values are available for all of the COPCs selected for the Washington County Lead District Site with the exception of lead. Consequently, an alternate method for evaluating the toxicity of lead is required for the Washington County Lead District Site.

Although toxicity values for lead (i.e., in the form of RfDs, RfCs and CSFs) are not available, quantitative evaluation of lead toxicity is performed through the estimation of blood-lead (Pb-B) concentrations for receptors of concern. Pb-B concentrations may be estimated for child and adult exposures using one of the following models: (1) the Integrated Exposure Uptake Biokinetic Model for Lead, which estimates Pb-B concentrations in children, and (2) the EPA Adult Lead Model, which estimates Pb-B concentrations in adults that are protective of a fetus.

4.5 SUMMARY OF TOXICITY DATA

The available EPA oral and inhalation health effects criteria for the COPCs at the Washington County Lead District Site are presented in RAGS D Tables 5 and 6 (Appendix G). The chronic and subchronic oral RfDs, oral to dermal adjustment factors, adjusted dermal RfDs, primary target organ, combined uncertainty/modifying factors and source of the information is shown in RAGS D Table 5.1. The chronic and subchronic inhalation RfCs, primary target organ, combined uncertainty/modifying factors and source of the information is shown in RAGS D Table 5.2. The oral CSFs, oral to dermal adjustment factors, adjusted dermal CSFs, weight of evidence cancer classification and source of information is presented in RAGS D Table 6.1. The IURs, weight of evidence cancer classification, and source of information is presented in RAGS D Table 6.2.

5.0 RISK CHARACTERIZATION

Risk characterization integrates the results of the exposure and toxicity assessments to derive quantitative and qualitative estimates of the potential cancer risk and noncancer hazards that may occur due to exposure to site-related contaminants. This section presents the methods and results of the risk characterization. The methods for quantitative risk characterization are somewhat different for lead and non-lead COPCs and for noncancer and cancer endpoints. The methods for noncancer hazard estimation are presented in Section 5.1 and the Methods for cancer risk estimation are presented in Section 5.2. The results of the noncancer hazard and cancer risk estimation for the non-lead COPCs are presented in Section 5.3. These results are presented in Table 5-1. The estimates of hazards and risks are expressed numerically in spreadsheets in Appendix G (RAGS D Tables 7.1 through 7.2 and 8.1 through 8.2). The hazard and risk estimates are also summarized in Appendix H (RAGS D Tables 9.1 and 10.1).

The methods for quantitatively evaluating the hazards associated with exposure to lead and results of the analysis are presented in Section 5.4. These results are presented in Table 5-2. The results are also provided in Appendix I (IEUBK Model Results for Residential Exposures).

The methods for qualitatively evaluating the risks associated with exposure to lead and non-lead COPCs and the results of the analysis are presented in Section 5.5. These results are presented in Tables 5-3 through 5-7. This analysis includes the results of qualitative risks associated with exposures to residents, recreational users, ATV riders, industrial/commercial workers and construction workers to surface water, sediment, mine waste, as well as historical soil and groundwater data collected throughout the Washington County Lead District Site.

5.1 METHOD FOR NONCANCER HAZARD ESTIMATION

The potential for chronic noncarcinogenic health effects due to chemical exposure was evaluated by comparing intake (expressed in mg/kg/day) with an RfD (expressed in mg/kg/day). This comparison, or unitless ratio, is called the hazard quotient (HQ) and is expressed by the following equation:

HQ = Chronic daily intake (CDI) or dermal absorbed dose (mg/kg/day) / Chronic RfD (mg/kg/day)

or

$$HQ = \text{Exposure Concentration } (mg/m^3) / \text{Chronic RfC } (mg/m^3)$$

The CTE hazard quotients were quantified using the average CTE exposure intake values. The RME hazard quotients were quantified using the RME exposure intake values. Hazard quotients were calculated for all chemicals and all pathways. Hazard quotients were summed for each chemical across multiple exposure pathways to produce a total hazard index (HI) for a receptor for a given chemical. HIs were summed across multiple chemicals and multiple pathways to provide a total HI of noncancer risks under an assumption of additivity of toxic effects. The assumption of additivity is applicable to COPCs that induce the same type of effect. If the total HI was greater than one (unity), COPCs were re-evaluated by critical effect. Separate HIs were calculated by type of effect (target organ-specific HI) because health effects from exposure to different chemicals are only additive if they have the same toxic effect (affect the same target organ system).

The calculated noncancer hazard quotient assumes that there is a threshold level of exposure below which it is unlikely for even sensitive populations to experience adverse health effects. If the exposure level exceeds the threshold (HQ exceeds one), there may be a concern for potential noncancer effects. Although the greater the value of the HQ is above one generally suggests a greater level of concern, the magnitude of the HQ or HI cannot be interpreted as a statistical probability. It is important to note that the level of concern associated with the HQ does not increase linearly as the RfD is approached or exceeded because RfDs do not have equal accuracy or precision and are not based on the same severity of effect. Moreover, for the calculation of an HI, HQs are combined for substances with RfDs based on critical effects of varying toxicological significance. Also, in the calculation of an HI, RfDs of varying levels of confidence that include different uncertainty adjustments and modifying factors are combined, thus making interpretation even more complex. If the HI is greater than one as a consequence of summing several hazard quotients of similar value, it is appropriate to sum HIs according to target organ/critical effect. RAGS D Table 9.1 in Appendix H show total HI values that are summed across all media and exposure routes as well as the HI values that are segregated by target organ.

5.2 METHOD FOR CANCER RISK ESTIMATION

For chemicals that are potential carcinogens, risk was estimated as the incremental probability of a receptor developing cancer over a lifetime as a result of exposure via each identified exposure pathway. The slope factor converts estimated daily intakes to the

incremental risk of a receptor developing cancer. The following equation (the linear low-dose cancer risk equation) was used to compute chemical-specific cancer risk:

$$\text{Risk} = \text{CDI or dermal absorbed dose (mg/kg/day)} \times \text{slope factor (mg/kg/day)}^{-1}$$

or

$$\text{Risk} = \text{Exposure Concentration (mg/m}^3\text{)} \times \text{Inhalation Unit Risk (mg/m}^3\text{)}^{-1}$$

Above cancer risks of 1E-02, the model is no longer linear, and the following equation (i.e., the one-hit equation) must be used:

$$\text{Risk} = 1 - \exp(-\text{CDI or Dose} \times \text{slope factor})$$

For the Washington County Lead District Site, the one-hit equation was not used to calculate any cancer risks because cancer risks were all below 1E-02.

Total incremental lifetime cancer risks for residential and recreational exposure scenarios were calculated by combining the estimated cancer risks for the adult and child.

The CTE risk estimate was quantified using the average CTE exposure intake parameters. The RME risk was quantified using the RME exposure intake parameters. The total cancer risk for each exposure pathway was quantified by summing the chemical-specific cancer risks. RAGS D Table 9.1 in Appendix H presents total cancer risks that are summed across all media and exposure routes.

To provide a perspective on the potential risks associated with the Washington County Lead District Site, the magnitude of the potential risks associated with the known or suspected carcinogens detected were compared to the EPA acceptable cancer risk range of 1E-04 to 1E-06. A cancer risk of 1E-04 is equivalent to one cancer case in 10,000 exposed people, while a cancer risk of 1E-06 is equivalent to one cancer case in one million exposed people. EPA considers acceptable exposure levels to be the residual concentration levels that represent an excess cancer risk to an individual of between 1E-04 to 1E-06 (55 Federal Register [FR] 8848) based on dose and response information for the particular chemical. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) has identified an excess upper-bound lifetime cancer risk of 1E-06 as the point of departure for determining the need for remediation of chemicals that do not have applicable or relevant

and appropriate requirements (ARARs) or for which an ARAR is not sufficiently protective because of the presence of multiple chemicals or multiple pathways of exposure (55 FR 8848). Furthermore, EPA (1990) states that where the cumulative carcinogenic site risk to an individual based on the RME for both current and future land use is less than 1E-04 and the noncarcinogenic HQ is less than 1, action generally is not warranted unless there are adverse environmental impacts.

5.3 SITE-SPECIFIC HAZARD AND RISK ESTIMATES

Cancer risks and noncancer hazards were evaluated for residential exposures to soil and potable well water. Exposures were evaluated for adult and child residents. For residential exposures, the cancer risk for the child was combined with the cancer risk for the adult to estimate lifetime cancer risk. The results of the cancer risk and noncancer hazard calculations are summarized in Table 5-1.

Cancer risk and noncancer hazards associated with exposure to specific residential properties at the Washington County Lead District Site were evaluated for residential exposures to soil and groundwater.

Current/Future residential exposures to COPCs in soil and groundwater at the Washington County Lead District Site were evaluated for 48 specific residential properties. Current/Future exposures may occur through ingestion and dermal absorption of soil as well as ingestion and dermal absorption of groundwater.

The total adult residential HIs, for all current/future exposure pathways combined, were found to range from a low of 1E-02 (for the adult CTE) to as high as 6E-01 (for the adult RME). The total child residential HIs, for all current/future exposure pathways combined, were found to range from a low of 2E-02 (CTE) to as high as 4E+00 (RME), respectively. HIs associated with exposure to noncancer COPCs at residential properties. Since the HIs associated with exposures at several properties exceed one, further evaluation of the potential for noncarcinogenic effects is required. In accordance with agency guidance (EPA, 1989), the potential noncarcinogenic hazards for these residents were evaluated separately for each target organ system. The results of this analysis indicate that target organ effects exceed one at only one residential property. The results of this analysis indicate that the target organ HI for effects on the thyroid exceeds one at Residential Property 23378. Cobalt is the COC for these residential exposures. Refer to Table 5-1 and Appendix H (RAGS D Tables 9.1 and 10.1).

The total current/future lifetime carcinogenic risk levels for residents (adult and child) for all exposure pathways combined range from a low of 1.6E-06 (for the CTE) to as high as 6.4E-05 (for the RME). These cancer risk estimates are within the EPA acceptable risk management range (1E-04 to 1E-06) for all residential properties. There are no carcinogenic COCs for these residential exposures. Refer to Table 5-1 and Appendix H (RAGS D Tables 9.1 and 10.1). Refer to Sections 6.1 through 6.4 for a discussion of uncertainty issues related to these risk and hazard estimates.

5.4 METHOD FOR EVALUATING EXPOSURES TO LEAD

As described in Section 3.5.2, non-cancer risks associated with exposure to lead are evaluated using a somewhat different approach than the other COPCs. For lead, mathematical models are used to estimate the distribution of blood lead values in a population of people exposed to lead under a specified set of conditions. Risks to children are evaluated using the IEUBK model. Health risks are judged to be acceptable if there is no more than a 5% probability that an exposed individual (a child) is estimated to have a blood lead level that exceeds 10 ug/dL (USEPA, 1994 and 1998). For convenience, this probability is referred to as P10.

Risks associated with lead were quantitatively evaluated for child residents. As explained further below, since children are recognized to be the most sensitive receptor group, the risk to the adult resident is expected to be less than the young child resident. Therefore, the quantitative evaluation for children using the IEUBK model is considered to be protective of adult residents. Consequently, a quantitative evaluation for adult residents is not necessary. Refer to Sections 6.1 through 6.4 for a discussion of uncertainty issues related to these risk estimates.

Risks are expressed as the probability that a child residing at the site will have a blood lead value that exceeds 10 ug/dL (P10). EPA has identified a health protection goal that the value of P10 should not exceed 5%. (USEPA 1994, 1998). The results of the IEUBK model runs for residential exposures to lead are presented in Appendix I. Table 5-2 summarizes the risks to child residents associated with exposure to lead in soil and groundwater at the 48 residential properties that were evaluated.

Risks associated with exposure to outdoor soil, indoor dust and potable well water were evaluated for each of the 48 residential properties sampled during 2008. P10 values were found to exceed the health based goal of 5% at 32 properties (66.7%) of the 48 properties

evaluated. Only 16 properties (33.3%) are predicted to have P10 values less than or equal to the health based goal. Lead is a COC for the 32 properties with P10 values exceeding 5%.

Summary of Available Blood Lead Statistics

Data on blood lead levels in children living in Washington County are collected and compiled by the State of Missouri Department of Health and Senior Services (MDHSS). Because residential exposure to lead contamination has been correlated with elevated blood lead levels in children, regional Agency for Toxic Substances and Disease Registry (ATSDR) staff, MDHSS, and the Washington County Health Department have collaborated with the Missouri Department of Natural Resources (MDNR) and EPA to encourage blood lead testing. In 2001, 20% of the children less than 72 months of age were tested. In 2002, 23% were tested, and in 2003 and 2004, 19% were tested. In 2005, the number of children tested increased to 23% with 5% of the children tested having elevated blood lead levels. 25% of the children in Washington County were tested for blood lead in 2006 with 5.6% having elevated levels of blood lead. It is important to note that these data are based on county wide results. Testing data for children living at specific properties impacted by mine waste are not available.

5.5 QUALITATIVE RISK EVALUATION

During the data evaluation step of this risk assessment (see Section 2), it was determined that the data for surface water, sediment, mine waste soil, historical soil, historical groundwater and fish tissue was either not representative of exposure conditions or did not meet data quality requirements for use in the quantitative risk assessment. As a result, receptor exposures to these media were evaluated qualitatively. The results of the qualitative risk evaluation are presented in the following subsections.

5.5.1 Surface Water

Adult and child recreational users may be exposed to surface water in the Potosi, Richwoods and Old Mines areas. Exposures may occur through incidental ingestion and dermal absorption. To qualitatively evaluate the potential for risk to recreational users, the range of exposure concentrations detected in surface water were compared to the Regional Screening Levels (RSLs) for tap water and the Maximum Contaminant Levels (MCLs). These values are intended to protect human exposures associated with consumption of drinking water, and likely are somewhat overprotective for recreational exposures to surface water. Table 5-3 presents the qualitative evaluation for surface water data. Maximum concentrations of

arsenic, barium and manganese in surface water at the Potosi area are below either the MCL or tap water RSL. For the Richwoods area, the maximum concentrations of arsenic and barium are below either the MCL or tap water RSL; however, the maximum concentration of lead exceeds the drinking water action level. For the Old Mines area, the maximum concentrations of barium and lead exceed both MCL and RSL values. Maximum concentrations of arsenic in surface water at the Old Mines area are below the MCL. Based on this evaluation, there is a potential for risk associated with lead in surface water at the Richwoods and Old Mines areas, and a potential for risk associated with barium in surface water at the Old Mines area.

A detailed analysis of the number of surface water samples that exceed the evaluation criteria is presented in Appendix J. For the Richwoods area, 2 surface water samples (approximately 17 percent of the total) had lead concentrations exceeding the drinking water action level of 15 ug/L. For the Old Mines area, 5 surface water samples (approximately 26 percent of the total) had lead concentrations exceeding the drinking water action level of 15 ug/L. Although 18 surface water samples (approximately 95 percent of the total) at the Old Mines area had barium concentrations that exceeded the drinking water MCL, only 1 surface water sample (approximately 5 percent of the total) had a barium concentration that exceeded the tap water RSL.

5.5.2 Sediment

Adult and child recreational users may be exposed to sediment in the Potosi, Richwoods and Old Mines areas. Exposures may occur through incidental ingestion and dermal absorption. To qualitatively evaluate the potential for risk to recreational users, the range of exposure concentrations detected in sediment were compared to the Regional Screening Levels (RSLs) for soil. These values are intended to protect human exposures associated with residential and industrial exposures, and likely are somewhat overprotective for recreational exposures to sediment. Table 5-4 presents the qualitative evaluation for sediment data. Maximum concentrations of arsenic and lead exceed the RSLs for both residential and industrial exposures at the Potosi, Richwoods and Old Mines areas. Based on this evaluation, there is a potential for risk associated with arsenic and lead in sediment at the Potosi, Richwoods and Old Mines areas.

A detailed analysis of the number of sediment samples that exceed the evaluation criteria is presented in Appendix J. For the Potosi area, all 33 sediment samples (100 percent of the total) had arsenic concentrations exceeding both residential and industrial RSLs. In addition, 11 sediment samples in the Potosi area (33 percent of the total) had lead

concentrations exceeding the residential RSL and only 6 samples (18 percent of the total) had lead concentrations exceeding the industrial RSL. For the Richwoods area, 14 sediment samples (approximately 93 percent of the total) had arsenic concentrations exceeding the industrial RSL and 1 sample (7 percent of the total) exceeding the residential RSL but less than the industrial RSL. In addition, 8 sediment samples in the Richwoods area (approximately 53 percent of the total) had lead concentrations exceeding the residential RSL and only 4 samples (27 percent of the total) had lead concentrations exceeding the industrial RSL. For the Old Mines area, all 20 sediment samples (100 percent of the total) had arsenic concentrations exceeding both residential and industrial RSLs. In addition, 5 sediment samples in the Old Mines area (approximately 25 percent of the total) had lead concentrations exceeding the residential RSL and only 2 samples (10 percent of the total) had lead concentrations exceeding the industrial RSL.

5.5.3 Mine Waste

Adult and child residents, industrial/commercial workers, construction workers, ATV riders, and adult and child recreational users may be exposed to mine waste soils in the Potosi, Richwoods and Old Mines areas. Exposures may occur through incidental ingestion, dermal absorption and inhalation of particulates. To qualitatively evaluate the potential for risk to these receptors, the range of exposure concentrations detected in mine waste soil were compared to the Regional Screening Levels (RSLs) for soil. These values are intended to protect human exposures associated with residential and industrial exposures, and likely are somewhat overprotective for recreational exposures to mine waste soil. Table 5-5 presents the qualitative evaluation for mine waste soil data. Maximum concentrations of arsenic and lead exceed the RSLs for both residential and industrial exposures at the Potosi, Richwoods and Old Mines areas. Based on this evaluation, there is a potential for risk associated with arsenic and lead in mine waste soil at the Potosi, Richwoods and Old Mines areas.

A detailed analysis of the number of mine waste samples that exceed the evaluation criteria is presented in Appendix J. For the Potosi area, one mine waste sample (100 percent of the total) had arsenic concentrations exceeding both residential and industrial RSLs. In addition, 169 mine waste samples in the Potosi area (77 percent of the total) had lead concentrations exceeding the residential RSL and 112 samples (51 percent of the total) had lead concentrations exceeding the industrial RSL. For the Richwoods area, 4 mine waste samples (100 percent of the total) had arsenic concentrations exceeding both residential and industrial RSLs. In addition, 18 mine waste samples in the Richwoods area (approximately 82 percent of the total) had lead concentrations exceeding the residential RSL and 9 samples

(41 percent of the total) had lead concentrations exceeding the industrial RSL. For the Old Mines area, all 15 mine waste samples (100 percent of the total) had arsenic concentrations exceeding both residential and industrial RSLs. In addition, 38 mine waste samples in the Old Mines area (approximately 90 percent of the total) had lead concentrations exceeding the residential RSL and 26 samples (62 percent of the total) had lead concentrations exceeding the industrial RSL.

5.5.4 Historical Soil

Adult and child residents, industrial/commercial workers, construction workers, and adult and child recreational users may be exposed to historical soils in the Potosi, Richwoods and Old Mines areas. Exposures may occur through incidental ingestion, dermal absorption and inhalation of particulates. To qualitatively evaluate the potential for risk to these receptors, the range of exposure concentrations detected in historical soil were compared to the Regional Screening Levels (RSLs) for soil. These values are intended to protect human exposures associated with residential and industrial exposures, and likely are somewhat overprotective for recreational exposures to historical soil. Table 5-6 presents the qualitative evaluation for historical soil data. Maximum concentrations of arsenic and lead exceed the RSLs for both residential and industrial exposures at the Potosi, Richwoods and Old Mines areas. Based on this evaluation, there is a potential for risk associated with arsenic and lead in historical soil at the Potosi, Richwoods and Old Mines areas.

A detailed analysis of the number of historical soil samples that exceed the evaluation criteria is presented in Appendix J. It is important to note that the total number of samples analyzed varied for each COPC and area. For the Potosi area, 591 of the 592 historical soil samples that were evaluated for arsenic (almost 100 percent of the total) had concentrations exceeding both residential and industrial RSLs. In addition, 586 of the 950 historical soil samples that were evaluated for lead in the Potosi area (62 percent of the total) had concentrations exceeding the residential RSL and 319 samples (34 percent of the total) had lead concentrations exceeding the industrial RSL. For the Richwoods area, 178 of the 178 historical soil samples that were evaluated for arsenic (100 percent of the total) had concentrations exceeding the residential RSL and 172 historical soil samples (97 percent of the total) had arsenic concentrations exceeding the industrial RSL. In addition, 70 of the 190 historical soil samples that were evaluated for lead in the Richwoods area (approximately 37 percent of the total) had concentrations exceeding the residential RSL and 31 samples (16 percent of the total) had lead concentrations exceeding the industrial RSL. For the Old Mines area, 554 of the 554 historical soil samples that were evaluated for arsenic (100 percent of the total) had concentrations exceeding the residential RSL and 527

samples (approximately 95 percent of the total) had arsenic concentrations exceeding the industrial RSL. In addition, 271 of the 560 historical soil samples that were evaluated for lead in the Old Mines area (approximately 48 percent of the total) had concentrations exceeding the residential RSL and 114 samples (20 percent of the total) had lead concentrations exceeding the industrial RSL.

5.5.5 Historical Groundwater

Adult and child residents, industrial/commercial workers, and construction workers may be exposed to historical groundwater in the Potosi, Richwoods and Old Mines areas. Exposures may occur through incidental ingestion and dermal absorption. To qualitatively evaluate the potential for risk to these receptors, the range of exposure concentrations detected in historical groundwater were compared to the RSLs for tap water and MCLs. These values are intended to protect human exposures associated with consumption of drinking water. Table 5-7 presents the qualitative evaluation for historical groundwater data. Maximum concentrations of lead exceed the drinking water action level for lead at the Potosi, Richwoods and Old Mines areas. In addition, maximum concentrations of arsenic and cadmium in historical groundwater at the Old Mines area exceed both the tap water RSL and MCL values. Based on this evaluation, there is a potential for risk associated with lead in historical groundwater at the Potosi, Richwoods and Old Mines areas as well as arsenic and cadmium at the Old Mines area.

A detailed analysis of the number of historical groundwater samples that exceed the evaluation criteria is presented in Appendix J. It is important to note that the total number of samples analyzed varied for each COPC and area. For the Potosi area, 166 of the 1034 historical groundwater samples that were evaluated for lead (approximately 16 percent of the total) had concentrations exceeding the drinking water action level of 15 ug/L. For the Richwoods area, 63 of the 361 historical groundwater samples that were evaluated for lead (approximately 17 percent of the total) had concentrations exceeding the drinking water action level of 15 ug/L. For the Old Mines area, 140 of the 992 historical groundwater samples that were evaluated for lead (approximately 14 percent of the total) had concentrations exceeding the drinking water action level of 15 ug/L. In addition, only 1 of the 969 historical groundwater samples that were evaluated for arsenic and only 1 of the 955 historical groundwater samples that were evaluated for cadmium at the Old Mines area (less than 1 percent of the total) had concentrations that exceeded the drinking water MCL.

5.5.6 Fish Tissue

Adult and child recreational users may be exposed to fish tissue in the Potosi, Richwoods and Old Mines areas. Exposures may occur through consumption of fish. Lead was the only COPC selected for fish tissue. Samples of fish fillet tissue were only obtained from two samples. Two fish fillet tissue samples are not adequate for characterizing representative levels of contaminants in fish, especially given the size of the site and that there are numerous surface water bodies present within the Washington County Mines site where surface water and sediment contamination may vary. In addition, there are no fish tissue RSLs available to compare with the concentrations detected in the fish tissue samples collected. Furthermore, potential risks associated with consumption of fish are also influenced by the quantity of fish consumed. Consequently, there is considerable uncertainty associated with the evaluation of this pathway. Due to the lack of adequate samples, and the known concentrations of lead in surface water and sediment, there is a potential risk associated with consumption of fish in the Washington County Lead District Site.

5.6 SUMMARY OF RISK CHARACTERIZATION

Risk characterization integrates the results of the exposure and toxicity assessments to derive quantitative and qualitative estimates of the potential cancer risk and noncancer hazards that may occur due to exposure to site-related contaminants. Risks associated with exposure to lead were evaluated using the IEUBK model.

In summary, there are significant health risks to children and adults at the Washington County Lead District Site. The exposure pathways, exposure points, and contaminants that have been identified as a concern to human receptors include:

Potosi Site

Surface Water: No chemicals of concern (COCs) were identified for current and future exposures to Potosi surface water.

Sediment: Arsenic and lead were identified as COCs for current and future exposures to Potosi sediment.

Mine Waste Soil: Arsenic and lead were identified as COCs for current and future exposures to Potosi mine waste soils.

Historical Soil: Arsenic and lead were identified as COCs for current and future exposures to Potosi historical soil.

Historical Groundwater: Lead was identified as a COC for current and future exposures to Potosi historical groundwater.

Richwoods Site

Surface Water: Lead was identified as a COC for current and future exposures to Richwoods surface water.

Sediment: Arsenic and lead were identified as COCs for current and future exposures to Richwoods sediment.

Mine Waste Soil: Arsenic and lead were identified as chemicals of concern (COCs) for future exposures to Richwoods mine waste soil.

Historical Soil: Arsenic and lead were identified as COCs for current and future exposures to Richwoods historical soil.

Historical Groundwater: Lead was identified as a COC for current and future exposures to Richwoods historical groundwater.

Old Mines Site

Surface Water: Barium and lead were identified as COCs for current and future exposures to Old Mines surface water.

Sediment: Arsenic and lead were identified as COCs for current and future exposures to Old Mines sediment.

Mine Waste Soil: Arsenic and lead were identified as chemicals of concern (COCs) for future exposures to Old Mines mine waste soil.

Historical Soil: Arsenic and lead were identified as COCs for current and future exposures to Old Mines historical soil.

Historical Groundwater: Arsenic, cadmium and lead were identified as COCs for current and future exposures to Old Mines historical groundwater.

Residential Properties

Cobalt and lead were identified as chemicals of concern (COCs) for current and future residential exposures to the residential properties evaluated. Cobalt was identified as a COC for non-cancer potential effects associated with concentrations in soil at only 1 of the 48 residential properties evaluated. Lead was identified as a COC for in soil and groundwater at 32 of the 48 residential properties that were evaluated.

6.0 UNCERTAINTY ANALYSIS

The goal of an uncertainty analysis in a risk assessment is to provide to the appropriate decision makers (i.e., risk managers) a wide range of information about risk assessment assumptions, their inherent uncertainty and variability, and the effect of uncertainty and variability on the estimate of risk. Risk estimates presented in this report are single-point estimates of risk rather than probabilistic estimates. Therefore, it is important to specify the uncertainties inherent in the risk assessment to place the risk estimates in their proper perspective. This section discusses the uncertainties in the HHRA for the Washington County Lead District Site. The major impact of the uncertainty analysis is that the predicted potential risks are relative in nature and do not represent an absolute quantification. This is an important point that is vital to the proper interpretation and understanding of the potential risks presented in this report.

Key assumptions and site-related variables that contribute to uncertainty for the estimate of risk are described in the following sections as low (probably will not impact the risk outcome), moderate (may impact the risk outcome slightly), or high (likely to significantly impact the risk estimate). Uncertainties are addressed for each step of the risk assessment process: data adequacy and identification of COPCs, the exposure assessment, the toxicity assessment, as well as risk characterization.

6.1 UNCERTAINTIES ASSOCIATED WITH DATA ADEQUACY AND IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

A number of assumptions were made in this HHRA that are for the most part designed to overestimate exposure in areas where the available data make more specific quantification difficult or impossible. It is inherent in these assumptions that the actual case would clearly result in lower exposure and risk relative to the hypothetical case made in the HHRA. The assumptions concern the treatment of chemicals in blanks, detection limits, and lack of adequate data for certain media.

Generally all of the analytical data generated during the 2008 remedial investigation were acceptable and useable in the HHRA. Uncertainty may exist in the assessment when the sample quantitation limit for a chemical exceeded the applicable risk-based screening levels for soil, groundwater, surface water or sediment. If the detection limit is higher than the risk-based screening level, the chemical could be present at a concentration below the

detection limit but above the risk-based concentration, and this could lead to elimination of constituents as COPCs and an underestimation of risk. Generally, detection limits were lower than risk-based screening levels. In several cases when detection limits were higher than risk-based screening levels, the constituent was selected as a COPC because the maximum detected concentration also exceeded the screening level.

Constituents that were not detected in any samples of a data set were eliminated from consideration as COPCs. The elimination of nondetect results (those less than detection limit values) also affects the risk assessment. However, detection limits for most analytes were generally low enough to detect concentrations of chemicals that could pose an unacceptable risk. However, this was not always the case, as some constituents were not detected in any of the samples collected and the detection limits were higher than the screening levels. Such was the case for arsenic in potable well water from the residential properties. It is important to note that arsenic was selected as a COPC for the quantitative risk assessment of potable well water from residential properties on the basis of inadequate detection limits. Arsenic was reported as non-detect in all samples of this data set, but the detection limits were greater than the risk based screening level (see Appendix C). Additional constituents with inadequate detection limits include antimony, cobalt and thallium in residential potable wells as well as thallium in residential soil. Antimony cobalt and thallium were not detected in any historical groundwater samples and thallium was not detected in any historical soil or mine waste samples. Consequently, there is no evidence to suggest that these constituents may actually be present in these media and they were not selected as COPCs. Since it is unknown if any of these constituents is actually present at concentrations above the screening levels, a data gap exists and there is uncertainty in the final identification of COPCs for these media.

To prevent the inclusion of non-site related constituents in the HHRA, the Washington County Lead District Site database was reviewed to identify constituents detected in field and/or laboratory blanks. None of the metals results were flagged “B”, and consequently none were removed from the database used in this risk assessment.

Uncertainty may also exist in the assessment when tentatively identified chemicals are selected as COPCs based on a maximum detected value qualified as tentatively identified. No tentatively identified chemicals were reported in the database for the Washington County Lead District Site. Consequently no uncertainty was introduced into this assessment due to tentatively identified chemicals.

COPCs were generally selected and evaluated in the risk assessment without consideration of background concentrations. The constituents analyzed in all environmental media of concern at the Washington County Lead District site were limited to inorganic chemicals (metals and nutrients). Background is generally a concern when inorganic chemicals are analyzed and detected. Arsenic was identified as a COC in soil. The maximum concentration of arsenic detected in each exposure area evaluated (Potosi, Richwoods and Old Mines mine waste areas, area wide soils and residential properties) ranged from 25.2 mg/kg to 313 mg/kg. These concentrations exceeded the average background concentration of arsenic (19.8 mg/kg; combined site data and USGS background data for Washington County, MO). Cobalt was also identified as a COC in soil. The maximum concentration of cobalt detected at residential properties was 34.9 mg/kg. This concentration exceeds the average background concentration of cobalt (10.5 mg/kg; combined site data and USGS background data for Washington County, MO). Lead was also identified as a COC in soil. The maximum concentrations of lead detected in each exposure area evaluated (Potosi, Richwoods and Old Mines mine waste areas, area wide soils and residential properties) ranged from 3343 mg/kg to 53100 mg/kg. These concentrations exceeded the average background concentration of lead (166 mg/kg; combined site data and USGS background data for Washington County, MO). Based on this analysis, arsenic, cobalt and lead are considered to be site related.

Laboratory confirmation samples were collected to provide validation of the XRF data collected in the field. Although the primary purpose of these laboratory confirmation samples was to assess the accuracy of the XRF data and not necessarily for assessing the nature and extent of non-lead contamination in residential yards. It is highly uncertain whether a single confirmation sample collected from one quadrant of a residential yard can provide useable data for characterizing health risks for non-lead COPCs. For comparison, a single sample alone would not generally be sufficient for evaluating lead. Although the intent of the laboratory confirmation sampling was not to characterize the nature and extent of non-lead contamination, many of the non-lead constituents were detected at concentrations above screening levels and thus were selected as COPCs. It is unknown and highly uncertain whether additional samples from a residential yard would yield results above or below the detected concentrations from the single confirmation sample. Therefore, there is considerable uncertainty associated with the use of the non-lead COPC data collected during the confirmation sampling.

The quantity of data available for each exposure media may be a source of uncertainty particularly when only a few samples were available to characterize exposure. When only a few samples were available, the complete range of chemical concentrations to which a receptor may be exposed may be underestimated, and chemicals may be eliminated from consideration as COPCs due to small sample size. For the Washington County Lead District Site, only a few mine waste soil samples were available to select COPCs for the qualitative risk assessment for Potosi (only 1 sample for arsenic and barium) and Richwoods (only 4 samples for arsenic and barium) and fish tissue (only two samples). Although these exposure media were qualitatively characterized by only a few samples, none of the constituents detected were eliminated as COPCs for the qualitative risk assessment. Consequently, the identification of COPCs for some of these exposure media is not expected to have been underestimated due to small sample size.

6.2 UNCERTAINTIES ASSOCIATED WITH EXPOSURE ASSESSMENT

A number of assumptions were made in this HHRA that are designed to overestimate exposure. It is inherent in these assumptions that the actual case would clearly result in lower exposure and risk relative to the hypothetical case made in the HHRA. The assumptions concern estimated EPCs based on monitoring data as well as exposure assumptions regarding intake, exposure time, exposure frequency and exposure duration. Uncertainties may also be associated with site-specific and default inputs to the IEUBK model used to evaluate exposure and risk to lead.

Factors that can contribute to uncertainty in EPCs include data availability and data heterogeneity. Data are only available for metals in soil, groundwater, surface water, sediment, and fish tissue. Heterogeneity in the distribution of chemicals could contribute to uncertainties when estimating EPCs. Use of maximum detected values when particular subsets of data were too small to calculate meaningful 95% UCLs may have overestimated or underestimated exposure. Such was the case with the non-lead yard data and potable well water data, for which there was only one data point available for each exposure unit (residential property). For these media, the exposure estimate resulting from a single data point may or may not be representative of maximum, minimum or average concentrations. As a result, a considerable level of uncertainty exists in the data, and the resulting exposure and risk estimates are of limited use in risk management decisions.

There is considerable uncertainty and data gaps associated with the fish tissue data. Two fish fillet tissue samples are not adequate for characterizing representative levels of contaminants in fish, especially given the size of the site and that there are numerous surface water bodies present within the Washington County Lead District Site. Multiple samples are required from each exposure area to develop more representative exposure estimates for the receptors of interest. Because this data was determined to be inadequate for quantitative risk assessment, it was only evaluated qualitatively in this report. However, because of the data gaps associated with this data, it is important to note that the resulting exposure and qualitative risk analysis for the fish tissue data are of limited use in risk management decisions.

Assumptions used to quantify exposure are also a source of uncertainty in the risk assessment. This assessment included the use of site-specific factors and EPA default factors, such as the extent of exposure (i.e., the exposure time, frequency, and duration) associated with various receptors. These assumptions use information on current land use and reasonable projections of future land use. The uncertainties in the exposure scenario developed for future conditions are moderate because future land use patterns may change.

Intake parameters used in the exposure assessment were derived from data in the literature, including federal EPA guidelines. Quantitative estimates of exposure were only developed for residential soil and potable well water from residential properties. Because considerable information is available with respect to reasonable assumptions for intake parameters, the related uncertainty is considered to be low for potential exposures to soil and groundwater.

Although the EPA default value for M_{sd} was used as input to the IEUBK model, the site-specific evaluation of M_{sd} presented in Section 3.5.2.1 could have been underestimated for some homes because XRF data for the drip zone soils were included in the yard wide average XRF concentration used in the analysis. A few of the residential properties evaluated have significantly elevated levels of lead in the drip zone which could have a significant impact on the M_{sd}. The M_{sd}s for these homes could have been underestimated because the drip zones (having the higher concentrations) were included in the analysis. Also, the inclusion of drip zone soils in the development of the EPC could result in an overestimate of exposure to lead. Children are not expected to regularly play within the drip zone of a house, where concentrations of lead could be higher than other locations on the residential yard. Although the potential for underestimation of the M_{sd} and overestimation of the EPC exists for some homes, the use of the drip zone data should generally not impact

the findings of this risk assessment because the concentrations in the drip zone for most homes are similar to that of the rest of the yard.

6.3 UNCERTAINTIES ASSOCIATED WITH TOXICITY ASSESSMENT

Uncertainty is inherent in the toxicity values used to characterize the carcinogenic and noncarcinogenic risks. Such uncertainty is chemical-specific and is incorporated into the toxicity values during their development. For example, uncertainty factors are applied when deriving human equivalent RfDs from animal data. A conservative model (which should over-estimate risk) is used in estimating dose-response for carcinogens at extremely low concentrations.

For a risk to exist, both significant exposure to the COPCs and toxicity at the predicted exposure levels must exist. The toxicological uncertainties primarily relate to the methodology by which carcinogenic and noncarcinogenic criteria (i.e., cancer slope factors and reference doses) are developed. In general, the methodology currently used to develop cancer slope factors and reference doses is very conservative, and likely results in overestimation of human toxicity. These and other factors are discussed in the subsections below.

(1) Reference Doses

In the development of RfDs for each chemical by exposure route, it is assumed that a threshold dose exists below which there is no potential for adverse health effects to the most sensitive individuals in the population. The RfD is typically derived from dose-response studies in animals in which a NOAEL or a LOAEL is determined by applying several uncertainty factors of 10 each. An additional modifying factor of up to 10 can be applied which accounts for a qualitative professional assessment of additional uncertainties in the available toxicity data. EPA recommended in a recent report that the total uncertainty factor not exceed 3,000 for an RfC and 10,000 for an RfD (EPA, 2002d). The RfDs are established to err on the side of protecting human health.

National Center for Environmental Assessment (NCEA) PPRTVs were used as the source for aluminum (chronic RfD and RfC), cobalt (chronic RfD and RfC), and iron (chronic RfD). The NCEA PPRTVs are considered Tier 2 toxicity values. These values are not IRIS-verified and are thus subject to revision. (This is particularly true in the case of cobalt

which is currently under IRIS review and may have different toxicity values derived in the future).

In addition, a number of toxicity values were obtained from Tier 3 sources (HEAST, ATSDR-MRLs and CalEPA values). These values are also not IRIS-verified and are thus subject to revision. There is a higher level of uncertainty associated with Tier 3 sources as opposed to sources considered Tier 1 and Tier 2 values.

(2) Cancer Slope Factors

US EPA's linear extrapolation approach assumes there is increased risk of cancer at all levels of exposure. This uncertainty implies that exposure to even a single molecule of a chemical may be associated with a finite risk, however small. The assumption is that even if relatively large doses of a chemical were required to cause cancer in laboratory animals (i.e., much higher than a person would ever likely be exposed to over a lifetime), these exposure doses can be linearly extrapolated downward many orders of magnitude to estimate slope factors. A significant uncertainty for the carcinogens is whether the cancer slope factors accurately reflect the carcinogenic potency of these chemicals at low exposure concentrations. The calculated slope factor is used to estimate an upperbound lifetime probability of an individual developing cancer as a result of exposure to a particular carcinogen level. Therefore, the cancer slope factors developed by EPA are generally conservative and represent the upperbound limit of the chemical's carcinogenic potency. The actual risk posed by each chemical is unknown but is likely to be lower than the calculated risk, and may even be as low as zero. There is more uncertainty concerning the carcinogenic potential of Group B and C carcinogens in humans, than with those compounds classified as Group A carcinogens.

(3) Metal Speciation

There are many uncertainties associated with toxicity values, especially those that are derived from studies in laboratory animals. One general uncertainty concerns toxicity values for metals. The form in which a metal occurs can greatly influence its toxicity potential. However, the metal speciation in onsite media is not known. Typically, the salts of metals are used for animal testing because these forms are most readily absorbed by the animals. Therefore, the toxicity values that are generated from these data represent the toxicity potential of the metals in their soluble forms. In characterizing risk, the assumption is made that the metals at the site are present in forms similar to those used in characterizing

the toxicity potentials of those substances. This uncertainty may specifically apply to manganese where it is well documented that the nature of the salt can significantly affect gastrointestinal absorption.

6.4 UNCERTAINTIES ASSOCIATED WITH THE RISK CHARACTERIZATION

Assumptions built into the risk assessment process tend to overestimate rather than underestimate risk. The summation of individual chemical risks to derive a total risk or hazard introduces moderate to high uncertainty. This practice may overestimate risks for many analytes; however, for those analytes that are synergistic (e.g., when exposure to two or more COPCs concurrently might induce a greater toxic effect than would be expected if the separate effects were added), risks may be underestimated because little is known about the effects of chemical mixtures.

The potential risks presented in this report need to be viewed in light of the information on uncertainty. Assumptions regarding exposure were selected to error on the side of overestimation to ensure a conservative (high) evaluation of risk. As a result of these conservative assumptions, the potential risk to some human receptors was likely overestimated and there is an overall moderate degree of uncertainty associated with the analysis.

7.0 RISK ASSESSMENT SUMMARY

The HHRA is an assessment of the potential for exposure and risk to humans from contaminants associated with the site. It describes the conceptual site model (CSM) for human exposure to site-related contaminants, identifies exposure pathways that could lead to contact with site-related contaminants, identifies which exposure pathways are believed to be most significant, and presents the exposure parameters and model inputs for use in quantifying exposure from each identified pathway. It also describes the approach for selecting COPCs in site media and the approaches for quantifying risks for lead and other COPCs.

7.1 CHEMICALS OF POTENTIAL CONCERN

COPCs are chemical which exist in the environment at concentration levels that might be of potential health concern to humans and which are or might be derived, at least in part, from site-related sources. Chemicals that are not likely to contribute significant risks to humans are eliminated, while chemicals that might be of potential concern are selected for detailed evaluation. This COPC selection procedure is intended to be conservative; that is, it is expected that some chemicals may be identified as COPCs that are actually of little or no concern, but that no chemicals of authentic concern will be overlooked.

In Step 1, a chemical may be eliminated from the quantitative risk assessment if it is detected only infrequently in a site medium. In the risk assessment for the Washington County Lead District Site, chemicals were excluded only if they were never detected in any site sample. A review of the analytical detection limits for the chemicals analyzed indicated that most detection limits were sufficiently low (detection limits were below the available screening levels). It is important to note that arsenic was an exception as it was reported as non-detect in all samples of the residential potable well water data set, but the detection limits were greater than the risk based screening level.

In Step 2, chemicals for which toxicity values are not available are eliminated. If a chemical does not have a toxicity value, this is identified as a source of uncertainty unless the chemical is a beneficial nutrient and the expected intake from the site is within the range that is considered healthful.

In Step 3, detected chemicals whose maximum value is below a level of concern are eliminated from further consideration. If a chemical is detected at least once, but the

maximum detected concentration is well below a level of health concern, that chemical is eliminated from further consideration. The screening step was performed using EPA Regional Screening Values (EPA 2008). Because there are no Regional Screening Values for either sediment or surface water, the values for residential soil and tapwater were used, respectively, to screen chemicals in these media. Target risk levels were set to a Hazard Quotient (HQ) value of 0.1 and a cancer risk level or 1E-06 (Black & Veatch, 2009).

The COPCs selected for the quantitative risk assessment of residential property soil and potable well water include aluminum, antimony, arsenic, barium, cadmium, cobalt, iron, lead, manganese vanadium and zinc. The COPCs selected for qualitative evaluation of surface water, sediment, mine waste, historical soil, historical groundwater and fish tissue include aluminum, arsenic, barium, cadmium, cobalt, iron, lead, manganese, and vanadium.

7.2 EXPOSURE ASSESSMENT

Exposure is the process by which human receptors come into contact with chemicals in the environment. In general, receptors can be exposed to chemicals in a variety of environmental media (e.g., soil, water, air, food), and these exposures can occur through several pathways (e.g., ingestion, dermal contact, inhalation). For the purposes of this HHRA, the Washington County Lead District Site is divided into three conceptual categories: Potosi, Richwoods and Old Mines areas. The Potosi Site encompasses an area of about 45 square miles in the eastern portion of Washington County, Missouri. It primarily includes mine waste and residential and commercial areas within and around the communities of Potosi, Cadet, Mineral Point, Springtown, Happy Hollow, Shibboleth, Summit, and other smaller communities. The Richwoods site encompasses an area of 45 square miles in the northeastern portion of Washington County, Missouri. It primarily includes mine waste areas, residential areas and commercial/industrial areas within and around the community of Richwoods. The Old Mines site includes an area greater than 90 square miles in the northeastern portion of Washington County, Missouri. It primarily consists of mine waste areas, as well as residential and commercial areas within and around the communities of Old Mines, Bellefontaine, Fertile, and other smaller communities. In addition, detailed exposure data was collected for 48 residential properties located throughout the Washington County Lead District Site.

An analysis of the COPCs in conjunction with the source area characteristics identified the potential constituent migration and exposure pathways. An exposure pathway screening was then conducted to identify those pathways to be included in the detailed analysis. The

selected exposure pathways for quantitative analysis at the Washington County Lead District site include:

- Current/Future Ingestion of COPCs in Residential Surface Soil by Residents at Residential Properties
- Current/Future Dermal Absorption of COPCs in Residential Surface Soil by Residents at Residential Properties
- Current/Future Ingestion of COPCs in Residential Potable well water by Residents at Residential Properties
- Current/Future Dermal Absorption of COPCs in Residential Potable well water by Residents at Residential Properties

The selected exposure pathways for qualitative analysis at the Washington County Lead District site include:

- Current/Future Ingestion and dermal absorption and inhalation of COPCs in Mine Waste Soil by Residents, Workers, Recreational Users and ATV Riders
- Current/Future Ingestion and dermal absorption of COPCs in Historical Soil by Residents, Workers, and Recreational Users
- Current/Future Ingestion of COPCs in Historical Groundwater by Residents and Workers
- Current/Future Ingestion and dermal absorption of COPCs in Surface Water and Sediment by Recreational Users
- Current/Future Ingestion of COPCs in Fish Tissue by Recreational Users

For every exposure pathway of potential concern, it is expected that there will be differences between different individuals in the level of exposure at a specific location due to differences in intake rates, body weights, exposure frequencies, and exposure durations. Thus, there is normally a wide range of average daily intakes between different members of an exposed population. Because of this, all daily intake calculations must specify what part of the range of doses is being estimated. Typically, attention is focused on intakes that are "average" or are otherwise near the central portion of the range, and on intakes that are near the upper end of the range (e.g., the 95th percentile). These two exposure estimates are referred to as CTE and RME, respectively. CTE exposures were evaluated for both lead and non-lead COPCs. RME exposures were only evaluated for non-lead COPCs.

7.3 TOXICITY ASSESSMENT

The toxicity assessment identifies the types of adverse health effects associated with exposure to a contaminant and how the appearance of these adverse health effects is related to the exposure level. Human health risk assessments typically characterize potential non-cancer and cancer health effects separately. This two-part approach is employed because there are typically major differences in the time-course of action and the shape of the dose-response curve for cancer and non-cancer effects.

Toxicity values are available for all of the COPCs selected for the Washington County Lead District Site with the exception of lead. Quantitative evaluation of lead toxicity is performed through the estimation of blood-lead (Pb-B) concentrations for receptors of concern. Pb-B concentrations are estimated for child exposures using the IEUBK Model for Lead, which estimates Pb-B concentrations in children.

7.4 RISK CHARACTERIZATION

Risk characterization integrates the exposure and toxicity assessments to quantify the risks or potential for adverse non-cancer and cancer health effects. This final step also discusses the uncertainties of each step of the risk assessment and their impact on the risk estimates.

For most chemicals, the potential for non-cancer effects is evaluated by comparing the estimated daily intake of the contaminant over a specific time period with a level not associated with adverse health effects for that contaminant. This comparison results in a non-cancer HQ, while a HI is calculated when an individual is exposed to more than one chemical or exposure pathway, such as eating and breathing a contaminant. If the HQ or HI for a contaminant(s) is equal to or less than 1.0 (1E+00), it is believed that there is no appreciable risk that non-cancer health effects will occur. If an HQ exceeds 1.0 (1E+00), there is some possibility that non-cancer effects may occur. This is because of the margin of safety inherent in the derivation of the HQ value. If the total HI exceeds 1.0, it may be appropriate to perform conduct a more detailed evaluation of the COPCs by critical effect. Separate HIs are calculated by type of effect (target organ-specific HI) because health effects from exposure to different chemicals are only additive if they have the same toxic effect (affect the same target organ system).

For contaminants that EPA considers potentially carcinogenic in humans, the risk assessment estimates the risk or probability that an individual will develop cancer over a lifetime as a result of exposure to site-related contaminants. For example, the cancer risk is

expressed as a probability of 1 in 10,000 in an individual or for every 10,000 people exposed to the contaminant, one extra or excess cancer case may occur beyond what would normally be expected from all other causes of cancer. The cancer risks are summed across all chemicals of concern and all exposure pathways that contribute to exposure of an individual in a given population. In general, EPA considers excess cancer risks that are below 1 in 1,000,000 or 1E-06 to be so small as to be negligible, and risks above 1 in 10,000 or 1E-04 to be sufficiently large that some sort of remediation is desirable. Excess cancer risks that range between 1 in 10,000 and 1 in 1,000,000 are generally considered to be acceptable, although this is evaluated on a case by case basis.

The risks or potential for adverse health effects for lead are evaluated using a different approach than for most other metals. Because lead is widespread in the environment, exposure can occur by many different pathways. Thus, lead risks are based on consideration of total exposure (all pathways) rather than just site-related exposure. In addition, because most studies of lead exposures and resultant health effects in humans have traditionally been described in terms of blood lead level (PbB, expressed in units of micrograms per deciliter or μg/dL), lead exposures and risks are typically assessed using mathematical models.

The risk assessment for the Washington County Lead District Site used EPA's IEUBK Model for Lead in Children to estimate the distribution of blood lead levels in a population of children exposed to lead at the site. EPA has established a health protection goal that there be no more than a 5% chance that an exposed individual (a child less than 7 years of age) will have a blood lead level that exceeds 10 μg/dL. For convenience, this probability is referred to as P10.

In summary, there are significant health risks to children at the Washington County Lead District Site. The exposure pathways, exposure points, and contaminants that have been identified as a concern to human receptors are presented in the following discussion.

7.4.1 Potosi Site

The qualitative risk evaluation associated with the Potosi area indicated that there is a potential for risks due to exposure to sediment, mine waste, historical soil and historical groundwater as summarized below:

Surface Water: No chemicals of concern (COCs) were identified for current and future exposures to Potosi surface water.

Sediment: Arsenic and lead were identified as COCs for current and future exposures to Potosi sediment.

Mine Waste Soil: Arsenic and lead were identified as COCs for current and future exposures to Potosi mine waste soils.

Historical Soil: Arsenic and lead were identified as COCs for current and future exposures to Potosi historical soil.

Historical Groundwater: Lead was identified as a COC for current and future exposures to Potosi historical groundwater.

7.4.2 Richwoods Site

The qualitative risk evaluation associated with the Richwoods area indicated that there is a potential for risks due to exposure to surface water, sediment, mine waste, historical soil and historical groundwater as summarized below:

Surface Water: Lead was identified as a COC for current and future exposures to Richwoods surface water.

Sediment: Arsenic and lead were identified as COCs for current and future exposures to Richwoods sediment.

Mine Waste Soil: Arsenic and lead were identified as chemicals of concern (COCs) for future exposures to Richwoods mine waste soil.

Historical Soil: Arsenic and lead were identified as COCs for current and future exposures to Richwoods historical soil.

Historical Groundwater: Lead was identified as a COC for current and future exposures to Richwoods historical groundwater.

7.4.3 Old Mines Site

The qualitative risk evaluation associated with the Old Mines area indicated that there is a potential for risks due to exposure to surface water, sediment, mine waste, historical soil and historical groundwater as summarized below:

Surface Water: Barium and lead were identified as COCs for current and future exposures to Old Mines surface water.

Sediment: Arsenic and lead were identified as COCs for current and future exposures to Old Mines sediment.

Mine Waste Soil: Arsenic and lead were identified as chemicals of concern (COCs) for future exposures to Old Mines mine waste soil.

Historical Soil: Arsenic and lead were identified as COCs for current and future exposures to Old Mines historical soil.

Historical Groundwater: Arsenic, cadmium and lead were identified as COCs for current and future exposures to Old Mines historical groundwater.

7.4.4 Residential Properties

Cobalt and lead were identified as chemicals of concern (COCs) for current and future residential exposures to the residential properties evaluated in the quantitative risk assessment. Cobalt was identified as a COC for non-cancer potential effects associated with concentrations in soil at only 1 of the 48 residential properties evaluated. Lead was identified as a COC for in soil and groundwater at 32 of the 48 residential properties that were evaluated.

To determine an acceptable soil concentration for lead, the IEUBK model was run in the "Find Soil Concentration" mode. Using default values for M_{sd} (0.7) and drinking water concentration (4 ug/L) as well as a site-specific absolute bioavailability of 26.95%, a preliminary risk-based remediation goal (PRG) of 466 mg/kg was calculated by the IEUBK model. This concentration of lead corresponds to the acceptable P10 value (no more than a 5% probability that an exposed child is estimated to have a blood lead level that exceeds 10 ug/dL).

The calculated PRG of 466 mg/kg is applicable to the fine fraction measured by the ICP. Additional adjustment would be required for evaluating bulk XRF and fine XRF data.

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Tables

Table 2-1
Chemicals of Potential Concern for Quantitative Risk Assessment
Washington County Lead District RI/FS

	Exposure Point	
Chemical of Potential Concern	**Soil (Residential Properties)**	**Potable Well Water (Residential Properties)**
Aluminum	X	
Antimony	X	
Arsenic	X	X
Barium	X	X
Cadmium	X	X
Cobalt	X	
Iron	X	
Lead	X	X
Manganese	X	
Vanadium	X	
Zinc	X	

Note: Arsenic retained as a COPC in potable well water based on inadequate detection limits.

Table 2-2
Chemicals of Potential Concern for Qualitative Risk Assessment
Washington County Lead District RI/FS

	Exposure Point															
Chemical of Potential Concern	**Surface Water Potosi**	**Surface Water Richwoods**	**Surface Water Old Mines**	**Sediment Potosi**	**Sediment Richwoods**	**Sediment Old Mines**	**Soil (Mines Waste) Potosi**	**Soil (Mines Waste) Richwoods**	**Soil (Mines Waste) Old Mines**	**Soil (Area Wide) Potosi**	**Soil (Area Wide) Richwoods**	**Soil (Area Wide) Old Mines**	**Groundwater (Area Wide) Potosi**	**Groundwater (Area Wide) Richwoods**	**Groundwater (Area Wide) Old Mines**	**Fish Tissue (Fillets)**
Aluminum				X												
Arsenic	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Barium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Cadmium				X		X			X	X	X	X	X	X	X	
Cobalt				X												
Iron				X												
Lead		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Manganese	X			X												
Vanadium				X												

Table 3-1
Physical/Chemical Properties of COPCs
Washington County Lead District RI/FS

COPC	Atomic Weight (g/mole)	Boiling Point (°C)	Melting Point (°C)	Water Solubility (mg/L)	Soil/Water Partition Coefficient (K_d, L/kg)
Aluminum	27	2327	660	CS	1500
Antimony	122	1750	631	CS	45
Arsenic	75	613	817	CS	200
Barium	137	1640	725	CS	60
Cadmium	112	765	321	CS	6.5
Cobalt	59	2870	1495	CS	45
Iron	56	2750	1535	CS	25
Lead	207	1740	328	CS	900
Manganese	55	1962	1244	CS	65
Vanadium	51	3380	1890	CS	1000
Zinc	65	907	420	CS	40

Notes:
CS = Compound Specific. Water solubility depends on specific compound present.
g/mole = grams per mole
mg/L = milligrams per liter
L/kg = liters per kilogram

Source:
RAIS, 2009
Baes, et al. 1984

Table 3-2
Fraction of Indoor Dust from Outdoor Soil
Washington County Lead District RI/FS

ASR #	Sample #	Mean XRF(fine-fraction) Pb ppm (mg/kg)	Adjusted [1] XRF Pb ppm (mg/kg)	Vacuum Dust Pb ppm (mg/kg)	M_{sd}
3902	101	35.8	76	64.9	0.854
3902	103	438.3	434	53.5	0.123
3902	104	3793.6	3415	79.1	0.023
3902	105	152.8	180	138	0.767
3902	106	417.6	415	94.6	0.228
3902	107	663.2	633	336	0.530
3902	108	1510.4	1386	58.5	0.042
3902	109	4735.6	4252	581	0.137
3902	110	894.6	839	419	0.499
3902	111	675.4	644	13.2	0.020
3902	112	260.7	276	64.7	0.235
3902	113	497	486	113	0.233
3902	114	1423.3	1309	578	0.442
3902	115	751.2	712	51	0.072
3902	116	295.1	306	40	0.131
3902	117	812.4	766	107	0.140
3902	118	9608.7	8582	126	0.015
3902	119	369	372	105	0.282
3902	120	356.3	361	25.2	0.070
3902	121	405.5	404	2.4	0.006
3902	122	428.5	425	15	0.035
3902	123	230.5	249	64	0.257
3902	124	160.3	187	82.5	0.442
3902	125	1121.3	1041	356	0.342
3902	126	759.8	719	276	0.384
3902	127	920.5	862	13.8	0.016
3902	128	979.3	914	65.2	0.071
3902	129	977.6	913	334	0.366
3902	130	670.8	640	230	0.359
3902	131	1217.8	1126	20.4	0.018
3902	132	1155.3	1071	125	0.117
3902	133	493	482	22.6	0.047
3902	134	1222.1	1130	25.1	0.022
3902	135	721.8	686	113	0.165
3902	136	898.3	842	78.2	0.093
3902	137	887.3	833	110	0.132
3902	138	994.6	928	51.6	0.056
3902	139	730.3	693	80.2	0.116
3902	140	447.4	442	152	0.344
3902	141	510.6	498	179	0.360
3902	142	909	852	21	0.025
3902	143	992.6	926	9.7	0.010
3902	145	227.2	246	134	0.545
3902	146	880	826	24.8	0.030
3902	147	654.7	626	159	0.254
3902	148	689.2	657	36	0.055
3902	149	964.8	901	23.3	0.026
3902	150	425	422	20.7	0.049
	Minimum	35.8	76	2.4	0.006
	Maximum	9608.7	8582	581	0.854
	Mean M_{sd}				0.128
	Median M_{sd}				0.127

[1] Adjusted XRF Pb = (0.8886 x XRF-fine fraction) + 44.142

Table 3-3
In Vitro Bioaccessibility and Estimated Relative Bioavailability of Lead in Residential Soil Samples
Washington County Lead District RI/FS

ASR #	Sample #	XRF Pb Concentration (mg/kg)	IVBA (%)	RBA (%)
3902	601	5089	76.8	67.4
3902	602	507	53.8	47.2
3902	603	5151	84.1	73.8
3902	604	2367	74.9	65.7
3902	605	1291	60.4	53.0
3902	606	1136	64.9	57.0
3902	607	606	51.8	45.5
3902	608	528	62.5	54.8
3902	609	676	57.5	50.5
3902	610	893	50.8	44.6
3902	611	1349	45.5	39.9
3902	612	1272	71.2	62.5
3902	613	1566	57.4	50.4
3902	614	481	57.0	50.0
3902	615	637	52.6	46.2
minimum		481	45.5	39.9
maximum		5151	84.1	73.8
average		1570	61.4	53.9

IVBA = *In vitro* bioaccessibility
RBA = Relative bioavailability (*In vivo*)
RBA = 0.878*[IVBA] - 0.028

Table 3-4
IEUBK Model Inputs
Washington County Lead District RI/FS

Parameter	Value
C_{soil} = Soil Concentration (mg/kg)	Property Specific [1]
Dust Concentration (mg/kg)	model default (M_{sd} =0.7)
Air Concentration (ug/m^3)	0.10
Indoor Air Concentration	30% of outdoor
Drinking Water Concentration (ug/L)	Area or Property Specific [1]
Absorption Fractions	
Air	32%
Diet	50%
Water	50%
Soil/Dust (residential soils)	26.95%
Fraction soil	45%
GSD	1.6

Age Dependent Model Inputs

Age	Air		Diet	Water	Soil
	Time Outdoors (hrs)	Ventilation Rate (m^3/day)	Dietary Intake (ug/day)	Intake (L/day)	Intake (mg/day)
0-1	1.0	2.0	2.26	0.20	85
1-2	2.0	3.0	1.96	0.50	135
2-3	3.0	5.0	2.13	0.52	135
3-4	4.0	5.0	2.04	0.53	135
4-5	4.0	5.0	1.95	0.55	100
5-6	4.0	7.0	2.05	0.58	90
6-7	4.0	7.0	2.22	0.59	85

[1] Based on measured soil or groundwater concentration for residential property. If no measured groundwater data was available, the model default of 4 ug/L was used.

Table 5-1
Summary of Human Health Risk Characterization
Residential Properties
Washington County Lead District RI/FS

Residential Property	Receptor	Cancer Risk			Hazard Index	
		RME	CT		RME	CT
8	Adult	NC	NC		3E-01	1E-01
	Child	NC	NC		7E-01	2E-01
	Lifetime	NC	NC		NC	NC
69	Adult	NC	NC		5E-01	2E-01
	Child	NC	NC		1E+00	3E-01
	Lifetime	NC	NC		NC	NC
438	Adult	7.9E-06	7.4E-07		5E-01	2E-01
	Child	1.8E-05	2.0E-06		3E+00	9E-01
	Lifetime	2.6E-05	2.7E-06		NC	NC
486	Adult	6.5E-06	6.2E-07		3E-01	8E-02
	Child	1.5E-05	1.6E-06		3E+00	8E-01
	Lifetime	2.1E-05	2.3E-06		NC	NC
1612	Adult	1.2E-06	6.0E-07		5E-01	2E-01
	Child	2.6E-05	1.6E-06		7E-01	8E-01
	Lifetime	2.7E-05	2.2E-06		NC	NC
1643	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
1653	Adult	NC	NC		3E-01	2E-01
	Child	NC	NC		9E-01	2E-01
	Lifetime	NC	NC		NC	NC
5003	Adult	5.9E-06	5.6E-07		2E-01	6E-02
	Child	1.3E-05	1.5E-06		2E+00	6E-01
	Lifetime	1.9E-05	2.0E-06		NC	NC
5007	Adult	8.8E-06	8.3E-07		5E-01	2E-01
	Child	2.0E-05	2.2E-06		3E+00	1E+00
	Lifetime	2.9E-05	3.0E-06		NC	NC
5008	Adult	4.5E-06	4.2E-07		3E-01	1E-01
	Child	1.0E-05	1.1E-06		2E+00	6E-01
	Lifetime	1.5E-05	1.6E-06		NC	NC
5012	Adult	NC	NC		2E-01	7E-02
	Child	NC	NC		2E+00	6E-01
	Lifetime	NC	NC		NC	NC
5013	Adult	9.8E-06	9.2E-07		3E-01	1E-01
	Child	2.2E-05	2.5E-06		3E+00	9E-01
	Lifetime	3.2E-05	3.4E-06		NC	NC
5014	Adult	NC	NC		3E-02	1E-02
	Child	NC	NC		6E-02	2E-02
	Lifetime	NC	NC		NC	NC

Table 5-1
Summary of Human Health Risk Characterization
Residential Properties
Washington County Lead District RI/FS

Residential Property	Receptor	Cancer Risk			Hazard Index	
		RME	CT		RME	CT
20008	Adult	NC	NC		3E-01	1E-01
	Child	NC	NC		8E-01	2E-01
	Lifetime	NC	NC		NC	NC
20027	Adult	NC	NC		3E-01	2E-01
	Child	NC	NC		8E-01	2E-01
	Lifetime	NC	NC		NC	NC
20028	Adult	NC	NC		2E-01	6E-02
	Child	NC	NC		2E+00	5E-01
	Lifetime	NC	NC		NC	NC
20070	Adult	7.2E-06	6.8E-07		2E-01	5E-02
	Child	1.6E-05	1.8E-06		2E+00	5E-01
	Lifetime	2.3E-05	2.5E-06		NC	NC
20108	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
20171	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
20173	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
20187	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
20331	Adult	9.0E-06	8.5E-07		3E-01	9E-02
	Child	8.5E-07	2.3E-06		3E+00	9E-01
	Lifetime	9.8E-06	3.1E-06		NC	NC
20349	Adult	1.2E-05	2.2E-06		2E-01	8E-02
	Child	2.7E-05	3.0E-06		2E+00	7E-01
	Lifetime	3.9E-05	5.2E-06		NC	NC
20397	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
20428	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC

Table 5-1
Summary of Human Health Risk Characterization
Residential Properties
Washington County Lead District RI/FS

Residential Property	Receptor	Cancer Risk			Hazard Index	
		RME	CT		RME	CT
20437	Adult	NC	NC		4E-01	2E-01
	Child	NC	NC		1E+00	3E-01
	Lifetime	NC	NC		NC	NC
20758	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
20767	Adult	NC	NC		9E-02	4E-02
	Child	NC	NC		2E-01	6E-02
	Lifetime	NC	NC		NC	NC
20918	Adult	9.1E-06	8.6E-07		3E-01	9E-02
	Child	2.0E-05	2.3E-06		3E+00	8E-01
	Lifetime	3.0E-05	3.1E-06		NC	NC
23264	Adult	NC	NC		2E-01	9E-02
	Child	NC	NC		5E-01	1E-01
	Lifetime	NC	NC		NC	NC
23378	Adult	4.7E-06	4.5E-07		6E-01	2E-01
	Child	1.1E-05	1.2E-06		4E+00	1E+00
	Lifetime	1.5E-05	1.6E-06		NC	NC
23575	Adult	NC	NC		3E-02	2E-02
	Child	NC	NC		9E-02	2E-02
	Lifetime	NC	NC		NC	NC
30079	Adult	4.5E-06	4.2E-07		5E-01	2E-01
	Child	1.0E-05	1.1E-06		2E+00	7E-01
	Lifetime	1.5E-05	1.6E-06		NC	NC
30126	Adult	4.7E-06	4.4E-07		2E-01	6E-02
	Child	1.1E-05	1.2E-06		2E+00	6E-01
	Lifetime	1.5E-05	1.6E-06		NC	NC
30172	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
30177	Adult	7.4E-06	7.0E-07		2E-01	7E-02
	Child	1.7E-05	1.9E-06		2E+00	7E-01
	Lifetime	2.4E-05	2.6E-06		NC	NC
30182	Adult	NC	NC		6E-01	2E-01
	Child	NC	NC		3E+00	8E-01
	Lifetime	NC	NC		NC	NC

Table 5-1
Summary of Human Health Risk Characterization
Residential Properties
Washington County Lead District RI/FS

Residential Property	Receptor	Cancer Risk			Hazard Index	
		RME	CT		RME	CT
30271	Adult	NC	NC		2E-01	6E-02
	Child	NC	NC		2E+00	5E-01
	Lifetime	NC	NC		NC	NC
30364	Adult	9.6E-06	9.1E-07		3E-01	9E-02
	Child	2.2E-05	2.4E-06		2E+00	8E-01
	Lifetime	3.1E-05	3.3E-06		NC	NC
30417	Adult	5.1E-06	4.8E-07		3E-01	8E-02
	Child	1.2E-05	1.3E-06		2E+00	8E-01
	Lifetime	1.7E-05	1.8E-06		NC	NC
30448	Adult	NC	NC		3E-01	1E-01
	Child	NC	NC		7E-01	2E-01
	Lifetime	NC	NC		NC	NC
30553	Adult	8.9E-06	8.4E-07		4E-01	2E-01
	Child	2.0E-05	2.2E-06		3E+00	9E-01
	Lifetime	2.9E-05	3.1E-06		NC	NC
30577	Adult	NC	NC		NC	NC
	Child	NC	NC		NC	NC
	Lifetime	NC	NC		NC	NC
30651	Adult	1.4E-05	1.3E-06		3E-01	9E-02
	Child	3.1E-05	3.4E-06		3E+00	8E-01
	Lifetime	4.4E-05	4.7E-06		NC	NC
30911	Adult	2.0E-05	1.9E-06		4E-01	1E-01
	Child	4.5E-05	5.0E-06		3E+00	1E+00
	Lifetime	6.4E-05	6.8E-06		NC	NC
30914	Adult	7.3E-06	6.9E-07		5E-01	2E-01
	Child	1.7E-05	1.8E-06		3E+00	8E-01
	Lifetime	2.4E-05	2.5E-06		NC	NC
30965	Adult	NC	NC		6E-02	3E-02
	Child	NC	NC		2E-01	4E-02
	Lifetime	NC	NC		NC	NC
31016	Adult	NC	NC		5E-01	2E-01
	Child	NC	NC		2E+00	6E-01
	Lifetime	NC	NC		NC	NC

Notes:

CT = central tendency

RME = reasonable maximum exposure

NC = not calculated. For cancer risk, no carcinogenic COPCs were detected. For Noncancer hazards, lead was only COPC or lifetime hazards are not calculated.

Table 5-2
IEUBK Lead Model Results for
Residential Properties
Washington County Lead District RI/FS

Residential Property	Geometric Mean Blood Lead Level (ug/dL)	$P10_{child}$ (%) Lead	Total Lead Uptake (ug)	Uptake from Soil/Dust (ug) (Percent of Total)	Uptake from Diet (ug) (Percent of Total)	Uptake from Drinking Water (ug) (Percent of Total)	Uptake from Air (ug) (Percent of Total)
8	19.6	92.3	67.3	66.4 98.60%	0.7 0.97%	0.2 0.30%	0.1 0.10%
69	4.6	4.8	14.8	11.7 78.90%	0.9 6.28%	2.1 14.37%	0.1 0.45%
438	4.1	2.8	13.2	12.1 91.45%	0.9 7.12%	0.1 0.93%	0.1 0.51%
486	7.7	28.9	25.5	23.7 92.83%	0.9 3.38%	0.9 3.52%	0.1 0.26%
1612	2.7	0.2	8.5	7.4 86.39%	1.0 11.35%	0.1 0.79%	0.1 1.48%
1643	2.9	0.4	9.3	7.2 78.10%	1.0 10.38%	1.0 10.79%	0.1 0.72%
1653	7.4	26.3	24.2	16.9 69.88%	0.9 3.61%	6.3 26.24%	0.1 0.28%
5003	34.4	99.6	121.4	120.4 99.16%	0.5 0.39%	0.5 0.40%	0.1 0.06%
5007	5.7	11.6	18.7	17.2 92.05%	0.9 4.83%	0.5 2.76%	0.1 0.36%
5008	5.8	12.4	19.1	17.4 91.11%	0.9 4.73%	0.7 3.81%	0.1 0.35%
5012	7.8	29.7	25.8	24.0 92.93%	0.9 3.34%	0.9 3.47%	0.1 0.26%
5013	4.7	5.6	15.4	13.5 87.33%	0.9 6.00%	1.0 6.24%	0.1 0.43%
5014	5.5	10.4	18.2	17.1 94.00%	0.9 4.99%	0.1 0.65%	0.1 0.37%
20008	7.9	30.6	26.0	21.7 83.58%	0.9 3.32%	3.3 12.85%	0.1 0.26%
20027	6.1	14.9	20.2	19.2 94.67%	0.9 4.42%	0.1 0.57%	0.1 0.33%
20028	3.8	2.0	12.3	10.3 83.84%	0.9 7.66%	1.0 7.96%	0.1 0.54%
20070	2.4	0.1	7.7	5.6 73.24%	1.0 12.70%	1.0 13.20%	0.1 0.88%
20108	7.1	23.5	23.6	21.7 92.14%	0.9 3.72%	0.9 3.86%	0.1 0.42%
20171	6.0	13.7	19.7	17.8 90.34%	0.9 4.57%	0.9 4.75%	0.1 0.51%

Table 5-2
IEUBK Lead Model Results for
Residential Properties
Washington County Lead District RI/FS

Residential Property	Geometric Mean Blood Lead Level (ug/dL)	$P10_{child}$ (%) Lead	Total Lead Uptake (ug)	Uptake from Soil/Dust (ug) (Percent of Total)	Uptake from Diet (ug) (Percent of Total)	Uptake from Drinking Water (ug) (Percent of Total)	Uptake from Air (ug) (Percent of Total)
20173	7.6	28.1	25.2	23.4 92.74%	0.9 3.43%	0.9 3.57%	0.1 0.40%
20187	4.3	3.6	13.9	11.9 85.81%	0.9 6.73%	1.0 6.98%	0.1 0.72%
20331	9.0	41.2	30.1	28.3 94.09%	0.8 2.79%	0.9 2.90%	0.1 0.33%
20349	9.0	41.4	29.3	27.6 94.05%	0.9 2.90%	0.8 2.83%	0.1 0.21%
20397	7.3	25.1	24.2	22.3 92.36%	0.9 3.61%	0.9 3.75%	0.1 0.41%
20428	7.2	24.0	23.7	21.9 92.20%	0.9 3.69%	0.9 3.83%	0.1 0.28%
20437	10.7	55.4	35.8	33.5 93.57%	0.8 2.26%	1.4 3.98%	0.1 0.19%
20758	1.5	0.00	4.5	2.4 53.86%	1.0 21.91%	1.0 22.77%	0.1 1.48%
20767	4.5	4.6	14.7	13.6 92.43%	0.9 6.30%	0.1 0.82%	0.1 0.45%
20918	10.1	50.7	33.8	32.0 94.87%	0.8 2.42%	0.9 2.52%	0.1 0.20%
23264	4.5	4.4	14.6	12.2 83.72%	0.9 6.38%	1.4 9.44%	0.1 0.46%
23378	22.5	95.8	77.8	77.0 99.03%	0.6 0.78%	0.1 0.10%	0.1 0.09%
23575	3.0	0.5	9.4	5.3 57.03%	1.0 10.26%	3.0 31.99%	0.1 0.72%
30079	3.0	0.5	9.4	8.1 85.68%	1.0 10.18%	0.3 3.44%	0.1 0.71%
30126	4.4	4.2	14.4	12.4 86.36%	0.9 6.47%	1.0 6.72%	0.1 0.47%
30172	6.2	15.7	20.5	18.6 90.79%	0.9 4.36%	0.9 4.53%	0.1 0.33%
30177	6.2	15.3	20.3	18.5 90.70%	0.9 4.40%	0.9 4.57%	0.1 0.33%
30182	4.3	3.8	14.0	11.4 81.30%	0.9 6.65%	1.6 11.58%	0.1 0.48%
30271	7.8	29.6	25.8	24.0 92.92%	0.9 3.35%	0.9 3.48%	0.1 0.26%

Table 5-2
IEUBK Lead Model Results for
Residential Properties
Washington County Lead District RI/FS

Residential Property	Geometric Mean Blood Lead Level (ug/dL)	$P10_{child}$ (%) Lead	Total Lead Uptake (ug)	Uptake from Soil/Dust (ug) (Percent of Total)	Uptake from Diet (ug) (Percent of Total)	Uptake from Drinking Water (ug) (Percent of Total)	Uptake from Air (ug) (Percent of Total)
30364	7.2	24.5	23.9	22.1 92.27%	0.9 3.65%	0.9 3.79%	0.1 0.28%
30417	8.7	38.1	28.9	27.1 93.81%	0.8 2.92%	0.9 3.04%	0.1 0.23%
30448	7.7	28.8	25.2	19.9 78.93%	0.9 3.43%	4.4 17.38%	0.1 0.27%
30553	6.2	15.3	20.4	19.3 94.72%	0.9 4.38%	0.1 0.57%	0.1 0.33%
30577	4.9	6.2	15.8	13.9 87.68%	0.9 5.83%	1.0 6.06%	0.1 0.42%
30651	7.7	28.8	25.5	23.7 92.83%	0.9 3.39%	0.9 3.52%	0.1 0.26%
30911	7.4	25.7	24.4	22.5 92.44%	0.9 3.57%	0.9 3.71%	0.1 0.27%
30914	9.0	40.9	29.8	26.2 87.88%	0.8 2.82%	2.7 9.08%	0.1 0.22%
30965	3.1	0.7	10.1	8.9 88.59%	1.0 9.51%	0.1 1.23%	0.1 0.67%
31016	4.5	4.6	14.6	10.5 71.95%	0.9 6.38%	3.1 21.22%	0.1 0.46%

Notes:

Table 5-3 Qualitative Evaluation of Surface Water Data
Washington County Lead District

Area/COPC	Exposure Concentrations Min ug/L	Exposure Concentrations Max ug/L	RSL ug/L	MCL ug/L
Potosi				
Arsenic	1	1.1	0.045	10
Barium	259	1190	7300	200
Manganese	1.2	92	880	50
Richwoods				
Arsenic	1.08	3.33	0.045	10
Barium	627	5380	7300	200
Lead	1.01	35	NA	15 *
Old Mines				
Arsenic	1.03	4.87	0.045	10
Barium	338	9290	7300	200
Lead	1.09	540	NA	15 *

* Value is the Drinking Water Action Level

Table 5-4 Qualitative Evaluation of Sediment Data
Washington County Lead District

Area/COPC	Exposure Concentrations Min mg/kg	Exposure Concentrations Max mg/kg	Residential RSL mg/kg	Industrial RSL mg/kg
Potosi				
Aluminum	744	29800	77000	990000
Arsenic	6.3	26.5	0.39	1.6
Barium	35.7	6910	15000	190000
Cadmium	1.1	12.7	70	800
Cobalt	1.5	15.5	23	300
Iron	7480	52500	55000	720000
Lead	37.5	4040	400	800
Manganese	83.9	1470	1800	23000
Vanadium	19.6	117	390	5200
Richwoods				
Arsenic	2.95	23.5	0.39	1.6
Barium	526	8100	15000	190000
Lead	22.1	1620	400	800
Old Mines				
Arsenic	5.11	18	0.39	1.6
Barium	97.3	5480	15000	190000
Cadmium	1.26	11.6	70	800
Lead	33.8	1620	400	800

Table 5-5 Qualitative Evaluation of Mine Waste Data
Washington County Lead District

Area/COPC	Exposure Concentrations Min mg/kg	Exposure Concentrations Max mg/kg	Residential RSL mg/kg	Industrial RSL mg/kg
Potosi				
Arsenic	54.9	54.9	0.39	1.6
Barium	3850	3850	15000	190000
Lead (XRF data)	26	31047	400	800
Richwoods				
Arsenic	7.87	25.2	0.39	1.6
Barium	829	6970	15000	190000
Lead (XRF data)	220	4406	400	800
Old Mines				
Arsenic	4.14	25.2	0.39	1.6
Barium	1040	6590	15000	190000
Cadmium	1.99	11.4	70	800
Lead (XRF data)	234	3343	400	800

Table 5-6 Qualitative Evaluation of Historical Soil Data
Washington County Lead District

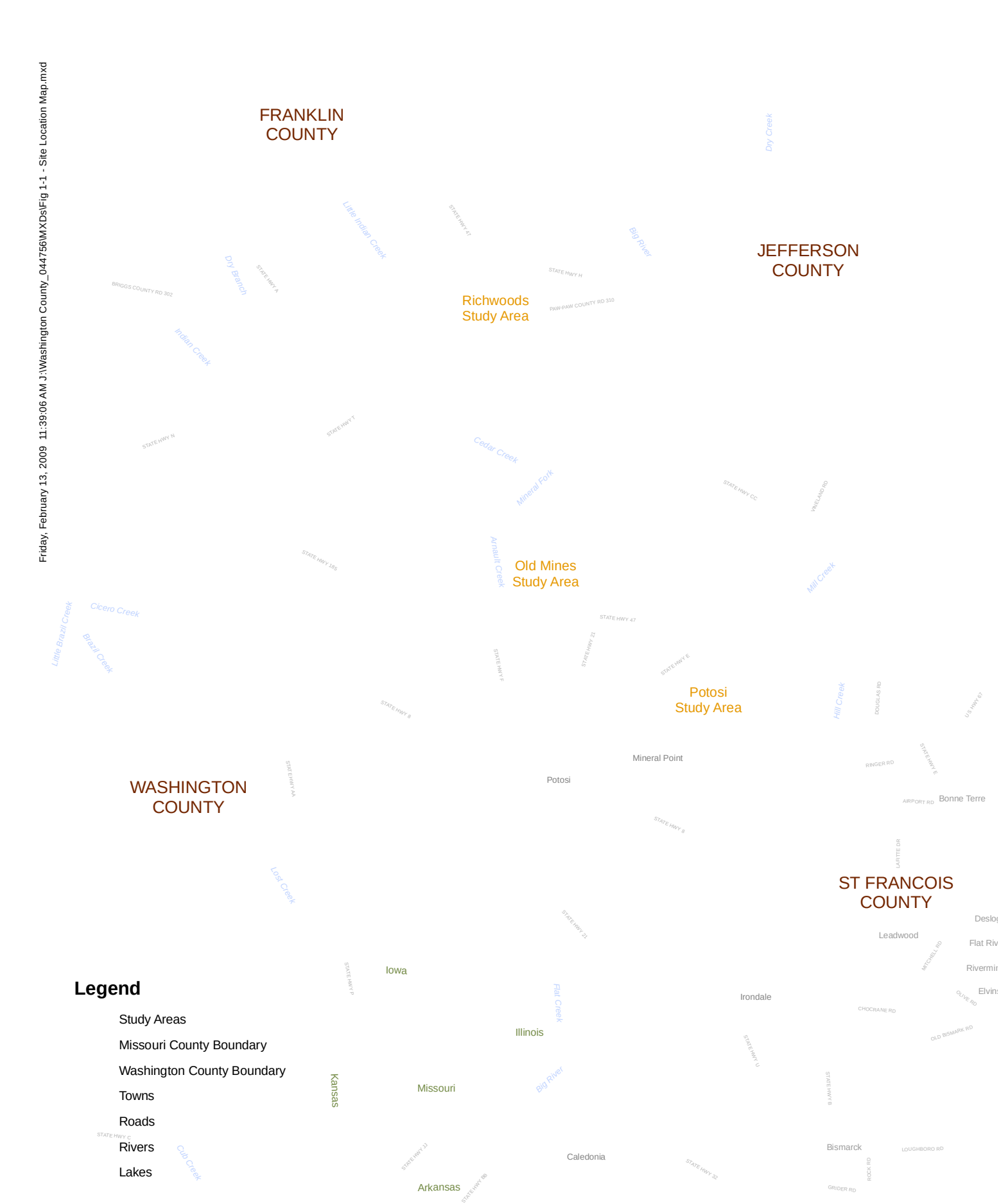
Area/COPC	Exposure Concentrations Min mg/kg	Exposure Concentrations Max mg/kg	Residential RSL mg/kg	Industrial RSL mg/kg
Potosi				
Arsenic	2.72	313	0.39	1.6
Barium	29	11000	15000	190000
Cadmium	0.517	66.6	70	800
Lead (XRF data)	5.34	45900	400	800
Richwoods				
Arsenic	1.88	25.2	0.39	1.6
Barium	196	10300	15000	190000
Cadmium	0.52	11.4	70	800
Lead (XRF data)	2.97	6770	400	800
Old Mines				
Arsenic	0.936	64.2	0.39	1.6
Barium	92.5	10900	15000	190000
Cadmium	0.533	27.4	70	800
Lead (XRF data)	3.6	53100	400	800

Table 5-7 Qualitative Evaluation of Historical Groundwater Data
Washington County Lead District

Area/COPC	Exposure Concentrations Min ug/L	Exposure Concentrations Max ug/L	RSL ug/L	MCL ug/L
Potosi				
Arsenic	1	4.69	0.045	10
Barium	1	2220	7300	200
Cadmium	1	8.11	18	5
Lead	1	808	NA	15 *
Richwoods				
Arsenic	1.1	3.04	0.045	10
Barium	17.6	3410	7300	200
Cadmium	1	3.36	18	5
Lead	1	278	NA	15 *
Old Mines				
Arsenic	1	87.2	0.045	10
Barium	10.2	4030	7300	200
Cadmium	1	31.5	18	5
Lead	1	450	NA	15 *

* Value is the Drinking Water Action Level

Figures



Site Location Map
Washington County Lead District
Washington County, MO

Figure 1-1

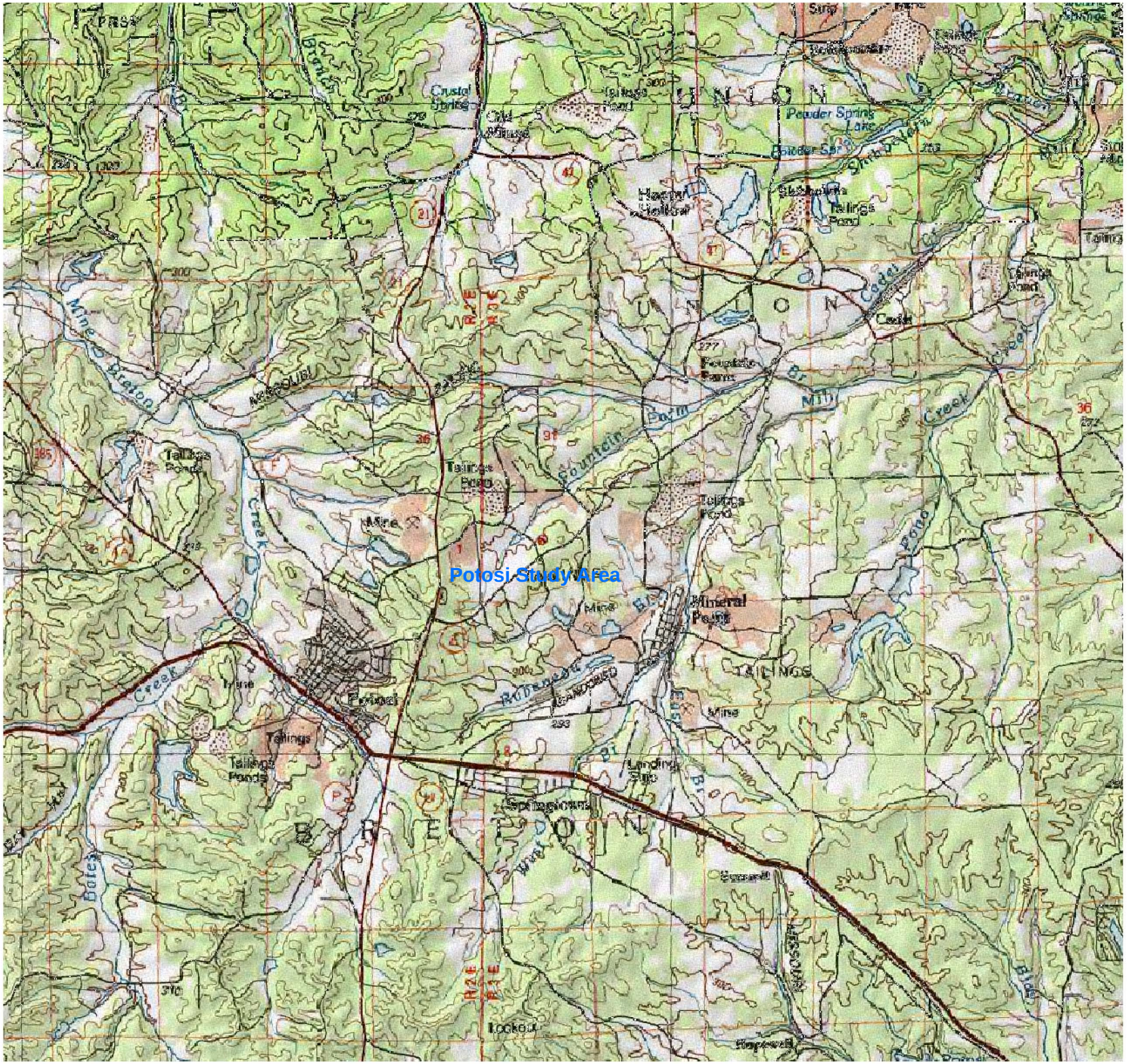


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Figure 1-2
Potosi Site Study Area Map
Washington County Lead District
Washington County, MO

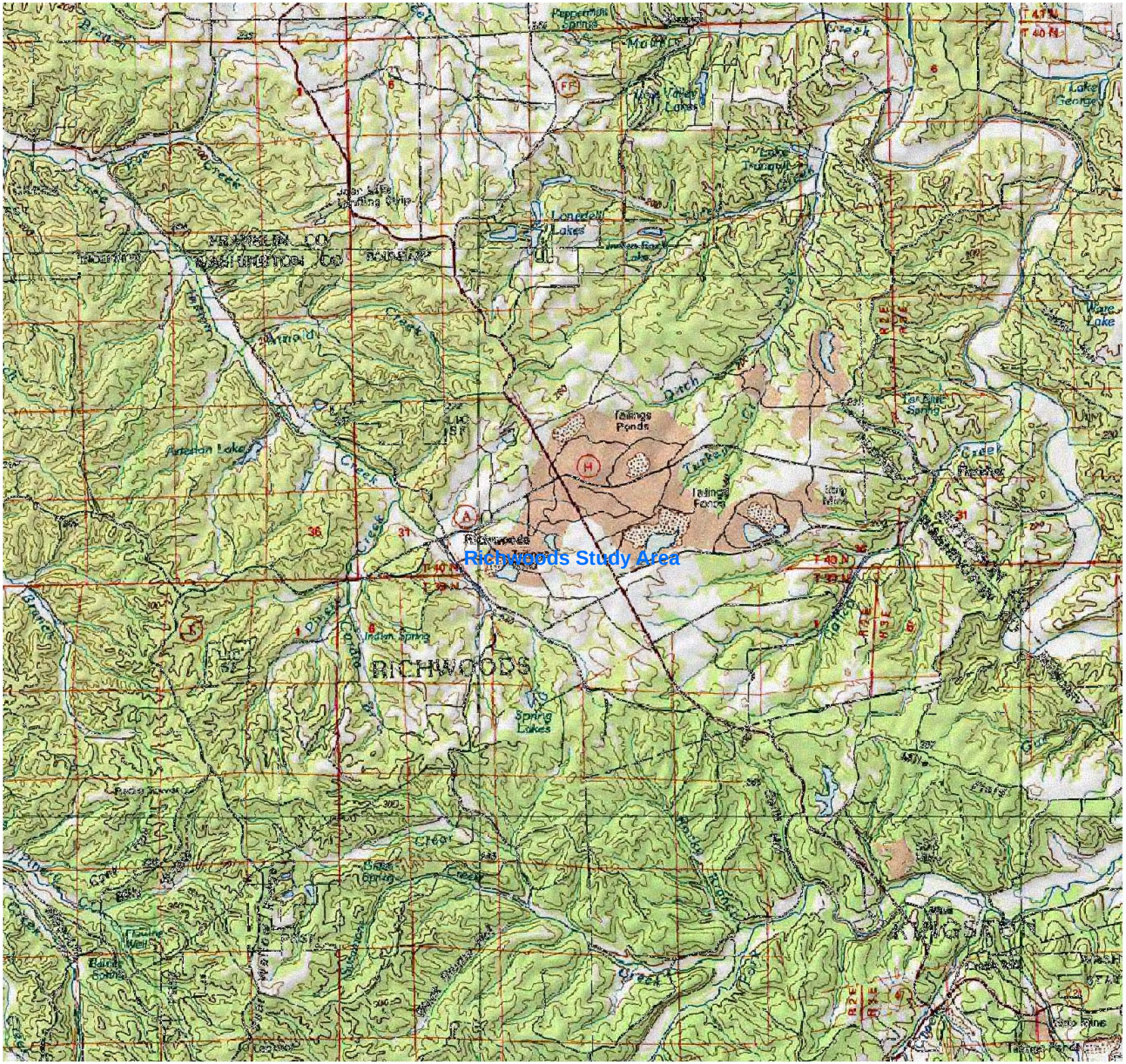

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Figure 1-3
Richwoods Site Study Area Map
Washington County Lead District
Washington County, MO

NAD 1983, UTM, 15N

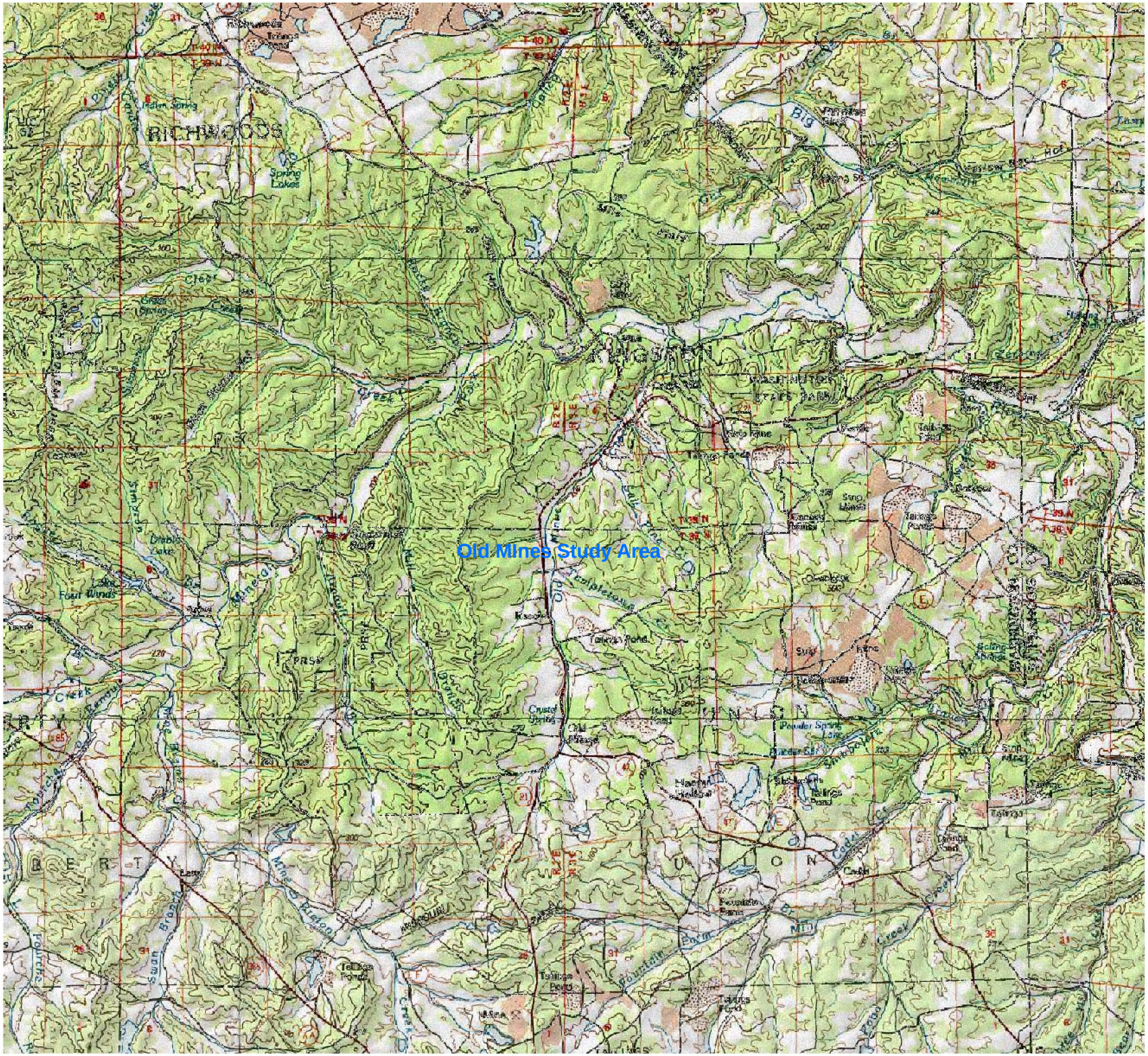

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Figure 1-4
Old Mines Site Study Area Map
Washington County Lead District
Washington County, MO

Tuesday, February 24, 2009 2:11:50 PM J:\Washington County_044756\MXDs\Fig 2-17 SD & SW Samples_area wide.mxd

WSS-4
SW/SED-5
SW/SED-4
WSW/WSS-3
WSS-5
WSW/WSS-2
WSW/WSS-1
WSS-6
SW/SED-6
WSW/WSS-8
SW/SED-0
SW/SED-1
WSS-7
SW/SED-2
SW/SED-3
Richwoods Study Area
JEFFERSON COUNTY
Private Dr
State Hwy H
Wolf Road
State Hwy 47
Valet Rd
Little Indian Creek
Carp Lake Rd
Dry Creek
Big River
Mineral Fork
Cedar Creek
104
SW-24
SW/SED-25
SW/SED-26
SW/SED-33
SW/SED-15
SED-14
SW/SED-16
Peacock Rd
Old Mines Creek
Peppersville Rd
Lakeview Dr
SW/SED-23
State Hwy CC
Red Barn Dr
State Hwy EL
SED-22
Old MInes Study Area
WASHINGTON COUNTY
Rogue Creek Rd
Arnault Creek
Tiff County Rd 408
SW/SED-28
SED-29
Villmer Rd
SW/SED-21
SW/SD-18
SW/SED-18
SW/SED-19A
SW-20
SS08
SW/SD-19
SW/SED-19
SED-20
SW/SD-11
SW/SED-30
State Hwy F
Pat Daly County Rd 329
Mine Breton Creek
SW/SED-31
SS09
SW/SD-09
SW/SED-4, Area 19
SW/SED-3, Area 19
SW/SED-2, Area 19
State Hwy 185
State Hwy 21
SD/SW22
SW/SD-06
Mill Creek
SW/SD-16
SD15 - water
SW-1, Area 19
Potosi Study Area
Flamewood Rd
SS06
SS05
SW/SD-03
SS07
SW/SD-02
SS04
SS03
SW/SD-14
Mineral Point
SW/SD-04
SS11
SW/SD-20
SD13 - water
Brand Rd
Cloyel Rd
SW/SD-12
Potosi
State Hwy O
SS10
SS01
SS02
SW/SD-01
State Hwy 8

Legend

MEDIA

- Surface Water
- Sediment

Study Area
County Boundary
Lakes
Roads
Rivers
Towns

N

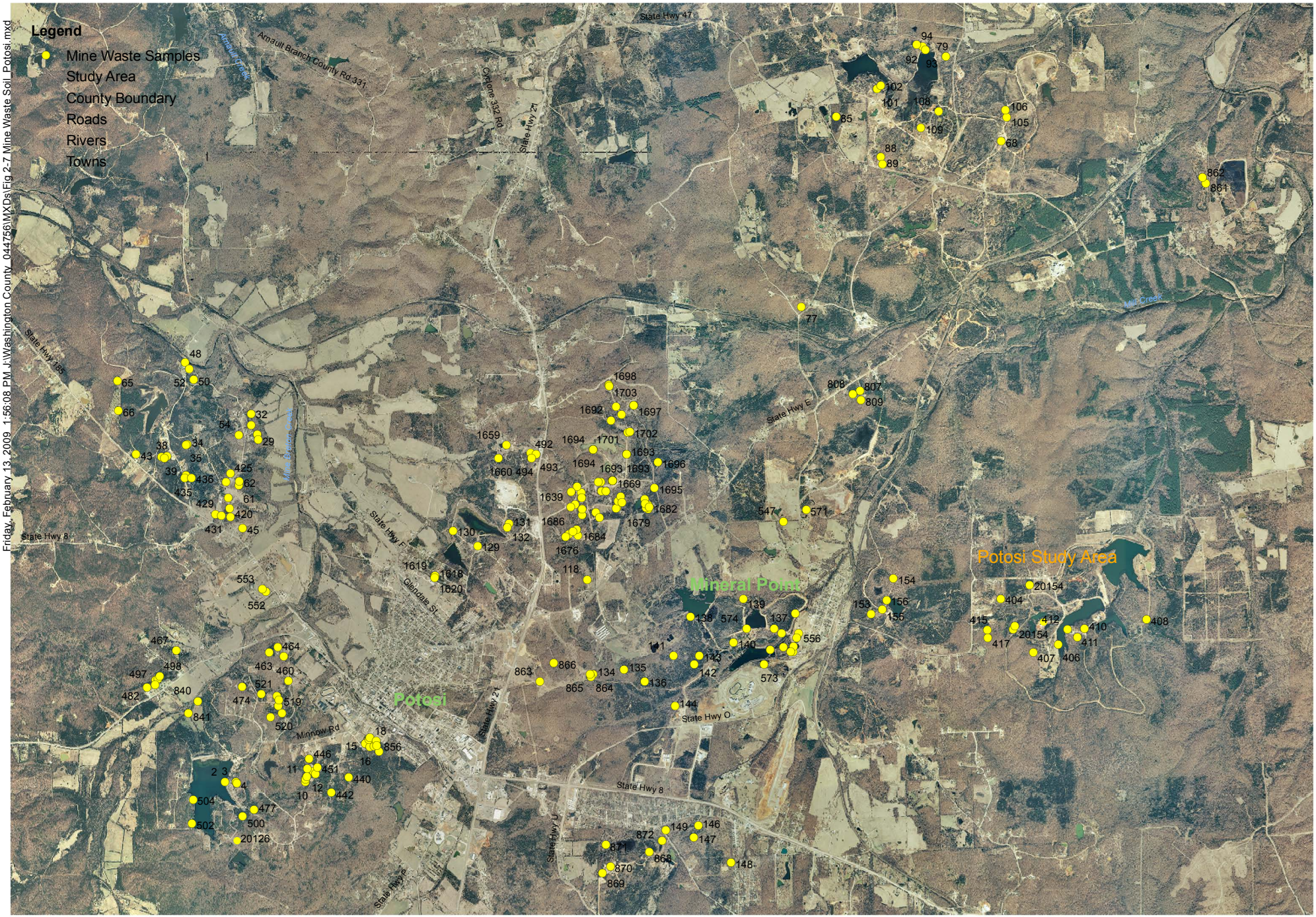
0 0.5 1

Miles

NAD 1983, UTM 15N

Sediment and Surface Water Sample Location Map
All Study Areas
Washington County Lead District
Washington County, MO

Figure 2-1



N

0 0.5 1

Miles

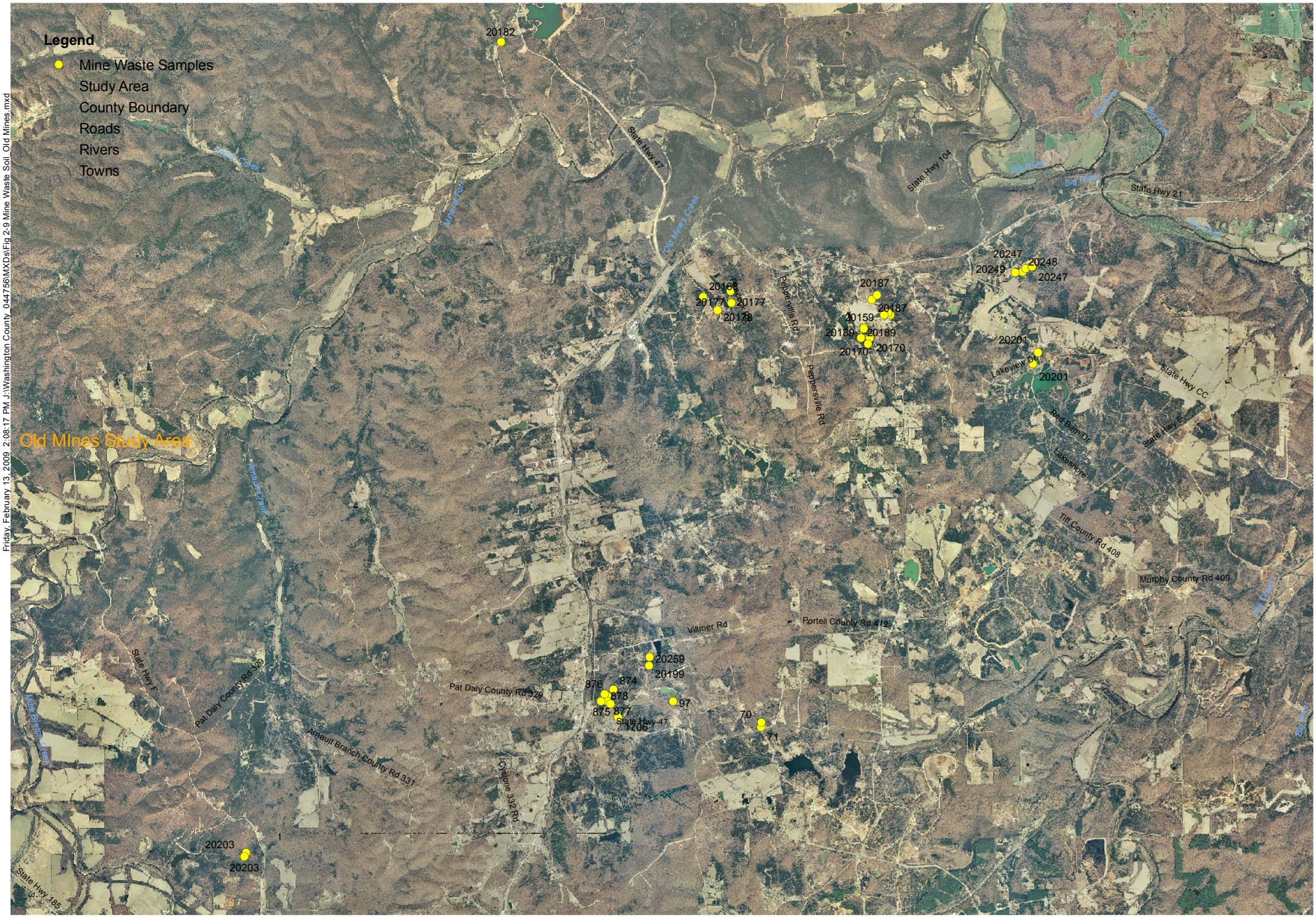
NAD 1983, UTM 15N

Mine Waste Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-2

Mine Waste Soil Sample Location Map
Richwoods Site
Washington County Lead District
Washington County, MO

Figure 2-3



Friday, February 13, 2009 2:08:17 PM J:\Washington County_044756\MXDs\Fig 2-9 Mine Waste Soil_Old Mines.mxd

Mine Waste Soil Sample Location Map
Old Mines Site
Washington County Lead District
Washington County, MO

Figure 2-4

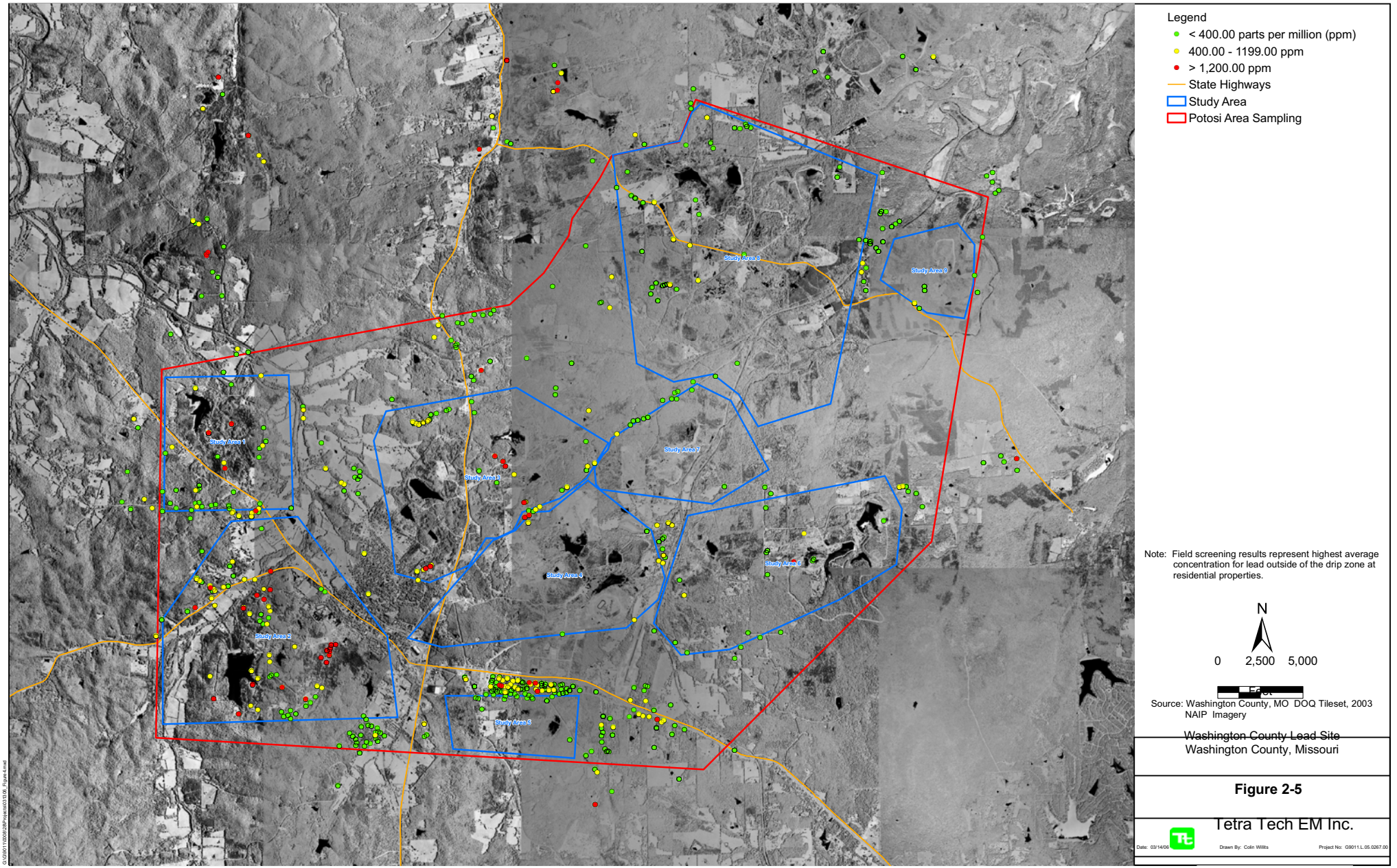
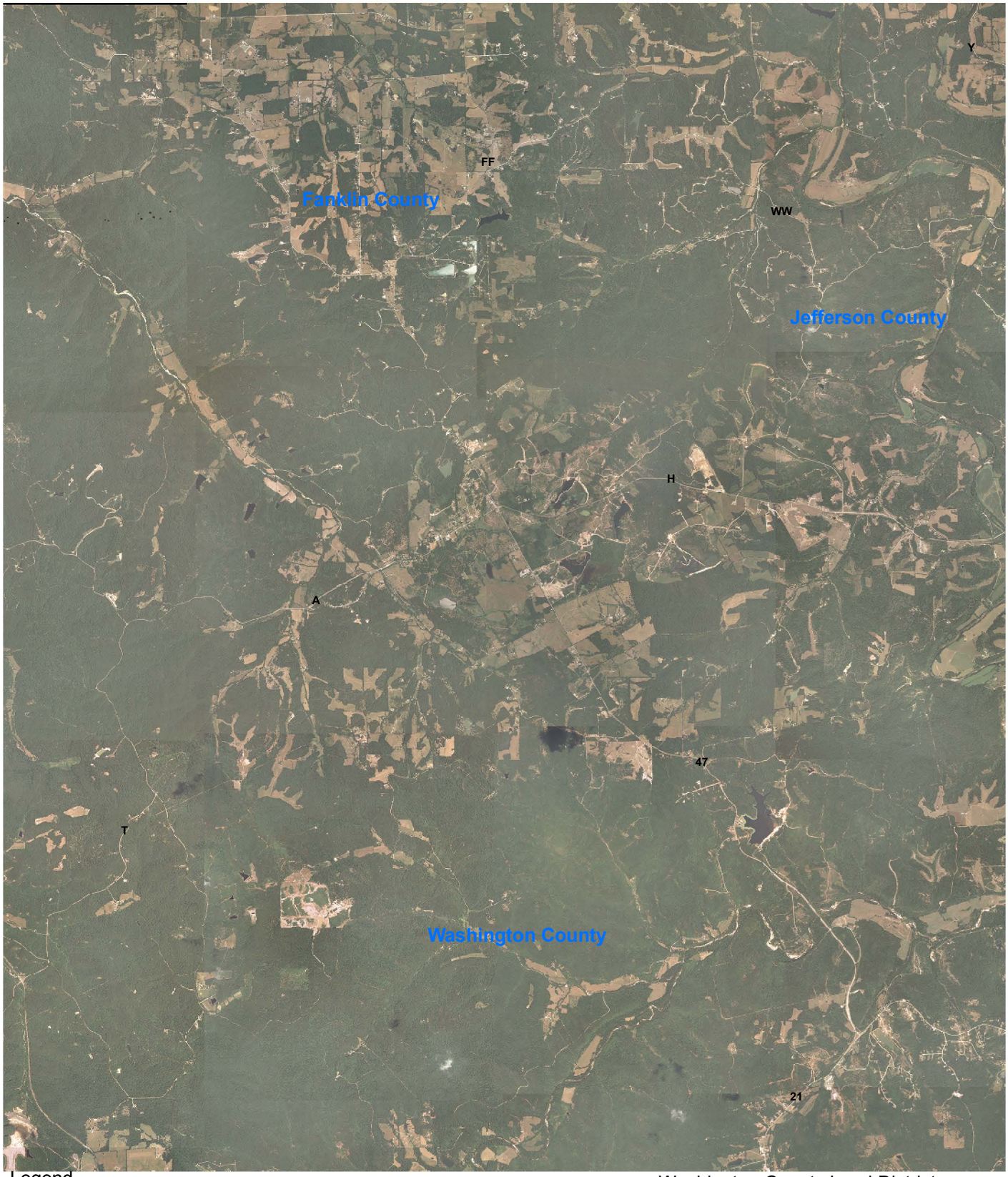


Figure 2-5 Historical Area-wide Soil Samples - Potosi Site



Legend

- Cross-section of Hwy 47 and Hwy A/H
- Historical soil sample location
- State highway
- Richwoods study area
- County boundary

0 0.5 1 2

Miles

Source: Washington County, MO NAIP Aerial Imagery, 2005

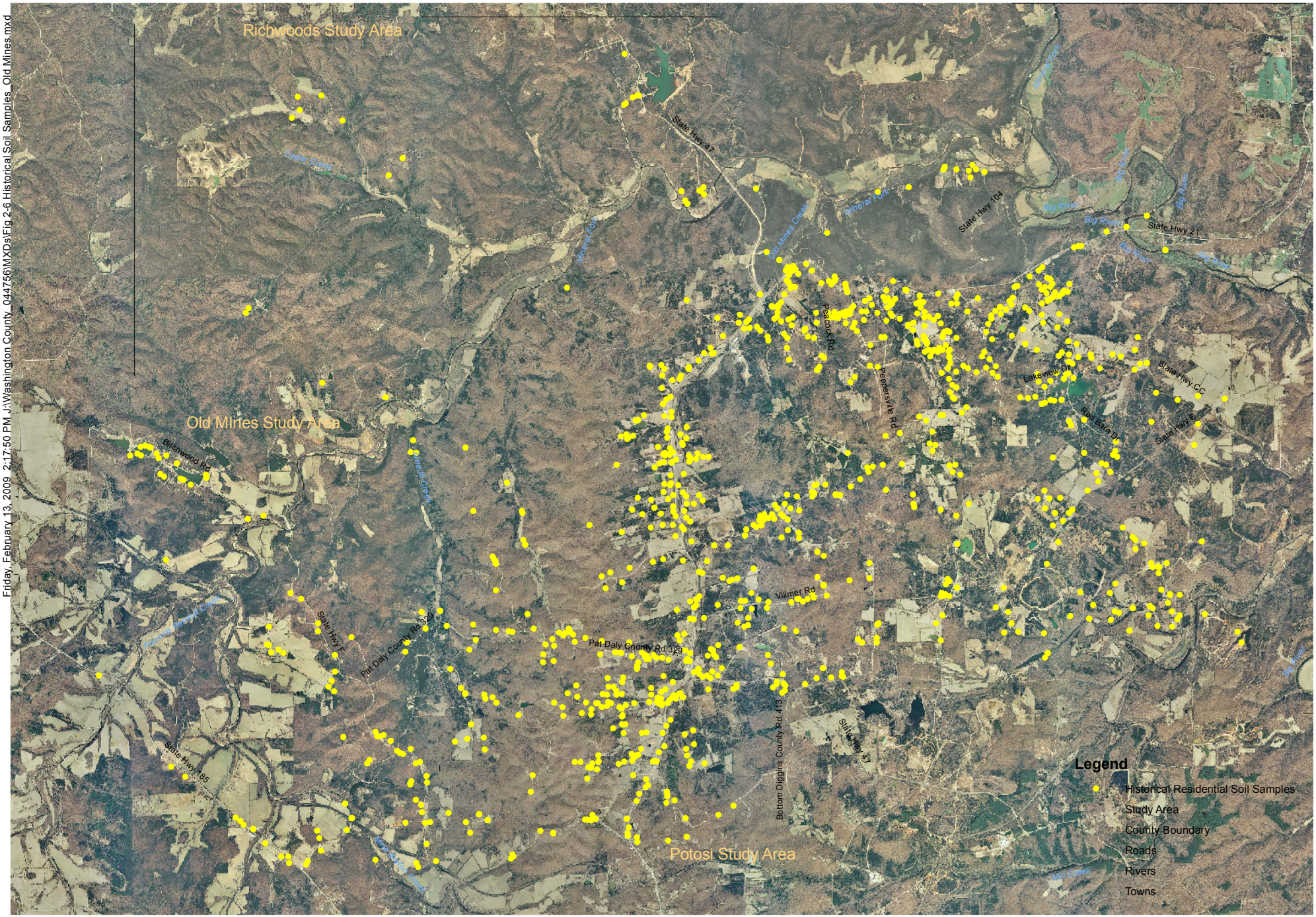
Washington County Lead District
Richwoods Study Area
Washington County, Missouri

Figure 2-6
Historical Soil
Sample Location Map

TETRA TECH EM INC.

Date: 05/29/07 Drawn By: Bill Spiking Project No: I9004.L.06.0027.000

X:\G\9004\0027\HRS\projects\Richwoods_HRS_Final\Figure4.mxd



Friday, February 13, 2009 2:17:50 PM J:\Washington County_044756\MXDs\Fig 2-6 Historical Soil Samples_Old Mines.mxd

N

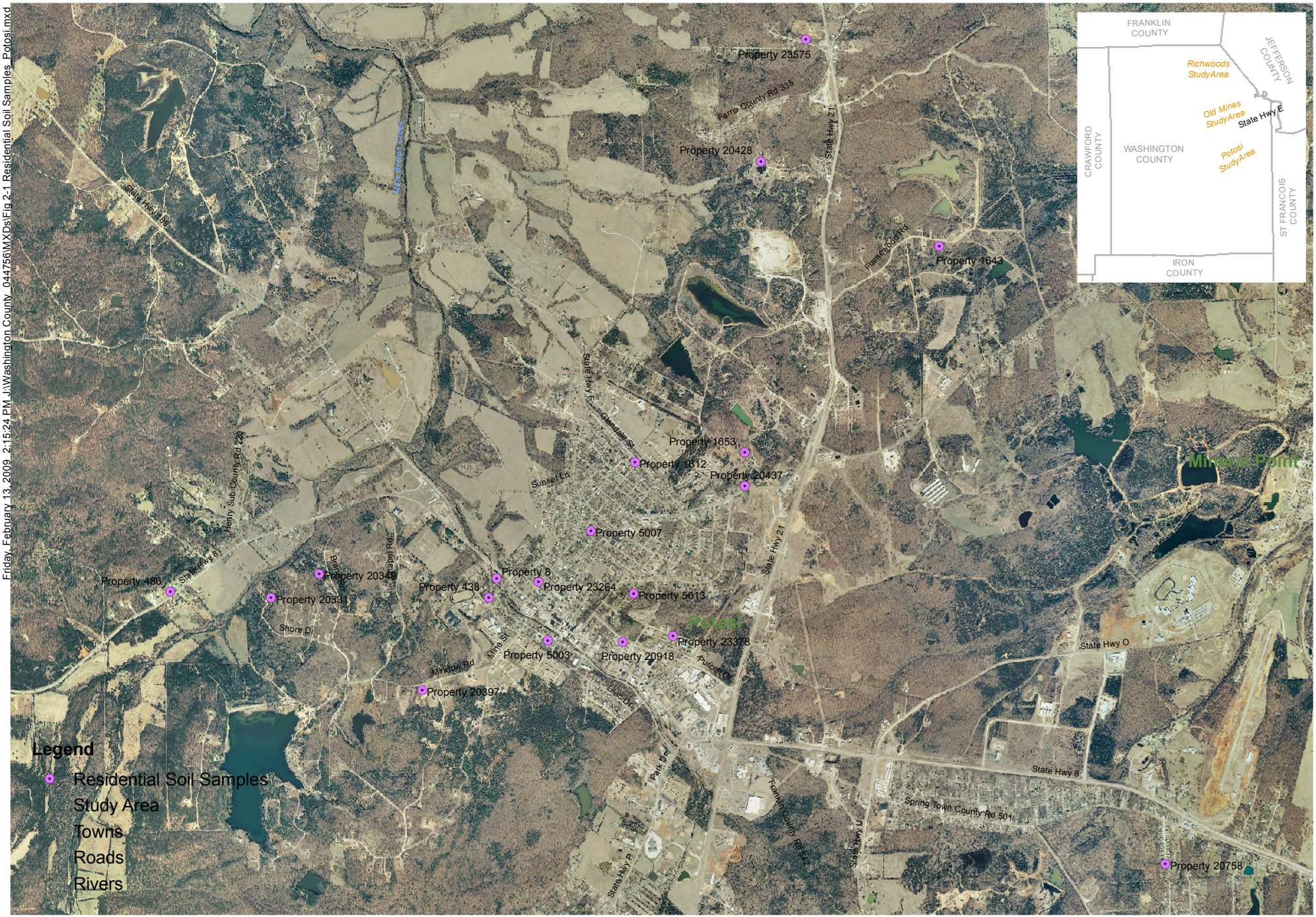
0 1 2

Miles

NAD 1983, UTM 15N

Area-wide Historical Soil Sample Location Map
Old Mines Study Area
Washington County Lead District
Washington County, MO

Figure 2-7



Friday, February 13, 2009 2:15:24 PM J:\Washington County_044756\MXDs\Fig 2-1 Residential Soil Samples_Potosi.mxd

N

0 0.25 0.5

Miles

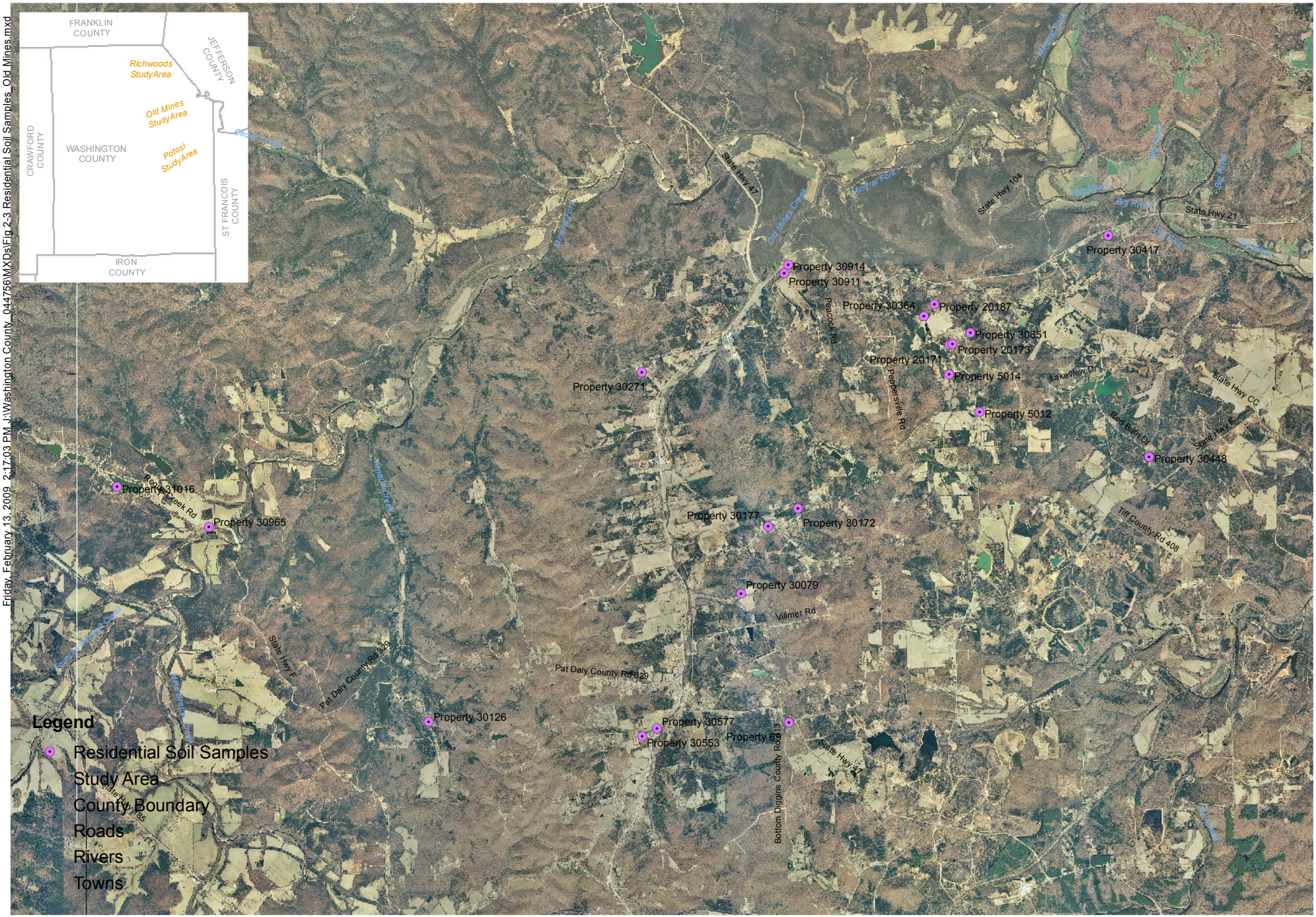
NAD 1983, UTM 15N

Residential Property Soil Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-8

Residential Property Soil Sample Location Map
Richwoods Site
Washington County Lead District
Washington County, MO

Figure 2-9

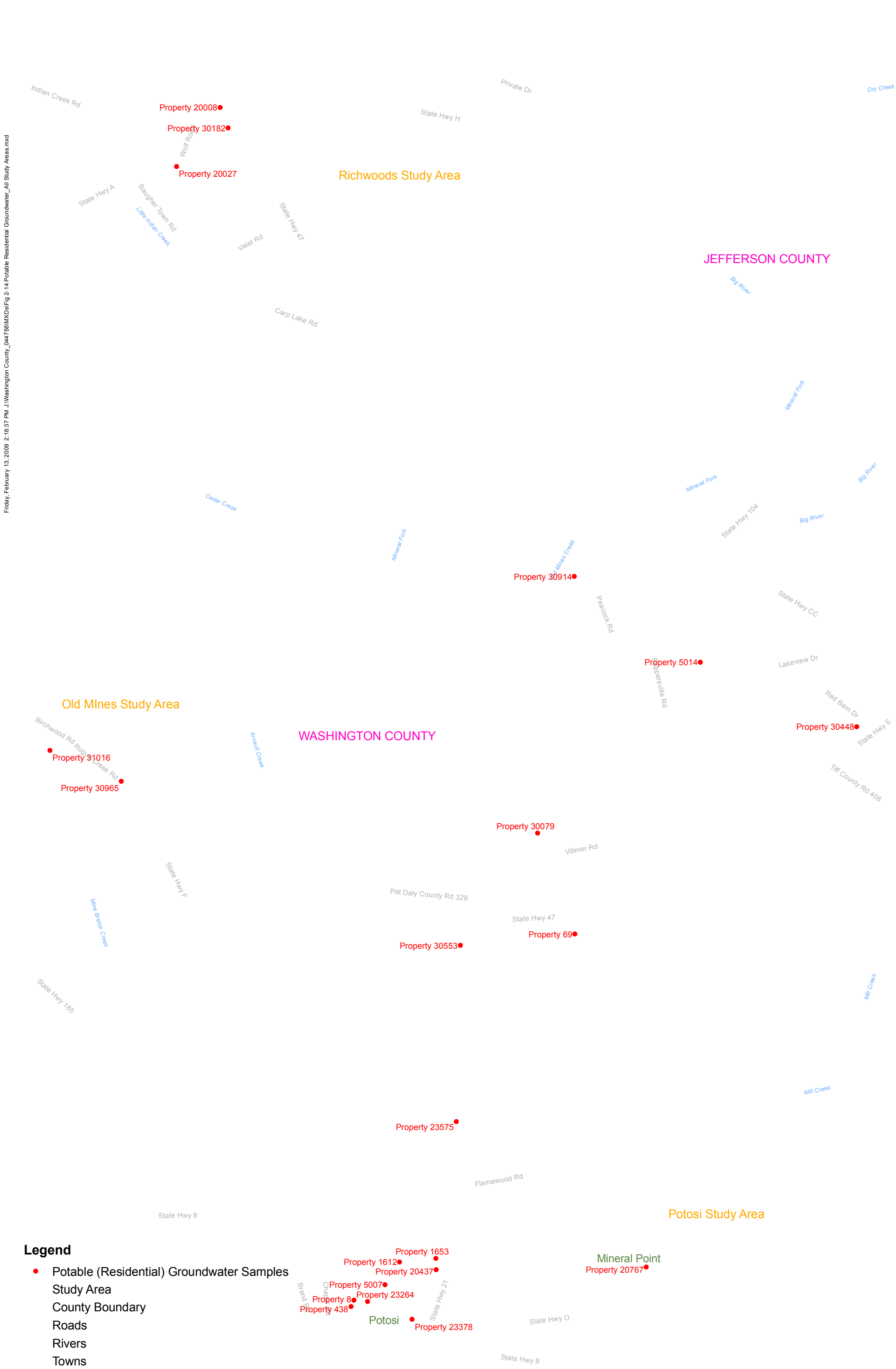


Friday, February 13, 2009 2:17:03 PM J:\Washington County_044756\MXDs\Fig 2-3 Residential Soil Samples_Old Mines.mxd

Residential Property Soil Sample Location Map
Old Mines Site
Washington County Lead District
Washington County, MO

Figure 2-10

Friday, February 13, 2009 2:18:37 PM J:\Washington County_044756\MXDs\Fig 2-14 Potable Residential Groundwater_All Study Areas.mxd



Legend

- Potable (Residential) Groundwater Samples
- Study Area
- County Boundary
- Roads
- Rivers
- Towns

N

0 1 2

Miles

NAD 1983, UTM 15N

Potable Wells at Residential Properties Sample Location Map
All Study Areas
Washington County Lead District
Washington County, MO

Figure 2-11

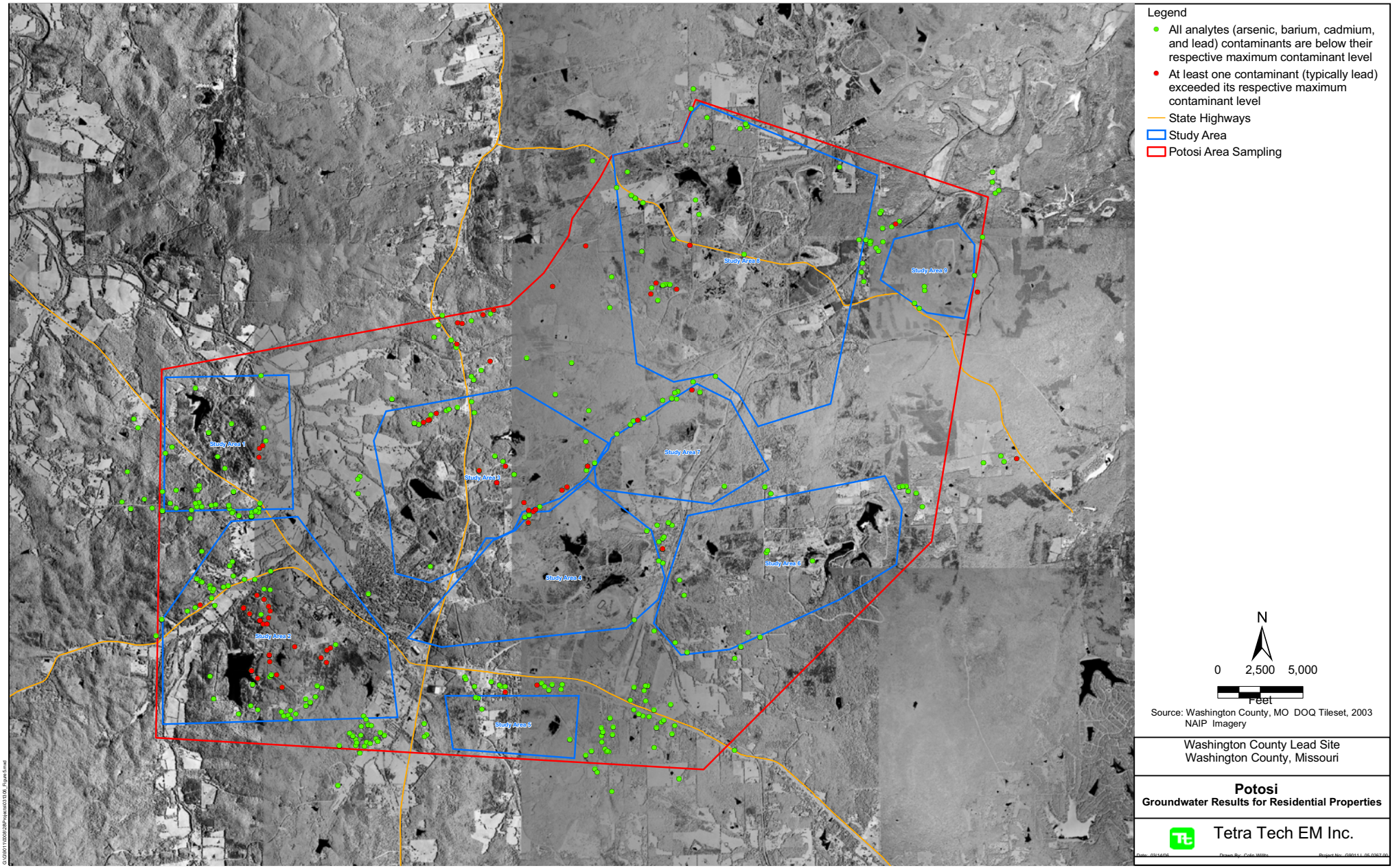
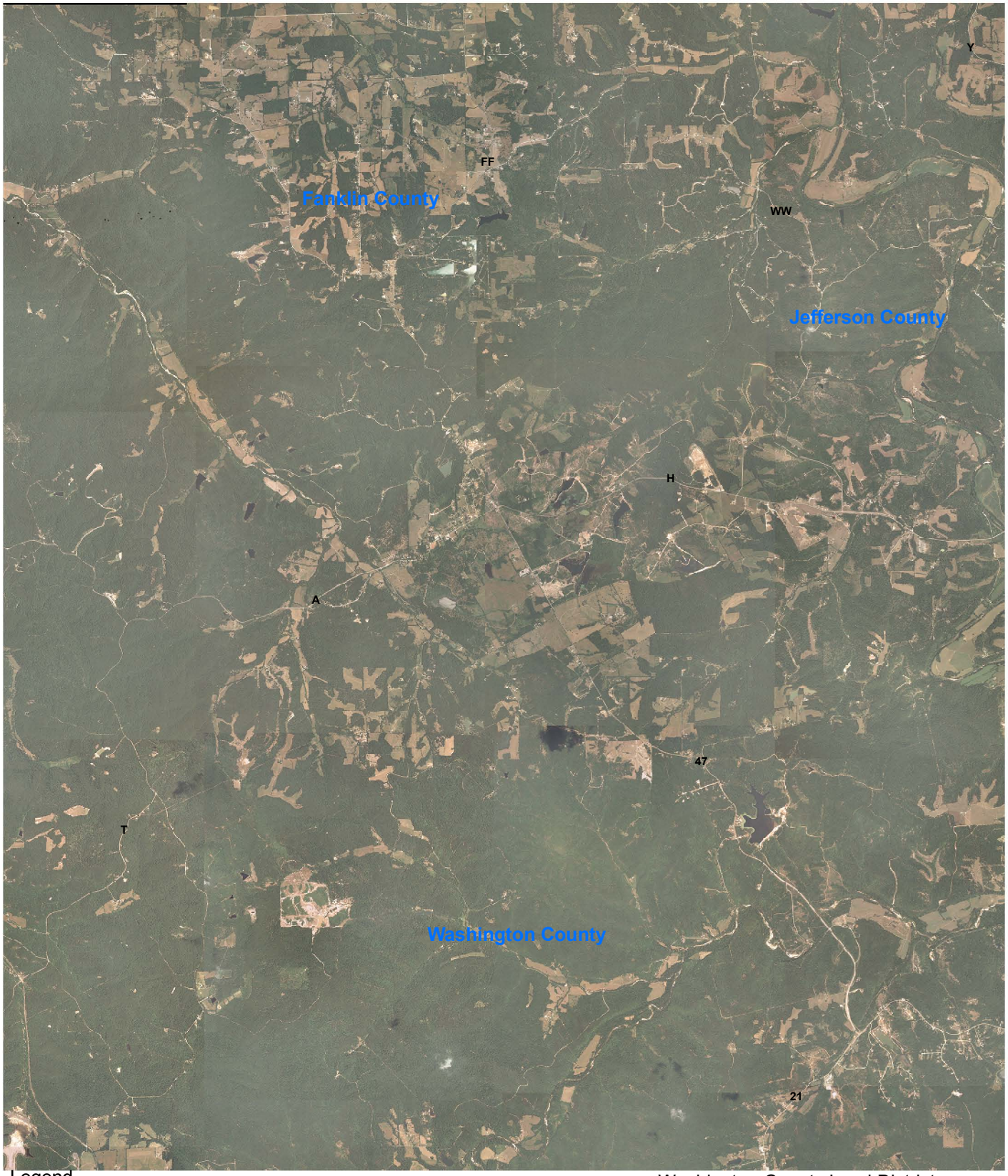


Figure 2-12 Historical Groundwater Sample Locations Map
Potosi Site



Legend

Cross-section of Hwy 47 and Hwy A/H

Historical ground water sample location

State highway

Richwoods study area

County boundary

Washington County Lead District
Richwoods Study Area
Washington County, Missouri

0.5 0 1 2

Miles

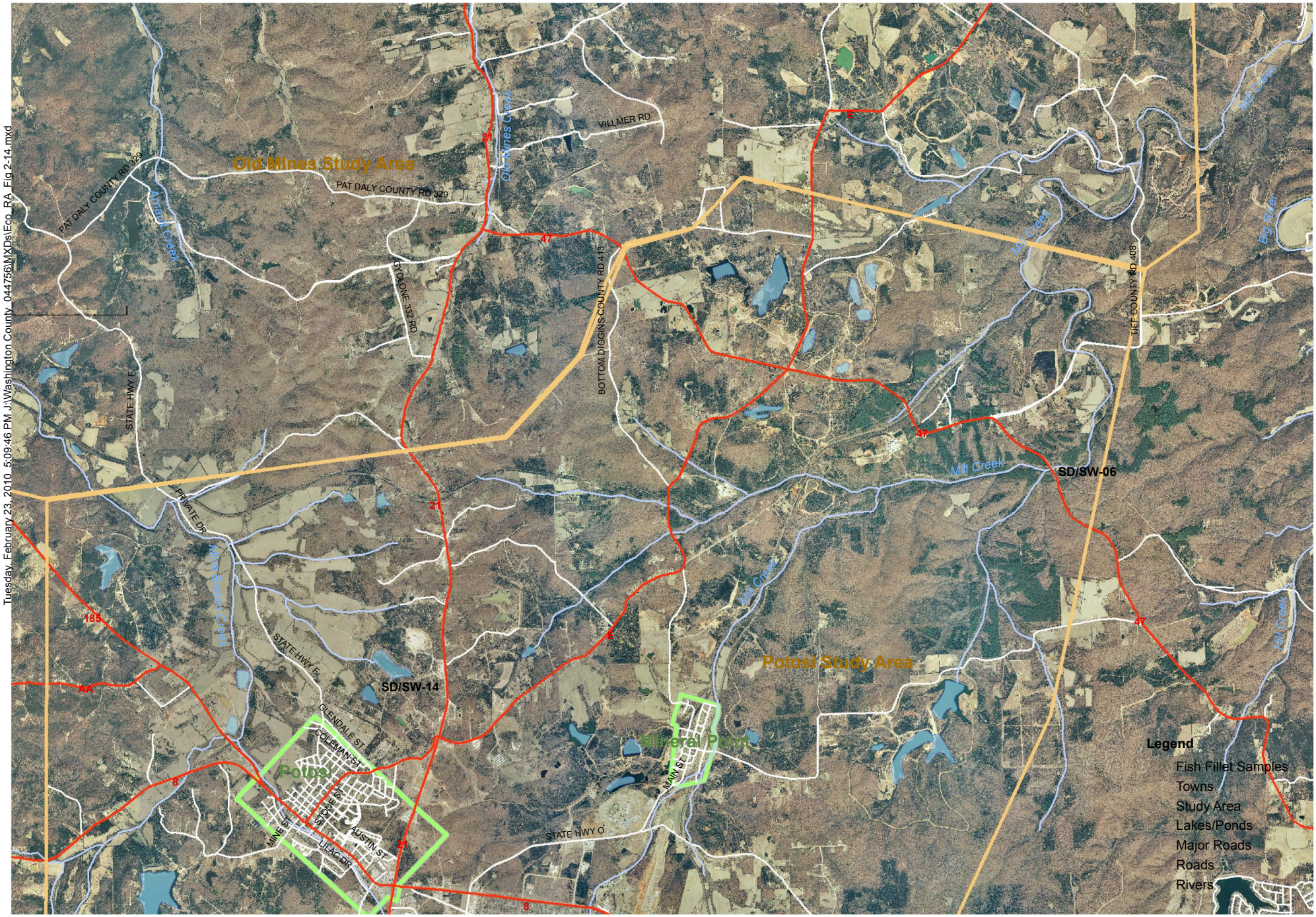
Source: Washington County, MO NAIP Aerial Imagery, 2005

TETRA TECH EM INC.

Date: 05/29/07 Drawn By: Bill Spiking Project No: I9004.L.06.0027.000

X:\G\9004\0027\HRS\gis\mxds\Richwoods_HRS_Final\Figure3.mxd

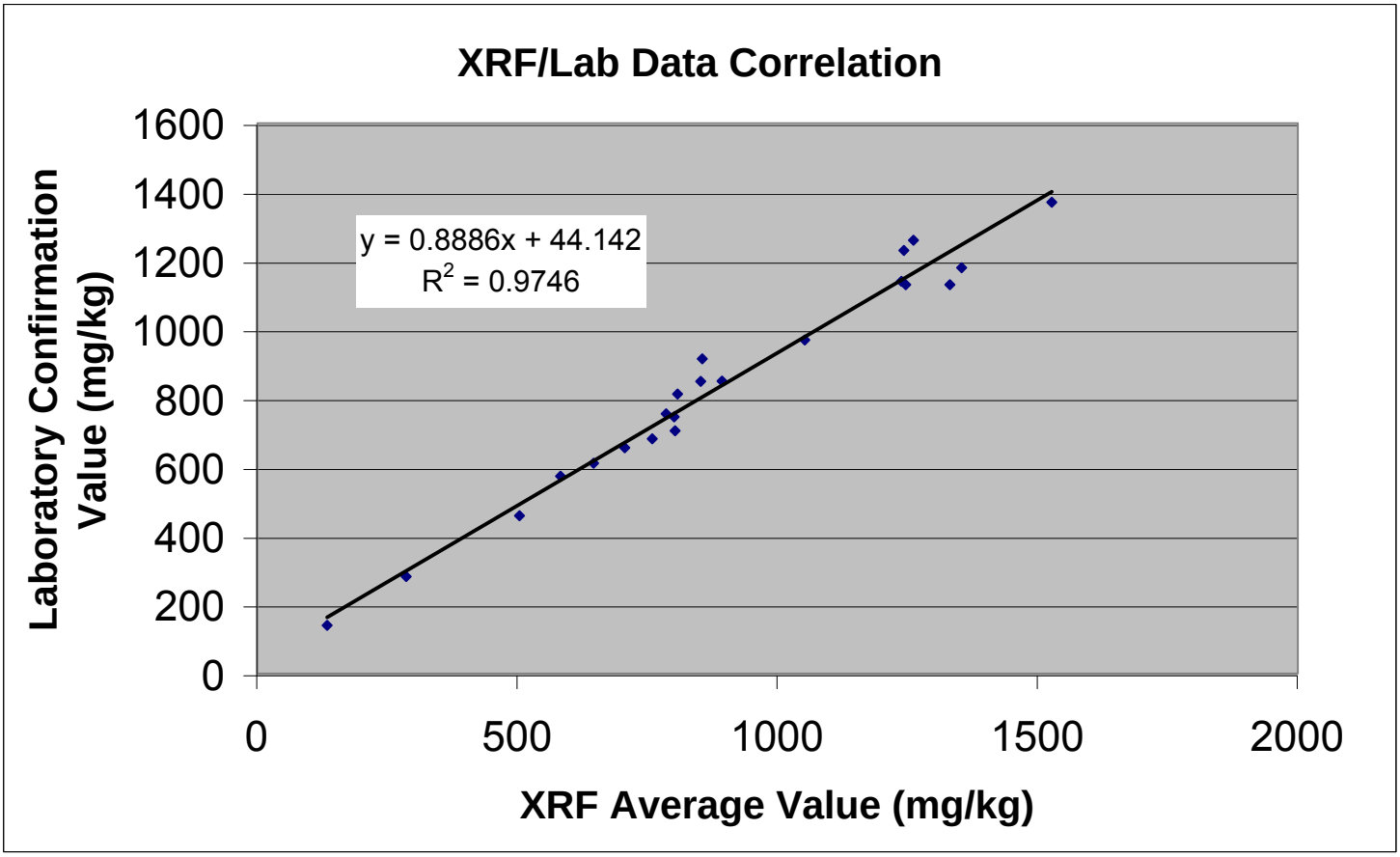
Figure 2-13 Area-wide Historical Groundwater Sample Location Map - Richwoods Site



Tuesday, February 23, 2010 5:09:46 PM J:\Washington County_044756\MXDs\Eco_RA_Fig 2-14.mxd

Fish Fillet Sample Location Map
Potosi Site
Washington County Lead District
Washington County, MO

Figure 2-14



SUMMARY OUTPUT - REGRESSION RESULTS

Regression Statistics	
Multiple R	0.987220825
R Square	0.974604957
Adjusted R Squar	0.973335205
Standard Error	52.48123094
Observations	22

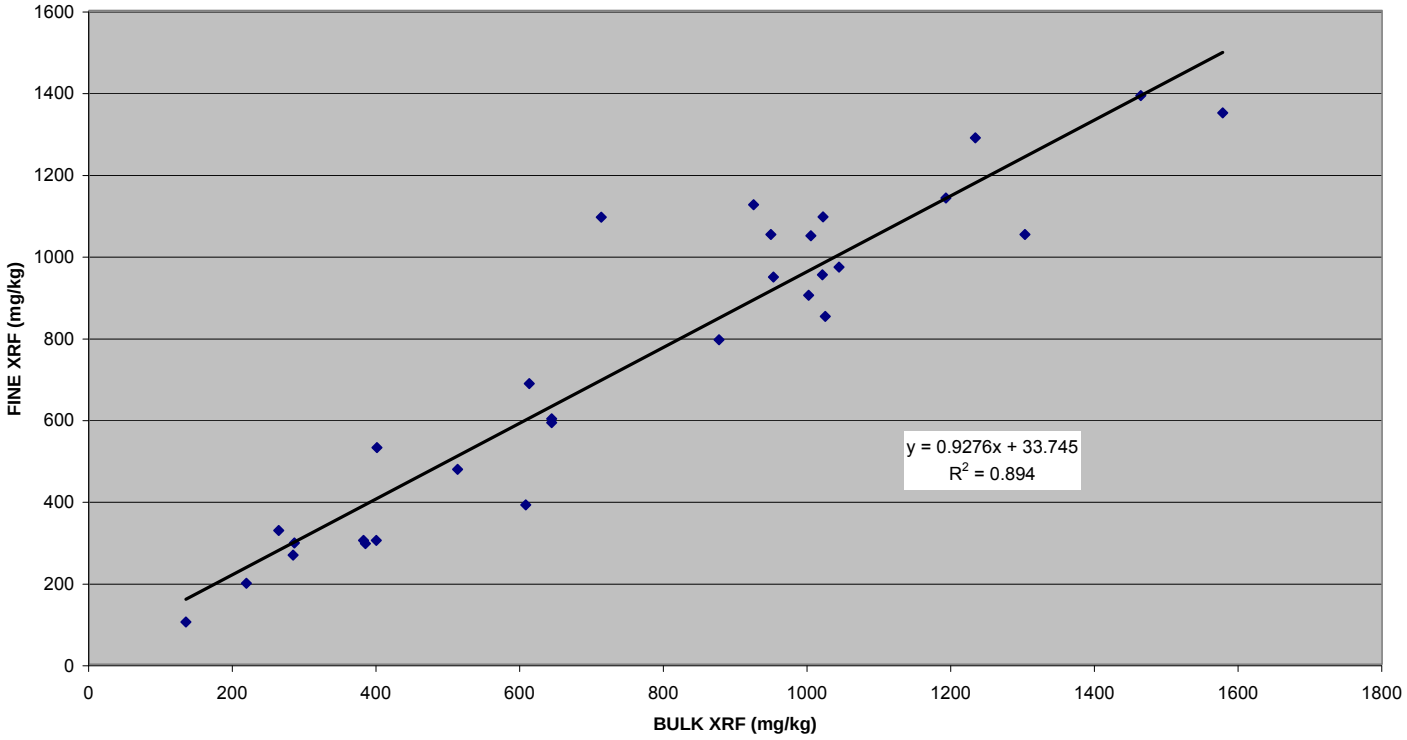
ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2114061.863	2114061.863	767.5552845	1.98866E-17
Residual	20	55085.59201	2754.279601		
Total	21	2169147.455			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	44.14246372	30.77960866	1.43414636	0.166981824	-20.06267468	108.3476021	-20.06267468	108.3476021
X Variable 1	0.888593949	0.03207366	27.70478812	1.98866E-17	0.821689468	0.955498431	0.821689468	0.955498431

Figure 2-15 Regression Analysis of XRF Data and Laboratory Confirmation Samples Washington County Lead District Site

SITE SPECIFIC BULK-XRF to FINE-XRF RELATIONSHIP



SUMMARY OUTPUT - REGRESSION RESULTS

Regression Statistics	
Multiple R	0.94553318
R Square	0.894032994
Adjusted R Squar	0.890248458
Standard Error	127.2633965
Observations	30

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3826026.148	3826026.148	236.2331897	3.54402E-15
Residual	28	453487.2187	16195.9721		
Total	29	4279513.367			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	33.74513458	51.93079313	0.649809728	0.521111033	-72.63027155	140.1205407	-72.63027155	140.1205407
X Variable 1	0.927603134	0.060352012	15.3698793	3.54402E-15	0.803977644	1.051228625	0.803977644	1.051228625

Figure 2-16 Regression Analysis of XRF Bulk and Fine Fraction Data Washington County Lead District Site

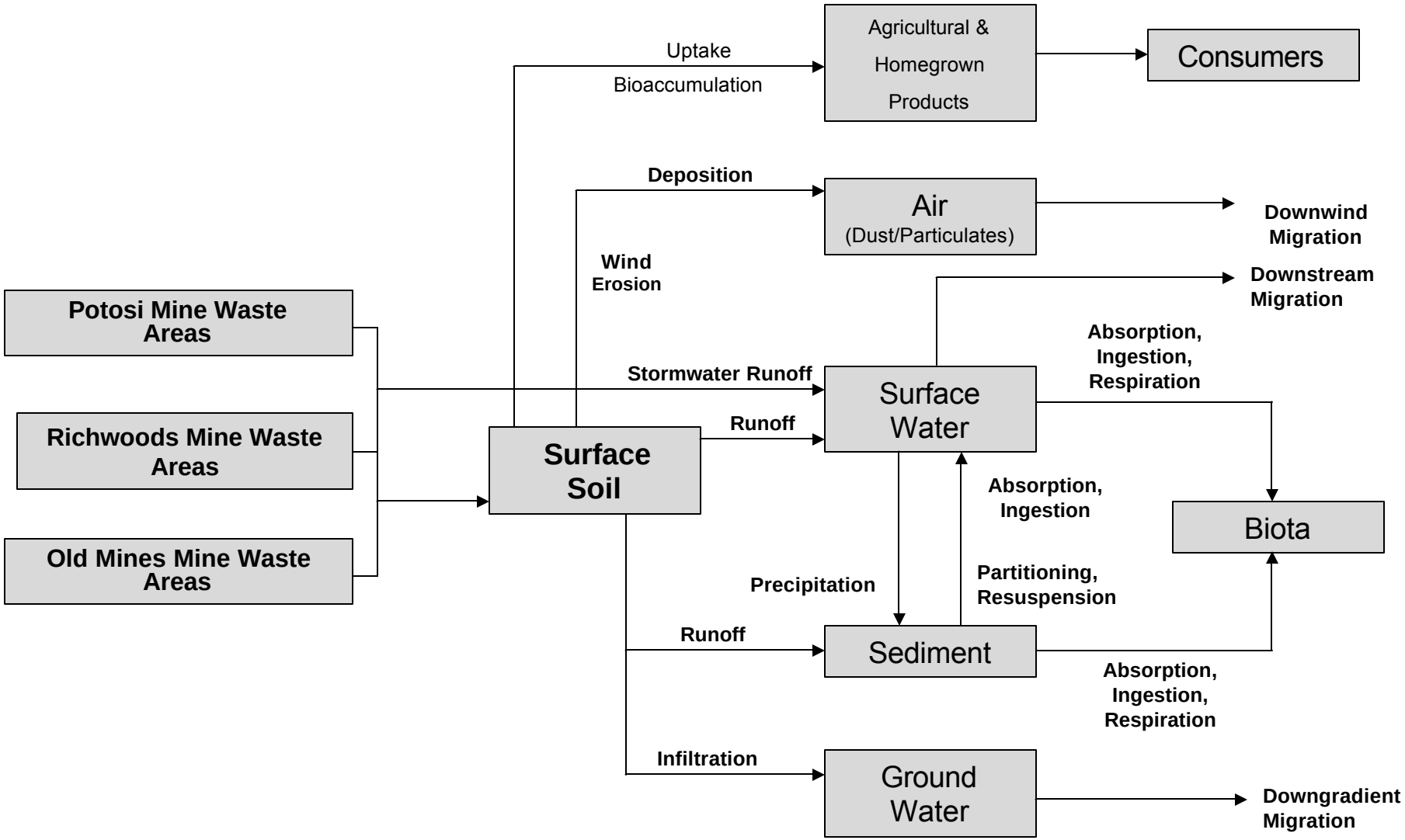


Figure 3-1a
Conceptual Exposure Model (Migration Pathways)
Washington County Lead District Site

RECEPTORS

MEDIA	EXPOSURE PATHWAYS	Industrial Worker (Adult)	Construction Worker (Adult)	Recreational User (Adult/Child)	Resident (Adult)	Resident (Child)	ATV Rider (Adolescent)
Soil (Mine Waste, Area Wide, Residential)	Dermal Absorption, Ingestion	C/F	C/F	C/F	C/F	C/F	C/F
Agricultural Products/ Homegrown Produce	Ingestion	C/F	C/F	C/F	C/F	C/F	C/F
Groundwater (Area Wide, Residential)	Dermal Absorption, Ingestion	C/F	C/F	C/F	C/F	C/F	C/F
Air (Soil-Derived Dust)	Inhalation	C/F	C/F	C/F	C/F	C/F	C/F
Surface Water	Dermal Absorption, Ingestion	C/F	C/F	C/F	C/F	C/F	C/F
Sediment	Dermal Absorption, Ingestion	C/F	C/F	C/F	C/F	C/F	C/F
Biota (Fish Tissue)	Ingestion	C/F	C/F	C/F	C/F	C/F	C/F

C – Current Use Scenario (Complete Pathway)
F – Future Use Scenario (Complete Pathway)

See text for discussion of which pathways are quantitatively evaluated

Figure 3-1b
Conceptual Exposure Model (Exposure Pathways)
Washington County Lead District Site

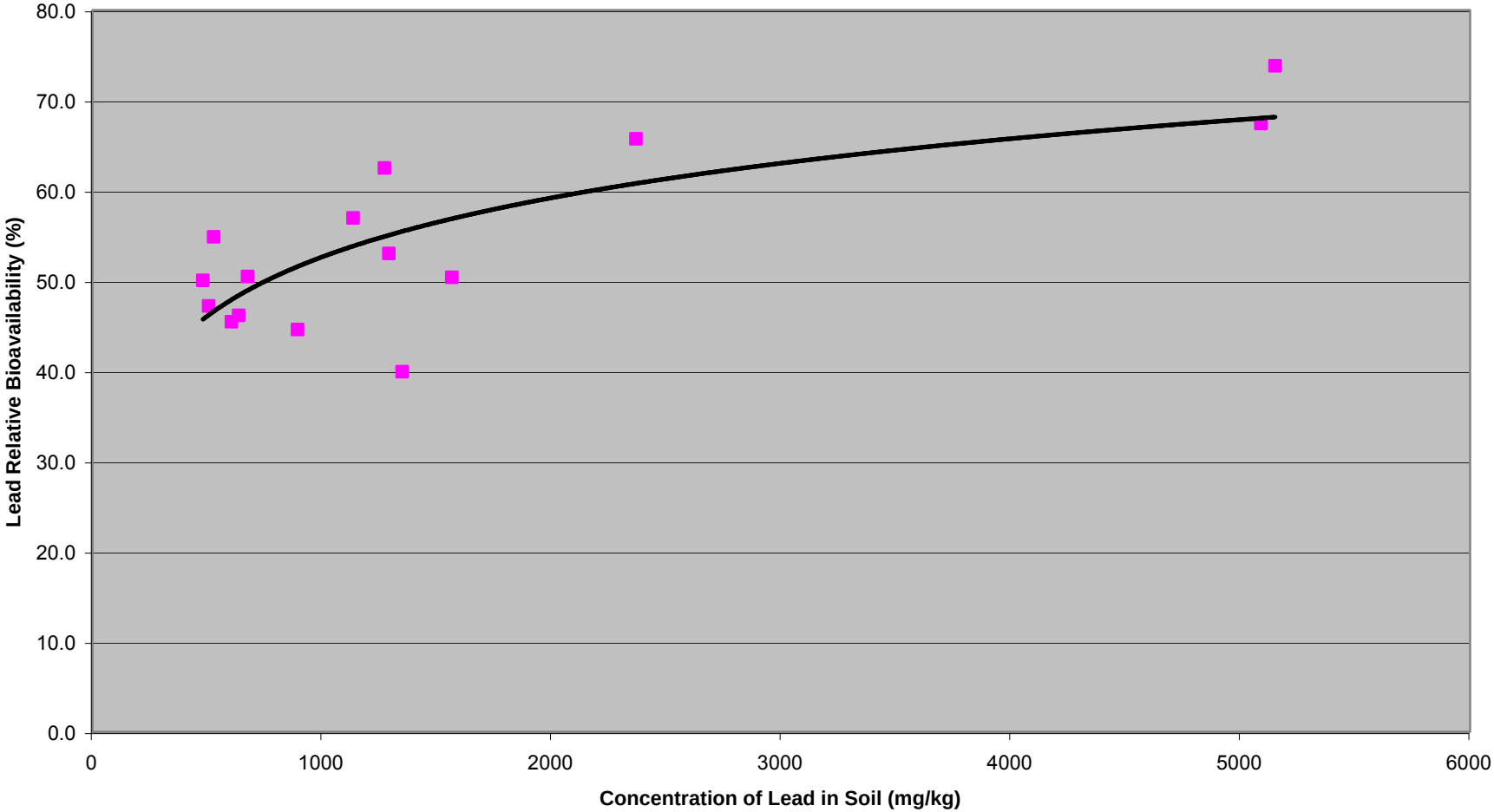


Figure 3-3 Relative Bioavailability of Lead in Residential Soils
Washington County Lead District Site

Appendix A

Raw Analytical Data

United States Environmental Protection Agency
Region 7
901 N. 5th Street
Kansas City, KS 66101

Date: 01/07/2009

Subject: Transmittal of Sample Analysis Results for ASR #: 3903

Project ID: BMA78N01

Project Description: Washington County Lead District - Richwoods RI sampling

From: Michael F. Davis, Chief
Chemical Analysis and Response Branch, Environmental Services Division

To: Bruce Morrison
SUPR/FFSE

Enclosed are the analytical data for the above-referenced Analytical Services Request (ASR) and Project. The Regional Laboratory has reviewed and verified the results in accordance with procedures described in our Quality Manual (QM). In addition to all of the analytical results, this transmittal contains pertinent information that may have influenced the reported results and documents any deviations from the established requirements of the QM.

Please contact us within 14 days of receipt of this package if you determine there is a need for any changes. Please complete the enclosed Customer Satisfaction Survey and Data Disposition/Sample Release memo for this ASR as soon as possible. The process of disposing of the samples for this ASR will be initiated 30 days from the date of this transmittal unless an alternate release date is specified on the Data Disposition/Sample Release memo.

If you have any questions or concerns relating to this data package, contact our customer service line at 913-551-5295.

Enclosures

cc: Analytical Data File.

Project Manager: Bruce Morrison Org: SUPR/FFSE Phone: 913-551-7755

Project ID: BMA78N01

Project Desc: Washington County Lead District - Richwoods RI sampling

Location: Richwoods State: Missouri Program: Superfund

Site Name: WASHINGTON COUNTY LEAD DISTRICT - RICHWOODS - RESIDENTIAL YARD REMOVAL Site ID: A78N Site OU: 01

GPRA PRC: 302DD2C

Purpose: Site Characterization

Explanation of Codes, Units and Qualifiers used on this report

Sample QC Codes: QC Codes identify the type of sample for quality control purpose.

__ = Field Sample

Units: Specific units in which results are reported.

mg/L = Milligrams per Liter
ug/L = Micrograms per Liter

Data Qualifiers: Specific codes used in conjunction with data values to provide additional information on the quality of reported results, or used to explain the absence of a specific value.

(Blank) = Values have been reviewed and found acceptable for use.
J = The identification of the analyte is acceptable; the reported value is an estimate.
U = The analyte was not detected at or above the reporting limit.

Project ID: BMA78N01 Project Desc: Washington County Lead District - Richwoods RI sampling

Sample No	QC Code	Matrix	Location Description	External Sample No	Start Date	Start Time	End Date	End Time	Receipt Date
101 -	__	Water	ZPGPLZZ-5008		08/19/2008	15:00			10/24/2008
102 -	__	Water	ZPGPLZZ-5010		08/22/2008	13:00			10/24/2008
103 -	__	Water	ZPGPLZZ-5014 (Well water from property 5014)		08/29/2008	11:00			10/24/2008

Analysis	Comments About Results For This Analysis

1 Metals in Water by ICP

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3122.3C

Samples: 101-__ 102-__ 103-__

Comments:
(N/A)

1 Metals in Water by ICP/MS

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3123.1B

Samples: 101-__ 102-__ 103-__

Comments:
Zinc was J-coded in sample 101. Although the analyte in question has been positively identified in the sample, the quantitation is an estimate (J-coded) due to low recovery of this analyte in the laboratory matrix spike. The actual concentration for this analyte may be higher than the reported value.

Project ID: BMA78N01 Project Desc: Washington County Lead District - Richwoods RI sampling

Analysis/ Analyte	Units	101-__	102-__	103-__
1 Metals in Water by ICP				
Aluminum	ug/L	50 U	50 U	50 U
Antimony	ug/L	50 U	50 U	50 U
Arsenic	ug/L	25 U	25 U	25 U
Barium	ug/L	460	873	162
Beryllium	ug/L	3 U	3 U	3 U
Cadmium	ug/L	3 U	3 U	3 U
Calcium	mg/L	65.2	90.9	80.1
Chromium	ug/L	15 U	15 U	15 U
Cobalt	ug/L	10 U	10 U	10 U
Copper	ug/L	5 U	12	5 U
Iron	ug/L	50 U	50 U	50 U
Lead	ug/L	50 U	50 U	50 U
Magnesium	mg/L	39.0	57.7	50.0
Manganese	ug/L	5 U	5 U	5 U
Molybdenum	ug/L	15 U	15 U	15 U
Nickel	ug/L	20 U	20 U	20 U
Potassium	mg/L	2.00 U	2.00 U	2.00 U
Selenium	ug/L	50 U	50 U	50 U
Silver	ug/L	25 U	25 U	25 U
Sodium	mg/L	10.8	5.44	5.00 U
Thallium	ug/L	50 U	50 U	50 U
Titanium	ug/L	20 U	20 U	20 U
Vanadium	ug/L	10 U	10 U	10 U
Zinc	ug/L	97	201	606
1 Metals in Water by ICP/MS				
Antimony	ug/L	2.0 U	2.0 U	2.0 U
Arsenic	ug/L	1.0 U	1.0 U	1.0 U
Barium	ug/L	494	989	170
Beryllium	ug/L	1.0 U	1.0 U	1.0 U
Cadmium	ug/L	1.0 U	1.0	1.0 U
Chromium	ug/L	2.0 U	2.0 U	2.0 U
Cobalt	ug/L	1.0 U	1.0 U	1.0 U
Copper	ug/L	2.0 U	8.1	2.9
Lead	ug/L	3.1	5.8	1.0 U
Manganese	ug/L	1.1	1.0 U	1.0 U
Nickel	ug/L	2.3	3.4	3.4
Selenium	ug/L	5.0 U	5.0 U	5.0 U
Silver	ug/L	1.0 U	1.0 U	1.0 U
Thallium	ug/L	1.0 U	1.0 U	1.0 U
Vanadium	ug/L	1.0 U	1.0 U	1.0 U
Zinc	ug/L	80.0 J	174	549

United States Environmental Protection Agency
Region VII
901 N. 5th Street
Kansas City, KS 66101

Date: __/__/____

Subject: Data Disposition/Sample Release for ASR #: 3903

Project ID: BMA78N01

Project Description: Washington County Lead District - Richwoods RI sampling

From: Bruce Morrison
SUPR/FFSE

To: Kaye Dollmann
ENSV/RLAB

I have received and reviewed the Transmittal of Sample Analysis Results for the above-referenced Analytical Services Request(ASR) and have indicated my findings below by checking one of the boxes for Data Disposition.

I understand all samples will be disposed upon receipt of this form, unless samples are requested to be held. If I do not return this form all samples will be disposed of on _____.

☐ "RELEASED" - Read-only to all Region 7 employees and contractors that have R7LIMS "Customer" account. All Samples may be disposed of upon receipt of this form if not requested to be held.

☐ "Project Manager Accessible" - Available on the LAN in R7LIMS for my use only. All Samples may be disposed of upon receipt of this form if not requested to be held.

☐ "Archived" - THIS DATA IS OF A SENSITIVE NATURE. Any future reports must be requested through the laboratory. All samples may be disposed of upon receipt of the form if not requested to be held.

☐ Hold Samples - I have determined that the samples need to be held until _____, after which time they will be disposed of in accordance with applicable regulations.
The reason for the hold is:

- ☐ Samples are associated with a legal proceeding.
- ☐ Question/Concern with data - possible reanalysis requested.
- ☐ Other:_____

United States Environmental Protection Agency
Region 7
901 N. 5th Street
Kansas City, KS 66101

Date: 08/22/2008

Subject: Transmittal of Sample Analysis Results for ASR #: 3881

Project ID: VMA78D01

Project Description: Washington County Lead District - Potosi site (Ecological RA sampling)

From: Michael F. Davis, Chief
Laboratory Branch, Environmental Services Division

To: Venessa Madden
ENSV/DISO

Enclosed are the analytical data for the above-referenced Analytical Services Request (ASR) and Project. The Regional Laboratory has reviewed and verified the results in accordance with procedures described in our Quality Manual (QM). In addition to all of the analytical results, this transmittal contains pertinent information that may have influenced the reported results and documents any deviations from the established requirements of the QM.

Please contact us within 14 days of receipt of this package if you determine there is a need for any changes. Please complete the enclosed Customer Satisfaction Survey and Data Disposition/Sample Release memo for this ASR as soon as possible. The process of disposing of the samples for this ASR will be initiated 30 days from the date of this transmittal unless an alternate release date is specified on the Data Disposition/Sample Release memo.

If you have any questions or concerns relating to this data package, contact our customer service line at 913-551-5295.

Enclosures

cc: Analytical Data File.

Project Manager: Venessa Madden Org: ENSV/DISO Phone: 913-551-7794

Project ID: VMA78D01

Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Location: Potosi State: Missouri Program: Superfund

Site Name: WASHINGTON COUNTY LEAD DISTRICT - POTOSI - RESIDENTIAL YARD REMOVAL Site ID: A78D Site OU: 01

GPRA PRC: 302DD2C

Purpose: Site Characterization

Explanation of Codes, Units and Qualifiers used on this report

Sample QC Codes: QC Codes identify the type of sample for quality control purpose.

__ = Field Sample

Units: Specific units in which results are reported.

%	=	Percent
Deg C	=	Degrees Celsius
SU	=	Standard Units (pH)
mg/L	=	Milligrams per Liter
mg/kg	=	Milligrams per Kilogram
ug/L	=	Micrograms per Liter
umhos/cm	=	Micromhos per Centimeter

Data Qualifiers: Specific codes used in conjunction with data values to provide additional information on the quality of reported results, or used to explain the absence of a specific value.

(Blank)	=	Values have been reviewed and found acceptable for use.
J	=	The identification of the analyte is acceptable; the reported value is an estimate.
U	=	The analyte was not detected at or above the reporting limit.
UJ	=	The analyte was not detected at or above the reporting limit. The reporting limit is an estimate.

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Sample No	QC Code	Matrix	Location Description	External Sample No	Start Date	Start Time	End Date	End Time	Receipt Date
1	__	Solid	SD01 - Hornsey Lake		06/25/2008	11:45	06/25/2008		06/26/2008
2	__	Solid	SD02 - Sediment from Big Quarry Lake		06/25/2008	09:35	06/25/2008	11:00	06/26/2008
3	__	Solid	SD03 - Sediment		06/24/2008	08:00	06/24/2008	09:00	06/26/2008
4	__	Solid	SD04 - East Branch Mill Creek		06/23/2008	08:00	06/23/2008	08:30	06/26/2008
5	__	Solid	Soil/Sediment sample						06/26/2008
6	__	Solid	SD06 - Mill Creek at Hwy 47		06/24/2008	11:45	06/24/2008		06/26/2008
7	__	Solid	SD07 - Mill Creek Sediment		06/24/2008	04:00	06/24/2008	05:00	06/26/2008
8	__	Solid	SD08 - Mill Creek Sediment		06/24/2008	05:00	06/24/2008	06:00	06/26/2008
9	__	Solid	SD09 - Mill Creek at Tiff (Center of Creek)		06/24/2008	02:00			06/26/2008
10	__	Solid	SD10 - Mill Creek		06/25/2008	06:35	06/25/2008		06/26/2008
11	__	Solid	SD11 - Powder Springs Lake		06/25/2008	03:00	06/25/2008	03:30	06/26/2008
12	__	Solid	SD12 - Mine A Breton Creek sieved sediment		06/23/2008	02:00	06/23/2008	03:00	06/26/2008
13	__	Solid	SD13 - Bates Creek Sediment		06/23/2008	02:00	06/23/2008	03:00	06/26/2008
14	__	Solid	SD14 - Small Quarry Lake Sediment		06/25/2008	08:20	06/25/2008	08:30	06/26/2008
15	__	Solid	SD15 - Keyes Branch Sediment		06/23/2008	04:00	06/23/2008	05:00	06/26/2008
16	__	Solid	SD16 - Long Hollow Sediment		06/23/2008	05:00	06/23/2008	06:00	06/26/2008
17	__	Solid	Soil/Sediment sample		06/25/2008				06/26/2008
18	__	Solid	SD18 - Shibboleth Sediment		06/24/2008	07:15	06/24/2008	07:30	06/26/2008
19	__	Solid	SD19 - Shibboleth Branch Sediment		06/24/2008	06:15	06/24/2008	06:30	06/26/2008
20	__	Solid	SD20 - Apex Lake Sediment		06/25/2008	04:40	06/25/2008	05:00	06/26/2008
21	__	Solid	SS01 - Hornsey Lake		06/25/2008	12:34	06/25/2008	12:44	06/26/2008
22	__	Solid	SD22 - Fountain Farm at Cimbar		06/23/2008	07:00	06/23/2008	08:00	06/26/2008
23	__	Solid	SS02 - Hornsey Lake		06/25/2008	01:00	06/25/2008	01:20	06/26/2008
24	__	Solid	SS07		06/25/2008	03:56	06/25/2008	04:06	06/26/2008
25	__	Solid	SS10 - Hornsey Lake		06/25/2008	01:00	06/25/2008	01:20	06/26/2008
26	__	Solid	SS03 - Soil near Small Quarry Pond		06/25/2008	08:20	06/25/2008	08:30	06/26/2008
27	__	Solid	SS04 - Soil near Big Quarry Lake		06/25/2008	09:35	06/25/2008	11:00	06/26/2008
28	__	Solid	SS09 - Hwy E		06/25/2008	03:24	06/25/2008	03:34	06/26/2008
29	__	Solid	SS11 - Soil near Apex Lake		06/25/2008	04:50	06/25/2008	05:00	06/26/2008
30	__	Solid	SD17 - Big River Sediment		06/25/2008	19:50	06/25/2008	19:51	06/26/2008
37	__	Solid	SS05 - Soil sample near Mill Creek at Hwy Dep		06/24/2008	09:35	06/24/2008	09:45	06/26/2008
38	__	Solid	SS06 - Hwy Department		06/24/2008	09:35	06/24/2008	09:45	06/26/2008
40	__	Solid	SS08 - Soil near Shibboleth at Tiff		06/24/2008	06:30	06/24/2008	07:00	06/26/2008
101	__	Tissue	SD08 - Mill Creek fish sample		06/24/2008	05:00	06/24/2008	06:00	06/26/2008
102	__	Tissue	SD08 - Mill Creek Crayfish sample		06/24/2008	05:00	06/24/2008	06:00	06/26/2008
103	__	Tissue	SD03 - Mill Creek at the Hwy Dep Fish sample		06/24/2008	08:00	06/24/2008	09:00	06/26/2008
104	__	Tissue	SD04 - East Branch Mill Creek Fish sample		06/24/2008	08:30	06/24/2008	09:00	06/26/2008
105	__	Tissue	SD02 - Big Quarry Lake Eco Fish sample		06/25/2008	09:35	06/25/2008		06/26/2008
106	__	Tissue	SS04 - Big Quarry Lake Vegetation sample		06/25/2008	09:35	06/25/2008	11:00	06/26/2008
107	__	Tissue	SD01 - Hornsey Lake Eco Fish		06/25/2008	11:00	06/25/2008	12:00	06/26/2008

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Sample No	QC Code	Matrix	Location Description	External Sample No	Start Date	Start Time	End Date	End Time	Receipt Date
			sample						
108 - __		Tissue	SS01 - Vegetation sample		06/25/2008	11:00	06/25/2008	12:00	06/26/2008
109 - __		Tissue	SS02 - Vegetation sample		06/25/2008	01:00	06/25/2008	01:20	06/26/2008
110 - __		Tissue	SS03 - Vegetation sample		06/25/2008	08:20	06/25/2008	08:30	06/26/2008
111 - __		Tissue	SS09 - Hwy E Vegetation sample		06/25/2008		06/25/2008		06/26/2008
112 - __		Tissue	SS07 - Vegetation sample		06/25/2008	04:00	06/25/2008	04:04	06/26/2008
113 - __		Tissue	SD03 - Mill Creek at Hwy Department Crayfish sample		06/24/2008	08:00	06/24/2008	09:00	06/26/2008
114 - __		Tissue	SS10 - Lake Vegetation sample		06/25/2008	01:00	06/25/2008	01:20	06/26/2008
115 - __		Tissue	SD05 - Pond Creek Eco Fish sample		06/25/2008	04:00	06/25/2008	04:30	06/26/2008
117 - __		Tissue	SS06 - Vegetation sample		06/24/2008	10:08	06/24/2008	10:18	06/26/2008
118 - __		Tissue	SS05 - Vegetation sample		06/24/2008	09:35	06/24/2008	09:45	06/26/2008
119 - __		Tissue	SS08 - Vegetation sample		06/24/2008	06:30	06/24/2008	07:00	06/26/2008
120 - __		Tissue	SD14 - Eco Fish (Top Minnows) sample		06/25/2008	08:00	06/25/2008	09:00	06/26/2008
121 - __		Tissue	SD14 - Human Health Fillets - Sunfish sample		06/25/2008	08:00	06/25/2008	09:00	06/26/2008
122 - __		Tissue	SD10 - Mill Creek Eco Fish sample		06/25/2008	06:36	06/25/2008	07:00	06/26/2008
135 - __		Tissue	SD006 - Mill Creek = Human Health Fillets - Suckers sample		06/24/2008	12:00	06/24/2008	01:00	06/26/2008
136 - __		Tissue	SD06 - Mill Creek (small fish) Hwy 47 sample		06/24/2008	12:00	06/24/2008	12:30	06/26/2008
137 - __		Tissue	SD06 - Mill Creek Crayfish sample (Hwy 47)		06/24/2008	12:00	06/24/2008	12:45	06/26/2008
138 - __		Tissue	SD09 - Mill Creek at Tiff Eco-Risk Fish sample		06/24/2008	03:00	06/24/2008	03:30	06/26/2008
139 - __		Tissue	SD07 - Mill Creek Fish sample		06/24/2008	04:00	06/24/2008	05:00	06/26/2008
201 - __		Water	SD01 - Hornsey lake water sample		06/25/2008	11:45	06/25/2008	12:00	06/26/2008
202 - __		Water	SD02 - Big Quarry Lake surface water sample		06/25/2008	09:35	06/25/2008	11:00	06/26/2008
203 - __		Water	SD03 - Hwy Department surface water sample		06/24/2008	08:00	06/24/2008	09:00	06/26/2008
204 - __		Water	SD04 - East Branch Mill Creek water sample		06/23/2008	08:00	06/24/2008	08:30	06/26/2008
206 - __		Water	SD06 - Mill Creek at Hwy 47 water sample		06/24/2008	11:45	06/24/2008		06/26/2008
207 - __		Water	SD07 - Mill Creek off of Tiff water sample		06/24/2008	04:00	06/24/2008	05:00	06/26/2008
208 - __		Water	SD08 - Mill Creek water sample		06/24/2008	05:20	06/24/2008	05:30	06/26/2008
209 - __		Water	SD09 - Mill Creek water sample		06/24/2008				06/26/2008
210 - __		Water	SD10 - Mill Creek water sample		06/25/2008	06:37	06/25/2008		06/26/2008
211 - __		Water	SD11 - Powder Springs water sample		06/25/2008	03:00	06/25/2008	03:10	06/26/2008
212 - __		Water	SD12 - Mine A Breton water sample		06/23/2008				06/26/2008
213 - __		Water	SD13 - Bates Creek water sample		06/23/2008	02:00	06/23/2008	03:00	06/26/2008
214 - __		Water	SD14 - Small Quarry Lake surface water sample		06/25/2008	08:20	06/25/2008	08:30	06/26/2008
215 - __		Water	SD15 - Keyes Branch water sample		06/23/2008	04:00	06/23/2008	05:00	06/26/2008
216 - __		Water	SD16 - Long Hollow Brach water sample		06/23/2008	05:00	06/23/2008	06:00	06/26/2008
218 - __		Water	SD18 - water sample		06/24/2008	07:15	06/24/2008	07:30	06/26/2008

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Sample No	QC Code	Matrix	Location Description	External Sample No	Start Date	Start Time	End Date	End Time	Receipt Date
219 -	__	Water	SD19 - water sample		06/24/2008	06:15	06/24/2008	06:30	06/26/2008
220 -	__	Water	Water sample		06/25/2008	04:40	06/25/2008		06/26/2008
222 -	__	Water	SD22 - Fountain Farm at Cimbar water sample		06/23/2008	07:00	06/23/2008	08:00	06/26/2008

Analysis Comments About Results For This Analysis

1 Metals in Solids by ICP

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3122.3C

Basis: Dry

Samples:							
	1-__	2-__	3-__	4-__	5-__	6-__	7-__
	8-__	9-__	10-__	11-__	12-__	13-__	14-__
	15-__	16-__	17-__	18-__	19-__	20-__	21-__
	22-__	23-__	24-__	25-__	26-__	27-__	28-__
	29-__	30-__	37-__	38-__	40-__		

Comments:
Arsenic, Copper and Nickle was J-coded in sample 1 and Calcium and Magneseium was J-coded in sample 24. Although the analyte in question has been positively identified in the sample, the quantitation is an estimate (J-coded) due to high recovery of this analyte in the laboratory matrix spike. Sample 1 As(138,125), Cu(174,118), Ni(116,114) and Sample 24 Ca(248,118), Mg(178,125). The actual concentration for this analyte may be lower than the reported value.

Cadmium, and Chromium was J-coded in sample 1 and Cadmium was J coded in sample 24. Although the analyte in question has been positively identified in the sample, the quantitation is an estimate (J-coded) due to low recovery of this analyte in the laboratory matrix spike. Sample 1 Cd(72,75), Cr(74,75) and Sample 24 Cd(74,75). The actual concentration for this analyte may be higher than the reported value.

Selenium was UJ-coded in sample 1 and Antimony was UJ coded in sample 24. This analyte was not found in the sample at or above the reporting limit, however, the reporting limit is an estimate (UJ-coded) due to low recovery of this analyte in the laboratory matrix spike. Se(43,75) and Sb(59,75). The actual reporting limit for this analyte may be higher than the reported value.

Lead was J-coded in sample 1. Although the analyte in question has been positively identified in the sample, the quantitation is an estimate (J-coded) due to poor precision obtained for this analyte in the laboratory matrix spike and matrix spike duplicate. (171,29)

1 Percent Solid

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3142.9E

Basis: N/A

Samples:							
	1-__	2-__	3-__	4-__	5-__	6-__	7-__
	8-__	9-__	10-__	11-__	12-__	13-__	14-__
	15-__	16-__	17-__	18-__	19-__	20-__	21-__
	22-__	23-__	24-__	25-__	26-__	27-__	28-__
	29-__	30-__	37-__	38-__	40-__		

Analysis Comments About Results For This Analysis

Comments:
(N/A)

1 Total Organic Carbon in Soil

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3151.2C

Basis: Dry

Samples:	1-__	2-__	3-__	4-__	5-__	6-__	7-__
	8-__	9-__	10-__	11-__	12-__	13-__	14-__
	15-__	16-__	17-__	18-__	19-__	20-__	21-__
	22-__	23-__	24-__	25-__	26-__	27-__	28-__
	29-__	30-__	37-__	38-__	40-__		

Comments:
Sample 10 was analyzed 16 day(s) past their 28 day holding time. The results for analytes that were not found at or above the reporting limit were UJ-coded to indicate that the reporting limit is an estimated value. The actual reporting limit may be higher than the reported value.

Samples 1-9, 11-30, 37-40 were analyzed 16-18 day(s) past their 28 day holding time. All positive results were reported with a J-code indicating that they are estimated values. The actual concentration of some or all analytes may have been higher than the reported result.

1 Metals in Fish by ICP

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3122.3C

Samples:	101-__	102-__	103-__	104-__	105-__	106-__	107-__
	108-__	109-__	110-__	111-__	112-__	113-__	114-__
	115-__	117-__	118-__	119-__	120-__	121-__	122-__
	135-__	136-__	137-__	138-__	139-__		

Comments:
There was one tissue sample received without a proper label. It was a crayfish in it's own ziplock bag with this written in blue marker on the outside: SDO9 Mill Creek crayfish. The results for the metals requested are as follows: Cadmium RL = 0.12, Result = 0.12U. Lead RL = 0.68, Result = 0.68U. Selenium RL = 2.19, Result = 2.19U.

1 Percent Lipid in Tissue

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3210.3E

Samples:	101-__	102-__	103-__	104-__	105-__	107-__	113-__
	115-__	120-__	121-__	122-__	135-__	136-__	137-__
	138-__	139-__					

Analysis Comments About Results For This Analysis

Comments:
There was one tissue sample received without a proper label. It was a crayfish in it's own ziplock bag with this written in blue marker on the outside: SD09 Mill Creek crayfish. The percent lipid for this sample was 1.6%.

1 Conductivity by Field Measurement

Lab: (Field Measurement)

Method: Measurement of field parameter

Samples: 201-__ 206-__ 207-__ 208-__ 209-__ 210-__ 212-__
218-__ 219-__ 220-__

Comments:
(N/A)

1 Hardness in Water by Calculation

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3122.3C

Samples: 201-__ 202-__ 203-__ 204-__ 206-__ 207-__ 208-__
209-__ 210-__ 211-__ 212-__ 213-__ 214-__ 215-__
216-__ 218-__ 219-__ 220-__ 222-__

Comments:
Samples 203, 207 & 209 were determined to be improperly preserved when checked in the laboratory. Therefore, the samples were acidified with 2 mL of nitric acid and allowed to sit for 24 hours. The subsequent pH check indicated a pH less than 2.

1 Metals - Dissolved, in Water by ICP/MS

Lab: Region 7 EPA Laboratory - Kansas City, Ks.

Method: EPA Region 7 RLAB Method 3123.1A Applied to Field Filtered Samples for "Dissolved" Results

Samples: 201-__ 202-__ 203-__ 204-__ 206-__ 207-__ 208-__
209-__ 210-__ 211-__ 212-__ 213-__ 214-__ 215-__
216-__ 218-__ 219-__ 220-__ 222-__

Comments:
Silver was UJ-coded in samples 201-204, 206-216, 218-220, and 222. This analyte was not found in the samples at or above the reporting limit, however, the reporting limit is an estimate (UJ-coded) due to the instrument calibration standard not meeting method validation requirements. The actual reporting limit may be higher than the reported value.

Selenium was UJ-coded in samples 201-204, 206-208, 210-216, 218-220, and 222. This analyte was not found in the samples at or above the reporting limit, however, the reporting limit is an estimate (UJ-coded) due to low recovery of this analyte in the corresponding laboratory control sample. The actual reporting limit for this analyte may be higher than the reported value.

Analysis	Comments About Results For This Analysis

Sample 209 was determined to be improperly preserved when checked in the laboratory. Therefore, the sample was acidified with 2 mL of nitric acid and allowed to sit for 24 hours. The subsequent pH check indicated a pH less than 2.

1 pH of Water by Field Measurement

Lab: (Field Measurement)

Method: Measurement of field parameter

Samples: 201-__ 206-__ 207-__ 208-__ 209-__ 210-__ 212-__
218-__ 219-__ 220-__

Comments:
(N/A)

1 Temperature of Water by Field Measurement

Lab: (Field Measurement)

Method: Measurement of field parameter

Samples: 201-__ 206-__ 207-__ 208-__ 209-__ 210-__ 212-__
218-__ 219-__ 220-__

Comments:
(N/A)

1 Total Dissolved Oxygen in Water by Field Measurement

Lab: (Field Measurement)

Method: Measurement of field parameter

Samples: 201-__ 206-__ 207-__ 208-__ 209-__ 210-__ 212-__
218-__ 219-__ 220-__

Comments:
(N/A)

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	1-__	2-__	3-__	4-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	1160	18900	7970	2480
Antimony	mg/kg	2.1 U	4.5 U	3.0 U	2.0 U
Arsenic	mg/kg	6.9 J	17.8	11.7	5.0 U
Barium	mg/kg	994	6910	3800	726
Beryllium	mg/kg	1.1 U	2.7	1.5 U	1.0 U
Cadmium	mg/kg	5.2 J	6.4	4.5	3.3
Calcium	mg/kg	61700	3930	9020	6160
Chromium	mg/kg	17.6 J	26.6	20.5	52.5
Cobalt	mg/kg	4.3	9.6	8.0	12.0
Copper	mg/kg	8.4 J	53.4	23.9	6.9
Iron	mg/kg	12800	42300	26900	21700
Lead	mg/kg	4040 J	2550	266	140
Magnesium	mg/kg	33900	3540	5230	3110
Manganese	mg/kg	1020	166	593	949
Molybdenum	mg/kg	2.1 U	4.5 U	3.0 U	2.0 U
Nickel	mg/kg	6.7 J	22.4	13.5	8.2
Potassium	mg/kg	497	1080	461	89.0
Selenium	mg/kg	10.5 UJ	22.3 U	14.9 U	10.1 U
Silver	mg/kg	2.1 U	4.5 U	3.0 U	2.0 U
Sodium	mg/kg	112	111 U	74.3 U	50.4 U
Thallium	mg/kg	10.5 U	22.3 U	14.9 U	10.1 U
Vanadium	mg/kg	15.2	80.0	44.3	43.4
Zinc	mg/kg	193	770	688	338
1 Percent Solid					
Solids, percent	%	82.9	39.0	62.7	82.5
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	0.87 J	0.34 J	1.47 J	1.33 J

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	5-__	6-__	7-__	8-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	2860	1750	1150	744
Antimony	mg/kg	2.4 U	2.0 U	1.4 U	1.4 U
Arsenic	mg/kg	7.4	5.0 U	3.5 U	3.4 U
Barium	mg/kg	420	898	262	269
Beryllium	mg/kg	1.2 U	1.0 U	0.7 U	0.7 U
Cadmium	mg/kg	2.3	1.9	1.7	1.6
Calcium	mg/kg	9100	2710	1250	883
Chromium	mg/kg	23.7	25.9	21.9	25.4
Cobalt	mg/kg	7.0	3.1	3.3	2.8
Copper	mg/kg	4.5	5.2	2.9	2.9
Iron	mg/kg	15400	13300	11600	11500
Lead	mg/kg	54.3	99.4	49.0	53.2
Magnesium	mg/kg	5460	1480	744	552
Manganese	mg/kg	640	137	96.4	121
Molybdenum	mg/kg	2.4 U	2.0 U	1.4 U	1.4 U
Nickel	mg/kg	6.5	4.7	4.3	4.0
Potassium	mg/kg	171	94.6	46.0	34.2 U
Selenium	mg/kg	12.0 U	10.1 U	7.0 U	6.8 U
Silver	mg/kg	2.4 U	2.0 U	1.4 U	1.4 U
Sodium	mg/kg	60.1 U	50.4 U	35.2 U	34.2 U
Thallium	mg/kg	12.0 U	10.1 U	7.0 U	6.8 U
Vanadium	mg/kg	30.6	27.6	24.8	22.1
Zinc	mg/kg	172	276	182	178
1 Percent Solid					
Solids, percent	%	76.3	84.3	84.1	82.4
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	0.27 J	0.10 J	0.11 J	0.07 J

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	9-__	10-__	11-__	12-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	800	843	865	4870
Antimony	mg/kg	1.9 U	1.6 U	1.7 U	2.6 U
Arsenic	mg/kg	4.9 U	4.1 U	4.2 U	7.1
Barium	mg/kg	201	136	131	3040
Beryllium	mg/kg	1.0 U	0.8 U	0.8 U	1.3 U
Cadmium	mg/kg	1.2	1.1	1.6	4.7
Calcium	mg/kg	23500	3720	75300	41300
Chromium	mg/kg	12.7	14.2	17.2	16.5
Cobalt	mg/kg	2.4	2.2	3.4	7.7
Copper	mg/kg	1.9	3.1	1.0	34.2
Iron	mg/kg	7480	7900	7610	16000
Lead	mg/kg	37.5	38.7	70.8	614
Magnesium	mg/kg	4080	2160	43700	19900
Manganese	mg/kg	125	83.9	250	782
Molybdenum	mg/kg	1.9 U	1.6 U	1.7 U	2.6 U
Nickel	mg/kg	2.9	2.9	2.2	10.4
Potassium	mg/kg	48.7 U	62.2	78.3	382
Selenium	mg/kg	9.7 U	8.1 U	8.5 U	12.8 U
Silver	mg/kg	1.9 U	1.6 U	1.7 U	2.6 U
Sodium	mg/kg	154	40.7 U	168	100
Thallium	mg/kg	9.7 U	8.1 U	8.5 U	12.8 U
Vanadium	mg/kg	16.4	16.9	16.4	26.6
Zinc	mg/kg	131	141	162	436
1 Percent Solid					
Solids, percent	%	86.6	81.6	83.1	66.4
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	0.12 J	0.10 UJ	0.81 J	4.06 J

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	13-__	14-__	15-__	16-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	5040	2740	8650	4450
Antimony	mg/kg	2.5 U	2.0 U	2.0 U	1.6 U
Arsenic	mg/kg	6.3 U	8.6	9.0	6.3
Barium	mg/kg	1760	2880	2420	1340
Beryllium	mg/kg	1.3 U	1.0 U	1.0 U	0.8 U
Cadmium	mg/kg	2.4	2.2	4.7	5.1
Calcium	mg/kg	11400	11600	9020	830
Chromium	mg/kg	13.6	15.3	19.4	29.6
Cobalt	mg/kg	5.9	2.1	15.5	12.2
Copper	mg/kg	16.6	11.0	17.0	18.3
Iron	mg/kg	10700	13200	25600	30000
Lead	mg/kg	193	228	703	397
Magnesium	mg/kg	6230	6620	5340	630
Manganese	mg/kg	273	121	1290	114
Molybdenum	mg/kg	2.5 U	2.0 U	2.0 U	1.6 U
Nickel	mg/kg	7.2	5.3	12.8	10.4
Potassium	mg/kg	380	181	525	196
Selenium	mg/kg	12.6 U	10.2 U	9.9 U	7.8 U
Silver	mg/kg	2.5 U	2.0 U	2.0 U	1.6 U
Sodium	mg/kg	109	50.8 U	72.2	38.9 U
Thallium	mg/kg	12.6 U	10.2 U	9.9 U	7.8 U
Vanadium	mg/kg	25.6	22.9	49.9	59.3
Zinc	mg/kg	298	283	609	650
1 Percent Solid					
Solids, percent	%	45.3	79.3	64.2	79.6
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	5.24 J	0.41 J	2.56 J	0.45 J

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	17-__	18-__	19-__	20-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	2440	1690	1560	972
Antimony	mg/kg	2.1 U	1.5 U	1.6 U	2.2 U
Arsenic	mg/kg	6.3	3.8 U	4.1 U	12.3
Barium	mg/kg	2000	506	1090	4490
Beryllium	mg/kg	1.1 U	0.8 U	0.8 U	1.1 U
Cadmium	mg/kg	8.5	2.0	6.4	5.0
Calcium	mg/kg	51600	5100	2900	248
Chromium	mg/kg	34.0	25.8	54.2	29.2
Cobalt	mg/kg	8.3	4.0	5.3	1.5
Copper	mg/kg	24.8	4.3	27.0	28.9
Iron	mg/kg	22300	12200	37300	33100
Lead	mg/kg	763	113	251	167
Magnesium	mg/kg	27600	2750	1720	186
Manganese	mg/kg	1210	344	356	110
Molybdenum	mg/kg	2.1 U	1.5 U	1.6 U	2.2 U
Nickel	mg/kg	11.4	4.3	14.2	13.5
Potassium	mg/kg	259	93.6	60.3	55.5 U
Selenium	mg/kg	10.5 U	7.6 U	8.2 U	11.1 U
Silver	mg/kg	2.1 U	1.5 U	1.6 U	2.2 U
Sodium	mg/kg	81.5	37.9 U	41.2 U	55.5 U
Thallium	mg/kg	10.5 U	7.6 U	8.2 U	11.1 U
Vanadium	mg/kg	23.4	24.4	41.0	32.0
Zinc	mg/kg	604	304	608	611
1 Percent Solid					
Solids, percent	%	82.7	77.3	76.4	82.4
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	1.21 J	0.25 J	0.12 J	0.18 J

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	21-__	22-__	23-__	24-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	29800	3350	7600	3350
Antimony	mg/kg	2.8 U	1.6 U	2.0 U	2.3 UJ
Arsenic	mg/kg	26.5	7.6	7.4	6.9
Barium	mg/kg	5030	2400	2810	3760
Beryllium	mg/kg	1.4	0.8 U	1.0 U	1.1 U
Cadmium	mg/kg	7.3	3.9	2.9	8.3 J
Calcium	mg/kg	4310	20100	106000	20200 J
Chromium	mg/kg	45.5	20.5	9.1	18.3
Cobalt	mg/kg	4.6	7.0	8.5	9.0
Copper	mg/kg	56.6	24.8	10.2	38.4
Iron	mg/kg	47100	20100	12200	18500
Lead	mg/kg	2150	513	339	1160
Magnesium	mg/kg	3300	11500	56100	10300 J
Manganese	mg/kg	250	840	373	789
Molybdenum	mg/kg	2.8 U	1.6 U	2.0 U	2.3 U
Nickel	mg/kg	20.0	8.0	9.1	9.9
Potassium	mg/kg	854	205	578	362
Selenium	mg/kg	14.2 U	8.1 U	9.8 U	11.3 U
Silver	mg/kg	2.8 U	1.6 U	2.0 U	2.3 U
Sodium	mg/kg	71.1 U	61.6	194	108
Thallium	mg/kg	14.2 U	8.1 U	9.8 U	11.3 U
Vanadium	mg/kg	117	29.0	25.2	26.0
Zinc	mg/kg	293	598	209	1290
1 Percent Solid					
Solids, percent	%	69.2	69.2	82.1	83.3
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	0.47 J	2.75 J	3.06 J	4.65 J

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	25-__	26-__	27-__	28-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	3790	17100	23300	2500
Antimony	mg/kg	1.8 U	2.2 U	2.3 U	1.8 U
Arsenic	mg/kg	12.3	17.4	15.8	4.5 U
Barium	mg/kg	2310	4550	4230	3910
Beryllium	mg/kg	0.9 U	1.1 U	1.5	0.9 U
Cadmium	mg/kg	2.5	12.7	7.5	2.0
Calcium	mg/kg	94600	15800	6640	1440
Chromium	mg/kg	6.5	23.5	29.0	27.5
Cobalt	mg/kg	8.3	15.2	13.4	5.4
Copper	mg/kg	31.9	58.2	57.8	11.0
Iron	mg/kg	11800	52500	36200	14500
Lead	mg/kg	2540	396	1560	386
Magnesium	mg/kg	54600	9450	4760	795
Manganese	mg/kg	574	1470	566	574
Molybdenum	mg/kg	1.8 U	2.2 U	2.3 U	1.8 U
Nickel	mg/kg	8.7	35.2	25.5	4.6
Potassium	mg/kg	341	1340	1210	174
Selenium	mg/kg	8.9 U	11.1 U	11.3 U	9.0 U
Silver	mg/kg	1.8 U	2.2 U	2.3 U	1.8 U
Sodium	mg/kg	292	59.1	56.4 U	45.1 U
Thallium	mg/kg	8.9 U	11.1 U	11.3 U	9.0 U
Vanadium	mg/kg	25.8	87.4	83.6	29.4
Zinc	mg/kg	201	1850	1530	216
1 Percent Solid					
Solids, percent	%	92.0	79.7	80.5	82.9
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	2.12 J	4.04 J	3.34 J	1.17 J

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	29-__	30-__	37-__	38-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	5860	1280	8100	9390
Antimony	mg/kg	2.1 U	2.4 U	2.3 U	2.3 U
Arsenic	mg/kg	10.6	6.0 U	5.7 U	10.8
Barium	mg/kg	2730	35.7	2750	3900
Beryllium	mg/kg	1.1 U	1.2 U	1.1 U	1.1 U
Cadmium	mg/kg	5.2	4.9	3.1	4.0
Calcium	mg/kg	2510	37100	2220	1410
Chromium	mg/kg	22.4	11.6	16.0	17.7
Cobalt	mg/kg	8.8	13.5	9.2	6.8
Copper	mg/kg	37.6	6.0	14.8	19.3
Iron	mg/kg	31900	18800	18000	26600
Lead	mg/kg	346	490	150	279
Magnesium	mg/kg	1170	19000	1700	1360
Manganese	mg/kg	575	1260	899	363
Molybdenum	mg/kg	2.1 U	2.4 U	2.3 U	2.3 U
Nickel	mg/kg	12.2	11.8	12.2	10.0
Potassium	mg/kg	461	272	555	551
Selenium	mg/kg	10.6 U	12.0 U	11.4 U	11.3 U
Silver	mg/kg	2.1 U	2.4 U	2.3 U	2.3 U
Sodium	mg/kg	52.8 U	60.1	57.1 U	56.6 U
Thallium	mg/kg	10.6 U	12.0 U	11.4 U	11.3 U
Vanadium	mg/kg	42.9	19.6	32.2	44.3
Zinc	mg/kg	663	242	402	481
1 Percent Solid					
Solids, percent	%	89.3	83.6	83.5	83.4
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	3.00 J	0.48 J	1.06 J	1.19 J

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	40-__	101-__	102-__	103-__
1 Metals in Solids by ICP					
Aluminum	mg/kg	9950			
Antimony	mg/kg	2.2 U			
Arsenic	mg/kg	7.0			
Barium	mg/kg	3560			
Beryllium	mg/kg	1.1 U			
Cadmium	mg/kg	4.2			
Calcium	mg/kg	7870			
Chromium	mg/kg	20.1			
Cobalt	mg/kg	9.2			
Copper	mg/kg	25.5			
Iron	mg/kg	24200			
Lead	mg/kg	340			
Magnesium	mg/kg	4290			
Manganese	mg/kg	1160			
Molybdenum	mg/kg	2.2 U			
Nickel	mg/kg	17.6			
Potassium	mg/kg	1050			
Selenium	mg/kg	10.8 U			
Silver	mg/kg	2.2 U			
Sodium	mg/kg	82.4			
Thallium	mg/kg	10.8 U			
Vanadium	mg/kg	41.4			
Zinc	mg/kg	534			
1 Percent Solid					
Solids, percent	%	62.5			
1 Total Organic Carbon in Soil					
Total Organic Carbon	%	3.06 J			
1 Metals in Fish by ICP					
Cadmium	mg/kg		0.12 U	0.12 U	0.12 U
Lead	mg/kg		0.68 U	0.68 U	2.05
Selenium	mg/kg		2.20 U	2.20 U	2.24 U
1 Percent Lipid in Tissue					
Lipid	%		6.7	1.2	12

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	104-__	105-__	106-__	107-__
1 Metals in Fish by ICP					
Cadmium	mg/kg	0.12 U	0.11 U	0.12 U	0.12 U
Lead	mg/kg	0.68 U	0.64 U	7.83	3.68
Selenium	mg/kg	2.20 U	2.07 U	2.18 U	2.17 U
1 Percent Lipid in Tissue					
Lipid	%	6.7	0.94		1.2

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	108-__	109-__	110-__	111-__
1 Metals in Fish by ICP					
Cadmium	mg/kg	0.12 U	1.24	0.11 U	0.12 U
Lead	mg/kg	11.7	7.95	2.19	2.23
Selenium	mg/kg	2.21 U	2.16 U	2.14 U	2.23 U

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	112-__	113-__	114-__	115-__
1 Metals in Fish by ICP					
Cadmium	mg/kg	1.72	0.11 U	0.12 U	0.12 U
Lead	mg/kg	43.9	0.65 U	105	0.68 U
Selenium	mg/kg	1.91 U	2.09 U	2.22 U	2.18 U
1 Percent Lipid in Tissue					
Lipid	%		1.6		6.1

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	117-__	118-__	119-__	120-__
1 Metals in Fish by ICP					
Cadmium	mg/kg	0.11 U	0.19	0.41	0.11 U
Lead	mg/kg	6.34	8.43	34.7	0.66 U
Selenium	mg/kg	2.15 U	1.88 U	1.99 U	2.11 U
1 Percent Lipid in Tissue					
Lipid	%				1.3

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	121-__	122-__	135-__	136-__
1 Metals in Fish by ICP					
Cadmium	mg/kg	0.11 U	0.12 U	0.11 U	0.12 U
Lead	mg/kg	0.68	3.58	0.67 U	3.11
Selenium	mg/kg	2.11 U	2.20 U	2.14 U	2.20 U
1 Percent Lipid in Tissue					
Lipid	%	0.60	1.3	4.5	5.3

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	137-__	138-__	139-__	201-__
1 Metals in Fish by ICP					
Cadmium	mg/kg	0.10 U	0.11 U	0.14	
Lead	mg/kg	0.61 U	1.39	9.49	
Selenium	mg/kg	1.96 U	2.08 U	2.21 U	
1 Percent Lipid in Tissue					
Lipid	%	0.85	3.1	4.7	
1 Conductivity by Field Measurement					
Conductivity	umhos/cm				0.191
1 Hardness in Water by Calculation					
Hardness as CaCO3	mg/L				110
1 Metals - Dissolved, in Water by ICP/MS					
Antimony	ug/L				2.0 U
Arsenic	ug/L				1.0
Barium	ug/L				1190
Beryllium	ug/L				1.0 U
Cadmium	ug/L				1.0 U
Chromium	ug/L				2.0 U
Cobalt	ug/L				1.0 U
Copper	ug/L				2.0 U
Lead	ug/L				7.0
Manganese	ug/L				7.3
Nickel	ug/L				1.0 U
Selenium	ug/L				5.0 UJ
Silver	ug/L				1.0 UJ
Thallium	ug/L				1.0 U
Vanadium	ug/L				1.0 U
Zinc	ug/L				22.6
1 pH of Water by Field Measurement					
pH	SU				8.89
1 Temperature of Water by Field Measurement					
Temperature	Deg C				28.9
1 Total Dissolved Oxygen in Water by Field Measurement					
Dissolved Oxygen	mg/L				8.00

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	202-__	203-__	204-__	206-__
1 Conductivity by Field Measurement					
Conductivity	umhos/cm				0.463
1 Hardness in Water by Calculation					
Hardness as CaCO3	mg/L	164	297	316	252
1 Metals - Dissolved, in Water by ICP/MS					
Antimony	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Arsenic	ug/L	1.1	1.0 U	1.0 U	1.0 U
Barium	ug/L	1170	527	411	536
Beryllium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Chromium	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Cobalt	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Copper	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Lead	ug/L	1.0 U	7.7	1.0 U	1.0 U
Manganese	ug/L	45.3	82.1	6.5	14.9
Nickel	ug/L	1.0 U	1.1	1.1	1.1
Selenium	ug/L	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Silver	ug/L	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Thallium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Vanadium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	ug/L	12.7	53.0	4.8	12.6
1 pH of Water by Field Measurement					
pH	SU				8.55
1 Temperature of Water by Field Measurement					
Temperature	Deg C				20.9
1 Total Dissolved Oxygen in Water by Field Measurement					
Dissolved Oxygen	mg/L				10.45

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	207-__	208-__	209-__	210-__
1 Conductivity by Field Measurement					
Conductivity	umhos/cm	0.396	0.406	0.428	0.407
1 Hardness in Water by Calculation					
Hardness as CaCO3	mg/L	222	224	236	235
1 Metals - Dissolved, in Water by ICP/MS					
Antimony	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Arsenic	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Barium	ug/L	512	530	540	612
Beryllium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Chromium	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Cobalt	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Copper	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Lead	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Manganese	ug/L	8.4	4.7	9.9	10.5
Nickel	ug/L	1.0 U	1.0 U	1.2	1.0 U
Selenium	ug/L	5.0 UJ	5.0 UJ	5.0 U	5.0 UJ
Silver	ug/L	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Thallium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Vanadium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	ug/L	4.8	24.3	3.8	3.0
1 pH of Water by Field Measurement					
pH	SU	8.47	8.41	8.35	8.35
1 Temperature of Water by Field Measurement					
Temperature	Deg C	23.3	23.6	22.0	26.6
1 Total Dissolved Oxygen in Water by Field Measurement					
Dissolved Oxygen	mg/L	9.89	9.08	9.90	7.96

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	211-__	212-__	213-__	214-__
1 Conductivity by Field Measurement					
Conductivity	umhos/cm		0.569		
1 Hardness in Water by Calculation					
Hardness as CaCO3	mg/L	182	321	267	150
1 Metals - Dissolved, in Water by ICP/MS					
Antimony	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Arsenic	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Barium	ug/L	835	259	384	949
Beryllium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Chromium	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Cobalt	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Copper	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Lead	ug/L	1.0 U	1.7	1.0 U	1.0 U
Manganese	ug/L	15.5	12.9	6.4	1.2
Nickel	ug/L	1.0 U	1.3	1.0 U	1.0 U
Selenium	ug/L	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Silver	ug/L	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Thallium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Vanadium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	ug/L	31.1	10.4	20.5	3.2
1 pH of Water by Field Measurement					
pH	SU		8.25		
1 Temperature of Water by Field Measurement					
Temperature	Deg C		23.6		
1 Total Dissolved Oxygen in Water by Field Measurement					
Dissolved Oxygen	mg/L		8.45		

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	215-__	216-__	218-__	219-__
1 Conductivity by Field Measurement					
Conductivity	umhos/cm			0.379	0.383
1 Hardness in Water by Calculation					
Hardness as CaCO3	mg/L	223	153	218	215
1 Metals - Dissolved, in Water by ICP/MS					
Antimony	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Arsenic	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Barium	ug/L	321	452	688	669
Beryllium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Chromium	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Cobalt	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Copper	ug/L	2.0 U	2.0 U	2.0 U	2.0 U
Lead	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Manganese	ug/L	3.0	3.0	8.0	4.8
Nickel	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Selenium	ug/L	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ
Silver	ug/L	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Thallium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Vanadium	ug/L	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	ug/L	6.5	6.5	8.5	7.9
1 pH of Water by Field Measurement					
pH	SU			8.38	8.46
1 Temperature of Water by Field Measurement					
Temperature	Deg C			24.2	23.7
1 Total Dissolved Oxygen in Water by Field Measurement					
Dissolved Oxygen	mg/L			7.59	7.82

Project ID: VMA78D01 Project Desc: Washington County Lead District - Potosi site (Ecological RA sampling)

Analysis/ Analyte	Units	220-__	222-__
1 Conductivity by Field Measurement			
Conductivity	umhos/cm	0.147	
1 Hardness in Water by Calculation			
Hardness as CaCO3	mg/L	77.7	108
1 Metals - Dissolved, in Water by ICP/MS			
Antimony	ug/L	2.0 U	2.0 U
Arsenic	ug/L	1.0 U	1.0 U
Barium	ug/L	457	369
Beryllium	ug/L	1.0 U	1.0 U
Cadmium	ug/L	1.0 U	1.0 U
Chromium	ug/L	2.0 U	2.0 U
Cobalt	ug/L	1.0 U	1.0 U
Copper	ug/L	2.0 U	3.1
Lead	ug/L	1.0 U	9.1
Manganese	ug/L	81.5	92.0
Nickel	ug/L	1.0 U	1.0 U
Selenium	ug/L	5.0 UJ	5.0 UJ
Silver	ug/L	1.0 UJ	1.0 UJ
Thallium	ug/L	1.0 U	1.0 U
Vanadium	ug/L	1.0 U	1.0 U
Zinc	ug/L	47.7	55.5
1 pH of Water by Field Measurement			
pH	SU	7.93	
1 Temperature of Water by Field Measurement			
Temperature	Deg C	28.9	
1 Total Dissolved Oxygen in Water by Field Measurement			
Dissolved Oxygen	mg/L	6.74	

United States Environmental Protection Agency
Region VII
901 N. 5th Street
Kansas City, KS 66101

Date: __/__/____

Subject: Data Disposition/Sample Release for ASR #: 3881

Project ID: VMA78D01

Project Description: Washington County Lead District - Potosi site (Ecological RA sampling)

From: Venessa Madden
ENSV/DISO

To: Kaye Dollmann
ENSV/RLAB

I have received and reviewed the Transmittal of Sample Analysis Results for the above-referenced Analytical Services Request(ASR) and have indicated my findings below by checking one of the boxes for Data Disposition.

I understand all samples will be disposed upon receipt of this form, unless samples are requested to be held. If I do not return this form all samples will be disposed of on _____.

☐ "RELEASED" - Read-only to all Region 7 employees and contractors that have R7LIMS "Customer" account. All Samples may be disposed of upon receipt of this form if not requested to be held.

☐ "Project Manager Accessible" - Available on the LAN in R7LIMS for my use only. All Samples may be disposed of upon receipt of this form if not requested to be held.

☐ "Archived" - THIS DATA IS OF A SENSITIVE NATURE. Any future reports must be requested through the laboratory. All samples may be disposed of upon receipt of the form if not requested to be held.

☐ Hold Samples - I have determined that the samples need to be held until _____, after which time they will be disposed of in accordance with applicable regulations.
The reason for the hold is:

☐ Samples are associated with a legal proceeding.

☐ Question/Concern with data - possible reanalysis requested.

☐ Other:_____

Appendix B

RAGS D TABLE 1 AND TABLE 2s

Scenario Timeframe	Medium	Exposure Medium	Exposure Point(s)	Receptor Population	Receptor Age	Exposure Route	On-Site/Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Water	Surface Water	Surface Water (Potosi, Old Mines, Richwoods)	Recreational User	Adult	Dermal Absorption	On/Off-site	Qual.	Adult recreational users may be exposed (via dermal contact) to contaminants in Surface Water.
						Ingestion	On/Off-site	Qual.	Adult recreational users may be exposed to contaminants in Surface Water.
					Child	Dermal Absorption	On/Off-site	Qual.	Child recreational users may be exposed (via dermal contact) to contaminants in Surface Water.
						Ingestion	On/Off-site	Qual.	Child recreational users may be exposed to contaminants in Surface Water.
					Adult/Child	Dermal Absorption	On/Off-site	Qual.	Adult/child cancer risk combined for recreational exposure (via dermal contact) to contaminants in Surface Water.
						Ingestion	On/Off-site	Qual.	Adult/child cancer risk combined for recreational exposure to contaminants in Surface Water.
	Sediment	Sediment	Sediment (Potosi, Old Mines, Richwoods)	Recreational User	Adult	Dermal Absorption	On/Off-site	Qual.	Adult recreational users may be exposed to contaminants in Sediment.
						Ingestion	On/Off-site	Qual.	Adult recreational users may be exposed to contaminants in Sediment.
					Child	Dermal Absorption	On/Off-site	Qual.	Child recreational users may be exposed to contaminants in Sediment.
						Ingestion	On/Off-site	Qual.	Child recreational users may be exposed to contaminants in Sediment.
					Adult/Child	Dermal Absorption	On/Off-site	Qual.	Adult/child cancer risk combined for recreational exposure to contaminants in Sediment.
						Ingestion	On/Off-site	Qual.	Adult/child cancer risk combined for recreational exposure to contaminants in Sediment.
	Fish Tissue	Fish Fillets	Site Wide	Recreational User	Adult	Ingestion	On-site	Qual.	Adult recreational users may be exposed to contaminants in fish tissue.
					Child	Ingestion	On-site	Qual.	Child recreational users may be exposed to contaminants in fish tissue.
					Adult/Child	Ingestion	On-site	Qual.	Adult/child cancer risk combined for recreational exposure to contaminants in Fish Tissue.
	Homegrown Produce	Homegrown Produce	Residential Properties	Residential	Adult	Ingestion	On-site	Qual.	Adult residents may consume vegetables grown in backyard gardens.
					Child	Ingestion	On-site	Qual.	Child residents may consume vegetables grown in backyard gardens.
					Adult/Child	Ingestion	On-site	Qual.	Adult/child cancer risk combined for residential exposure to contaminants in vegetables grown in backyard gardens.
	Agricultural Products	Agicultural Products	County Wide	Residential	Adult	Ingestion	On-site	Qual.	Adult residents may consume agricultural products (i.e., meat, dairy, produce) that have bioaccumulated contaminants from past mining activities.
					Child	Ingestion	On-site	Qual.	Child residents may consume agricultural products (i.e., meat, dairy, produce) that have bioaccumulated contaminants from past mining activities.
					Adult/Child	Ingestion	On-site	Qual.	Adult/child cancer risk combined associated with consumption of agricultural products (i.e., meat, dairy, produce) that have bioaccumulated contaminants.
	Soil	Surface Soil	Mine Waste Areas and Area Wide Soils (Potosi, Old Mines, Richwoods)	Resident	Adult	Dermal Absorption	On-site	Qual.	Adult Residents may be exposed to contaminants in surface soil.
						Inhalation	On-site	Qual.	Adult Residents may be exposed (via inhalation) to dusts/particulate matter from surface soil.
						Ingestion	On-site	Qual.	Adult Residents may be exposed to contaminants in surface soil.
					Child	Dermal Absorption	On-site	Qual.	Child Residents may be exposed to contaminants in surface soil.
						Inhalation	On-site	Qual.	Child Residents may be exposed (via inhalation) to dusts/particulate matter from surface soil.
						Ingestion	On-site	Qual.	Child Residents may be exposed to contaminants in surface soil.
					Adult/Child	Dermal Absorption	On-site	Qual.	Adult/child cancer risk combined for Residents exposed to contaminants in surface soil.
						Inhalation	On-site	Qual.	Adult/child cancer risk combined for Residents exposed (via inhalation) to dusts/particulate matter from surface soil.
						Ingestion	On-site	Qual.	Adult/child cancer risk combined for Residents exposed to contaminants in surface soil.
				Industrial/Commercial Worker	Adult	Dermal Absorption	On-site	Qual.	Industrial/Commercial Workers may be exposed to contaminants while performing work duties.
						Inhalation	On-site	Qual.	Industrial/Commercial Workers may be exposed (via inhalation) to dusts/particulate matter from soil while performing work duties.
						Ingestion	On-site	Qual.	Industrial/Commercial Workers may be exposed to contaminants while performing work duties.
				Recreational User (ATV Rider)	Adolescent	Dermal Absorption	On-site	Qual.	Adolescent recreational users may be exposed to contaminants in Source Areas.
						Inhalation	On-site	Qual.	Adolescent recreational users may be exposed (via inhalation) to dusts/particulate matter from surface soil.
						Ingestion	On-site	Qual.	Adolescent recreational users may be exposed to contaminants in Source Areas.
				Construction Worker	Adult	Dermal Absorption	On-site	Qual.	Construction Workers may be exposed to contaminants while performing excavation activities (e.g., utilities, building foundations).
						Inhalation	On-site	Qual.	Construction Workers may be exposed (via inhalation) to dusts/particulate matter while performing excavation activities (e.g., utilities, building foundataions).
						Ingestion	On-site	Qual.	Construction Workers may be exposed to contaminants while performing excavation activities (e.g., utilities, building foundations).
			Residential Properties (48 Properties sampled during 2008 Field Investigation)	Resident	Adult	Dermal Absorption	On-site	Quant	Adult Residents may be exposed to contaminants in surface soil.
						Inhalation	On-site	Qual.	Adult Residents may be exposed (via inhalation) to dusts/particulate matter from surface soil.
						Ingestion	On-site	Quant	Adult Residents may be exposed to contaminants in surface soil.
					Child	Dermal Absorption	On-site	Quant	Child Residents may be exposed to contaminants in surface soil.
						Inhalation	On-site	Qual.	Child Residents may be exposed (via inhalation) to dusts/particulate matter from surface soil.
						Ingestion	On-site	Quant	Child Residents may be exposed to contaminants in surface soil.
					Adult/Child	Dermal Absorption	On-site	Quant	Adult/child cancer risk combined for Residents exposed to contaminants in surface soil.
						Inhalation	On-site	Qual.	Adult/child cancer risk combined for Residents exposed (via inhalation) to dusts/particulate matter from surface soil.
						Ingestion	On-site	Quant	Adult/child cancer risk combined for Residents exposed to contaminants in surface soil.
	Groundwater	Potable Wells	Area Wide Groundwater for Potosi, Richwoods and Old Mines	Industrial/Commercial Worker	Adult	Dermal Absorption	On-site	Qual.	Industrial/Commercial workers may be exposed (via dermal contact) to constituents in potable water.
						Ingestion	On-site	Qual.	Industrial/Commercial workers may be exposed to constituents in potable water.
				Construction Worker	Adult	Dermal Absorption	On-site	Qual.	Construction workers may be exposed (via dermal contact) to constituents in potable water.
						Ingestion	On-site	Qual.	Construction workers may be exposed to constituents in potable water.
			Area Wide Groundwater for Potosi, Old Mines, and Richwoods	Resident	Adult	Dermal Absorption	On-site	Qual.	Adult residents may be exposed (via dermal contact) to constituents in potable water.
						Ingestion	On-site	Qual.	Adult residents may be exposed to constituents in potable water.
					Child	Dermal Absorption	On-site	Qual.	Child residents may be exposed (via dermal contact) to constituents in potable water.
						Ingestion	On-site	Qual.	Child residents may be exposed to constituents in potable water.
					Adult/Child	Dermal Absorption	On-site	Qual.	Cancer risk combined for adult/child resident who may be exposed (via dermal contact) to contaminants in potable water.
						Ingestion	On-site	Qual.	Cancer risk combined for adult/child resident who may be exposed to contaminants in potable water.
			Residential Properties (22 Properties sampled during 2008 Field Investigation)	Resident	Adult	Dermal Absorption	On-site	Quant.	Adult residents may be exposed (via dermal contact) to constituents in potable water.
						Ingestion	On-site	Quant.	Adult residents may be exposed to constituents in potable water.
					Child	Dermal Absorption	On-site	Quant.	Child residents may be exposed (via dermal contact) to constituents in potable water.
						Ingestion	On-site	Quant.	Child residents may be exposed to constituents in potable water.
					Adult/Child	Dermal Absorption	On-site	Quant.	Cancer risk combined for adult/child resident who may be exposed (via dermal contact) to contaminants in potable water.
						Ingestion	On-site	Quant.	Cancer risk combined for adult/child resident who may be exposed to contaminants in potable water.

Table 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water (Potosi Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
								Min.	Max.							
Surface Water (Potosi Area)	**7440-38-2**	**Arsenic**	1	1.1	ug/L	3881-202	2 / 19	1	1	1.1	NA	0.045 ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	259	1190	ug/L	3881-201	19 / 19	NA	NA	1190	NA	730 nc	NA	NA	**Y**	**ASL**
	7440-50-8	Copper	3.1	3.1	ug/L	3881-222	1 / 19	2	2	3.1	NA	150 nc	NA	NA	N	BSL
	7439-92-1	Lead	1.7	9.1	ug/L	3881-222	4 / 19	1	1	9.1	NA	15	NA	NA	N	BSL
	7439-96-5	**Manganese**	1.2	92	ug/L	3881-222	19 / 19	NA	NA	92	NA	88 nc	NA	NA	**Y**	**ASL**
	7440-02-0	Nickel	1.1	1.3	ug/L	3881-212	5 / 19	1	1	1.3	NA	73 nc	NA	NA	N	BSL
	7440-66-6	Zinc	3	55.5	ug/L	3881-222	19 / 19	NA	NA	55.5	NA	1100 nc	NA	NA	N	BSL

Footnotes

NA = Not available
ug/L = micrograms per liter
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Tapwater (EPA, 2008b). For surface water, the Tapwater value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water (Richwoods Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min.	Max.									
Surface Water (Richwoods Area)	**7440-38-2**	**Arsenic**	1.08		3.33		ug/L	3169-105	7 / 14	1	1	3.33		NA	0.045	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	627	J	5380	J	ug/L	3169-105	14 / 14	10	10	5380	J	NA	730	nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	1.01	J	35	J	ug/L	3169-104	11 / 14	1	1	35	J	NA	15		NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
ug/L = micrograms per liter
(1) J = Analyte present. Reported value may not be accurate or precise.
U = Analyte not detected.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Tapwater (EPA, 2008b). For surface water, the Tapwater value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water (Old Mines Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
								Min.	Max.							
Surface Water (Old Mines Area)	**7440-38-2**	**Arsenic**	1.03	4.87	ug/L	3165-116	4 / 21	1	1	4.87	NA	0.045 ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	338	9290	ug/L	3165-116	21 / 21	10	10	9290	NA	730 nc	NA	NA	**Y**	**ASL**
	7440-43-9	Cadmium	1.15	1.15	ug/L	3165-116	1 / 21	1	1	1.15	NA	1.8 nc	NA	NA	N	BSL
	7439-92-1	**Lead**	1.09	540	ug/L	3165-116	20 / 21	1	1	540	NA	15	NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
ug/L = micrograms per liter
(1) J = Analyte present. Reported value may not be accurate or precise.
U = Analyte not detected.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Tapwater (EPA, 2008b). For surface water, the Tapwater value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment (Potosi Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
								Min	Max								
Sediment (Potosi Area)	**7429-90-5**	**Aluminum**	744	29800	mg/kg	3881-21	33 / 33	NA	NA	29800	NA	7700	nc	NA	NA	**Y**	**ASL**
	7440-38-2	**Arsenic**	6.3	26.5	mg/kg	3881-21	20 / 33	3.4	6.3	26.5	NA	0.39	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	35.7	6910	mg/kg	3881-2	33 / 33	NA	NA	6910	NA	1500	nc	NA	NA	**Y**	**ASL**
	7440-41-7	Beryllium	1.4	2.7	mg/kg	3881-2	3 / 33	0.7	1.5	2.7	NA	16	nc	NA	NA	N	BSL
	7440-43-9	**Cadmium**	1.1	12.7	mg/kg	3881-26	33 / 33	NA	NA	12.7	NA	7	nc	NA	NA	**Y**	**ASL**
	7440-70-2	Calcium	248	106000	mg/kg	3881-23	33 / 33	NA	NA	106000	NA	NA		NA	NA	N	NUT
	7440-47-3	Chromium (Total)	6.5	54.2	mg/kg	3881-19	33 / 33	NA	NA	54.2	NA	280	ca	NA	NA	N	BSL
	7440-48-4	**Cobalt**	1.5	15.5	mg/kg	3881-15	33 / 33	NA	NA	15.5	NA	2.3	nc	NA	NA	**Y**	**ASL**
	7440-50-8	Copper	1.0	58.2	mg/kg	3881-26	33 / 33	NA	NA	58.2	NA	310	nc	NA	NA	N	BSL
	7439-89-6	**Iron**	7480	52500	mg/kg	3881-26	33 / 33	NA	NA	52500	NA	5500	nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	37.5	4040	mg/kg	3881-1	33 / 33	NA	NA	4040	NA	400		NA	NA	**Y**	**ASL**
	7439-95-4	Magnesium	186	56100	mg/kg	3881-23	33 / 33	NA	NA	56100	NA	NA		NA	NA	N	NUT
	7439-96-5	**Manganese**	83.9	1470	mg/kg	3881-26	33 / 33	NA	NA	1470	NA	180	nc	NA	NA	**Y**	**ASL**
	7440-02-0	Nickel	2.2	35.2	mg/kg	3881-26	33 / 33	NA	NA	35.2	NA	160	nc	NA	NA	N	BSL
	7440-09-7	Potassium	46	1340	mg/kg	3881-26	30 / 33	34.2	55.5	1340	NA	NA		NA	NA	N	NUT
	7440-23-5	Sodium	59.1	292	mg/kg	3881-25	14 / 33	34.2	111	292	NA	NA		NA	NA	N	NUT
	7440-62-2	**Vanadium**	19.6	117	mg/kg	3881-21	33 / 33	NA	NA	117	NA	39	nc	NA	NA	**Y**	**ASL**
	7440-66-6	Zinc	131	1850	mg/kg	3881-26	33 / 33	NA	NA	1850	NA	2300	nc	NA	NA	N	BSL

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For sediment, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment (Richwoods Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Sediment (Richwoods Area)	**7440-38-2**	**Arsenic**	2.95	J	23.5	J	mg/kg	3169-006	12 / 16	1.18	5.21	23.5	J	NA	0.39	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	526		8100		mg/kg	3169-006	16 / 16	23.7	104	8100		NA	1500	nc	NA	NA	**Y**	**ASL**
	7440-43-9	Cadmium	0.781	J	2.3	J	mg/kg	3169-024	5 / 16	0.592	2.6	2.3	J	NA	7	nc	NA	NA	N	BSL
	7439-92-1	**Lead**	22.1		1620		mg/kg	3169-001	16 / 16	1.18	5.21	1620		NA	400		NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For sediment, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.6
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment (Old Mines Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Sediment (Old Mines Area)	**7440-38-2**	**Arsenic**	5.11		18		mg/kg	3165-013	5 / 22	5	5	18		NA	0.39	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	97.3		5480	J	mg/kg	3165-003	22 / 22	NA	NA	5480	J	NA	1500	nc	NA	NA	**Y**	**ASL**
	7440-43-9	**Cadmium**	1.26		11.6		mg/kg	3165-013	21 / 22	1	1	11.6		NA	7	nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	33.8		1620		mg/kg	3165-017	22 / 22	NA	NA	1620		NA	400		NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For sediment, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Mine Waste Soils (Potosi Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
								Min	Max							
Mine Waste Soils (Potosi Area)	**7440-38-2**	**Arsenic**	54.9	54.9	mg/kg	2730-021	1 / 1	1.1	1.1	54.9	NA	0.39 ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	3850	3850	mg/kg	2730-021	1 / 1	60	60	3850	NA	1500 nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead (XRF data)**	26	31047	mg/kg	158-S1	218 / 218	NA	NA	31047	NA	400	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	1540	1540	mg/kg	2730-021	1 / 1	1.1	1.1	1540	NA	400	NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For soil, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level; "NUT" = .

Table 2.8
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Mine Waste Soils (Richwoods Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
								Min	Max							
Mine Waste Soils (Richwoods Area)	**7440-38-2**	**Arsenic**	7.87 J	25.2 J	mg/kg	2730-029	4 / 4	1.02	1.1	25.2 J	NA	0.39 ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	829	6970	mg/kg	2691-011	4 / 4	20.4	65.9	6970	NA	1500 nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead (XRF data)**	220	4406	mg/kg	20008-S-1	18 / 18	NA	NA	4406	NA	400	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	185	1280	mg/kg	2691-011	4 / 4	1.02	1.1	1280	NA	400	NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For soil, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level; "NUT" = .

Table 2.9
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Mine Waste Soils (Old Mines Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Mine Waste Soils (Old Mines Area)	**7440-38-2**	**Arsenic**	4.14	J	25.2	J	mg/kg	2774-005	15 / 15	1.01	5.1	25.2	J	NA	0.39	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	1040	J	6590	J	mg/kg	2774-018	15 / 15	2	64.9	6590	J	NA	1500	nc	NA	NA	**Y**	**ASL**
	7440-43-9	**Cadmium**	1.99	J	11.4		mg/kg	3295-007	5 / 15	0.505	1	11.4		NA	7	nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead (XRF data)**	234		3343		mg/kg	20247-S-1	27 / 27	NA	NA	3343		NA	400		NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	209	J	2710		mg/kg	2774-005	15 / 15	1.01	5.1	2710		NA	400		NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For soil, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level; "NUT" = .

Table 2.10
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Potosi Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Soil (Potosi Area)	**7440-38-2**	**Arsenic**	2.72		313		mg/kg	2901-027	493 / 592	0.929	5	313		NA	0.39	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	29		11000	J	mg/kg	3521-018	658 / 659	1	200	11000	J	NA	1500	nc	NA	NA	**Y**	**ASL**
	7440-43-9	**Cadmium**	0.517	J	66.6		mg/kg	2801-019	572 / 659	0.461	1.1	66.6		NA	7	nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	5.34		45900		mg/kg	3037-028	988 / 989	0.923	5.7	45900		NA	400		NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For soil, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level; "NUT" = .

Table 2.11
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Richwoods Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Soil (Richwoods Area)	**7440-38-2**	**Arsenic**	1.88		25.2	J	mg/kg	2730-029	121 / 179	0.991	5.3	25.2	J	NA	0.39	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	196	J	10300		mg/kg	3169-010	179 / 179	2	171	10300		NA	1500	nc	NA	NA	**Y**	**ASL**
	7440-43-9	**Cadmium**	0.52	J	11.4		mg/kg	3551-004	93 / 179	0.496	1.1	11.4		NA	7	nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	2.97		6770		mg/kg	2691-009	191 / 191	0.991	5.3	6770		NA	400		NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For soil, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level; "NUT" = .

Table 2.12
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Old Mines Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Soil (Old Mines Area)	**7440-38-2**	**Arsenic**	0.936	J	64.2		mg/kg	2992-012	376 / 560	0.854	5.7	64.2		NA	0.39	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	92.5		10900	J	mg/kg	3022-001	555 / 555	0.9	202	10900	J	NA	1500	nc	NA	NA	**Y**	**ASL**
	7440-43-9	**Cadmium**	0.533		27.4		mg/kg	3377-015	288 / 555	0.427	1.1	27.4		NA	7	nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	3.6	J	53100	J	mg/kg	3377-015	564 / 566	0.854	23.5	53100		NA	400		NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For soil, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level; "NUT" = .

Table 2.13
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUANTITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
								Min	Max								
Soil (Residential Exposure Units)	**7429-90-5**	**Aluminum**	5770	22200	mg/kg	3902-17	27 / 27	NA	NA	22200	NA	7700	nc	NA	NA	**Y**	**ASL**
	7440-36-0	**Antimony**	2.6	23.3	mg/kg	3902-3	19 / 27	2	2.2	23.3	NA	3.1	nc	NA	NA	**Y**	**ASL**
	7440-38-2	**Arsenic**	5.7	25	mg/kg	3902-15	22 / 27	5.1	5.5	25	NA	0.39	ca	NA	NA	**Y**	**ASL**
	7440-39-3	**Barium**	235	4690	mg/kg	3902-26	27 / 27	NA	NA	4690	NA	1500	nc	NA	NA	**Y**	**ASL**
	7440-43-9	**Cadmium**	1.1	12.2	mg/kg	3902-10	21 / 27	1	1.1	12.2	NA	7	nc	NA	NA	**Y**	**ASL**
	7440-70-2	Calcium	2350	86500	mg/kg	3902-3	27 / 27	NA	NA	86500	NA	NA		NA	NA	N	NUT
	7440-47-3	Chromium (Total)	6.8	23.7	mg/kg	3902-17	26 / 27	2	2	23.7	NA	280	ca	NA	NA	N	BSL
	7440-48-4	**Cobalt**	5	34.9	mg/kg	3902-3	27 / 27	NA	NA	34.9	NA	2.3	nc	NA	NA	**Y**	**ASL**
	7440-50-8	Copper	15.6	169	mg/kg	3902-3	27 / 27	NA	NA	169	NA	310	nc	NA	NA	N	BSL
	7439-89-6	**Iron**	13300	39100	mg/kg	3902-15	27 / 27	NA	NA	39100	NA	5500	nc	NA	NA	**Y**	**ASL**
	7439-92-1	**Lead (XRF data)**	13	17124	mg/kg	ESGRXA3-5003-DZ	307 / 307	NA	NA	17124	NA	400		NA	NA	**Y**	**ASL**
	7439-92-1	**Lead**	140	6610	mg/kg	3902-1	27 / 27	NA	NA	6610	NA	400		NA	NA	**Y**	**ASL**
	7439-95-4	Magnesium	1280	40200	mg/kg	3902-3	27 / 27	NA	NA	40200	NA	NA		NA	NA	N	NUT
	7439-96-5	**Manganese**	515	2570	mg/kg	3902-3	27 / 27	NA	NA	2570	NA	180	nc	NA	NA	**Y**	**ASL**
	7439-98-7	Molybdenum	2.4	6.4	mg/kg	3902-16; 3902-20	8 / 27	2	2.4	6.4	NA	39	nc	NA	NA	N	BSL
	7440-02-0	Nickel	11.2	25.6	mg/kg	3902-3	27 / 27	NA	NA	25.6	NA	160	nc	NA	NA	N	BSL
	7440-09-7	Potassium	782	2260	mg/kg	3902-16	27 / 27	NA	NA	2260	NA	NA		NA	NA	N	NUT
	7440-23-5	Sodium	63.1	174	mg/kg	3902-5	9 / 27	50.5	56	174	NA	NA		NA	NA	N	NUT
	7440-62-2	**Vanadium**	9.8	60.4	mg/kg	3902-17	27 / 27	NA	NA	60.4	NA	39	nc	NA	NA	**Y**	**ASL**
	7440-66-6	**Zinc**	59.4	9250	mg/kg	3902-2	27 / 27	NA	NA	9250	NA	2300	nc	NA	NA	**Y**	**ASL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Residential Soil (EPA, 2008b). For soil, the Residential Soil value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.14
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater (Potosi Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
								Min	Max								
Groundwater (Potosi Area)	**7440-38-2**	**Arsenic**	1	4.69	ug/l	2774-144	34 / 442	1	10	4.69	NA	0.045	ca	10	MCL	**Y**	**ASL**
	7440-39-3	**Barium**	1	2220	ug/l	0503926, 3149-024	1086 / 1102	1	200	2220	NA	730	nc	2000	MCL	**Y**	**ASL**
	7440-43-9	**Cadmium**	1	8.11	ug/l	2863-134	116 / 916	1	5	8.11	NA	1.8	nc	5	MCL	**Y**	**ASL**
	7439-92-1	**Lead**	1	808	ug/l	3785-125	711 / 1097	1	10	808	NA	15		15	MCL	**Y**	**ASL**
	7440-14-4	Radium 226 & 228	0.848	2.043	pCi/L	3149-009	16 / 25	0.092	0.995	2.043	NA	5		5	MCL	N	BSL

Footnotes

NA = Not available
ug/l = micrograms per liter

(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Tapwater (EPA, 2008b). For potable well water, the Tapwater value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.15
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater (Richwoods Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Groundwater (Richwoods Area)	**7440-38-2**	**Arsenic**	1.1		3.04		ug/l	2937-103	4 / 393	1	10	3.04		NA	0.045	ca	10	MCL	**Y**	**ASL**
	7440-39-3	**Barium**	17.6		3410		ug/l	2937-145	369 / 395	5	200	3410		NA	730	nc	2000	MCL	**Y**	**ASL**
	7440-43-9	**Cadmium**	1		3.36		ug/l	2937-105	40 / 395	1	5	3.36		NA	1.8	nc	5	MCL	**Y**	**ASL**
	7439-92-1	**Lead**	1		278		ug/l	3316-101	188 / 395	1	10	278		NA	15		15	MCL	**Y**	**ASL**

Footnotes

NA = Not available
ug/l = micrograms per liter
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Tapwater (EPA, 2008b). For potable well water, the Tapwater value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.16
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater (Old Mines Area)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (nc/ca) (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Groundwater (Old Mines Area)	**7440-38-2**	**Arsenic**	1		87.2		ug/l	3419-138	29 / 1096	1	10	87.2		NA	0.045	ca	10	MCL	**Y**	**ASL**
	7440-39-3	**Barium**	10.2	J	4030	J	ug/l	3377-112	1045 / 1106	5	200	4030	J	NA	730	nc	2000	MCL	**Y**	**ASL**
	7440-43-9	**Cadmium**	1		31.5		ug/l	3244-105	160 / 1101	1	5	31.5		NA	1.8	nc	5	MCL	**Y**	**ASL**
	7439-92-1	**Lead**	1		450		ug/l	2977-151	698 / 1106	1	10	450		NA	15		15	MCL	**Y**	**ASL**

Footnotes

NA = Not available
ug/l = micrograms per liter
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Tapwater (EPA, 2008b). For potable well water, the Tapwater value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.17
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUANTITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Potable Well Water (Residential Exposure Units)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)		Maximum Concentration (Qualifier) (1)		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)		Background Value (3)	Screening Toxicity Value (4)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
										Min	Max									
Potable Well Water (Residential Exposure Units)	7440-39-3	**Barium**	78		1230		ug/l	3902-409	22 / 22	NA	NA	1230		NA	730	nc	2000	MCL	**Y**	**ASL**
	7440-43-9	**Cadmium**	3		6		ug/l	3902-404	16 / 22	1	3	6		NA	1.8	nc	5	MCL	**Y**	**ASL**
	7440-70-2	Calcium	50,200		91,400		ug/l	3902-406	22 / 22	NA	NA	91400		NA	NA		NA	NA	N	NUT
	7440-50-8	Copper	2.9		29		ug/l	3902-419	13 / 22	2	5	29		NA	150	nc	1300	MCL	N	BSL
	7439-89-6	Iron	54		420		ug/l	3902-402	3 / 22	50	50	420		NA	2600	nc	NA	NA	N	BSL
	7439-92-1	**Lead**	1.2		28		ug/l	3902-410	14 / 22	1	1	28		NA	15		15	MCL	**Y**	**ASL**
	7439-95-4	Magnesium	28,700		66,600		ug/l	3902-410	22 / 22	NA	NA	66600		NA	NA		NA	NA	N	NUT
	7439-96-5	Manganese	1.1		10		ug/l	3902-403; 3902-414	3 / 22	1	5	10		NA	88	nc	50	SMCL	N	BSL
	7440-02-0	Nickel	2.3		3.4		ug/l	3903-103	2 / 22	1	20	3.4		NA	73	nc	NA	NA	N	BSL
	7440-23-5	Sodium	5,270		70,000		ug/l	3902-415	17 / 22	5000	5000	70000		NA	NA		NA	NA	N	NUT
	7440-66-6	Zinc	31		836		ug/l	3902-419	22 / 22	NA	NA	836		NA	1100	nc	5000	SMCL	N	BSL

Footnotes

NA = Not available

ug/l = micrograms per liter

(1) J = Analyte present. Reported value may not be accurate or precise.

(2) The maximum detected concentration was used for screening.

(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.

(4) The toxicity screening values were obtained from the EPA Regional Screening Levels for Tapwater (EPA, 2008b). For potable well water, the Tapwater value was used.
Codes used nc = noncarcinogenic, ca = carcinogenic (Cancer risk at 1E-06, Non-Cancer Hazard at HI = 0.1)

(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level, "NUT" = Essential Nutrient.

Table 2.18
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN FOR QUALITATIVE RISK ASSESSMENT
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillets Only)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits		Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
								Min	Max							
Fish Tissue	**7439-92-1**	**Lead**	0.68	0.68	mg/kg	SD14	1 / 2	0.67	0.67	0.68	NA	NA	NA	NA	**Y**	**NSL**

Footnotes

NA = Not available
mg/kg = milligrams per kilogram
(1) J = Analyte present. Reported value may not be accurate or precise.
(2) The maximum detected concentration was used for screening.
(3) Background values were not appropriate for purposes of this screening. "NA" = not available at time of screening.
(4) No screening value available for lead in fish.
(5) Codes used for the "Rationale for Selection or Deletion": "BSL" = Below Screening Level, "ASL" = Above Screening Level; "NSL" = No Screening Level.

Appendix C

Detection Limit Evaluation and

Data Useability Worksheets

Appendix C

1.0 Detection Limit Adequacy Evaluation

1.1 Introduction

In accord with USEPA guidance (USEPA, 1989), chemicals that are not detected in a sample are assigned an estimated concentration that is equal to ½ of the detection limit for that sample. This approach is generally acceptable if the detection limit is below the concentration that corresponds to a level of potential health concern. This is referred to as the risk-based concentration (RBC). However, if the detection limits are at or above the RBC, then risks that are calculated based on non-detect values may be unreliable, especially if the non-detect frequency is high.

This appendix presents an evaluation of the detection limits for all chemicals analyzed in the various media of concern at the Washington County Lead District Site to determine if they are adequate for use in providing meaningful estimates of exposure and risk for the quantitative and qualitative risk assessment.

1.2 Approach

The minimum, maximum and mean non-detect concentrations for each chemical analyzed in each media were compared to a detection limit goal of ½ of the RBC, corresponding to a target noncancer Hazard Quotient of 1 and a target cancer risk of 1E-06. The RBCs were obtained from the most recent version of the Regional Screening Level Table (RSL) dated May 19, 2009 available on the internet at:

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

The detection limit goal of ½ the RBC (as opposed to the RBC) ensures that a non-detect value is below a level of potential concern. For soil and sediment, the RSL for residential soil was used. For groundwater and surface water, the RSL for tap water was used.

This evaluation of detection limits was conducted for all data used in the risk assessment (both quantitative and qualitative). If the non-detect concentration of a chemical was less than the detection limit goal (½ of the RBC), then the detection limit was considered reliable. If the non-detect concentration of a chemical was greater than the detection limit goal (½ of the RBC), then any location where the chemical was not detected was flagged as an uncertainty in the risk assessment.

1.3 Results

Tables C-1 through C-18 present the results of the detection limit evaluation for each of the media evaluated in the risk assessment (soil, groundwater, surface water, sediment and fish). The key findings are summarized, by medium, below:

- Surface Water: Surface water data was determined to be useable only in the qualitative risk evaluation. Tables C-1 through C-3 indicate that the detection limits were found to be adequate for all chemicals with the exception of arsenic. For arsenic, although the non-detect concentration exceeds ½ of an RBC based on a 1E-06 target cancer risk, it does not exceed ½ of the RBC based on a 1E-04 target cancer risk. The RBC_{1E-04} is equal to 4.5 ug/L. Because the non-detect concentration for arsenic is still within the target cancer risk range of 1E-06 to 1E-04, the arsenic non-detect data were considered useable for the qualitative risk evaluation. However, it should be noted that there is uncertainty associated with the use of this data for the qualitative risk assessment.

- Sediment: Sediment data was determined to be useable only in the qualitative risk evaluation. Tables C-4 through C-6 indicate that the detection limits were found to be adequate for all chemicals with the exception of arsenic and thallium. For arsenic, although the non-detect concentration exceeds ½ of an RBC based on a 1E-06 target cancer risk, it does not exceed ½ of the RBC based on a 1E-04 target cancer risk. The RBC_{1E-04} is equal to 39 mg/kg. Because the non-detect concentration for arsenic is still within the target cancer risk range of 1E-06 to 1E-04, the arsenic non-detect data were considered useable for the qualitative risk evaluation. However, it should be noted that there is uncertainty associated with the use of this data for the qualitative risk assessment. For thallium, the non-detect concentration exceeds ½ of an RBC based on a HQ of 1. There is uncertainty associated with the use of this data for the qualitative risk assessment.

- Mine Waste Soil: Mine waste soil data was determined to be useable only in the qualitative risk evaluation. Tables C-7 through C-9 indicate that the detection limits were found to be adequate for all chemicals.

- Historical Soil: Historical soil data was determined to be useable only in the qualitative risk evaluation. Tables C-10 through C-12 indicate that the detection limits were found to be adequate for all chemicals with the exception of arsenic. For arsenic, although the non-detect concentration exceeds ½ of an RBC based on a 1E-06 target cancer risk, it does not exceed ½ of the RBC based on a 1E-04 target cancer risk. The RBC_{1E-04} is equal to 39 mg/kg. Because the non-detect concentration for arsenic is still within the target cancer risk range of 1E-06 to 1E-04, the arsenic non-detect data were considered useable for the qualitative risk evaluation. However, it should be noted that there is uncertainty associated with the use of this data for the qualitative risk assessment.

- Residential Properties Soil: The soil data collected from the 48 residential properties was determined to be useable for the quantitative risk evaluation. Table C-13 indicates that the detection limits were found to be adequate for all chemicals with the exception of arsenic and thallium. For arsenic, although the non-detect concentration exceeds ½ of an RBC based on a 1E-06 target cancer risk, it does not exceed ½ of the RBC based on a 1E-04 target cancer risk. The RBC_{1E-04} is equal to 39 mg/kg. Given the inadequate detection limits, the arsenic

data from the 48 residential properties should be used cautiously. Arsenic was selected as a COPC for the residential properties soil dataset. It should be noted that there is uncertainty associated with the use of this data for the quantitative risk assessment (arsenic may actually be present at concentrations that may be a concern at those properties where it was reported as non-detect) . For thallium, the non-detect concentration exceeds ½ of an RBC based on a HQ of 1. Thallium was not reported in historical soil data and consequently, thallium was not selected as a COPC. It should be noted that there is uncertainty associated with the use of this data for the quantitative risk assessment.

- Historical Groundwater: Historical groundwater data was determined to be useable only in the qualitative risk evaluation. Tables C-14 through C-16 indicate that the detection limits were found to be adequate for all chemicals with the exception of arsenic and lead. For arsenic, although the mean non-detect concentration exceeds ½ of an RBC based on a 1E-06 target cancer risk, it does not exceed ½ of the RBC based on a 1E-04 target cancer risk. The RBC_{1E-04} is equal to 4.5 ug/L. Because the mean non-detect concentration for arsenic is still within the target cancer risk range of 1E-06 to 1E-04, the arsenic non-detect data were considered useable for the qualitative risk evaluation. However, it should be noted that there is uncertainty associated with the use of this data for the qualitative risk assessment. For lead, only the maximum non-detect concentration exceeds ½ of an RBC. The mean non-detect concentration for lead does not exceed ½ of the RBC. Because the mean non-detect concentration for lead is still below the target non-detect value, the lead non-detect data were considered useable for the qualitative risk evaluation. However, it should be noted that there is uncertainty associated with the use of this data for the qualitative risk assessment.

- Residential Properties Groundwater: The potable well water data collected from 22 residential properties was determined to be useable for the quantitative risk evaluation. Table C-17 indicates that the detection limits were found to be adequate for all chemicals with the exception of antimony, arsenic, cobalt and thallium. For antimony, cobalt and thallium, the non-detect concentration exceeds ½ of an RBC based on a HQ of 1. None of these chemicals have been reported in historical groundwater data, and none of these chemicals were selected as COPC. It should be noted that there is uncertainty associated with the use of this data for the quantitative risk assessment. For arsenic, although the non-detect concentration exceeds ½ of an RBC based on a 1E-06 target cancer risk, it does not exceed ½ of the RBC based on a 1E-04 target cancer risk. The RBC_{1E-04} is equal to 4.5 ug/L. Given the inadequate detection limits and the fact that arsenic has been detected in other historical groundwater, the arsenic data from the 22 residential properties is not useable in the risk assessment for the purpose of eliminating COPCs or quantifying health risks. Consequently, arsenic should be retained as a COPC. However, it should be noted that there is uncertainty associated with the use of this data for the quantitative risk assessment.

- Fish Tissue: Fish tissue data was determined to be useable only in the qualitative risk evaluation. Table C-18 indicates that the detection limits were found to be adequate for all chemicals.

Table C-1
Surface Water (Potosi) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (ug/L)			Regional Screening Level (ug/L)	Target Detection Limit (ug/L) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Antimony	ND	2	2	2	15	7.5	YES	YES	YES	YES	YES	YES
Arsenic	11%	1	1	1	0.045	0.0225	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	7,300	3650	--	--	--	NA	NA	NA
Beryllium	ND	1	1	1	73	36.5	YES	YES	YES	YES	YES	YES
Cadmium	ND	1	1	1	18	9	YES	YES	YES	YES	YES	YES
Chromium	ND	2	2	2	55000	27500	YES	YES	YES	YES	YES	YES
Cobalt	ND	1	1	1	11	5.5	YES	YES	YES	YES	YES	YES
Copper	5%	2	2	2	1500	750	YES	YES	YES	YES	YES	YES
Lead	21%	1	1	1	15	7.5	YES	YES	YES	YES	YES	YES
Manganese	100%	--	--	--	880	440	--	--	--	NA	NA	NA
Nickel	26%	1	1	1	730	365	YES	YES	YES	YES	YES	YES
Selenium	ND	5	5	5	180	90	YES	YES	YES	YES	YES	YES
Silver	ND	1	1	1	180	90	YES	YES	YES	YES	YES	YES
Thallium	ND	1	1	1	2.4	1.2	YES	YES	YES	YES	YES	YES
Vanadium	ND	1	1	1	180	90	YES	YES	YES	YES	YES	YES
Zinc	100%	--	--	--	11000	5500	--	--	--	NA	NA	NA

Notes:
[1] Drinking Water Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-2
Surface Water (Richwoods) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (ug/L)			Regional Screening Level (ug/L)	Target Detection Limit (ug/L) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	50%	1	1	1	0.045	0.0225	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	7,300	3650	--	--	--	NA	NA	NA
Cadmium	ND	1	1	1	18	9	YES	YES	YES	YES	YES	YES
Lead	21%	1	1	1	15	7.5	YES	YES	YES	YES	YES	YES

Notes:
[1] Drinking Water Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-3
Surface Water (Old Mines) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (ug/L)			Regional Screening Level (ug/L)	Target Detection Limit (ug/L) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	19%	1	1	1	0.045	0.0225	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	7,300	3650	--	--	--	NA	NA	NA
Cadmium	5%	1	1	1	18	9	YES	YES	YES	YES	YES	YES
Lead	95%	1	1	1	15	7.5	YES	YES	YES	YES	YES	YES

Notes:
[1] Drinking Water Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-4
Sediment (Potosi) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Aluminum	100%	--	--	--	77000	38500	--	--	--	NA	NA	NA
Antimony	ND	1.4	4.5	2.127	31	15.5	YES	YES	YES	YES	YES	YES
Arsenic	61%	3.4	6.3	4.65	0.39	0.195	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	15,000	7500	--	--	--	NA	NA	NA
Beryllium	9%	0.7	1.5	1.01	160	80	YES	YES	YES	YES	YES	YES
Cadmium	100%	--	--	--	70	35	--	--	--	NA	NA	NA
Calcuim	100%	--	--	--	NA	NA	--	--	--	NA	NA	NA
Chromium	100%	--	--	--	39	19.5	--	--	--	NA	NA	NA
Cobalt	100%	--	--	--	23	11.5	--	--	--	NA	NA	NA
Copper	100%	--	--	--	3,100	1550	--	--	--	NA	NA	NA
Iron	100%	--	--	--	55,000	27500	--	--	--	NA	NA	NA
Lead	100%	--	--	--	400	200	--	--	--	NA	NA	NA
Magnesium	100%	--	--	--	NA	NA	--	--	--	NA	NA	NA
Manganese	100%	--	--	--	1,800	900	--	--	--	NA	NA	NA
Molybdenum	ND	1.4	4.5	2.13	390	195	YES	YES	YES	YES	YES	YES
Nickel	100%	--	--	--	1,500	750	--	--	--	NA	NA	NA
Selenium	ND	6.8	22.3	10.62	390	195	YES	YES	YES	YES	YES	YES
Silver	ND	1.4	4.5	2.13	390	195	YES	YES	YES	YES	YES	YES
Thallium	ND	6.8	22.3	10.62	5.1	2.55	NO	NO	NO	**NO**	**NO**	**NO**
Vanadium	100%	--	--	--	390	195	--	--	--	NA	NA	NA
Zinc	100%	--	--	--	23,000	11500	--	--	--	NA	NA	NA

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-5
Sediment (Richwoods) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	75%	2.6	6.5	4.58	0.39	0.195	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	15,000	7500	--	--	--	NA	NA	NA
Cadmium	31%	0.6	2.6	1.048	70	35	YES	YES	YES	YES	YES	YES
Lead	100%	--	--	--	400	200	--	--	--	NA	NA	NA

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-6
Sediment (Old Mines) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	23%	5	5	5	0.39	0.195	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	15,000	7500	--	--	--	NA	NA	NA
Cadmium	95%	1	1	1	70	35	YES	YES	YES	YES	YES	YES
Lead	100%	--	--	--	400	200	--	--	--	NA	NA	NA

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-7
Mine Waste (Potosi) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	100%	--	--	--	0.39	0.195	--	--	--	NA	NA	NA
Barium	100%	--	--	--	15000	7500	--	--	--	NA	NA	NA
Cadmium	ND	5.48	5.48	5.48	70	35	YES	YES	YES	YES	YES	YES
Lead	100%	--	--	--	400	200	--	--	--	NA	NA	NA

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-8
Mine Waste (Richwoods) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	100%	--	--	--	0.39	0.195	--	--	--	NA	NA	NA
Barium	100%	--	--	--	15000	7500	--	--	--	NA	NA	NA
Cadmium	ND	0.51	0.559	0.525	70	35	YES	YES	YES	YES	YES	YES
Lead	100%	--	--	--	400	200	--	--	--	NA	NA	NA

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-9
Mine Waste (Old Mines) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	100%	--	--	--	0.39	0.195	--	--	--	NA	NA	NA
Barium	100%	--	--	--	15000	7500	--	--	--	NA	NA	NA
Cadmium	33%	0.505	1.99	0.657	70	35	YES	YES	YES	YES	YES	YES
Lead	100%	--	--	--	400	200	--	--	--	NA	NA	NA

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-10
Historical Soil (Potosi) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	83%	2.6	10.2	5.93	0.39	0.195	NO	NO	NO	**NO**	**NO**	**NO**
Barium	99.8%	20.3	20.3	20.3	15000	7500	YES	YES	YES	YES	YES	YES
Cadmium	87%	0.464	0.89	0.777	70	35	YES	YES	YES	YES	YES	YES
Lead	99.9%	1.0	1.0	1.01	400	200	YES	YES	YES	YES	YES	YES

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-11
Historical Soil (Richwoods) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	68%	1.3	10.4	5.355	0.39	0.195	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	15000	7500	--	--	--	NA	NA	NA
Cadmium	52%	0.496	1.0	0.58	70	35	YES	YES	YES	YES	YES	YES
Lead	100%	--	--	--	400	200	--	--	--	NA	NA	NA

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-12
Historical Soil (Old Mines) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	67%	1.02	14.8	4.86	0.39	0.195	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	15000	7500	--	--	--	NA	NA	NA
Cadmium	52%	0.427	3.03	0.739	70	35	YES	YES	YES	YES	YES	YES
Lead	99.6%	5	5	5	400	200	YES	YES	YES	YES	YES	YES

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-13
Soil (Residential Exposure Units) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Aluminum	100%	--	--	--	77000	38500	--	--	--	NA	NA	NA
Antimony	70%	2	2.2	2.05	31	15.5	YES	YES	YES	YES	YES	YES
Arsenic	81%	5.1	5.5	5.26	0.39	0.195	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	15,000	7500	--	--	--	NA	NA	NA
Beryllium	ND	1	1.2	1.04	160	80	YES	YES	YES	YES	YES	YES
Cadmium	78%	1	1.1	1.05	70	35	YES	YES	YES	YES	YES	YES
Calcium	100%	--	--	--	NA	NA	--	--	--	NA	NA	NA
Chromium	96%	2	2	2	39	19.5	YES	YES	YES	YES	YES	YES
Cobalt	100%	--	--	--	23	11.5	--	--	--	NA	NA	NA
Copper	100%	--	--	--	3,100	1550	--	--	--	NA	NA	NA
Iron	100%	--	--	--	55,000	27500	--	--	--	NA	NA	NA
Lead	100%	--	--	--	400	200	--	--	--	NA	NA	NA
Magnesium	100%	--	--	--	NA	NA	--	--	--	NA	NA	NA
Manganese	100%	--	--	--	1,800	900	--	--	--	NA	NA	NA
Molybdenum	30%	2	2	2.09	390	195	YES	YES	YES	YES	YES	YES
Nickel	100%	--	--	--	1,500	750	--	--	--	NA	NA	NA
Potassium	100%	--	--	--	NA	NA	--	--	--	NA	NA	NA
Selenium	ND	10	11.8	10.53	390	195	YES	YES	YES	YES	YES	YES
Silver	ND	2	2.4	2.1	390	195	YES	YES	YES	YES	YES	YES
Sodium	33%	50.5	56	52.4	NA	NA	YES	YES	YES	YES	YES	YES
Thallium	ND	10	11.8	10.53	5.1	2.55	NO	NO	NO	**NO**	**NO**	**NO**
Vanadium	100%	--	--	--	390	195	--	--	--	NA	NA	NA
Zinc	100%	--	--	--	23,000	11500	--	--	--	NA	NA	NA

Notes:
[1] Soil Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-14
Historical Groundwater (Potosi) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (ug/L)			Regional Screening Level (ug/L)	Target Detection Limit (ug/L) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	8%	1	10	1.076	0.045	0.0225	NO	NO	NO	**NO**	**NO**	**NO**
Barium	99%	5	10	9.81	7300	3650	YES	YES	YES	YES	YES	YES
Cadmium	13%	1	5	1.025	18	9	YES	YES	YES	YES	YES	YES
Lead	65%	1	13	1.16	15	7.5	YES	NO	YES	YES	**NO**	YES
Radium 226	52%	0.402	0.995	0.803	5	2.5	YES	YES	YES	YES	YES	YES
Radium 228	60%	0.529	0.887	0.646	5	2.5	YES	YES	YES	YES	YES	YES

Notes:
[1] Drinking Water Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-15
Historical Groundwater (Richwoods) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (ug/L)			Regional Screening Level (ug/L)	Target Detection Limit (ug/L) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	1%	1	10	3.869	0.045	0.0225	NO	NO	NO	**NO**	**NO**	**NO**
Barium	93%	10	200	156.2	7300	3650	YES	YES	YES	YES	YES	YES
Cadmium	10%	1	5	2.397	18	9	YES	YES	YES	YES	YES	YES
Lead	48%	1	64.7	7.17	15	7.5	YES	NO	YES	YES	**NO**	YES

Notes:
[1] Drinking Water Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-16
Historical Groundwater (Old Mines) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (ug/L)			Regional Screening Level (ug/L)	Target Detection Limit (ug/L) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Arsenic	3%	1	10	1.207	0.045	0.0225	NO	NO	NO	**NO**	**NO**	**NO**
Barium	94%	5	1,490	217.8	7300	3650	YES	YES	YES	YES	YES	YES
Cadmium	15%	1	5	1.107	18	9	YES	YES	YES	YES	YES	YES
Lead	63%	1	35.2	1.755	15	7.5	YES	NO	YES	YES	**NO**	YES

Notes:
[1] Drinking Water Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-17
Residential Groundwater (Private Wells from 48 Properties) - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (ug/L)			Regional Screening Level (ug/L)	Target Detection Limit (ug/L) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Aluminum	ND	50	50	50	37000	18500	YES	YES	YES	YES	YES	YES
Antimony	ND	2	50	44.46	15	7.5	YES	NO	NO	YES	**NO**	**NO**
Arsenic	ND	1	25	22.23	0.045	0.0225	NO	NO	NO	**NO**	**NO**	**NO**
Barium	100%	--	--	--	7300	3650	--	--	--	NA	NA	NA
Beryllium	ND	1	3	2.77	73	36.5	YES	YES	YES	YES	YES	YES
Cadmium	73%	1	3	2.56	18	9	YES	YES	YES	YES	YES	YES
Calcium	100%	--	--	--	NA	NA	--	--	--	NA	NA	NA
Chromium	ND	2	15	13.5	55000	27500	YES	YES	YES	YES	YES	YES
Cobalt	ND	1	10	8.96	11	5.5	YES	NO	NO	YES	**NO**	**NO**
Copper	59%	2	5	4.73	1500	750	YES	YES	YES	YES	YES	YES
Iron	14%	50	420	72.1	26000	13000	YES	YES	YES	YES	YES	YES
Lead [1]	64%	1	1	1	15	7.5	YES	YES	YES	YES	YES	YES
Magnesium	100%	--	--	--	NA	NA	--	--	--	NA	NA	NA
Manganese	14%	1	10	4.93	880	440	YES	YES	YES	YES	YES	YES
Molybdenum	ND	15	15	15	180	90	YES	YES	YES	YES	YES	YES
Nickel	9%	2.3	20	18.1	730	365	YES	YES	YES	YES	YES	YES
Potassium	ND	2	2	2	NA	NA	--	--	--	NA	NA	NA
Selenium	ND	5	50	44.8	180	90	YES	YES	YES	YES	YES	YES
Silver	ND	1	25	22.2	180	90	YES	YES	YES	YES	YES	YES
Sodium [3]	77%	5	5	5	NA	NA	--	--	--	NA	NA	NA
Thallium	ND	1	50	44.35	2.4	1.2	YES	NO	NO	YES	**NO**	**NO**
Titanium	ND	20	20	20	NA	NA	--	--	--	NA	NA	NA
Vanadium	ND	1	10	9	180	90	YES	YES	YES	YES	YES	YES
Zinc	100%	--	--	--	11000	5500	--	--	--	NA	NA	NA

Notes:
[1] Drinking Water Action Level used for lead.
[2] Target detection limit is equal to half of the RSL. Target detection limits NA for calcium, magnesium, potassium, sodium, and titanium.
NA - Not applicable.
ND - Not detected.

Table C-18
Fish Tissue - Detection Limit Evaluation

Analytes	Detection Frequency (%)	Nondetect Concentration (mg/kg)			Regional Screening Level (mg/kg)	Target Detection Limit (mg/kg) [2]	Detection Limit = Target			Nondetect Data Adequate for Risk Assessment?		
		Min	Max	Mean			Min	Max	Mean	Min	Max	Mean
Cadmium	ND	0.11	0.11	0.11	1.4	0.7	YES	YES	YES	YES	YES	YES
Lead	50%	0.67	0.67	0.67	NA	NA	YES	YES	YES	YES	YES	YES
Selenium	ND	2.11	2.14	2.125	6.8	3.4	YES	YES	YES	YES	YES	YES

Notes:
[1] No screening level available for lead.
[2] Target detection limit is equal to half of the RSL.
NA - Not applicable.
ND - Not detected.

Appendix C

2.0 Data Useability Worksheets

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Soil (Bioaccesibility)

Activity	Comment
Field Sampling	
Discuss sampling problems and field conditions that affect data usability.	During the 2008 field investigation, lead bioaccessibility soil samples were collected from 15 of the 48 residential properties investigated. The soil samples were sieved through a No. 60 sieve. The samples were analyzed by XRF using the protocol for residential soil sampling and the values were recorded. Samples were submitted to the EPA Region 7 laboratory for in vitro bioaccessibility analysis. There were no apparent problems with the field sampling that would have negatively affected the data collected.
Are samples representative of receptor exposure for this medium (e.g. sample depth, grab vs. composite, filtered vs. unfiltered, low flow, etc.)?	Residential surface soil samples were collected after obtaining the property owner's signature on an access form. At each property, up to eight 5-point composite samples were collected: four samples from quadrant (front and back halves of the yard divided into equal areas); one sample from the drip zone; and additional samples from gardens, play areas, and unpaved driveways, if present. Smaller yards or yards with odd geometries were divided into fewer quadrants if necessary. Each soil aliquot was collected from the upper 1-inch soil horizon at randomly selected locations in the quadrant, away from influences of the drip zone. The soil samples for in-vitro bioaccessibility analysis were sieved through a No. 60 sieve and analyzed in the field with an XRF according to the protocol for residential soil sampling. The XRF values were recorded and the samples were submitted to the EPA Region 7 laboratory for in-vitro bioaccessibility analysis for lead by ICP. All surface soil samples for in-vitro bioaccessibility analysis should be considered representative of receptor exposure.
Assess the effect of field QC results on data usability.	There were no field QC samples collected for lead bioaccessibility per the May 2008 Quality Assurance Project Plan (QAPP).
Summarize the effect of field sampling issues on the risk assessment, if applicable.	There are no known field sampling issues that could effect the risk assessment.

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Soil (Bioaccesibility)

Activity	Comment
Analytical Techniques	
Were the analytical methods appropriate for quantitative risk assessment?	Yes, as discussed in the QAPP dated May 2008. Analyses were conducted in accordance with the EPA Region 7 RLAB Method 3122.3C for bioaccessible lead in soil.
Were detection limits adequate?	NA. Lead bioaccessibility was reported as a percentage.
Summarize the effect of analytical technique issues on the risk assessment, if applicable.	There are no analytical technique issues that will affect the risk assessment.
Data Quality Objectives	
Precision - How were duplicates handled?	In accordance with the May 2008 QAPP, field duplicate samples were not collected for lead bioaccessibility analysis. Lab duplicates were analyzed for each sample at the EPA Region 7 RLAB. The relative percent different (RPD) ranged from 0.7 to 8.8 percent which is within the acceptance criteria of 25% specified in the May 2008 QAPP.
Accuracy - How were split samples handled?	NA. Split samples were not collected.
Representativeness - Indicate any problems associated with data representativeness (e.g., trip blank or rinsate blank contamination, chain of custody problems, etc.).	There were no problems associated with data representativeness.
Completeness - Indicate any problems associated with data completeness (e.g., incorrect sample analysis, incomplete sample records, problems with field procedures, etc.).	There were no problems associated with completeness. All 15 samples were successfully collected and analyzed for in-vitro lead bioaccessibility.
Comparability - Indicate any problems associated with data comparability.	No problems associated with data comparability were noted.
Were the DQOs specified in the QAPP satisfied?	Yes, the DQOs identified in the QAPP were satisfied per the October 2008 Data Quality Assessment Record for ASR#3902.
Summarize the effect of DQO issues on the risk assessment, if applicable.	There are no DQO issues that should affect the risk assessment.
Data Validation and Interpretation	
What are the data validation requirements?	For inorganic samples, validators were required to check sample receipt/prep, initial calibration, continuing calibration, quality control samples (method blank, MS/MSD, laboratory control, laboratory fortified

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Soil (Bioaccesibility)

Activity	Comment
	samples) and perform a raw data evaluation.
What method or guidance was used to validate the data?	The Final National Functional Guidelines for Inorganic Data Review (October 2004) is the guidance used to validate EPA data.
Was the data validation method consistent with guidance? Discuss any discrepancies.	Yes. The data validation method was consistent with EPA guidance.
Were all data qualifiers defined? Discuss those which were not.	N/A. The lead bioaccessibility analytical results were reported as percentages.
Which qualifiers represent useable data?	N/A.
Which qualifiers represent unuseable data?	N/A.
How are tentatively identified compounds handled?	N/A.
Summarize the effect of data validation and interpretation issues on the risk assessment, if applicable.	N/A. There are no data validation or interpretation issues.
Additional notes:	According to the October 2008 Data Quality Assessment Record for ASR#3902, the continuing calibration blank was high in one instance. Results for lead were not high in the continuing calibration check immediately after the blank; therefore, the data was not qualified.

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Potable (Residential) Groundwater

Activity	Comment
Field Sampling	
Discuss sampling problems and field conditions that affect data usability.	During the 2008 field investigation, potable (residential) groundwater samples were collected at 22 out of the 48 properties at which dust/soil sampling was also conducted. Potable groundwater samples were analyzed for target analyte list (TAL) metals and nutrients by the EPA Region 7 laboratory. There were no apparent problems with the field sampling that would have negatively affected the data collected.
Are samples representative of receptor exposure for this medium (e.g. sample depth, grab vs. composite, filtered vs. unfiltered, low flow, etc.)?	Potable (residential) groundwater grab samples were collected after obtaining the property owner's signature on an access form. The samples were collected from the well head or an outside faucet. The water was allowed to purge for at least 5 minutes prior to sample collection. A hose was connected to the faucet and the water is to be purged away from the foundation of the residence or well. The hose was disconnected after the purge period and the sample was collected directly from the faucet. All potable groundwater samples collected at the site should be considered representative of receptor exposure.
Assess the effect of field QC results on data usability.	Field QC samples for potable groundwater included two (2) field blanks. None of the potable groundwater samples were qualified as "B" due to the presence in blank samples; therefore, there is no effect of field QC results on data usability. Analytical results for both field blank samples indicated non-detected values for all analytes.
Summarize the effect of field sampling issues on the risk assessment, if applicable.	There are no known field sampling issues that could effect the risk assessment.
Analytical Techniques	
Were the analytical methods appropriate for quantitative risk assessment?	Yes, as discussed in the QAPP dated May 2008. Analyses were conducted in accordance with the EPA Method for Metals in Water by inductively coupled plasma (ICP; EPA Method 200.8).
Were detection limits adequate?	Yes, with the exception of antimony, arsenic, cobalt, and thallium.

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Potable (Residential) Groundwater

Activity	Comment
	All groundwater samples were originally analyzed by ICP; however, adequate detection limits were not obtained for lead using this method. To obtain lower detection limits for lead, samples were re-run using inductively coupled plasma mass spectrometry (ICP/MS). A detection limit evaluation was conducted and concluded that detection limits for antimony, arsenic, cobalt, and thallium were not adequate. The non-detect concentrations for these compounds were greater than the Target Detection Limits established for each analyte. The results of the detection limit evaluation are discussed under the Uncertainty Analysis in the Human Health Risk Assessment.
Summarize the effect of analytical technique issues on the risk assessment, if applicable.	There are no analytical technique issues that will affect the risk assessment.
Data Quality Objectives	
Precision - How were duplicates handled?	In accordance with the May 2008 QAPP, field duplicate samples were not collected in potable (residential) groundwater. However, two (2) matrix spike/matrix spike duplicates (MS/MSD) were collected in the field and analyzed at the laboratory for TAL metals by ICP. The analytical results for all analytes indicated that the recovery ranged from 82-108% for the MS and from 83-103% for the MSD. All recoveries were within the acceptance criteria of 75-125% as specified in the May 2008 QAPP. The MS/MSD samples were re-run for lead using ICP/MS. The analytical results for lead indicated that the recovery ranged from 80-110% for the MS and from 87-106% for the MSD. All recoveries were within the acceptance criteria of 75-125% as specified in the May 2008 QAPP. Two (2) laboratory control samples (LCS) were analyzed at the laboratory for TAL metals by ICP and one (1) LCS was analyzed by ICP/MS. The analytical results indicated that the percent recovery ranged from 85-106% for all LCS analyzed by ICP. For LCS analyzed by ICP/MS, the percent recovery ranged from 88-106%. All recoveries were within the acceptance criteria of 75-

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Potable (Residential) Groundwater

Activity	Comment
	125% as specified in the May 2008 QAPP.
Accuracy - How were split samples handled?	NA. Split samples were not collected.
Representativeness - Indicate any problems associated with data representativeness (e.g., trip blank or rinsate blank contamination, chain of custody problems, etc.).	There were no problems associated with data representativeness.
Completeness - Indicate any problems associated with data completeness (e.g., incorrect sample analysis, incomplete sample records, problems with field procedures, etc.).	There were no problems associated with completeness. All potable (residential) samples were successfully collected and analyzed as planned.
Comparability - Indicate any problems associated with data comparability.	No problems associated with data comparability were noted.
Were the DQOs specified in the QAPP satisfied?	Yes, the DQOs specified in the QAPP were satisfied.
Summarize the effect of DQO issues on the risk assessment, if applicable.	There are no DQO issues that should affect the risk assessment.
Data Validation and Interpretation	
What are the data validation requirements?	For inorganic samples, validators are required to check sample receipt/prep, initial calibration, continuing calibration, quality control samples (method blank, MS/MSD, laboratory control, laboratory fortified samples) and perform a raw data evaluation.
What method or guidance was used to validate the data?	The Final National Functional Guidelines for Inorganic Data Review (October 2004) is the guidance used to validate EPA data.
Was the data validation method consistent with guidance? Discuss any discrepancies.	Yes. The data validation method was consistent with EPA guidance.
Were all data qualifiers defined? Discuss those which were not.	Yes. All data qualifiers were defined.
Which qualifiers represent useable data?	J, L, K, U, and combinations UJ, UL, UK.
Which qualifiers represent unusable data?	R and B.
How are tentatively identified compounds handled?	N/A.
Summarize the effect of data validation and interpretation issues on the risk assessment, if applicable.	The detection limit evaluation concluded that the detection limits for antimony, arsenic, cobalt, and thallium in groundwater were not adequate for evaluation in the risk assessment.
Additional notes:	None

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Surface Soil (Residential)

Activity	Comment
Field Sampling	
Discuss sampling problems and field conditions that affect data usability.	During the 2008 field investigation, surface soil samples from 48 residential property locations were collected to support the Human Health Risk Assessment (HHRA) for the site. This includes soil samples that were collected during site investigation efforts that were submitted for laboratory confirmation analysis as well samples that were analyzed for lead in the field with an X-ray Fluorescence (XRF) Spectrometer. A total of 307 surface soil samples were analyzed in the field for lead (only) and 27 samples were submitted to the EPA Region 7 RLAB for laboratory confirmation analysis of Target Analyte List (TAL) metals and nutrients. There were no apparent problems with the field sampling that would have negatively affected the data collected.
Are samples representative of receptor exposure for this medium (e.g. sample depth, grab vs. composite, filtered vs. unfiltered, low flow, etc.)?	Residential surface soil samples were collected after obtaining the property owner's signature on an access form. Up to eight 5-point composite samples were collected at each property within the upper 1-inch of the soil horizon. Composite samples were collected from four quadrants in the yard (front and back halves of the yard each divided into two quadrants for a total of four). One sample was collected from the drip zone of the residence. Additional samples were collected from gardens, play areas, and unpaved driveways, if present. All samples were collected in accordance with EPA's 2003 Superfund Lead-Contaminated Residential Sites Handbook. All residential soil samples collected at the site should be considered representative of receptor exposure.
Assess the effect of field QC results on data usability.	Field QC samples for potable groundwater included two (2) field blanks. None of the potable groundwater samples were qualified as "B" due to the presence in blank samples; therefore, there is no effect of field QC results on data usability. Analytical results for both field blank samples indicated non-detected values for all analytes.
Summarize the effect of field sampling issues on the risk	There are no known field sampling issues that could

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Surface Soil (Residential)

Activity	Comment
assessment, if applicable.	effect the risk assessment.
Analytical Techniques	
Were the analytical methods appropriate for quantitative risk assessment?	Yes, as discussed in the QAPP dated May 2008. Analyses were conducted in accordance with the EPA Method for Metals in Water by inductively coupled plasma (ICP; EPA Method 200.8).
Were detection limits adequate?	Yes, with the exception of antimony and thallium. A detection limit evaluation was conducted and concluded that detection limits for antimony and thallium were not adequate for the risk assessment of residential soil. The non-detect concentrations for these compounds were greater than the Target Detection Limits established for each analyte. The results of the detection limit evaluation are discussed under the Uncertainty Analysis in the Human Health Risk Assessment.
Summarize the effect of analytical technique issues on the risk assessment, if applicable.	There are no analytical technique issues that will affect the risk assessment.
Data Quality Objectives	
Precision - How were duplicates handled?	In accordance with the May 2008 QAPP, field duplicate samples were not collected in residential soil. Two (2) matrix spike/matrix spike duplicates (MS/MSD) were collected in the field and analyzed at the laboratory for TAL metals by ICP. The analytical results for all analytes indicated that the recovery ranged from -1495 to 970% for the MS and from -825 to 2165% for the MSD. The acceptance criteria for recoveries was specified as 75-125% in the May 2008 QAPP; therefore for recoveries less than 75% the analytical result is considered to be biased low and for recoveries greater than 125%, the analytical result is considered to be biased high. In the MS/MSD samples collected by B&V, the analytical result for antimony was reported as "biased low" and none were reported as being "biased high". Five (5) laboratory control samples (LCS) were analyzed at the laboratory for TAL metals by ICP. The analytical results indicated that the percent recovery ranged from 83-110% for all LCS. All recoveries were within the acceptance criteria of 75-125% as specified in the May

DATA USEABILITY WORKSHEET
Site: Washington County Lead District
Medium: Surface Soil (Residential)

Activity	Comment
	2008 QAPP.
Accuracy - How were split samples handled?	NA. Split samples were not collected.
Representativeness - Indicate any problems associated with data representativeness (e.g., trip blank or rinsate blank contamination, chain of custody problems, etc.).	There were no problems associated with data representativeness.
Completeness - Indicate any problems associated with data completeness (e.g., incorrect sample analysis, incomplete sample records, problems with field procedures, etc.).	There were no problems associated with completeness. All residential surface soil samples were successfully collected and analyzed as planned.
Comparability - Indicate any problems associated with data comparability.	No problems associated with data comparability were noted.
Were the DQOs specified in the QAPP satisfied?	Yes, the DQOs specified in the QAPP were satisfied.
Summarize the effect of DQO issues on the risk assessment, if applicable.	There are no DQO issues that should affect the risk assessment.
Data Validation and Interpretation	
What are the data validation requirements?	For inorganic samples, validators are required to check sample receipt/prep, initial calibration, continuing calibration, quality control samples (method blank, MS/MSD, laboratory control, laboratory fortified samples) and perform a raw data evaluation.
What method or guidance was used to validate the data?	The Final National Functional Guidelines for Inorganic Data Review (October 2004) is the guidance used to validate EPA data.
Was the data validation method consistent with guidance? Discuss any discrepancies.	Yes. The data validation method was consistent with EPA guidance.
Were all data qualifiers defined? Discuss those which were not.	Yes. All data qualifiers were defined.
Which qualifiers represent useable data?	J, L, K, U, and combinations UJ, UL, UK.
Which qualifiers represent unusable data?	R and B.
How are tentatively identified compounds handled?	N/A.
Summarize the effect of data validation and interpretation issues on the risk assessment, if applicable.	The detection limit evaluation concluded that the detection limits for antimony and thallium in residential soil were not adequate for evaluation in the risk assessment. There may be an underestimation of risk posed by these constituents in residential soil.
Additional notes:	None.

Appendix C

3.0 Other Quality Control Information

Appendix D

RAGS D TABLE 3s

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
8	Lead (adjusted XRF data)	mg/kg	3415.0	(NC-S)	5713	3415.0	Mean	(1)	3415.0	Mean	(2)
69	Lead (adjusted XRF data)	mg/kg	415.0	(NC-S)	851	415.0	Mean	(1)	415.0	Mean	(2)
438	Aluminum	mg/kg	NC	(NC-S)	10700	10700	Max	(3)	10700	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Arsenic	mg/kg	NC	(NC-S)	9.98	9.98	Max	(3)	10.0	Max	(4)
	Barium	mg/kg	NC	(NC-S)	3440	3440	Max	(3)	3440.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	12.2	12.2	Max	(3)	12.2	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	11.9	11.9	Max	(3)	11.9	Max	(4)
	Iron	mg/kg	NC	(NC-S)	14300	14300	Max	(3)	14300.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	425.0	(NC-S)	1238	425.0	Mean	(1)	425.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1010	1010.0	Max	(3)	1010.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	24.1	24.1	Max	(3)	24.1	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	1030	1030	Max	(3)	1030	Max	(4)
486	Aluminum	mg/kg	NC	(NC-S)	21600	21600	Max	(3)	21600	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	17.2	17.2	Max	(3)	17.2	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	8.3	8.3	Max	(3)	8.3	Max	(4)
	Barium	mg/kg	NC	(NC-S)	854	854.0	Max	(3)	854.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	1.7	1.7	Max	(3)	1.7	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	5.8	5.8	Max	(3)	5.8	Max	(4)
	Iron	mg/kg	NC	(NC-S)	22000	22000.0	Max	(3)	22000.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	914.0	(NC-S)	1502.0	914.0	Mean	(1)	914.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	720	720.0	Max	(3)	720.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	40.1	40.1	Max	(3)	40.1	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	300	300	Max	(3)	300	Max	(4)
1612	Aluminum	mg/kg	NC	(NC-S)	11000	11000	Max	(3)	11000	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Arsenic	mg/kg	NC	(NC-S)	8	8.0	Max	(3)	8.0	Max	(4)
	Barium	mg/kg	NC	(NC-S)	1500	1500.0	Max	(3)	1500.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Cobalt	mg/kg	NC	(NC-S)	13.3	13.3	Max	(3)	13.3	Max	(4)
	Iron	mg/kg	NC	(NC-S)	16500	16500.0	Max	(3)	16500.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	249.0	(NC-S)	533.0	249.0	Mean	(1)	249.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1450	1450.0	Max	(3)	1450.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	28.1	28.1	Max	(3)	28.1	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	462	462	Max	(3)	462	Max	(4)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
1643	Lead (adjusted XRF data)	mg/kg	246.0	(NC-S)	435.0	246.0	Mean	(1)	246.0	Mean	(2)
1653	Lead (adjusted XRF data)	mg/kg	644.0	(NC-S)	978.0	644.0	Mean	(1)	644.0	Mean	(2)
5003	Aluminum	mg/kg	NC	(NC-S)	8670	8670	Max	(3)	8670	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	4.0	4.0	Max	(3)	4.0	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	7.5	7.5	Max	(3)	7.5	Max	(4)
	Barium	mg/kg	NC	(NC-S)	612	612.0	Max	(3)	612.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	2.9	2.9	Max	(3)	2.9	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	9	9.0	Max	(3)	9.0	Max	(4)
	Iron	mg/kg	NC	(NC-S)	15700	15700.0	Max	(3)	15700.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	8582.0	(NC-S)	17124.0	8582.0	Mean	(1)	8582.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1240	1240.0	Max	(3)	1240.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	25	25.0	Max	(3)	25.0	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	903	903	Max	(3)	903	Max	(4)
5007	Aluminum	mg/kg	NC	(NC-S)	14000	14000	Max	(3)	14000	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	11.3	11.3	Max	(3)	11.3	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	11.1	11.1	Max	(3)	11.1	Max	(4)
	Barium	mg/kg	NC	(NC-S)	510	510.0	Max	(3)	510.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	10.1	10.1	Max	(3)	10.1	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	12.3	12.3	Max	(3)	12.3	Max	(4)
	Iron	mg/kg	NC	(NC-S)	19300	19300.0	Max	(3)	19300.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	633.0	(NC-S)	944.0	633.0	Mean	(1)	633.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1070	1070.0	Max	(3)	1070.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	39.9	39.9	Max	(3)	39.9	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	9250	9250	Max	(3)	9250	Max	(4)
5008	Aluminum	mg/kg	NC	(NC-S)	10800	10800	Max	(3)	10800	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	2.6	2.6	Max	(3)	2.6	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	5.7	5.7	Max	(3)	5.7	Max	(4)
	Barium	mg/kg	NC	(NC-S)	826	826.0	Max	(3)	826.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	2.7	2.7	Max	(3)	2.7	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	13.8	13.8	Max	(3)	13.8	Max	(4)
	Iron	mg/kg	NC	(NC-S)	16200	16200.0	Max	(3)	16200.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	640.0	(NC-S)	893.0	640.0	Mean	(1)	640.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1070	1070.0	Max	(3)	1070.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	22.5	22.5	Max	(3)	22.5	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	231	231	Max	(3)	231	Max	(4)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
5012	Aluminum	mg/kg	NC	(NC-S)	9280	9280	Max	(3)	9280	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	5.8	5.8	Max	(3)	5.8	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Barium	mg/kg	NC	(NC-S)	1490	1490.0	Max	(3)	1490.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	4.9	4.9	Max	(3)	4.9	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	17.6	17.6	Max	(3)	17.6	Max	(4)
	Iron	mg/kg	NC	(NC-S)	20500	20500.0	Max	(3)	20500.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	928.0	(NC-S)	2884.0	928.0	Mean	(1)	928.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1190	1190.0	Max	(3)	1190.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	18.6	18.6	Max	(3)	18.6	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	249	249	Max	(3)	249	Max	(4)
5013	Aluminum	mg/kg	NC	(NC-S)	12100	12100	Max	(3)	12100	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	10.4	10.4	Max	(3)	10.4	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	12.4	12.4	Max	(3)	12.4	Max	(4)
	Barium	mg/kg	NC	(NC-S)	942	942.0	Max	(3)	942.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	6	6.0	Max	(3)	6.0	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	15.3	15.3	Max	(3)	15.3	Max	(4)
	Iron	mg/kg	NC	(NC-S)	25100	25100.0	Max	(3)	25100.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	482.0	(NC-S)	855.0	482.0	Mean	(1)	482.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1450	1450.0	Max	(3)	1450.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	40.4	40.4	Max	(3)	40.4	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	1230	1230	Max	(3)	1230	Max	(4)
5014	Lead (adjusted XRF data)	mg/kg	626.0	(NC-S)	994.0	626.0	Mean	(1)	626.0	Mean	(2)
20008	Lead (adjusted XRF data)	mg/kg	839.0	(NC-S)	1651.0	839.0	Mean	(1)	839.0	Mean	(2)
20027	Lead (adjusted XRF data)	mg/kg	712.0	(NC-S)	1482.0	712.0	Mean	(1)	712.0	Mean	(2)
20028	Aluminum	mg/kg	NC	(NC-S)	13000	13000	Max	(3)	13000	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	5.5	5.5	Max	(3)	5.5	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Barium	mg/kg	NC	(NC-S)	576	576.0	Max	(3)	576.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	2.3	2.3	Max	(3)	2.3	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	11.7	11.7	Max	(3)	11.7	Max	(4)
	Iron	mg/kg	NC	(NC-S)	17000	17000.0	Max	(3)	17000.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	361.0	(NC-S)	759.0	361.0	Mean	(1)	361.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1130	1130.0	Max	(3)	1130.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	31.1	31.1	Max	(3)	31.1	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	432	432	Max	(3)	432	Max	(4)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
20070	Aluminum	mg/kg	NC	(NC-S)	13000	13000	Max	(3)	13000	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Arsenic	mg/kg	NC	(NC-S)	9.1	9.1	Max	(3)	9.1	Max	(4)
	Barium	mg/kg	NC	(NC-S)	430	430.0	Max	(3)	430.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Cobalt	mg/kg	NC	(NC-S)	6.4	6.4	Max	(3)	6.4	Max	(4)
	Iron	mg/kg	NC	(NC-S)	16800	16800.0	Max	(3)	16800.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	187.0	(NC-S)	646.0	187.0	Mean	(1)	187.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	755	755.0	Max	(3)	755.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	44.5	44.5	Max	(3)	44.5	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	192	192	Max	(3)	192	Max	(4)
20108	Lead (adjusted XRF data)	mg/kg	826.0	(NC-S)	1860.0	826.0	Mean	(1)	826.0	Mean	(2)
20171	Lead (adjusted XRF data)	mg/kg	657.0	(NC-S)	992.0	657.0	Mean	(1)	657.0	Mean	(2)
20173	Lead (adjusted XRF data)	mg/kg	901.0	(NC-S)	1151.0	901.0	Mean	(1)	901.0	Mean	(2)
20187	Lead (adjusted XRF data)	mg/kg	422.0	(NC-S)	709.0	422.0	Mean	(1)	422.0	Mean	(2)
20331	Aluminum	mg/kg	NC	(NC-S)	20900	20900	Max	(3)	20900	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	15.9	15.9	Max	(3)	15.9	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	11.4	11.4	Max	(3)	11.4	Max	(4)
	Barium	mg/kg	NC	(NC-S)	322	322.0	Max	(3)	322.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Cobalt	mg/kg	NC	(NC-S)	11.5	11.5	Max	(3)	11.5	Max	(4)
	Iron	mg/kg	NC	(NC-S)	22700	22700.0	Max	(3)	22700.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	1126.0	(NC-S)	1724.0	1126.0	Mean	(1)	1126.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	644	644.0	Max	(3)	644.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	47.2	47.2	Max	(3)	47.2	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	110	110	Max	(3)	110	Max	(4)
20349	Aluminum	mg/kg	NC	(NC-S)	11700	11700	Max	(3)	11700	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Arsenic	mg/kg	NC	(NC-S)	15.3	15.3	Max	(3)	15.3	Max	(4)
	Barium	mg/kg	NC	(NC-S)	235	235.0	Max	(3)	235.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	4.4	4.4	Max	(3)	4.4	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	12.8	12.8	Max	(3)	12.8	Max	(4)
	Iron	mg/kg	NC	(NC-S)	24200	24200.0	Max	(3)	24200.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	1130.0	(NC-S)	1768.0	1130.0	Mean	(1)	1130.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	833	833.0	Max	(3)	833.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	34	34.0	Max	(3)	34.0	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	426	426	Max	(3)	426	Max	(4)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
20397	Lead (adjusted XRF data)	mg/kg	852.0	(NC-S)	1768.0	852.0	Mean	(1)	852.0	Mean	(2)
20428	Lead (adjusted XRF data)	mg/kg	833.0	(NC-S)	1125.0	833.0	Mean	(1)	833.0	Mean	(2)
20437	Lead (adjusted XRF data)	mg/kg	1386.0	(NC-S)	3348.0	1386.0	Mean	(1)	1386.0	Mean	(2)
20758	Lead (adjusted XRF data)	mg/kg	76.0	(NC-S)	47.0	76.0	Mean	(1)	76.0	Mean	(2)
20767	Lead (adjusted XRF data)	mg/kg	486.0	(NC-S)	1392.0	486.0	Mean	(1)	486.0	Mean	(2)
20918	Aluminum	mg/kg	NC	(NC-S)	9200	9200	Max	(3)	9200	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	6.7	6.7	Max	(3)	6.7	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	11.5	11.5	Max	(3)	11.5	Max	(4)
	Barium	mg/kg	NC	(NC-S)	1400	1400.0	Max	(3)	1400.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	8.6	8.6	Max	(3)	8.6	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	12.8	12.8	Max	(3)	12.8	Max	(4)
	Iron	mg/kg	NC	(NC-S)	27200	27200.0	Max	(3)	27200.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	1309.0	(NC-S)	2378.0	1309.0	Mean	(1)	1309.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	812	812.0	Max	(3)	812.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	27.1	27.1	Max	(3)	27.1	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	1420	1420	Max	(3)	1420	Max	(4)
23264	Lead (adjusted XRF data)	mg/kg	434.0	(NC-S)	780.0	434.0	Mean	(1)	434.0	Mean	(2)
23378	Aluminum	mg/kg	NC	(NC-S)	5770	5770	Max	(3)	5770	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	23.3	23.3	Max	(3)	23.3	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	6	6.0	Max	(3)	6.0	Max	(4)
	Barium	mg/kg	NC	(NC-S)	940	940.0	Max	(3)	940.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	11.6	11.6	Max	(3)	11.6	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	34.9	34.9	Max	(3)	34.9	Max	(4)
	Iron	mg/kg	NC	(NC-S)	21700	21700.0	Max	(3)	21700.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	4252.0	(NC-S)	5934.0	4252.0	Mean	(1)	4252.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	2570	2570.0	Max	(3)	2570.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	9.8	9.8	Max	(3)	9.8	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	672	672	Max	(3)	672	Max	(4)
23575	Lead (adjusted XRF data)	mg/kg	180.0	(NC-S)	287.0	180.0	Mean	(1)	180.0	Mean	(2)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
30079	Aluminum	mg/kg	NC	(NC-S)	9750	9750	Max	(3)	9750	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Arsenic	mg/kg	NC	(NC-S)	5.7	5.7	Max	(3)	5.7	Max	(4)
	Barium	mg/kg	NC	(NC-S)	278	278.0	Max	(3)	278.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	2.2	2.2	Max	(3)	2.2	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	11.1	11.1	Max	(3)	11.1	Max	(4)
	Iron	mg/kg	NC	(NC-S)	14000	14000.0	Max	(3)	14000.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	276.0	(NC-S)	286.0	276.0	Mean	(1)	276.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1310	1310.0	Max	(3)	1310.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	25.7	25.7	Max	(3)	25.7	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	449	449	Max	(3)	449	Max	(4)
30126	Aluminum	mg/kg	NC	(NC-S)	12200	12200	Max	(3)	12200	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	4.3	4.3	Max	(3)	4.3	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	5.9	5.9	Max	(3)	5.9	Max	(4)
	Barium	mg/kg	NC	(NC-S)	4690	4690.0	Max	(3)	4690.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	1.6	1.6	Max	(3)	1.6	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	5	5.0	Max	(3)	5.0	Max	(4)
	Iron	mg/kg	NC	(NC-S)	19900	19900.0	Max	(3)	19900.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	442.0	(NC-S)	591.0	442.0	Mean	(1)	442.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	754	754.0	Max	(3)	754.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	24.5	24.5	Max	(3)	24.5	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	101	101	Max	(3)	101	Max	(4)
30172	Lead (adjusted XRF data)	mg/kg	693.0	(NC-S)	1007.0	693.0	Mean	(1)	693.0	Mean	(2)
30177	Aluminum	mg/kg	NC	(NC-S)	16300	16300	Max	(3)	16300	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Arsenic	mg/kg	NC	(NC-S)	9.4	9.4	Max	(3)	9.4	Max	(4)
	Barium	mg/kg	NC	(NC-S)	447	447.0	Max	(3)	447.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	5	5.0	Max	(3)	5.0	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	10	10.0	Max	(3)	10.0	Max	(4)
	Iron	mg/kg	NC	(NC-S)	30800	30800.0	Max	(3)	30800.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	686.0	(NC-S)	1277.0	686.0	Mean	(1)	686.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	821	821.0	Max	(3)	821.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	36.4	36.4	Max	(3)	36.4	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	361	361	Max	(3)	361	Max	(4)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
30182	Aluminum	mg/kg	NC	(NC-S)	12000	12000	Max	(3)	12000	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	3.7	3.7	Max	-	3.7	Max	-
	Arsenic	mg/kg	NC	(NC-S)	ND	ND	-	(3)	ND	-	(4)
	Barium	mg/kg	NC	(NC-S)	4520	4520.0	Max	(3)	4520.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	1.1	1.1	Max	(3)	1.1	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	9.3	9.3	Max	(3)	9.3	Max	(4)
	Iron	mg/kg	NC	(NC-S)	14200	14200.0	Max	(3)	14200.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	404.0	(NC-S)	871.0	404.0	Mean	(1)	404.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	962	962.0	Max	(3)	962.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	29.6	29.6	Max	(3)	29.6	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	177	177	Max	(3)	177	Max	(4)
30271	Aluminum	mg/kg	NC	(NC-S)	5780	5780	Max	(3)	5780	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	6.2	6.2	Max	(3)	6.2	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Barium	mg/kg	NC	(NC-S)	1410	1410.0	Max	(3)	1410.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	3.3	3.3	Max	(3)	3.3	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	14.3	14.3	Max	(3)	14.3	Max	(4)
	Iron	mg/kg	NC	(NC-S)	16100	16100.0	Max	(3)	16100.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	926.0	(NC-S)	1304.0	926.0	Mean	(1)	926.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1280	1280.0	Max	(3)	1280.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	15.9	15.9	Max	(3)	15.9	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	181	181	Max	(3)	181	Max	(4)
30364	Aluminum	mg/kg	NC	(NC-S)	18500	18500	Max	(3)	18500	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	3.5	3.5	Max	(3)	3.5	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	12.2	12.2	Max	(3)	12.2	Max	(4)
	Barium	mg/kg	NC	(NC-S)	1010	1010.0	Max	(3)	1010.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	5.1	5.1	Max	(3)	5.1	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	9.8	9.8	Max	(3)	9.8	Max	(4)
	Iron	mg/kg	NC	(NC-S)	32300	32300.0	Max	(3)	32300.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	842.0	(NC-S)	1281.0	842.0	Mean	(1)	842.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	748	748.0	Max	(3)	748.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	57.5	57.5	Max	(3)	57.5	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	337	337	Max	(3)	337	Max	(4)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
30417	Aluminum	mg/kg	NC	(NC-S)	8210	8210	Max	(3)	8210	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	11.5	11.5	Max	(3)	11.5	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	6.5	6.5	Max	(3)	6.5	Max	(4)
	Barium	mg/kg	NC	(NC-S)	312	312.0	Max	(3)	312.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	5.5	5.5	Max	(3)	5.5	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	17.8	17.8	Max	(3)	17.8	Max	(4)
	Iron	mg/kg	NC	(NC-S)	19100	19100.0	Max	(3)	19100.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	1071.0	(NC-S)	1527.0	1071.0	Mean	(1)	1071.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1580	1580.0	Max	(3)	1580.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	17.3	17.3	Max	(3)	17.3	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	342	342	Max	(3)	342	Max	(4)
30448	Lead (adjusted XRF data)	mg/kg	766.0	(NC-S)	1466.0	766.0	Mean	(1)	766.0	Mean	(2)
30553	Aluminum	mg/kg	NC	(NC-S)	12000	12000	Max	(3)	12000	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	4.7	4.7	Max	(3)	4.7	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	11.3	11.3	Max	(3)	11.3	Max	(4)
	Barium	mg/kg	NC	(NC-S)	443	443.0	Max	(3)	443.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Cobalt	mg/kg	NC	(NC-S)	16.3	16.3	Max	(3)	16.3	Max	(4)
	Iron	mg/kg	NC	(NC-S)	18300	18300.0	Max	(3)	18300.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	719.0	(NC-S)	992.0	719.0	Mean	(1)	719.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	1600	1600.0	Max	(3)	1600.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	41	41.0	Max	(3)	41.0	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	367	367	Max	(3)	367	Max	(4)
30577	Lead (adjusted XRF data)	mg/kg	498.0	(NC-S)	794.0	498.0	Mean	(1)	498.0	Mean	(2)
30651	Aluminum	mg/kg	NC	(NC-S)	22200	22200	Max	(3)	22200	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	4.1	4.1	Max	(3)	4.1	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	17.2	17.2	Max	(3)	17.2	Max	(4)
	Barium	mg/kg	NC	(NC-S)	391	391.0	Max	(3)	391.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	3.4	3.4	Max	(3)	3.4	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	7.2	7.2	Max	(3)	7.2	Max	(4)
	Iron	mg/kg	NC	(NC-S)	32100	32100.0	Max	(3)	32100.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	913.0	(NC-S)	1287.0	913.0	Mean	(1)	913.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	611	611.0	Max	(3)	611.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	60.4	60.4	Max	(3)	60.4	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	633	633	Max	(3)	633	Max	(4)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
30911	Aluminum	mg/kg	NC	(NC-S)	18200	18200	Max	(3)	18200	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	3.2	3.2	Max	(3)	3.2	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	25	25.0	Max	(3)	25.0	Max	(4)
	Barium	mg/kg	NC	(NC-S)	602	602.0	Max	(3)	602.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	8.1	8.1	Max	(3)	8.1	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	11.6	11.6	Max	(3)	11.6	Max	(4)
	Iron	mg/kg	NC	(NC-S)	39100	39100.0	Max	(3)	39100.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	862.0	(NC-S)	1243.0	862.0	Mean	(1)	862.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	685	685.0	Max	(3)	685.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	59.3	59.3	Max	(3)	59.3	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	1150	1150	Max	(3)	1150	Max	(4)
30914	Aluminum	mg/kg	NC	(NC-S)	11000	11000	Max	(3)	11000	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	9.5	9.5	Max	(3)	9.5	Max	(4)
	Arsenic	mg/kg	NC	(NC-S)	9.3	9.3	Max	(3)	9.3	Max	(4)
	Barium	mg/kg	NC	(NC-S)	584	584.0	Max	(3)	584.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	1.2	1.2	Max	(3)	1.2	Max	(4)
	Cobalt	mg/kg	NC	(NC-S)	5.3	5.3	Max	(3)	5.3	Max	(4)
	Iron	mg/kg	NC	(NC-S)	21700	21700.0	Max	(3)	21700.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	1041.0	(NC-S)	2082.0	1041.0	Mean	(1)	1041.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	515	515.0	Max	(3)	515.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	31.3	31.3	Max	(3)	31.3	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	748	748	Max	(3)	748	Max	(4)
30965	Lead (adjusted XRF data)	mg/kg	306.0	(NC-S)	1131.0	306.0	Mean	(1)	306.0	Mean	(2)
31016	Aluminum	mg/kg	NC	(NC-S)	10800	10800	Max	(3)	10800	Max	(4)
	Antimony	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Arsenic	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Barium	mg/kg	NC	(NC-S)	1240	1240.0	Max	(3)	1240.0	Max	(4)
	Cadmium	mg/kg	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Cobalt	mg/kg	NC	(NC-S)	10.5	10.5	Max	(3)	10.5	Max	(4)
	Iron	mg/kg	NC	(NC-S)	13300	13300.0	Max	(3)	13300.0	Max	(4)
	Lead (adjusted XRF data)	mg/kg	372.0	(NC-S)	678.0	372.0	Mean	(1)	372.0	Mean	(2)
	Manganese	mg/kg	NC	(NC-S)	988	988.0	Max	(3)	988.0	Max	(4)
	Vanadium	mg/kg	NC	(NC-S)	26.2	26.2	Max	(3)	26.2	Max	(4)
	Zinc	mg/kg	NC	(NC-S)	59.4	59.4	Max	(3)	59.4	Max	(4)

Table 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil (Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale

Notes:
EPC = Exposure Point Concentration
J = estimated value
mg/kg = milligrams per kilogram
UCL = upper confidence limit

(1) Since the lead model uses the mean concentration, the mean was selected as the RME EPC.
(2) The arithmetic mean concentration was used for the Central Tendency EPC.
(3) Maximum concentration used because too few observations to calculate a UCL.
(4) Maximum concentration used because to few observations to calculate a mean.

(NC) Not calculated
(S) Unknown distribution (too few observations).
(ND) Not Detected

Table 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Potable Well Water
(Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
8	Barium	ug/L	NC	(NC-S)	78	78	Max	(1)	78	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	1.2	1.2	Max	(1)	1.2	Max	(2)
69	Barium	ug/L	NC	(NC-S)	827	827	Max	(1)	827	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	6	6	Max	(1)	6	Max	(2)
	Lead	ug/L	NC	(NC-S)	8.8	8.8	Max	(1)	8.8	Max	(2)
438	Barium	ug/L	NC	(NC-S)	80	80	Max	(1)	80	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
1612	Barium	ug/L	NC	(NC-S)	129	129	Max	(1)	129	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
1653	Barium	ug/L	NC	(NC-S)	595	595	Max	(1)	595	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	28.0	28.0	Max	(1)	28.0	Max	(2)
5007	Barium	ug/L	NC	(NC-S)	126	126	Max	(1)	126	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	3	3	Max	(1)	3	Max	(2)
	Lead	ug/L	NC	(NC-S)	2.2	2.2	Max	(1)	2.2	Max	(2)

Table 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Potable Well Water
(Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
5008	Barium	ug/L	NC	(NC-S)	494	494	Max	(1)	494	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Lead	ug/L	NC	(NC-S)	3.1	3.1	Max	(1)	3.1	Max	(2)
5014	Barium	ug/L	NC	(NC-S)	170	170	Max	(1)	170	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Lead	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
20008	Barium	ug/L	NC	(NC-S)	500	500	Max	(1)	500	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	14.9	14.9	Max	(1)	14.9	Max	(2)
20027	Barium	ug/L	NC	(NC-S)	554	554	Max	(1)	554	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
20437	Barium	ug/L	NC	(NC-S)	641	641	Max	(1)	641	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	5	5	Max	(1)	5	Max	(2)
	Lead	ug/L	NC	(NC-S)	6.8	6.8	Max	(1)	6.8	Max	(2)
20767	Barium	ug/L	NC	(NC-S)	607	607	Max	(1)	607	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Lead	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-

Table 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Potable Well Water
(Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
23264	Barium	ug/L	NC	(NC-S)	85	85	Max	(1)	85	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	3	3	Max	(1)	3	Max	(2)
	Lead	ug/L	NC	(NC-S)	5.7	5.7	Max	(1)	5.7	Max	(2)
23378	Barium	ug/L	NC	(NC-S)	84	84	Max	(1)	84	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	3	3	Max	(1)	3	Max	(2)
	Lead	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
23575	Barium	ug/L	NC	(NC-S)	235	235	Max	(1)	235	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Lead	ug/L	NC	(NC-S)	12.0	12.0	Max	(1)	12.0	Max	(2)
30079	Barium	ug/L	NC	(NC-S)	1230	1230	Max	(1)	1230	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	3	3	Max	(1)	3	Max	(2)
	Lead	ug/L	NC	(NC-S)	1.3	1.3	Max	(1)	1.3	Max	(2)
30182	Barium	ug/L	NC	(NC-S)	962	962	Max	(1)	962	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	6.7	6.7	Max	(1)	6.7	Max	(2)
30448	Barium	ug/L	NC	(NC-S)	94	94	Max	(1)	94	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	19.5	19.5	Max	(1)	19.5	Max	(2)

Table 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Potable Well Water
(Residential Exposure Units)

Exposure Point (Residential Property)	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)	Maximum Concentration (Qualifier)	Reasonable Maximum Exposure			Central Tendency Exposure		
						EPC Value	EPC Statistic	EPC Rationale	EPC Value	EPC Statistic	EPC Rationale
30553	Barium	ug/L	NC	(NC-S)	1110	1110	Max	(1)	1110	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Lead	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
30914	Barium	ug/L	NC	(NC-S)	161	161	Max	(1)	161	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	12.4	12.4	Max	(1)	12.4	Max	(2)
30965	Barium	ug/L	NC	(NC-S)	419	419	Max	(1)	419	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
	Lead	ug/L	NC	(NC-S)	ND	ND	-	-	ND	-	-
31016	Barium	ug/L	NC	(NC-S)	608	608	Max	(1)	608	Max	(2)
	Cadmium	ug/L	NC	(NC-S)	4	4	Max	(1)	4	Max	(2)
	Lead	ug/L	NC	(NC-S)	12.8	12.8	Max	(1)	12.8	Max	(2)

Notes:

EPC = Exposure Point Concentration

UCL = upper confidence limit

ug/L = micrograms per liter

(1) Maximum concentration used because too few observations to calculate a UCL.
(2) Maximum concentration used because to few observations to calculate a mean.

(NC) Not calculated
(S) Unknown distribution (too few observations).
(1) Maximum concentration used because too few observations to calculate a UCL.
(2) Maximum concentration used because to few observations to calculate a mean.
(3) Since the lead model uses the mean concentration, the mean was selected as the RME EPC.
(4) The arithmetic mean concentration was used for the Central Tendency EPC.

Appendix E

RAGS D TABLE 4s

Appendix E
Table 4.1 Exposure Parameters for Residents
Washington County Lead District Site
Washington County, Missouri

Exposure Pathway	Exposure Parameter	Units	CTE				RME			
			Adult	Source	Child	Source	Adult	Source	Child	Source
General	Body Weight	kg	70	(1)	15	(1)	70	(1)	15	(1)
	Exposure Frequency	days/yr	245	(3, a)	245	(3, a)	350	(1)	350	(1)
	Exposure Duration	years	7	(3, 4, e)	2	(3, 4, e)	24	(1)	6	(1)
	Averaging Time, Cancer	days	25550	(2, d)	25550	(2, d)	25550	(2, d)	25550	(2, d)
	Averaging Time, Noncancer	days	2555	(2, d)	730	(2, d)	8760	(2, d)	2190	(2, d)
Soil Ingestion	Ingestion Rate	mg/day	50	(3, c)	100	(3, c)	100	(1)	200	(1)
	Conversion Factor	kg/mg	1.00E-06	- -	1.00E-06	- -	1.00E-06	- -	1.00E-06	- -
Soil Dermal Exposure	Exposed Skin Surface Area (SA)	cm^2/event	5700	(5)	2800	(5)	5700	(5)	2800	(5)
	Adherence Factor (AF)	mg/cm^2	0.01	(5)	0.04	(5)	0.07	(5)	0.2	(5)
	Event Frequency	events/day	1	(5)	1	(5)	1	(5)	1	(5)
	Dermal Absorption Fraction (ABS)	unitless	CS	- -	CS	- -	CS	- -	CS	(5)
	Conversion Factor	kg/mg	1.00E-06	- -	1.00E-06	- -	1.00E-06	- -	1.00E-06	- -
Groundwater Ingestion	Ingestion Rate	L/day	1.4	(1, 2)	0.4	(6,b)	2	(1, 2)	1.1	(6, b)
Groundwater Dermal	Exposed Skin Surface Area (SA)	cm^2/event	18,000	(5)	6,600	(5)	18,000	(5)	6,600	(5)
	Dermal Permeability Constant	cm/hour	CS	- -	CS	- -	CS	- -	CS	(5)
	t-event	hour/event	0.25	(5)	0.33	(5)	0.58	(5)	1	(5)
	Event Frequency	events/day	1	(5)	1	(5)	1	(5)	1	(5)
	Conversion Factor	L/cm^3	0.001	- -	0.001	- -	0.001	- -	0.001	- -

CS = Chemical Specific value
CTE = Central Tendency Exposure
RME = Reasonable Maximum Exposure

Sources:
(1) USEPA 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03. March.
(2) USEPA 1989. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response, Washington, D. C. EPA/540/1-89/002. December.
(3) USEPA 1997. Exposure Factors Handbook
(4) Professional judgement.
(5) USEPA 2004. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part E). Office of Solid Waste and Emergency Response, Washington, D.C. EPA/540/R/99/005. July.
(6) USEPA, 2002. Child-Specific Exposure Factors Handbook. Interim Report. EPA-600-P-00-002B. September.

Notes:
(a) Estimated by taking the percent of time men and women spend at home (67%) and muliplying by 365 days (0.67 x 365 days = 245 days)
(b) CTE value is the mean drinking water intake for 1-10 year olds and the RME value is the 95th percentile drinking water intake rate for 1-10 year olds.
(c) Mean recommended values for soil ingestion.
(d) Averaging time expressed as days. Noncancer averaging time calculated by muliplying the exposure duration in years by 365 days/year. Cancer averaging time calculated by multiplying a 70 year lifetime for cancer effects by 365 days/year.
(e) Average residency/occupancy of a home (9 years). Assumes 2 years as a child and 7 years as an adult.

Appendix E
Table 4.2 Summary of Human Intake Factor (HIF) Values by Receptor
Washington County Lead District Site
Washington County, Missouri

Receptor	Exposure Route	Units	HIF			
			Non-Cancer		Cancer	
			CTE	RME	CTE	RME
Residential Adult	Soil Ingestion	kg/kg-d	4.79E-07	1.37E-06	4.79E-08	4.70E-07
	Soil Dermal Contact	kg/kg-d	5.47E-07	5.47E-06	5.47E-08	1.87E-06
	Groundwater Ingestion	L/kg-d	1.34E-02	2.74E-02	1.34E-03	9.39E-03
	Groundwater Dermal Contact	cm^2-event/kg-d	1.73E+02	2.47E+02	1.73E+01	8.45E+01
Residential Child	Soil Ingestion	kg/kg-d	4.47E-06	1.28E-05	1.28E-07	1.10E-06
	Soil Dermal Contact	kg/kg-d	5.01E-06	3.58E-05	1.43E-07	3.07E-06
	Groundwater Ingestion	L/kg-d	1.79E-02	7.03E-02	5.11E-04	6.03E-03
	Groundwater Dermal Contact	cm^2-event/kg-d	2.95E+02	4.22E+02	8.44E+00	3.62E+01

Appendix F

RAGS D TABLE 5s AND TABLE 6s

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

WASHINGTON COUNTY LEAD DISTRICT RI/FS

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s) (3)	Date(s) (MM/DD/YYYY)
Aluminum	Chronic	1.0E+00	mg/kg-day	100%	1.0E+00	mg/kg-day	CNS	100	PPRTV	7/23/2009
Antimony	Chronic	4.0E-04	mg/kg-day	15%	6.0E-05	mg/kg-day	Lifetime/Blood	1000	IRIS	7/23/2009
Arsenic	Chronic	3.0E-04	mg/kg-day	100%	3.0E-04	mg/kg-day	Skin/Vascular	3	IRIS	7/23/2009
Barium	Chronic	2.0E-01	mg/kg-day	7%	1.4E-02	mg/kg-day	Kidney	300	IRIS	7/23/2009
Cadmium (diet)	Chronic	1.0E-03	mg/kg-day	2.5%	2.5E-05	mg/kg-day	Kidney	10	IRIS	7/23/2009
Cadmium (water)	Chronic	5.0E-04	mg/kg-day	5%	2.5E-05	mg/kg-day	Kidney	10	IRIS	7/23/2009
Cobalt	Chronic	3.0E-04	mg/kg-day	100%	3.0E-04	mg/kg-day	Thyroid	3000	PPRTV	7/23/2009
Iron	Chronic	7.0E-01	mg/kg-day	100%	7.0E-01	mg/kg-day	Gastrointestinal Tract	1.5	PPRTV	7/23/2009
Lead	Chronic	NA	mg/kg-day	NA	NA	mg/kg-day	NA	NA	IRIS	7/23/2009
Manganese (diet)	Chronic	1.4E-01	mg/kg-day	4%	5.60E-03	mg/kg-day	CNS	1	IRIS	7/23/2009
Manganese (water)	Chronic	2.4E-02	mg/kg-day	4%	9.60E-04	mg/kg-day	CNS	1	IRIS	7/23/2009
Vanadium	Chronic	7.0E-03	mg/kg-day	2.6%	1.8E-04	mg/kg-day	Lifetime	100	HEAST	7/23/2009
Zinc	Chronic	3.0E-01	mg/kg-day	1	3.0E-01	mg/kg-day	Blood	3	IRIS	7/23/2009

ATSDR-MRL = Agency for Toxic Substances and Disease Registry Minimal Risk Level
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables; July 1997
PPRTV = Provisional Peer Reviewed Toxicity Value
RfD = Reference dose
(1) Toxictiy values shown include COPCs in soil and groundwater.
(2) The dermal RfD was assumed to equal the oral RfD, unless an adjustment factor was found in Exhibit 4.1 of RAGS-E (EPA 2004)
(3) All toxicity values were confirmed from the available source, in July 2009.

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC (1)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC:Target Organ(s)	
		Value	Units			Source(s) (2)	Date(s) (MM/DD/YYYY)
Aluminum	Chronic	5.0E-03	mg/m^3	CNS	300	PPRTV	7/23/2009
Antimony	Chronic	NA	mg/m^3	NA	NA	NA	NA
Arsenic	Chronic	1.5E-05	mg/m^3	Developmental	1000	CalEPA-REL	7/23/2009
Barium	Chronic	5.0E-04	mg/m^3	Fetotoxicity	1000	HEAST	7/23/2009
Cadmium	Chronic	1.0E-05	mg/m^3	Kidney	9	ATSDR-MRL	7/23/2009
Cobalt	Chronic	6.0E-06	mg/m^3	Respiratory System Effects	300	PPRTV	7/23/2009
Iron	Chronic	NA	mg/m^3	NA	NA	NA	NA
Lead	Chronic	NA	mg/m^3	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m^3	CNS	1000	IRIS	7/23/2009
Vanadium	Chronic	NA	mg/m^3	NA	NA	NA	NA
Zinc	Chronic	NA	mg/m^3	NA	NA	NA	NA

ATSDR-MRL = Agency for Toxic Substances and Disease Registry Minimal Risk Level
CalEPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables; July 1997
MRL = Minimal Risk Level
PPRTV = Provisional Peer Reviewed Toxicity Value
REL = Reference Exposure Level
RfC = Reference concentration

(1) Toxictiy values shown include COPCs in soil and groundwater.
(2) All toxicity values were confirmed from the available source, in July 2009.

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

WASHINGTON COUNTY LEAD DISTRICT RI/FS

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Slope Factor (2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s) (3)	Date(s) (MM/DD/YYYY)
Aluminum	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA
Antimony	NA	$(mg/kg\text{-}day)^{-1}$	NA	N/A	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA
Arsenic	1.5E+00	$(mg/kg\text{-}day)^{-1}$	100%	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	7/23/2009
Barium	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	D	IRIS	7/23/2009
Cadmium	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	7/23/2009
Cobalt	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	NA	PPRTV	7/23/2009
Iron	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA
Lead	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	7/23/2009
Manganese	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	D	IRIS	7/23/2009
Vanadium	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA
Zinc	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA

CSF - Cancer Slope Factor
N/A - Not Available
IRIS - Integrated Risk Information System
mg/kg-day - milligrams per kilogram per day
PPRTV = Provisional Peer Reviewed Toxicity Value

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - Indicates limited human data are available
B2 - Probable human carcinogen - Indicates sufficient evidence in animals and inadequate or no evidence in humans
D -Not Classified

(1) RAGS A (1989); RAGS E (2004); see explanation of derivation provided in the text. Note: Oral to Dermal Adjustment Factor from Exhibit 4-1, RAGS E 2004
(2) Adjusted Dermal Slope Factor (1/mg/kg/day) = Oral Cancer Slope Factor (1/mg/kg/day) divided by Oral to Dermal Adjustment Factor
(3) All toxicity values were confirmed from the available source, in July 2009.

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Chemical of Potential Concern	Unit Risk		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation CSF	
	Value	Units		Source(s) (1)	Date(s) (MM/DD/YYYY)
Aluminum	NA	$(ug/m^3)^{-1}$	NA	NA	NA
Antimony	NA	$(ug/m^3)^{-1}$	NA	NA	NA
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	A	IRIS	2/7/2009
Barium	NA	$(ug/m^3)^{-1}$	D	IRIS	2/7/2009
Cadmium (diet)	4.2E-03	$(ug/m^3)^{-1}$	B1	CalEPA	2/7/2009
Cadmium (water)	1.8E-03	$(ug/m^3)^{-1}$	B1	IRIS	2/7/2009
Cobalt	9.0E-03	$(ug/m^3)^{-1}$	B1*	PPRTV	2/7/2009
Iron	NA	$(ug/m^3)^{-1}$	NA	NA	NA
Lead	NA	$(ug/m^3)^{-1}$	B2	IRIS	2/7/2009
Manganese	NA	$(ug/m^3)^{-1}$	D	IRIS	2/7/2009
Vanadium	NA	$(ug/m^3)^{-1}$	NA	NA	NA
Zinc	NA	$(ug/m^3)^{-1}$	NA	NA	NA

CalEPA = California Environmental Protection Agency
N/A - Not Available
IRIS - Integrated Risk Information System
mg/kg-day - milligrams per kilogram per day
PPRTV = Provisional Peer Reviewed Toxicity Value
ug/m^3 - micrograms per cubic meter

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - Indicates limited human data are available
B2 - Probable human carcinogen - Indicates sufficient evidence in animals and inadequate or no evidence in humans
D -Not Classified

(1) All toxicity values were confirmed from the available source, in July 2009.

Appendix G

RAGS D TABLE 7s AND TABLE 8s

Table 7.1a Adult Resident RME Soil at Property 8
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 8
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	3415	mg/kg	3415	mg/kg	M	4.7E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	3415	mg/kg	3415	mg/kg	M	1.9E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1a Adult Resident CTE Soil at Property 8
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 8
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	3415	mg/kg	3415	mg/kg	M	1.6E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	3415	mg/kg	3415	mg/kg	M	1.9E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1a Child Resident RME Soil at Property 8
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 8
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	3415	mg/kg	3415	mg/kg	M	4.4E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	3415	mg/kg	3415	mg/kg	M	1.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1a Child Resident CTE Soil at Property 8
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 8
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	3415	mg/kg	3415	mg/kg	M	1.5E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	3415	mg/kg	3415	mg/kg	M	1.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1b Adult Resident RME Soil at Property 69
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 69
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	415	mg/kg	415	mg/kg	M	5.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	415	mg/kg	415	mg/kg	M	2.3E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1b Adult Resident CTE Soil at Property 69
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 69
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	415	mg/kg	415	mg/kg	M	2.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	415	mg/kg	415	mg/kg	M	2.3E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
										Total Hazard Index Across All Exposure Routes/Pathways			NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1b Child Resident RME Soil at Property 69
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 69
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	415	mg/kg	415	mg/kg	M	5.3E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	415	mg/kg	415	mg/kg	M	1.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1b Child Resident CTE Soil at Property 69
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 69
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	415	mg/kg	415	mg/kg	M	1.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	415	mg/kg	415	mg/kg	M	2.1E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1c Adult Resident RME Soil at Property 438
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 438
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	10700	mg/kg	10700	mg/kg	M	1.5E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.5E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.98	mg/kg	9.98	mg/kg	M	1.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.6E-02
	Barium	3440	mg/kg	3440	mg/kg	M	4.7E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.4E-02
	Cadmium	12.2	mg/kg	12.2	mg/kg	M	1.7E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.7E-02
	Cobalt	11.9	mg/kg	11.9	mg/kg	M	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.4E-02
	Iron	14300	mg/kg	14300	mg/kg	M	2.0E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.8E-02
	Lead	425	mg/kg	425	mg/kg	M	5.8E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1010	mg/kg	1010	mg/kg	M	1.4E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	9.9E-03
	Vanadium	24.1	mg/kg	24.1	mg/kg	M	3.3E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.7E-03
	Zinc	1030	mg/kg	1030	mg/kg	M	1.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.7E-03
	(Total)												2.0E-01
Dermal	Aluminum	10700	mg/kg	10700	mg/kg	M	5.8E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.8E-04
	Antimony	NC	mg/kg	NC	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.98	mg/kg	9.98	mg/kg	M	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.5E-03
	Barium	3440	mg/kg	3440	mg/kg	M	1.9E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.3E-02
	Cadmium	12.2	mg/kg	12.2	mg/kg	M	6.7E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.7E-03
	Cobalt	11.9	mg/kg	11.9	mg/kg	M	6.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-03
	Iron	14300	mg/kg	14300	mg/kg	M	7.8E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-03
	Lead	425	mg/kg	425	mg/kg	M	2.3E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1010	mg/kg	1010	mg/kg	M	5.5E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.9E-03
	Vanadium	24.1	mg/kg	24.1	mg/kg	M	1.3E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.3E-03
	Zinc	1030	mg/kg	1030	mg/kg	M	5.6E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.9E-04
	(Total)												4.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.4E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1c Adult Resident CTE Soil at Property 438
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 438
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	10700	mg/kg	10700	mg/kg	M	5.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.1E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.98	mg/kg	9.98	mg/kg	M	4.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-02
	Barium	3440	mg/kg	3440	mg/kg	M	1.6E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	8.2E-03
	Cadmium	12.2	mg/kg	12.2	mg/kg	M	5.8E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.8E-03
	Cobalt	11.9	mg/kg	11.9	mg/kg	M	5.7E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-02
	Iron	14300	mg/kg	14300	mg/kg	M	6.9E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	9.8E-03
	Lead	425	mg/kg	425	mg/kg	M	2.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1010	mg/kg	1010	mg/kg	M	4.8E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.5E-03
	Vanadium	24.1	mg/kg	24.1	mg/kg	M	1.2E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.7E-03
	Zinc	1030	mg/kg	1030	mg/kg	M	4.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.6E-03
	(Total)												7.1E-02
Dermal	Aluminum	10700	mg/kg	10700	mg/kg	M	5.8E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.8E-05
	Antimony	NC	mg/kg	NC	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.98	mg/kg	9.98	mg/kg	M	1.6E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.5E-04
	Barium	3440	mg/kg	3440	mg/kg	M	1.9E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.3E-03
	Cadmium	12.2	mg/kg	12.2	mg/kg	M	6.7E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.7E-04
	Cobalt	11.9	mg/kg	11.9	mg/kg	M	6.5E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-04
	Iron	14300	mg/kg	14300	mg/kg	M	7.8E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-04
	Lead	425	mg/kg	425	mg/kg	M	2.3E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1010	mg/kg	1010	mg/kg	M	5.5E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.9E-04
	Vanadium	24.1	mg/kg	24.1	mg/kg	M	1.3E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.3E-04
	Zinc	1030	mg/kg	1030	mg/kg	M	5.6E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.9E-05
	(Total)												4.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	7.5E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1c Child Resident RME Soil at Property 438
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 438
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	10700	mg/kg	10700	mg/kg	M	1.4E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.4E-01
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.98	mg/kg	9.98	mg/kg	M	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.3E-01
	Barium	3440	mg/kg	3440	mg/kg	M	4.4E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.2E-01
	Cadmium	12.2	mg/kg	12.2	mg/kg	M	1.6E-04	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.6E-01
	Cobalt	11.9	mg/kg	11.9	mg/kg	M	1.5E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.1E-01
	Iron	14300	mg/kg	14300	mg/kg	M	1.8E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.6E-01
	Lead	425	mg/kg	425	mg/kg	M	5.4E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1010	mg/kg	1010	mg/kg	M	1.3E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	9.2E-02
	Vanadium	24.1	mg/kg	24.1	mg/kg	M	3.1E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.4E-02
	Zinc	1030	mg/kg	1030	mg/kg	M	1.3E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.4E-02
	(Total)												1.9E+00
Dermal	Aluminum	10700	mg/kg	10700	mg/kg	M	3.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.8E-03
	Antimony	NC	mg/kg	NC	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.98	mg/kg	9.98	mg/kg	M	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.6E-02
	Barium	3440	mg/kg	3440	mg/kg	M	1.2E-03	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	8.8E-02
	Cadmium	12.2	mg/kg	12.2	mg/kg	M	4.4E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.7E-02
	Cobalt	11.9	mg/kg	11.9	mg/kg	M	4.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-02
	Iron	14300	mg/kg	14300	mg/kg	M	5.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	7.3E-03
	Lead	425	mg/kg	425	mg/kg	M	1.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1010	mg/kg	1010	mg/kg	M	3.6E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.5E-02
	Vanadium	24.1	mg/kg	24.1	mg/kg	M	8.6E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	4.8E-02
	Zinc	1030	mg/kg	1030	mg/kg	M	3.7E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.2E-03
	(Total)												2.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.2E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1c Child Resident CTE Soil at Property 438
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 438
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	10700	mg/kg	10700	mg/kg	M	4.8E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.8E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.98	mg/kg	9.98	mg/kg	M	4.5E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-01
	Barium	3440	mg/kg	3440	mg/kg	M	1.5E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	7.7E-02
	Cadmium	12.2	mg/kg	12.2	mg/kg	M	5.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.5E-02
	Cobalt	11.9	mg/kg	11.9	mg/kg	M	5.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-01
	Iron	14300	mg/kg	14300	mg/kg	M	6.4E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	9.1E-02
	Lead	425	mg/kg	425	mg/kg	M	1.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1010	mg/kg	1010	mg/kg	M	4.5E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.2E-02
	Vanadium	24.1	mg/kg	24.1	mg/kg	M	1.1E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.5E-02
	Zinc	1030	mg/kg	1030	mg/kg	M	4.6E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-02
	(Total)												6.6E-01
Dermal	Aluminum	10700	mg/kg	10700	mg/kg	M	5.4E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.4E-04
	Antimony	NC	mg/kg	NC	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.98	mg/kg	9.98	mg/kg	M	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.0E-03
	Barium	3440	mg/kg	3440	mg/kg	M	1.7E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.2E-02
	Cadmium	12.2	mg/kg	12.2	mg/kg	M	6.1E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.4E-03
	Cobalt	11.9	mg/kg	11.9	mg/kg	M	6.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-03
	Iron	14300	mg/kg	14300	mg/kg	M	7.2E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.0E-03
	Lead	425	mg/kg	425	mg/kg	M	2.1E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1010	mg/kg	1010	mg/kg	M	5.1E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.0E-03
	Vanadium	24.1	mg/kg	24.1	mg/kg	M	1.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	6.7E-03
	Zinc	1030	mg/kg	1030	mg/kg	M	5.2E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.7E-04
	(Total)												3.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	7.0E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1d Adult Resident RME Soil at Property 486
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 486
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	21600	mg/kg	21600	mg/kg	M	3.0E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.0E-02
	Antimony	17.2	mg/kg	17.2	mg/kg	M	2.4E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	5.9E-02
	Arsenic	8.3	mg/kg	8.3	mg/kg	M	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.8E-02
	Barium	854	mg/kg	854	mg/kg	M	1.2E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	5.8E-03
	Cadmium	1.7	mg/kg	1.7	mg/kg	M	2.3E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.3E-03
	Cobalt	5.8	mg/kg	5.8	mg/kg	M	7.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-02
	Iron	22000	mg/kg	22000	mg/kg	M	3.0E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.3E-02
	Lead	914	mg/kg	914	mg/kg	M	1.3E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	720	mg/kg	720	mg/kg	M	9.9E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	7.0E-03
	Vanadium	40.1	mg/kg	40.1	mg/kg	M	5.5E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	7.8E-03
	Zinc	300	mg/kg	300	mg/kg	M	5.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.8E-04
	(Total)												2.2E-01
Dermal	Aluminum	21600	mg/kg	21600	mg/kg	M	1.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.2E-03
	Antimony	17.2	mg/kg	17.2	mg/kg	M	9.4E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.6E-02
	Arsenic	8.3	mg/kg	8.3	mg/kg	M	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.5E-03
	Barium	854	mg/kg	854	mg/kg	M	4.7E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.3E-03
	Cadmium	1.7	mg/kg	1.7	mg/kg	M	9.3E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.7E-04
	Cobalt	5.8	mg/kg	5.8	mg/kg	M	3.2E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-03
	Iron	22000	mg/kg	22000	mg/kg	M	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-03
	Lead	914	mg/kg	914	mg/kg	M	5.0E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	720	mg/kg	720	mg/kg	M	3.9E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.0E-03
	Vanadium	40.1	mg/kg	40.1	mg/kg	M	2.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.2E-02
	Zinc	300	mg/kg	300	mg/kg	M	2.2E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.3E-06
	(Total)												4.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.7E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1d Adult Resident CTE Soil at Property 486
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 486
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	21600	mg/kg	21600	mg/kg	M	1.0E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.0E-02
	Antimony	17.2	mg/kg	17.2	mg/kg	M	8.2E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.1E-02
	Arsenic	8.3	mg/kg	8.3	mg/kg	M	4.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.3E-02
	Barium	854	mg/kg	854	mg/kg	M	4.1E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.0E-03
	Cadmium	1.7	mg/kg	1.7	mg/kg	M	8.2E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	8.2E-04
	Cobalt	5.8	mg/kg	5.8	mg/kg	M	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.3E-03
	Iron	22000	mg/kg	22000	mg/kg	M	1.1E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-02
	Lead	914	mg/kg	914	mg/kg	M	4.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	720	mg/kg	720	mg/kg	M	3.5E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.5E-03
	Vanadium	40.1	mg/kg	40.1	mg/kg	M	1.9E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.7E-03
	Zinc	300	mg/kg	300	mg/kg	M	1.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.8E-04
	(Total)												7.7E-02
Dermal	Aluminum	21600	mg/kg	21600	mg/kg	M	1.2E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.2E-04
	Antimony	17.2	mg/kg	17.2	mg/kg	M	2.8E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	4.7E-03
	Arsenic	8.3	mg/kg	8.3	mg/kg	M	1.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.5E-04
	Barium	854	mg/kg	854	mg/kg	M	4.7E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.3E-04
	Cadmium	1.7	mg/kg	1.7	mg/kg	M	9.3E-10	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.7E-05
	Cobalt	5.8	mg/kg	5.8	mg/kg	M	3.2E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-04
	Iron	22000	mg/kg	22000	mg/kg	M	1.2E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-04
	Lead	914	mg/kg	914	mg/kg	M	5.0E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	720	mg/kg	720	mg/kg	M	3.9E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.0E-04
	Vanadium	40.1	mg/kg	40.1	mg/kg	M	2.2E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.2E-03
	Zinc	300	mg/kg	300	mg/kg	M	1.6E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.5E-06
	(Total)												7.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	8.5E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1d Child Resident RME Soil at Property 486
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 486
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	21600	mg/kg	21600	mg/kg	M	2.8E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.8E-01
	Antimony	17.2	mg/kg	17.2	mg/kg	M	2.2E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	5.5E-01
	Arsenic	8.3	mg/kg	8.3	mg/kg	M	1.1E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.5E-01
	Barium	854	mg/kg	854	mg/kg	M	1.1E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	5.5E-02
	Cadmium	1.7	mg/kg	1.7	mg/kg	M	2.2E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.2E-02
	Cobalt	5.8	mg/kg	5.8	mg/kg	M	7.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.5E-01
	Iron	22000	mg/kg	22000	mg/kg	M	2.8E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.0E-01
	Lead	914	mg/kg	914	mg/kg	M	1.2E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	720	mg/kg	720	mg/kg	M	9.2E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	6.6E-02
	Vanadium	40.1	mg/kg	40.1	mg/kg	M	5.1E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	7.3E-02
	Zinc	300	mg/kg	300	mg/kg	M	3.8E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.3E-02
	(Total)												2.1E+00
Dermal	Aluminum	21600	mg/kg	21600	mg/kg	M	7.7E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.7E-03
	Antimony	17.2	mg/kg	17.2	mg/kg	M	1.8E-05	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.1E-01
	Arsenic	8.3	mg/kg	8.3	mg/kg	M	8.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.0E-02
	Barium	854	mg/kg	854	mg/kg	M	3.1E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.2E-02
	Cadmium	1.7	mg/kg	1.7	mg/kg	M	6.1E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.4E-03
	Cobalt	5.8	mg/kg	5.8	mg/kg	M	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.9E-03
	Iron	22000	mg/kg	22000	mg/kg	M	7.9E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-02
	Lead	914	mg/kg	914	mg/kg	M	3.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	720	mg/kg	720	mg/kg	M	2.6E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	4.6E-02
	Vanadium	40.1	mg/kg	40.1	mg/kg	M	1.4E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.0E-02
	Zinc	300	mg/kg	300	mg/kg	M	1.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.6E-04
	(Total)												5.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.6E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1d Child Resident CTE Soil at Property 486
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 486
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	21600	mg/kg	21600	mg/kg	M	9.7E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	9.7E-02
	Antimony	17.2	mg/kg	17.2	mg/kg	M	7.7E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.9E-01
	Arsenic	8.3	mg/kg	8.3	mg/kg	M	3.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-01
	Barium	854	mg/kg	854	mg/kg	M	3.8E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.9E-02
	Cadmium	1.7	mg/kg	1.7	mg/kg	M	7.6E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	7.6E-03
	Cobalt	5.8	mg/kg	5.8	mg/kg	M	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.7E-02
	Iron	22000	mg/kg	22000	mg/kg	M	9.8E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.4E-01
	Lead	914	mg/kg	914	mg/kg	M	4.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	720	mg/kg	720	mg/kg	M	3.2E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.3E-02
	Vanadium	40.1	mg/kg	40.1	mg/kg	M	1.8E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.6E-02
	Zinc	300	mg/kg	300	mg/kg	M	1.3E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.5E-03
	(Total)												7.2E-01
Dermal	Aluminum	21600	mg/kg	21600	mg/kg	M	1.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.1E-03
	Antimony	17.2	mg/kg	17.2	mg/kg	M	2.6E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	4.3E-02
	Arsenic	8.3	mg/kg	8.3	mg/kg	M	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.2E-03
	Barium	854	mg/kg	854	mg/kg	M	4.3E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.1E-03
	Cadmium	1.7	mg/kg	1.7	mg/kg	M	8.5E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.4E-04
	Cobalt	5.8	mg/kg	5.8	mg/kg	M	2.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.7E-04
	Iron	22000	mg/kg	22000	mg/kg	M	1.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-03
	Lead	914	mg/kg	914	mg/kg	M	4.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	720	mg/kg	720	mg/kg	M	3.6E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.4E-03
	Vanadium	40.1	mg/kg	40.1	mg/kg	M	2.0E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.1E-02
	Zinc	300	mg/kg	300	mg/kg	M	1.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.0E-05
	(Total)												7.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	7.9E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1e Adult Resident RME Soil at Property 1612
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1612
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	11000	mg/kg	11000	mg/kg	M	1.5E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.5E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	8	mg/kg	8	mg/kg	M	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.7E-02
	Barium	1500	mg/kg	1500	mg/kg	M	2.1E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.0E-02
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	13.3	mg/kg	13.3	mg/kg	M	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.1E-02
	Iron	16500	mg/kg	16500	mg/kg	M	2.3E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.2E-02
	Lead	249	mg/kg	249	mg/kg	M	3.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	2.0E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.4E-02
	Vanadium	28.1	mg/kg	28.1	mg/kg	M	3.8E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	5.5E-03
	Zinc	462	mg/kg	462	mg/kg	M	6.3E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.1E-03
	(Total)												1.8E-01
Dermal	Aluminum	11000	mg/kg	11000	mg/kg	M	6.0E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.0E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	8	mg/kg	8	mg/kg	M	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.4E-03
	Barium	1500	mg/kg	1500	mg/kg	M	8.2E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.9E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	13.3	mg/kg	13.3	mg/kg	M	7.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-03
	Iron	16500	mg/kg	16500	mg/kg	M	9.0E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-03
	Lead	249	mg/kg	249	mg/kg	M	1.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	7.9E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.4E-02
	Vanadium	28.1	mg/kg	28.1	mg/kg	M	1.5E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.5E-03
	Zinc	462	mg/kg	462	mg/kg	M	2.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.4E-05
	(Total)												3.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.1E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1e Adult Resident CTE Soil at Property 1612
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1216
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	11000	mg/kg	11000	mg/kg	M	5.3E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.3E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	8	mg/kg	8	mg/kg	M	3.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.3E-02
	Barium	1500	mg/kg	1500	mg/kg	M	7.2E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.6E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	13.3	mg/kg	13.3	mg/kg	M	6.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-02
	Iron	16500	mg/kg	16500	mg/kg	M	7.9E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-02
	Lead	249	mg/kg	249	mg/kg	M	1.2E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	7.0E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	5.0E-03
	Vanadium	28.1	mg/kg	28.1	mg/kg	M	1.3E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.9E-03
	Zinc	462	mg/kg	462	mg/kg	M	2.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.4E-04
	(Total)												6.2E-02
Dermal	Aluminum	11000	mg/kg	11000	mg/kg	M	6.0E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.0E-05
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	8	mg/kg	8	mg/kg	M	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.4E-04
	Barium	1500	mg/kg	1500	mg/kg	M	8.2E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.9E-04
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	13.3	mg/kg	13.3	mg/kg	M	7.3E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-04
	Iron	16500	mg/kg	16500	mg/kg	M	9.0E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-04
	Lead	249	mg/kg	249	mg/kg	M	1.4E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	7.9E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.4E-03
	Vanadium	28.1	mg/kg	28.1	mg/kg	M	1.5E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.5E-04
	Zinc	462	mg/kg	462	mg/kg	M	2.5E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.4E-06
	(Total)												3.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	6.6E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1e Child Resident RME Soil at Property 1612
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1612
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	11000	mg/kg	11000	mg/kg	M	1.4E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.4E-01
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	8	mg/kg	8	mg/kg	M	1.0E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.4E-01
	Barium	1500	mg/kg	1500	mg/kg	M	1.9E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	9.6E-02
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	13.3	mg/kg	13.3	mg/kg	M	1.7E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.7E-01
	Iron	16500	mg/kg	16500	mg/kg	M	2.1E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.0E-01
	Lead	249	mg/kg	249	mg/kg	M	3.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	1.9E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.3E-01
	Vanadium	28.1	mg/kg	28.1	mg/kg	M	3.6E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	5.1E-02
	Zinc	462	mg/kg	462	mg/kg	M	5.9E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-02
	(Total)												1.6E+00
Dermal	Aluminum	11000	mg/kg	11000	mg/kg	M	3.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.9E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	8	mg/kg	8	mg/kg	M	8.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.9E-02
	Barium	1500	mg/kg	1500	mg/kg	M	5.4E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.8E-02
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	13.3	mg/kg	13.3	mg/kg	M	4.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-02
	Iron	16500	mg/kg	16500	mg/kg	M	5.9E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	8.4E-03
	Lead	249	mg/kg	249	mg/kg	M	8.9E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	5.2E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.3E-02
	Vanadium	28.1	mg/kg	28.1	mg/kg	M	1.0E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.6E-02
	Zinc	462	mg/kg	462	mg/kg	M	1.7E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.5E-04
	(Total)												2.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.9E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1e Child Resident CTE Soil at Property 1612
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1612
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	11000	mg/kg	11000	mg/kg	M	4.9E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.9E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	8	mg/kg	8	mg/kg	M	3.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-01
	Barium	1500	mg/kg	1500	mg/kg	M	6.7E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.4E-02
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	13.3	mg/kg	13.3	mg/kg	M	6.0E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-01
	Iron	16500	mg/kg	16500	mg/kg	M	7.4E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-01
	Lead	249	mg/kg	249	mg/kg	M	1.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	6.5E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.6E-02
	Vanadium	28.1	mg/kg	28.1	mg/kg	M	1.3E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.8E-02
	Zinc	462	mg/kg	462	mg/kg	M	2.1E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.9E-03
	(Total)												5.8E-01
Dermal	Aluminum	11000	mg/kg	11000	mg/kg	M	5.5E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.5E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	8	mg/kg	8	mg/kg	M	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.0E-03
	Barium	1500	mg/kg	1500	mg/kg	M	7.5E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.4E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	13.3	mg/kg	13.3	mg/kg	M	6.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-03
	Iron	16500	mg/kg	16500	mg/kg	M	8.3E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-03
	Lead	249	mg/kg	249	mg/kg	M	1.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	7.3E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.3E-02
	Vanadium	28.1	mg/kg	28.1	mg/kg	M	1.4E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.8E-03
	Zinc	462	mg/kg	462	mg/kg	M	2.3E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.7E-05
	(Total)												3.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	6.1E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1f Adult Resident RME Soil at Property 1643
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1643
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	246	mg/kg	246	mg/kg	M	3.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	246	mg/kg	246	mg/kg	M	1.3E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1f Adult Resident CTE Soil at Property 1643
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1643
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	246	mg/kg	246	mg/kg	M	1.2E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	246	mg/kg	246	mg/kg	M	1.3E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1f Child Resident RME Soil at Property 1643
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1643
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	246	mg/kg	246	mg/kg	M	3.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	246	mg/kg	246	mg/kg	M	8.8E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1f Child Resident CTE Soil at Property 1643
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1643
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	246	mg/kg	246	mg/kg	M	1.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	246	mg/kg	246	mg/kg	M	1.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1g Adult Resident RME Soil at Property 1653
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1653
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	644	mg/kg	644	mg/kg	M	8.8E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	644	mg/kg	644	mg/kg	M	3.5E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1g Adult Resident CTE Soil at Property 1653
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1653
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	644	mg/kg	644	mg/kg	M	3.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	644	mg/kg	644	mg/kg	M	3.5E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1g Child Resident RME Soil at Property 1653
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1653
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	644	mg/kg	644	mg/kg	M	8.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	644	mg/kg	644	mg/kg	M	2.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1g Child Resident CTE Soil at Property 1653
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 1653
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	644	mg/kg	644	mg/kg	M	2.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	644	mg/kg	644	mg/kg	M	3.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1h Adult Resident RME Soil at Property 5003
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5003
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8670	mg/kg	8670	mg/kg	M	1.2E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.2E-02
	Antimony	4	mg/kg	4	mg/kg	M	5.5E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.4E-02
	Arsenic	7.5	mg/kg	7.5	mg/kg	M	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.4E-02
	Barium	612	mg/kg	612	mg/kg	M	8.4E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	4.2E-03
	Cadmium	2.9	mg/kg	2.9	mg/kg	M	4.0E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.0E-03
	Cobalt	9	mg/kg	9	mg/kg	M	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.1E-02
	Iron	15700	mg/kg	15700	mg/kg	M	2.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.1E-02
	Lead	8582	mg/kg	8582	mg/kg	M	1.2E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1240	mg/kg	1240	mg/kg	M	1.7E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.2E-02
	Vanadium	25	mg/kg	25	mg/kg	M	3.4E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.9E-03
	Zinc	903	mg/kg	903	mg/kg	M	1.2E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.1E-03
	(Total)												1.6E-01
Dermal	Aluminum	8670	mg/kg	8670	mg/kg	M	4.7E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.7E-04
	Antimony	4	mg/kg	4	mg/kg	M	2.2E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.6E-03
	Arsenic	7.5	mg/kg	7.5	mg/kg	M	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.1E-03
	Barium	612	mg/kg	612	mg/kg	M	3.3E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.4E-03
	Cadmium	2.9	mg/kg	2.9	mg/kg	M	1.6E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	6.3E-04
	Cobalt	9	mg/kg	9	mg/kg	M	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-03
	Iron	15700	mg/kg	15700	mg/kg	M	8.6E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-03
	Lead	8582	mg/kg	8582	mg/kg	M	4.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1240	mg/kg	1240	mg/kg	M	6.8E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.2E-02
	Vanadium	25	mg/kg	25	mg/kg	M	1.4E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.6E-03
	Zinc	903	mg/kg	903	mg/kg	M	4.9E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.6E-04
	(Total)												3.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.9E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1h Adult Resident CTE Soil at Property 5003
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5003
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8670	mg/kg	8670	mg/kg	M	4.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.2E-03
	Antimony	4	mg/kg	4	mg/kg	M	1.9E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	4.8E-03
	Arsenic	7.5	mg/kg	7.5	mg/kg	M	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-02
	Barium	612	mg/kg	612	mg/kg	M	2.9E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.5E-03
	Cadmium	2.9	mg/kg	2.9	mg/kg	M	1.4E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.4E-03
	Cobalt	9	mg/kg	9	mg/kg	M	4.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-02
	Iron	15700	mg/kg	15700	mg/kg	M	7.5E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-02
	Lead	8582	mg/kg	8582	mg/kg	M	4.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1240	mg/kg	1240	mg/kg	M	5.9E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.2E-03
	Vanadium	25	mg/kg	25	mg/kg	M	1.2E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.7E-03
	Zinc	903	mg/kg	903	mg/kg	M	4.3E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.4E-03
	(Total)												5.6E-02
Dermal	Aluminum	8670	mg/kg	8670	mg/kg	M	4.7E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.7E-05
	Antimony	4	mg/kg	4	mg/kg	M	2.2E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.6E-04
	Arsenic	7.5	mg/kg	7.5	mg/kg	M	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.1E-04
	Barium	612	mg/kg	612	mg/kg	M	3.3E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.4E-04
	Cadmium	2.9	mg/kg	2.9	mg/kg	M	1.6E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	6.3E-05
	Cobalt	9	mg/kg	9	mg/kg	M	4.9E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-04
	Iron	15700	mg/kg	15700	mg/kg	M	8.6E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-04
	Lead	8582	mg/kg	8582	mg/kg	M	4.7E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1240	mg/kg	1240	mg/kg	M	6.8E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.2E-03
	Vanadium	25	mg/kg	25	mg/kg	M	1.4E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.6E-04
	Zinc	903	mg/kg	903	mg/kg	M	4.9E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.6E-05
	(Total)												3.4E-03
												Total Hazard Index Across All Exposure Routes/Pathways	6.0E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1h Child Resident RME Soil at Property 5003
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5003
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8670	mg/kg	8670	mg/kg	M	1.1E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.1E-01
	Antimony	4	mg/kg	4	mg/kg	M	5.1E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.3E-01
	Arsenic	7.5	mg/kg	7.5	mg/kg	M	9.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-01
	Barium	612	mg/kg	612	mg/kg	M	7.8E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.9E-02
	Cadmium	2.9	mg/kg	2.9	mg/kg	M	3.7E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.7E-02
	Cobalt	9	mg/kg	9	mg/kg	M	1.2E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.8E-01
	Iron	15700	mg/kg	15700	mg/kg	M	2.0E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.9E-01
	Lead	8582	mg/kg	8582	mg/kg	M	1.1E-01	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1240	mg/kg	1240	mg/kg	M	1.6E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.1E-01
	Vanadium	25	mg/kg	25	mg/kg	M	3.2E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.6E-02
	Zinc	903	mg/kg	903	mg/kg	M	1.2E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.8E-02
	(Total)												1.5E+00
Dermal	Aluminum	8670	mg/kg	8670	mg/kg	M	3.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.1E-03
	Antimony	4	mg/kg	4	mg/kg	M	1.4E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.4E-02
	Arsenic	7.5	mg/kg	7.5	mg/kg	M	8.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.7E-02
	Barium	612	mg/kg	612	mg/kg	M	2.2E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.6E-02
	Cadmium	2.9	mg/kg	2.9	mg/kg	M	1.0E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	4.2E-03
	Cobalt	9	mg/kg	9	mg/kg	M	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-02
	Iron	15700	mg/kg	15700	mg/kg	M	5.6E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	8.0E-03
	Lead	8582	mg/kg	8582	mg/kg	M	3.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1240	mg/kg	1240	mg/kg	M	4.4E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.9E-02
	Vanadium	25	mg/kg	25	mg/kg	M	8.9E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.0E-02
	Zinc	903	mg/kg	903	mg/kg	M	3.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.1E-03
	(Total)												2.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.7E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1h Child Resident CTE Soil at Property 5003
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5003
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8670	mg/kg	8670	mg/kg	M	3.9E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.9E-02
	Antimony	4	mg/kg	4	mg/kg	M	1.8E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	4.5E-02
	Arsenic	7.5	mg/kg	7.5	mg/kg	M	3.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-01
	Barium	612	mg/kg	612	mg/kg	M	2.7E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.4E-02
	Cadmium	2.9	mg/kg	2.9	mg/kg	M	1.3E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.3E-02
	Cobalt	9	mg/kg	9	mg/kg	M	4.0E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.3E-01
	Iron	15700	mg/kg	15700	mg/kg	M	7.0E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.0E-01
	Lead	8582	mg/kg	8582	mg/kg	M	3.8E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1240	mg/kg	1240	mg/kg	M	5.5E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.0E-02
	Vanadium	25	mg/kg	25	mg/kg	M	1.1E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.6E-02
	Zinc	903	mg/kg	903	mg/kg	M	4.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.3E-02
	(Total)												5.3E-01
Dermal	Aluminum	8670	mg/kg	8670	mg/kg	M	4.3E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.3E-04
	Antimony	4	mg/kg	4	mg/kg	M	2.0E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.3E-03
	Arsenic	7.5	mg/kg	7.5	mg/kg	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.8E-03
	Barium	612	mg/kg	612	mg/kg	M	3.1E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.2E-03
	Cadmium	2.9	mg/kg	2.9	mg/kg	M	1.5E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	5.8E-04
	Cobalt	9	mg/kg	9	mg/kg	M	4.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-03
	Iron	15700	mg/kg	15700	mg/kg	M	7.9E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-03
	Lead	8582	mg/kg	8582	mg/kg	M	4.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1240	mg/kg	1240	mg/kg	M	6.2E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.1E-02
	Vanadium	25	mg/kg	25	mg/kg	M	1.3E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.0E-03
	Zinc	903	mg/kg	903	mg/kg	M	4.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-04
	(Total)												3.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.6E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1i Adult Resident RME Soil at Property 5007
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5007
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	14000	mg/kg	14000	mg/kg	M	1.9E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.9E-02
	Antimony	11.3	mg/kg	11.3	mg/kg	M	1.5E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.9E-02
	Arsenic	11.1	mg/kg	11.1	mg/kg	M	1.5E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.1E-02
	Barium	510	mg/kg	510	mg/kg	M	7.0E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.5E-03
	Cadmium	10.1	mg/kg	10.1	mg/kg	M	1.4E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.4E-02
	Cobalt	12.3	mg/kg	12.3	mg/kg	M	1.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.6E-02
	Iron	19300	mg/kg	19300	mg/kg	M	2.6E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.8E-02
	Lead	633	mg/kg	633	mg/kg	M	8.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	1.5E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.0E-02
	Vanadium	39.9	mg/kg	39.9	mg/kg	M	5.5E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	7.8E-03
	Zinc	9250	mg/kg	9250	mg/kg	M	1.3E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.2E-02
	(Total)												2.8E-01
Dermal	Aluminum	14000	mg/kg	14000	mg/kg	M	7.7E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.7E-04
	Antimony	11.3	mg/kg	11.3	mg/kg	M	6.2E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.0E-02
	Arsenic	11.1	mg/kg	11.1	mg/kg	M	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.1E-03
	Barium	510	mg/kg	510	mg/kg	M	2.8E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.0E-03
	Cadmium	10.1	mg/kg	10.1	mg/kg	M	5.5E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.2E-03
	Cobalt	12.3	mg/kg	12.3	mg/kg	M	6.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-03
	Iron	19300	mg/kg	19300	mg/kg	M	1.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-03
	Lead	633	mg/kg	633	mg/kg	M	3.5E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	5.8E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.0E-02
	Vanadium	39.9	mg/kg	39.9	mg/kg	M	2.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.2E-02
	Zinc	9250	mg/kg	9250	mg/kg	M	5.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.7E-03
	(Total)												4.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	3.3E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1i Adult Resident CTE Soil at Property 5007
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5007
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	14000	mg/kg	14000	mg/kg	M	6.7E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.7E-03
	Antimony	11.3	mg/kg	11.3	mg/kg	M	5.4E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.4E-02
	Arsenic	11.1	mg/kg	11.1	mg/kg	M	5.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-02
	Barium	510	mg/kg	510	mg/kg	M	2.4E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.2E-03
	Cadmium	10.1	mg/kg	10.1	mg/kg	M	4.8E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.8E-03
	Cobalt	12.3	mg/kg	12.3	mg/kg	M	5.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-02
	Iron	19300	mg/kg	19300	mg/kg	M	9.3E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-02
	Lead	633	mg/kg	633	mg/kg	M	3.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	5.1E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.7E-03
	Vanadium	39.9	mg/kg	39.9	mg/kg	M	1.9E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.7E-03
	Zinc	9250	mg/kg	9250	mg/kg	M	4.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-02
	(Total)												9.8E-02
Dermal	Aluminum	14000	mg/kg	14000	mg/kg	M	7.7E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.7E-05
	Antimony	11.3	mg/kg	11.3	mg/kg	M	6.2E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.0E-03
	Arsenic	11.1	mg/kg	11.1	mg/kg	M	1.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.1E-04
	Barium	510	mg/kg	510	mg/kg	M	2.8E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.0E-04
	Cadmium	10.1	mg/kg	10.1	mg/kg	M	5.5E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.2E-04
	Cobalt	12.3	mg/kg	12.3	mg/kg	M	6.7E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-04
	Iron	19300	mg/kg	19300	mg/kg	M	1.1E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-04
	Lead	633	mg/kg	633	mg/kg	M	3.5E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	5.8E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.0E-03
	Vanadium	39.9	mg/kg	39.9	mg/kg	M	2.2E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.2E-03
	Zinc	9250	mg/kg	9250	mg/kg	M	5.1E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.7E-04
	(Total)												4.9E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.0E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1i Child Resident RME Soil at Property 5007
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5007
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	14000	mg/kg	14000	mg/kg	M	1.8E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.8E-01
	Antimony	11.3	mg/kg	11.3	mg/kg	M	1.4E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.6E-01
	Arsenic	11.1	mg/kg	11.1	mg/kg	M	1.4E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.7E-01
	Barium	510	mg/kg	510	mg/kg	M	6.5E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.3E-02
	Cadmium	10.1	mg/kg	10.1	mg/kg	M	1.3E-04	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.3E-01
	Cobalt	12.3	mg/kg	12.3	mg/kg	M	1.6E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.2E-01
	Iron	19300	mg/kg	19300	mg/kg	M	2.5E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.5E-01
	Lead	633	mg/kg	633	mg/kg	M	8.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	1.4E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	9.8E-02
	Vanadium	39.9	mg/kg	39.9	mg/kg	M	5.1E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	7.3E-02
	Zinc	9250	mg/kg	9250	mg/kg	M	1.2E-01	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.9E-01
	(Total)												2.6E+00
Dermal	Aluminum	14000	mg/kg	14000	mg/kg	M	5.0E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.0E-03
	Antimony	11.3	mg/kg	11.3	mg/kg	M	4.0E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	6.7E-02
	Arsenic	11.1	mg/kg	11.1	mg/kg	M	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.0E-02
	Barium	510	mg/kg	510	mg/kg	M	1.8E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.3E-02
	Cadmium	10.1	mg/kg	10.1	mg/kg	M	3.6E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.4E-02
	Cobalt	12.3	mg/kg	12.3	mg/kg	M	4.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-02
	Iron	19300	mg/kg	19300	mg/kg	M	6.9E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	9.9E-03
	Lead	633	mg/kg	633	mg/kg	M	2.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	3.8E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.8E-02
	Vanadium	39.9	mg/kg	39.9	mg/kg	M	1.4E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.9E-02
	Zinc	9250	mg/kg	9250	mg/kg	M	3.3E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.1E-02
	(Total)												3.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.9E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1i Child Resident CTE Soil at Property 5007
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5007
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	14000	mg/kg	14000	mg/kg	M	6.3E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.3E-02
	Antimony	11.3	mg/kg	11.3	mg/kg	M	5.1E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.3E-01
	Arsenic	11.1	mg/kg	11.1	mg/kg	M	5.0E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-01
	Barium	510	mg/kg	510	mg/kg	M	2.3E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.1E-02
	Cadmium	10.1	mg/kg	10.1	mg/kg	M	4.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.5E-02
	Cobalt	12.3	mg/kg	12.3	mg/kg	M	5.5E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-01
	Iron	19300	mg/kg	19300	mg/kg	M	8.6E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-01
	Lead	633	mg/kg	633	mg/kg	M	2.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	4.8E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.4E-02
	Vanadium	39.9	mg/kg	39.9	mg/kg	M	1.8E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.6E-02
	Zinc	9250	mg/kg	9250	mg/kg	M	4.1E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.4E-01
	(Total)												9.2E-01
Dermal	Aluminum	14000	mg/kg	14000	mg/kg	M	7.0E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.0E-04
	Antimony	11.3	mg/kg	11.3	mg/kg	M	5.7E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	9.4E-03
	Arsenic	11.1	mg/kg	11.1	mg/kg	M	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.6E-03
	Barium	510	mg/kg	510	mg/kg	M	2.6E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.8E-03
	Cadmium	10.1	mg/kg	10.1	mg/kg	M	5.1E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.0E-03
	Cobalt	12.3	mg/kg	12.3	mg/kg	M	6.2E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-03
	Iron	19300	mg/kg	19300	mg/kg	M	9.7E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.4E-03
	Lead	633	mg/kg	633	mg/kg	M	3.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	5.4E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.6E-03
	Vanadium	39.9	mg/kg	39.9	mg/kg	M	2.0E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.1E-02
	Zinc	9250	mg/kg	9250	mg/kg	M	4.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-03
	(Total)												4.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	9.6E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1j Adult Resident RME Soil at Property 5008
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5008
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	10800	mg/kg	10800	mg/kg	M	1.5E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.5E-02
	Antimony	2.6	mg/kg	2.6	mg/kg	M	3.6E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	8.9E-03
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	7.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-02
	Barium	826	mg/kg	826	mg/kg	M	1.1E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	5.7E-03
	Cadmium	2.7	mg/kg	2.7	mg/kg	M	3.7E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.7E-03
	Cobalt	13.8	mg/kg	13.8	mg/kg	M	1.9E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.3E-02
	Iron	16200	mg/kg	16200	mg/kg	M	2.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.2E-02
	Lead	640	mg/kg	640	mg/kg	M	8.8E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	1.5E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.0E-02
	Vanadium	22.5	mg/kg	22.5	mg/kg	M	3.1E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.4E-03
	Zinc	231	mg/kg	231	mg/kg	M	3.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.1E-03
	(Total)												1.7E-01
Dermal	Aluminum	10800	mg/kg	10800	mg/kg	M	5.9E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.9E-04
	Antimony	2.6	mg/kg	2.6	mg/kg	M	1.4E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.4E-03
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	9.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.1E-03
	Barium	826	mg/kg	826	mg/kg	M	4.5E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.2E-03
	Cadmium	2.7	mg/kg	2.7	mg/kg	M	1.5E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	5.9E-04
	Cobalt	13.8	mg/kg	13.8	mg/kg	M	7.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.5E-03
	Iron	16200	mg/kg	16200	mg/kg	M	8.9E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-03
	Lead	640	mg/kg	640	mg/kg	M	3.5E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	5.8E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.0E-02
	Vanadium	22.5	mg/kg	22.5	mg/kg	M	1.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	6.8E-03
	Zinc	231	mg/kg	231	mg/kg	M	1.3E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.2E-05
	(Total)												3.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.0E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1j Adult Resident CTE Soil at Property 5008
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5008
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	10800	mg/kg	10800	mg/kg	M	5.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.2E-03
	Antimony	2.6	mg/kg	2.6	mg/kg	M	1.2E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.1E-03
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.1E-03
	Barium	826	mg/kg	826	mg/kg	M	4.0E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.0E-03
	Cadmium	2.7	mg/kg	2.7	mg/kg	M	1.3E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.3E-03
	Cobalt	13.8	mg/kg	13.8	mg/kg	M	6.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-02
	Iron	16200	mg/kg	16200	mg/kg	M	7.8E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-02
	Lead	640	mg/kg	640	mg/kg	M	3.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	5.1E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.7E-03
	Vanadium	22.5	mg/kg	22.5	mg/kg	M	1.1E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.5E-03
	Zinc	231	mg/kg	231	mg/kg	M	1.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.7E-04
	(Total)												5.9E-02
Dermal	Aluminum	10800	mg/kg	10800	mg/kg	M	5.9E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.9E-05
	Antimony	2.6	mg/kg	2.6	mg/kg	M	1.4E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.4E-04
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	9.3E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.1E-04
	Barium	826	mg/kg	826	mg/kg	M	4.5E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.2E-04
	Cadmium	2.7	mg/kg	2.7	mg/kg	M	1.5E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	5.9E-05
	Cobalt	13.8	mg/kg	13.8	mg/kg	M	7.5E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.5E-04
	Iron	16200	mg/kg	16200	mg/kg	M	8.9E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-04
	Lead	640	mg/kg	640	mg/kg	M	3.5E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	5.8E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.0E-03
	Vanadium	22.5	mg/kg	22.5	mg/kg	M	1.2E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	6.8E-04
	Zinc	231	mg/kg	231	mg/kg	M	1.3E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.2E-06
	(Total)												3.1E-03
												Total Hazard Index Across All Exposure Routes/Pathways	6.3E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1j Child Resident RME Soil at Property 5008
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5008
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	10800	mg/kg	10800	mg/kg	M	1.4E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.4E-01
	Antimony	2.6	mg/kg	2.6	mg/kg	M	3.3E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	8.3E-02
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	7.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-01
	Barium	826	mg/kg	826	mg/kg	M	1.1E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	5.3E-02
	Cadmium	2.7	mg/kg	2.7	mg/kg	M	3.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.5E-02
	Cobalt	13.8	mg/kg	13.8	mg/kg	M	1.8E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.9E-01
	Iron	16200	mg/kg	16200	mg/kg	M	2.1E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.0E-01
	Lead	640	mg/kg	640	mg/kg	M	8.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	1.4E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	9.8E-02
	Vanadium	22.5	mg/kg	22.5	mg/kg	M	2.9E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.1E-02
	Zinc	231	mg/kg	231	mg/kg	M	3.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	9.8E-03
	(Total)												1.6E+00
Dermal	Aluminum	10800	mg/kg	10800	mg/kg	M	3.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.9E-03
	Antimony	2.6	mg/kg	2.6	mg/kg	M	9.3E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.6E-02
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	6.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-02
	Barium	826	mg/kg	826	mg/kg	M	3.0E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.1E-02
	Cadmium	2.7	mg/kg	2.7	mg/kg	M	9.7E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.9E-03
	Cobalt	13.8	mg/kg	13.8	mg/kg	M	4.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-02
	Iron	16200	mg/kg	16200	mg/kg	M	5.8E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	8.3E-03
	Lead	640	mg/kg	640	mg/kg	M	2.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	3.8E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.8E-02
	Vanadium	22.5	mg/kg	22.5	mg/kg	M	8.1E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	4.5E-02
	Zinc	231	mg/kg	231	mg/kg	M	8.3E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.8E-04
	(Total)												2.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.8E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1i Child Resident CTE Soil at Property 5008
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5008
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	10800	mg/kg	10800	mg/kg	M	4.8E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.8E-02
	Antimony	2.6	mg/kg	2.6	mg/kg	M	1.2E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.9E-02
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.5E-02
	Barium	826	mg/kg	826	mg/kg	M	3.7E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.8E-02
	Cadmium	2.7	mg/kg	2.7	mg/kg	M	1.2E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.2E-02
	Cobalt	13.8	mg/kg	13.8	mg/kg	M	6.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-01
	Iron	16200	mg/kg	16200	mg/kg	M	7.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.0E-01
	Lead	640	mg/kg	640	mg/kg	M	2.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	4.8E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.4E-02
	Vanadium	22.5	mg/kg	22.5	mg/kg	M	1.0E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.4E-02
	Zinc	231	mg/kg	231	mg/kg	M	1.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.4E-03
	(Total)												5.5E-01
Dermal	Aluminum	10800	mg/kg	10800	mg/kg	M	5.4E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.4E-04
	Antimony	2.6	mg/kg	2.6	mg/kg	M	1.3E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.2E-03
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.9E-03
	Barium	826	mg/kg	826	mg/kg	M	4.1E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.0E-03
	Cadmium	2.7	mg/kg	2.7	mg/kg	M	1.4E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	5.4E-04
	Cobalt	13.8	mg/kg	13.8	mg/kg	M	6.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-03
	Iron	16200	mg/kg	16200	mg/kg	M	8.1E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-03
	Lead	640	mg/kg	640	mg/kg	M	3.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1070	mg/kg	1070	mg/kg	M	5.4E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.6E-03
	Vanadium	22.5	mg/kg	22.5	mg/kg	M	1.1E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	6.3E-03
	Zinc	231	mg/kg	231	mg/kg	M	1.2E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.9E-05
	(Total)												2.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.8E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1k Adult Resident RME Soil at Property 5012
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5012
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9280	mg/kg	9280	mg/kg	M	1.3E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.3E-02
	Antimony	5.8	mg/kg	5.8	mg/kg	M	7.9E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.0E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1490	mg/kg	1490	mg/kg	M	2.0E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.0E-02
	Cadmium	4.9	mg/kg	4.9	mg/kg	M	6.7E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.7E-03
	Cobalt	17.6	mg/kg	17.6	mg/kg	M	2.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.0E-02
	Iron	20500	mg/kg	20500	mg/kg	M	2.8E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.0E-02
	Lead	928	mg/kg	928	mg/kg	M	1.3E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1190	mg/kg	1190	mg/kg	M	1.6E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.2E-02
	Vanadium	18.6	mg/kg	18.6	mg/kg	M	2.5E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.6E-03
	Zinc	249	mg/kg	249	mg/kg	M	3.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.1E-03
	(Total)												1.9E-01
Dermal	Aluminum	9280	mg/kg	9280	mg/kg	M	5.1E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.1E-04
	Antimony	5.8	mg/kg	5.8	mg/kg	M	3.2E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	5.3E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1490	mg/kg	1490	mg/kg	M	8.1E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.8E-03
	Cadmium	4.9	mg/kg	4.9	mg/kg	M	2.7E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.1E-03
	Cobalt	17.6	mg/kg	17.6	mg/kg	M	9.6E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-03
	Iron	20500	mg/kg	20500	mg/kg	M	1.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-03
	Lead	928	mg/kg	928	mg/kg	M	5.1E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1190	mg/kg	1190	mg/kg	M	6.5E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.2E-02
	Vanadium	18.6	mg/kg	18.6	mg/kg	M	1.0E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.6E-03
	Zinc	249	mg/kg	249	mg/kg	M	1.4E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.5E-05
	(Total)												3.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.2E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1k Adult Resident CTE Soil at Property 5012
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5012
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9280	mg/kg	9280	mg/kg	M	4.4E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.4E-03
	Antimony	5.8	mg/kg	5.8	mg/kg	M	2.8E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	7.0E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1490	mg/kg	1490	mg/kg	M	7.1E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.6E-03
	Cadmium	4.9	mg/kg	4.9	mg/kg	M	2.3E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.3E-03
	Cobalt	17.6	mg/kg	17.6	mg/kg	M	8.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.8E-02
	Iron	20500	mg/kg	20500	mg/kg	M	9.8E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.4E-02
	Lead	928	mg/kg	928	mg/kg	M	4.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1190	mg/kg	1190	mg/kg	M	5.7E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.1E-03
	Vanadium	18.6	mg/kg	18.6	mg/kg	M	8.9E-06	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.3E-03
	Zinc	249	mg/kg	249	mg/kg	M	1.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.0E-04
	(Total)												6.5E-02
Dermal	Aluminum	9280	mg/kg	9280	mg/kg	M	5.1E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.1E-05
	Antimony	5.8	mg/kg	5.8	mg/kg	M	3.2E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	5.3E-04
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1490	mg/kg	1490	mg/kg	M	8.1E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.8E-04
	Cadmium	4.9	mg/kg	4.9	mg/kg	M	2.7E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.1E-04
	Cobalt	17.6	mg/kg	17.6	mg/kg	M	9.6E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-04
	Iron	20500	mg/kg	20500	mg/kg	M	1.1E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-04
	Lead	928	mg/kg	928	mg/kg	M	5.1E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1190	mg/kg	1190	mg/kg	M	6.5E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.2E-03
	Vanadium	18.6	mg/kg	18.6	mg/kg	M	1.0E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.6E-04
	Zinc	249	mg/kg	249	mg/kg	M	1.4E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.5E-06
	(Total)												3.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	6.9E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1k Child Resident RME Soil at Property 5012
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5012
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9280	mg/kg	9280	mg/kg	M	1.2E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.2E-01
	Antimony	5.8	mg/kg	5.8	mg/kg	M	7.4E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.9E-01
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1490	mg/kg	1490	mg/kg	M	1.9E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	9.5E-02
	Cadmium	4.9	mg/kg	4.9	mg/kg	M	6.3E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.3E-02
	Cobalt	17.6	mg/kg	17.6	mg/kg	M	2.3E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.5E-01
	Iron	20500	mg/kg	20500	mg/kg	M	2.6E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.7E-01
	Lead	928	mg/kg	928	mg/kg	M	1.2E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1190	mg/kg	1190	mg/kg	M	1.5E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.1E-01
	Vanadium	18.6	mg/kg	18.6	mg/kg	M	2.4E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.4E-02
	Zinc	249	mg/kg	249	mg/kg	M	3.2E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.1E-02
	(Total)												1.7E+00
Dermal	Aluminum	9280	mg/kg	9280	mg/kg	M	3.3E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.3E-03
	Antimony	5.8	mg/kg	5.8	mg/kg	M	2.1E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.5E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1490	mg/kg	1490	mg/kg	M	5.3E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.8E-02
	Cadmium	4.9	mg/kg	4.9	mg/kg	M	1.8E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	7.0E-03
	Cobalt	17.6	mg/kg	17.6	mg/kg	M	6.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-02
	Iron	20500	mg/kg	20500	mg/kg	M	7.3E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.0E-02
	Lead	928	mg/kg	928	mg/kg	M	3.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1190	mg/kg	1190	mg/kg	M	4.3E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.6E-02
	Vanadium	18.6	mg/kg	18.6	mg/kg	M	6.7E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	3.7E-02
	Zinc	249	mg/kg	249	mg/kg	M	8.9E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.0E-04
	(Total)												2.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.0E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1k Child Resident CTE Soil at Property 5012
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5012
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9280	mg/kg	9280	mg/kg	M	4.2E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.2E-02
	Antimony	5.8	mg/kg	5.8	mg/kg	M	2.6E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	6.5E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1490	mg/kg	1490	mg/kg	M	6.7E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.3E-02
	Cadmium	4.9	mg/kg	4.9	mg/kg	M	2.2E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.2E-02
	Cobalt	17.6	mg/kg	17.6	mg/kg	M	7.9E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-01
	Iron	20500	mg/kg	20500	mg/kg	M	9.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-01
	Lead	928	mg/kg	928	mg/kg	M	4.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1190	mg/kg	1190	mg/kg	M	5.3E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.8E-02
	Vanadium	18.6	mg/kg	18.6	mg/kg	M	8.3E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.2E-02
	Zinc	249	mg/kg	249	mg/kg	M	1.1E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.7E-03
	(Total)												6.1E-01
Dermal	Aluminum	9280	mg/kg	9280	mg/kg	M	4.7E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.7E-04
	Antimony	5.8	mg/kg	5.8	mg/kg	M	2.9E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	4.8E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1490	mg/kg	1490	mg/kg	M	7.5E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.3E-03
	Cadmium	4.9	mg/kg	4.9	mg/kg	M	2.5E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	9.8E-04
	Cobalt	17.6	mg/kg	17.6	mg/kg	M	8.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.9E-03
	Iron	20500	mg/kg	20500	mg/kg	M	1.0E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-03
	Lead	928	mg/kg	928	mg/kg	M	4.7E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1190	mg/kg	1190	mg/kg	M	6.0E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.1E-02
	Vanadium	18.6	mg/kg	18.6	mg/kg	M	9.3E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.2E-03
	Zinc	249	mg/kg	249	mg/kg	M	1.2E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.2E-05
	(Total)												3.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	6.4E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1l Adult Resident RME Soil at Property 5013
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5013
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12100	mg/kg	12100	mg/kg	M	1.7E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.7E-02
	Antimony	10.4	mg/kg	10.4	mg/kg	M	1.4E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.6E-02
	Arsenic	12.4	mg/kg	12.4	mg/kg	M	1.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.7E-02
	Barium	942	mg/kg	942	mg/kg	M	1.3E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.5E-03
	Cadmium	6	mg/kg	6	mg/kg	M	8.2E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	8.2E-03
	Cobalt	15.3	mg/kg	15.3	mg/kg	M	2.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.0E-02
	Iron	25100	mg/kg	25100	mg/kg	M	3.4E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.9E-02
	Lead	482	mg/kg	482	mg/kg	M	6.6E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	2.0E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.4E-02
	Vanadium	40.4	mg/kg	40.4	mg/kg	M	5.5E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	7.9E-03
	Zinc	1230	mg/kg	1230	mg/kg	M	1.7E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.6E-03
	(Total)												2.7E-01
Dermal	Aluminum	12100	mg/kg	12100	mg/kg	M	6.6E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.6E-04
	Antimony	10.4	mg/kg	10.4	mg/kg	M	5.7E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	9.5E-03
	Arsenic	12.4	mg/kg	12.4	mg/kg	M	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.8E-03
	Barium	942	mg/kg	942	mg/kg	M	5.1E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.7E-03
	Cadmium	6	mg/kg	6	mg/kg	M	3.3E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.3E-03
	Cobalt	15.3	mg/kg	15.3	mg/kg	M	8.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.8E-03
	Iron	25100	mg/kg	25100	mg/kg	M	1.4E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.0E-03
	Lead	482	mg/kg	482	mg/kg	M	2.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	7.9E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.4E-02
	Vanadium	40.4	mg/kg	40.4	mg/kg	M	2.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.2E-02
	Zinc	1230	mg/kg	1230	mg/kg	M	6.7E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.2E-04
	(Total)												5.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	3.2E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1l Adult Resident CTE Soil at Property 5013
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5013
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12100	mg/kg	12100	mg/kg	M	5.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.8E-03
	Antimony	10.4	mg/kg	10.4	mg/kg	M	5.0E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.2E-02
	Arsenic	12.4	mg/kg	12.4	mg/kg	M	5.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-02
	Barium	942	mg/kg	942	mg/kg	M	4.5E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.3E-03
	Cadmium	6	mg/kg	6	mg/kg	M	2.9E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.9E-03
	Cobalt	15.3	mg/kg	15.3	mg/kg	M	7.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-02
	Iron	25100	mg/kg	25100	mg/kg	M	1.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-02
	Lead	482	mg/kg	482	mg/kg	M	2.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	7.0E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	5.0E-03
	Vanadium	40.4	mg/kg	40.4	mg/kg	M	1.9E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.8E-03
	Zinc	1230	mg/kg	1230	mg/kg	M	5.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-03
	(Total)												9.5E-02
Dermal	Aluminum	12100	mg/kg	12100	mg/kg	M	6.6E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.6E-05
	Antimony	10.4	mg/kg	10.4	mg/kg	M	5.7E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	9.5E-04
	Arsenic	12.4	mg/kg	12.4	mg/kg	M	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.8E-04
	Barium	942	mg/kg	942	mg/kg	M	5.1E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.7E-04
	Cadmium	6	mg/kg	6	mg/kg	M	3.3E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.3E-04
	Cobalt	15.3	mg/kg	15.3	mg/kg	M	8.4E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.8E-04
	Iron	25100	mg/kg	25100	mg/kg	M	1.4E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.0E-04
	Lead	482	mg/kg	482	mg/kg	M	2.6E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	7.9E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.4E-03
	Vanadium	40.4	mg/kg	40.4	mg/kg	M	2.2E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.2E-03
	Zinc	1230	mg/kg	1230	mg/kg	M	6.7E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.2E-05
	(Total)												5.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.0E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1l Child Resident RME Soil at Property 5013
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5013
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12100	mg/kg	12100	mg/kg	M	1.5E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.5E-01
	Antimony	10.4	mg/kg	10.4	mg/kg	M	1.3E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.3E-01
	Arsenic	12.4	mg/kg	12.4	mg/kg	M	1.6E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.3E-01
	Barium	942	mg/kg	942	mg/kg	M	1.2E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.0E-02
	Cadmium	6	mg/kg	6	mg/kg	M	7.7E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	7.7E-02
	Cobalt	15.3	mg/kg	15.3	mg/kg	M	2.0E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.5E-01
	Iron	25100	mg/kg	25100	mg/kg	M	3.2E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.6E-01
	Lead	482	mg/kg	482	mg/kg	M	6.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	1.9E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.3E-01
	Vanadium	40.4	mg/kg	40.4	mg/kg	M	5.2E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	7.4E-02
	Zinc	1230	mg/kg	1230	mg/kg	M	1.6E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.2E-02
	(Total)												2.5E+00
Dermal	Aluminum	12100	mg/kg	12100	mg/kg	M	4.3E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.3E-03
	Antimony	10.4	mg/kg	10.4	mg/kg	M	3.7E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	6.2E-02
	Arsenic	12.4	mg/kg	12.4	mg/kg	M	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.4E-02
	Barium	942	mg/kg	942	mg/kg	M	3.4E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.4E-02
	Cadmium	6	mg/kg	6	mg/kg	M	2.1E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	8.6E-03
	Cobalt	15.3	mg/kg	15.3	mg/kg	M	5.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-02
	Iron	25100	mg/kg	25100	mg/kg	M	9.0E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-02
	Lead	482	mg/kg	482	mg/kg	M	1.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	5.2E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.3E-02
	Vanadium	40.4	mg/kg	40.4	mg/kg	M	1.4E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.0E-02
	Zinc	1230	mg/kg	1230	mg/kg	M	4.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-03
	(Total)												3.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.9E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1l Child Resident CTE Soil at Property 5013
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5013
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12100	mg/kg	12100	mg/kg	M	5.4E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.4E-02
	Antimony	10.4	mg/kg	10.4	mg/kg	M	4.7E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.2E-01
	Arsenic	12.4	mg/kg	12.4	mg/kg	M	5.5E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-01
	Barium	942	mg/kg	942	mg/kg	M	4.2E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.1E-02
	Cadmium	6	mg/kg	6	mg/kg	M	2.7E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.7E-02
	Cobalt	15.3	mg/kg	15.3	mg/kg	M	6.8E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-01
	Iron	25100	mg/kg	25100	mg/kg	M	1.1E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-01
	Lead	482	mg/kg	482	mg/kg	M	2.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	6.5E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.6E-02
	Vanadium	40.4	mg/kg	40.4	mg/kg	M	1.8E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.6E-02
	Zinc	1230	mg/kg	1230	mg/kg	M	5.5E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.8E-02
	(Total)												8.8E-01
Dermal	Aluminum	12100	mg/kg	12100	mg/kg	M	6.1E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.1E-04
	Antimony	10.4	mg/kg	10.4	mg/kg	M	5.2E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	8.7E-03
	Arsenic	12.4	mg/kg	12.4	mg/kg	M	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.2E-03
	Barium	942	mg/kg	942	mg/kg	M	4.7E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.4E-03
	Cadmium	6	mg/kg	6	mg/kg	M	3.0E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.2E-03
	Cobalt	15.3	mg/kg	15.3	mg/kg	M	7.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-03
	Iron	25100	mg/kg	25100	mg/kg	M	1.3E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.8E-03
	Lead	482	mg/kg	482	mg/kg	M	2.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1450	mg/kg	1450	mg/kg	M	7.3E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.3E-02
	Vanadium	40.4	mg/kg	40.4	mg/kg	M	2.0E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.1E-02
	Zinc	1230	mg/kg	1230	mg/kg	M	6.2E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.1E-04
	(Total)												4.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	9.3E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1m Adult Resident RME Soil at Property 5014
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5014
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	626	mg/kg	626	mg/kg	M	8.6E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	626	mg/kg	626	mg/kg	M	3.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1m Adult Resident CTE Soil at Property 5014
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5014
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	626	mg/kg	626	mg/kg	M	3.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	626	mg/kg	626	mg/kg	M	3.4E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1m Child Resident RME Soil at Property 5014
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5014
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	626	mg/kg	626	mg/kg	M	8.0E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	626	mg/kg	626	mg/kg	M	2.2E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1m Child Resident CTE Soil at Property 5014
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 5014
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	626	mg/kg	626	mg/kg	M	2.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	626	mg/kg	626	mg/kg	M	3.1E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1n Adult Resident RME Soil at Property 20008
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20008
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	839	mg/kg	839	mg/kg	M	1.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	839	mg/kg	839	mg/kg	M	4.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1n Adult Resident CTE Soil at Property 20008
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20008
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	839	mg/kg	839	mg/kg	M	4.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	839	mg/kg	839	mg/kg	M	4.6E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1n Child Resident RME Soil at Property 20008
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20008
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	839	mg/kg	839	mg/kg	M	1.1E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	839	mg/kg	839	mg/kg	M	3.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1n Child Resident CTE Soil at Property 20008
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20008
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	839	mg/kg	839	mg/kg	M	3.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	839	mg/kg	839	mg/kg	M	4.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1o Adult Resident RME Soil at Property 20027
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20027
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	712	mg/kg	712	mg/kg	M	9.8E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	712	mg/kg	712	mg/kg	M	3.9E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1o Adult Resident CTE Soil at Property 20027
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20027
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	712	mg/kg	712	mg/kg	M	3.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	712	mg/kg	712	mg/kg	M	3.9E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1o Child Resident RME Soil at Property 20027
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20027
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	712	mg/kg	712	mg/kg	M	9.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	712	mg/kg	712	mg/kg	M	2.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1o Child Resident CTE Soil at Property 20027
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20027
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	712	mg/kg	712	mg/kg	M	3.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	712	mg/kg	712	mg/kg	M	3.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1p Adult Resident RME Soil at Property 20028
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20028
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	13000	mg/kg	13000	mg/kg	M	1.8E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.8E-02
	Antimony	5.5	mg/kg	5.5	mg/kg	M	7.5E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.9E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	576	mg/kg	576	mg/kg	M	7.9E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.9E-03
	Cadmium	2.3	mg/kg	2.3	mg/kg	M	3.2E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.2E-03
	Cobalt	11.7	mg/kg	11.7	mg/kg	M	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.3E-02
	Iron	17000	mg/kg	17000	mg/kg	M	2.3E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.3E-02
	Lead	361	mg/kg	361	mg/kg	M	4.9E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1130	mg/kg	1130	mg/kg	M	1.5E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.1E-02
	Vanadium	31.1	mg/kg	31.1	mg/kg	M	4.3E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	6.1E-03
	Zinc	432	mg/kg	432	mg/kg	M	5.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-03
	(Total)												1.5E-01
Dermal	Aluminum	13000	mg/kg	13000	mg/kg	M	7.1E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.1E-04
	Antimony	5.5	mg/kg	5.5	mg/kg	M	3.0E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	5.0E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	576	mg/kg	576	mg/kg	M	3.1E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.2E-03
	Cadmium	2.3	mg/kg	2.3	mg/kg	M	1.3E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	5.0E-04
	Cobalt	11.7	mg/kg	11.7	mg/kg	M	6.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-03
	Iron	17000	mg/kg	17000	mg/kg	M	9.3E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-03
	Lead	361	mg/kg	361	mg/kg	M	2.0E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1130	mg/kg	1130	mg/kg	M	6.2E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.1E-02
	Vanadium	31.1	mg/kg	31.1	mg/kg	M	1.7E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	9.4E-03
	Zinc	432	mg/kg	432	mg/kg	M	2.4E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.9E-05
	(Total)												3.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.8E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1p Adult Resident CTE Soil at Property 20028
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20028
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	13000	mg/kg	13000	mg/kg	M	6.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.2E-03
	Antimony	5.5	mg/kg	5.5	mg/kg	M	2.6E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	6.6E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	576	mg/kg	576	mg/kg	M	2.8E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.4E-03
	Cadmium	2.3	mg/kg	2.3	mg/kg	M	1.1E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.1E-03
	Cobalt	11.7	mg/kg	11.7	mg/kg	M	5.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-02
	Iron	17000	mg/kg	17000	mg/kg	M	8.2E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-02
	Lead	361	mg/kg	361	mg/kg	M	1.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1130	mg/kg	1130	mg/kg	M	5.4E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.9E-03
	Vanadium	31.1	mg/kg	31.1	mg/kg	M	1.5E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.1E-03
	Zinc	432	mg/kg	432	mg/kg	M	2.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.9E-04
	(Total)												5.2E-02
Dermal	Aluminum	13000	mg/kg	13000	mg/kg	M	7.1E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.1E-05
	Antimony	5.5	mg/kg	5.5	mg/kg	M	3.0E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	5.0E-04
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	576	mg/kg	576	mg/kg	M	3.1E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.2E-04
	Cadmium	2.3	mg/kg	2.3	mg/kg	M	1.3E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	5.0E-05
	Cobalt	11.7	mg/kg	11.7	mg/kg	M	6.4E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	17000	mg/kg	17000	mg/kg	M	9.3E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-04
	Lead	361	mg/kg	361	mg/kg	M	2.0E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1130	mg/kg	1130	mg/kg	M	6.2E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.1E-03
	Vanadium	31.1	mg/kg	31.1	mg/kg	M	1.7E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	9.4E-04
	Zinc	432	mg/kg	432	mg/kg	M	2.4E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.9E-06
	(Total)												3.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	5.6E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1p Child Resident RME Soil at Property 20028
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20028
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	13000	mg/kg	13000	mg/kg	M	1.7E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.7E-01
	Antimony	5.5	mg/kg	5.5	mg/kg	M	7.0E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.8E-01
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	576	mg/kg	576	mg/kg	M	7.4E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.7E-02
	Cadmium	2.3	mg/kg	2.3	mg/kg	M	2.9E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.9E-02
	Cobalt	11.7	mg/kg	11.7	mg/kg	M	1.5E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.0E-01
	Iron	17000	mg/kg	17000	mg/kg	M	2.2E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.1E-01
	Lead	361	mg/kg	361	mg/kg	M	4.6E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1130	mg/kg	1130	mg/kg	M	1.4E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.0E-01
	Vanadium	31.1	mg/kg	31.1	mg/kg	M	4.0E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	5.7E-02
	Zinc	432	mg/kg	432	mg/kg	M	5.5E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.8E-02
	(Total)												1.4E+00
Dermal	Aluminum	13000	mg/kg	13000	mg/kg	M	4.7E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.7E-03
	Antimony	5.5	mg/kg	5.5	mg/kg	M	2.0E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.3E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	576	mg/kg	576	mg/kg	M	2.1E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.5E-02
	Cadmium	2.3	mg/kg	2.3	mg/kg	M	8.2E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.3E-03
	Cobalt	11.7	mg/kg	11.7	mg/kg	M	4.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-02
	Iron	17000	mg/kg	17000	mg/kg	M	6.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	8.7E-03
	Lead	361	mg/kg	361	mg/kg	M	1.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1130	mg/kg	1130	mg/kg	M	4.0E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.2E-02
	Vanadium	31.1	mg/kg	31.1	mg/kg	M	1.1E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	6.2E-02
	Zinc	432	mg/kg	432	mg/kg	M	1.5E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.2E-04
	(Total)												2.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.6E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1p Child Resident CTE Soil at Property 20028
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20028
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	13000	mg/kg	13000	mg/kg	M	5.8E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.8E-02
	Antimony	5.5	mg/kg	5.5	mg/kg	M	2.5E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	6.2E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	576	mg/kg	576	mg/kg	M	2.6E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.3E-02
	Cadmium	2.3	mg/kg	2.3	mg/kg	M	1.0E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.0E-02
	Cobalt	11.7	mg/kg	11.7	mg/kg	M	5.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-01
	Iron	17000	mg/kg	17000	mg/kg	M	7.6E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-01
	Lead	361	mg/kg	361	mg/kg	M	1.6E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1130	mg/kg	1130	mg/kg	M	5.1E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.6E-02
	Vanadium	31.1	mg/kg	31.1	mg/kg	M	1.4E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.0E-02
	Zinc	432	mg/kg	432	mg/kg	M	1.9E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.4E-03
	(Total)												4.9E-01
Dermal	Aluminum	13000	mg/kg	13000	mg/kg	M	6.5E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.5E-04
	Antimony	5.5	mg/kg	5.5	mg/kg	M	2.8E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	4.6E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	576	mg/kg	576	mg/kg	M	2.9E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.1E-03
	Cadmium	2.3	mg/kg	2.3	mg/kg	M	1.2E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	4.6E-04
	Cobalt	11.7	mg/kg	11.7	mg/kg	M	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-03
	Iron	17000	mg/kg	17000	mg/kg	M	8.5E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-03
	Lead	361	mg/kg	361	mg/kg	M	1.8E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1130	mg/kg	1130	mg/kg	M	5.7E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.0E-02
	Vanadium	31.1	mg/kg	31.1	mg/kg	M	1.6E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.7E-03
	Zinc	432	mg/kg	432	mg/kg	M	2.2E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.2E-05
	(Total)												3.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.2E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1q Adult Resident RME Soil at Property 20070
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20070
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	13000	mg/kg	13000	mg/kg	M	1.8E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.8E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.1	mg/kg	9.1	mg/kg	M	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.2E-02
	Barium	430	mg/kg	430	mg/kg	M	5.9E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.9E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	6.4	mg/kg	6.4	mg/kg	M	8.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.9E-02
	Iron	16800	mg/kg	16800	mg/kg	M	2.3E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.3E-02
	Lead	187	mg/kg	187	mg/kg	M	2.6E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	755	mg/kg	755	mg/kg	M	1.0E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	7.4E-03
	Vanadium	44.5	mg/kg	44.5	mg/kg	M	6.1E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	8.7E-03
	Zinc	192	mg/kg	192	mg/kg	M	2.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.8E-04
	(Total)												1.4E-01
Dermal	Aluminum	13000	mg/kg	13000	mg/kg	M	7.1E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.1E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.1	mg/kg	9.1	mg/kg	M	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.0E-03
	Barium	430	mg/kg	430	mg/kg	M	2.4E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.7E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	6.4	mg/kg	6.4	mg/kg	M	3.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-03
	Iron	16800	mg/kg	16800	mg/kg	M	9.2E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-03
	Lead	187	mg/kg	187	mg/kg	M	1.0E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	755	mg/kg	755	mg/kg	M	4.1E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.4E-03
	Vanadium	44.5	mg/kg	44.5	mg/kg	M	2.4E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.4E-02
	Zinc	192	mg/kg	192	mg/kg	M	1.0E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.5E-05
	(Total)												3.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.7E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1q Adult Resident CTE Soil at Property 20070
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20070
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	13000	mg/kg	13000	mg/kg	M	6.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.2E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.1	mg/kg	9.1	mg/kg	M	4.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-02
	Barium	430	mg/kg	430	mg/kg	M	2.1E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.0E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	6.4	mg/kg	6.4	mg/kg	M	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.0E-02
	Iron	16800	mg/kg	16800	mg/kg	M	8.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-02
	Lead	187	mg/kg	187	mg/kg	M	9.0E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	755	mg/kg	755	mg/kg	M	3.6E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.6E-03
	Vanadium	44.5	mg/kg	44.5	mg/kg	M	2.1E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.0E-03
	Zinc	192	mg/kg	192	mg/kg	M	9.2E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.1E-04
	(Total)												4.9E-02
Dermal	Aluminum	13000	mg/kg	13000	mg/kg	M	7.1E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.1E-05
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.1	mg/kg	9.1	mg/kg	M	1.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.0E-04
	Barium	430	mg/kg	430	mg/kg	M	2.4E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.7E-04
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	6.4	mg/kg	6.4	mg/kg	M	3.5E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-04
	Iron	16800	mg/kg	16800	mg/kg	M	9.2E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-04
	Lead	187	mg/kg	187	mg/kg	M	1.0E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	755	mg/kg	755	mg/kg	M	4.1E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.4E-04
	Vanadium	44.5	mg/kg	44.5	mg/kg	M	2.4E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.4E-03
	Zinc	192	mg/kg	192	mg/kg	M	1.0E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.5E-06
	(Total)												3.1E-03
												Total Hazard Index Across All Exposure Routes/Pathways	5.3E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1q Child Resident RME Soil at Property 20070
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20070
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	13000	mg/kg	13000	mg/kg	M	1.7E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.7E-01
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.1	mg/kg	9.1	mg/kg	M	1.2E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.9E-01
	Barium	430	mg/kg	430	mg/kg	M	5.5E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.7E-02
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	6.4	mg/kg	6.4	mg/kg	M	8.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.7E-01
	Iron	16800	mg/kg	16800	mg/kg	M	2.1E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.1E-01
	Lead	187	mg/kg	187	mg/kg	M	2.4E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	755	mg/kg	755	mg/kg	M	9.7E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	6.9E-02
	Vanadium	44.5	mg/kg	44.5	mg/kg	M	5.7E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	8.1E-02
	Zinc	192	mg/kg	192	mg/kg	M	2.5E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.2E-03
	(Total)												1.3E+00
Dermal	Aluminum	13000	mg/kg	13000	mg/kg	M	4.7E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.7E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.1	mg/kg	9.1	mg/kg	M	9.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.3E-02
	Barium	430	mg/kg	430	mg/kg	M	1.5E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.1E-02
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	6.4	mg/kg	6.4	mg/kg	M	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.6E-03
	Iron	16800	mg/kg	16800	mg/kg	M	6.0E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	8.6E-03
	Lead	187	mg/kg	187	mg/kg	M	6.7E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	755	mg/kg	755	mg/kg	M	2.7E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	4.8E-02
	Vanadium	44.5	mg/kg	44.5	mg/kg	M	1.6E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.9E-02
	Zinc	192	mg/kg	192	mg/kg	M	6.9E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.3E-04
	(Total)												2.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.5E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1q Child Resident CTE Soil at Property 20070
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20070
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	13000	mg/kg	13000	mg/kg	M	5.8E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.8E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.1	mg/kg	9.1	mg/kg	M	4.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-01
	Barium	430	mg/kg	430	mg/kg	M	1.9E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	9.6E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	6.4	mg/kg	6.4	mg/kg	M	2.9E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.5E-02
	Iron	16800	mg/kg	16800	mg/kg	M	7.5E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-01
	Lead	187	mg/kg	187	mg/kg	M	8.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	755	mg/kg	755	mg/kg	M	3.4E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.4E-02
	Vanadium	44.5	mg/kg	44.5	mg/kg	M	2.0E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.8E-02
	Zinc	192	mg/kg	192	mg/kg	M	8.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.9E-03
	(Total)												4.6E-01
Dermal	Aluminum	13000	mg/kg	13000	mg/kg	M	6.5E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.5E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.1	mg/kg	9.1	mg/kg	M	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.6E-03
	Barium	430	mg/kg	430	mg/kg	M	2.2E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.5E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	6.4	mg/kg	6.4	mg/kg	M	3.2E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-03
	Iron	16800	mg/kg	16800	mg/kg	M	8.4E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-03
	Lead	187	mg/kg	187	mg/kg	M	9.4E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	755	mg/kg	755	mg/kg	M	3.8E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.8E-03
	Vanadium	44.5	mg/kg	44.5	mg/kg	M	2.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.2E-02
	Zinc	192	mg/kg	192	mg/kg	M	9.6E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.2E-05
	(Total)												2.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	4.9E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1r Adult Resident RME Soil at Property 20108
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20108
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	826	mg/kg	826	mg/kg	M	1.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	826	mg/kg	826	mg/kg	M	4.5E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1r Adult Resident CTE Soil at Property 20108
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20108
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	826	mg/kg	826	mg/kg	M	4.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	826	mg/kg	826	mg/kg	M	4.5E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1r Child Resident RME Soil at Property 20108
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20108
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	826	mg/kg	826	mg/kg	M	1.1E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	826	mg/kg	826	mg/kg	M	3.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1r Child Resident CTE Soil at Property 20108
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20108
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	826	mg/kg	826	mg/kg	M	3.7E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	826	mg/kg	826	mg/kg	M	4.1E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1s Adult Resident RME Soil at Property 20171
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20171
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	657	mg/kg	657	mg/kg	M	9.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	657	mg/kg	657	mg/kg	M	3.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1s Adult Resident CTE Soil at Property 20171
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20171
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	657	mg/kg	657	mg/kg	M	3.2E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	657	mg/kg	657	mg/kg	M	3.6E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1s Child Resident RME Soil at Property 20171
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20171
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	657	mg/kg	657	mg/kg	M	8.4E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	657	mg/kg	657	mg/kg	M	2.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1s Child Resident CTE Soil at Property 20171
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20171
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	657	mg/kg	657	mg/kg	M	2.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	657	mg/kg	657	mg/kg	M	3.3E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1t Adult Resident RME Soil at Property 20173
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20173
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	901	mg/kg	901	mg/kg	M	1.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	901	mg/kg	901	mg/kg	M	4.9E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1t Adult Resident CTE Soil at Property 20173
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20173
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	901	mg/kg	901	mg/kg	M	4.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	901	mg/kg	901	mg/kg	M	4.9E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1t Child Resident RME Soil at Property 20173
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20173
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	901	mg/kg	901	mg/kg	M	1.2E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	901	mg/kg	901	mg/kg	M	3.2E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1t Child Resident CTE Soil at Property 20173
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20173
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	901	mg/kg	901	mg/kg	M	4.0E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	901	mg/kg	901	mg/kg	M	4.5E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1u Adult Resident RME Soil at Property 20187
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20187
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	422	mg/kg	422	mg/kg	M	5.8E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	422	mg/kg	422	mg/kg	M	2.3E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1u Adult Resident CTE Soil at Property 20187
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20187
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	422	mg/kg	422	mg/kg	M	2.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	422	mg/kg	422	mg/kg	M	2.3E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1u Child Resident RME Soil at Property 20187
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20187
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	422	mg/kg	422	mg/kg	M	5.4E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	422	mg/kg	422	mg/kg	M	1.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1u Child Resident CTE Soil at Property 20187
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20187
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	422	mg/kg	422	mg/kg	M	1.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	422	mg/kg	422	mg/kg	M	2.1E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1v Adult Resident RME Soil at Property 20331
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20331
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	20900	mg/kg	20900	mg/kg	M	2.9E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.9E-02
	Antimony	15.9	mg/kg	15.9	mg/kg	M	2.2E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	5.4E-02
	Arsenic	11.4	mg/kg	11.4	mg/kg	M	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.2E-02
	Barium	322	mg/kg	322	mg/kg	M	4.4E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.2E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	11.5	mg/kg	11.5	mg/kg	M	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.3E-02
	Iron	22700	mg/kg	22700	mg/kg	M	3.1E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.4E-02
	Lead	1126	mg/kg	1126	mg/kg	M	1.5E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	644	mg/kg	644	mg/kg	M	8.8E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	6.3E-03
	Vanadium	47.2	mg/kg	47.2	mg/kg	M	6.5E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	9.2E-03
	Zinc	110	mg/kg	110	mg/kg	M	1.5E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.0E-04
	(Total)												2.5E-01
Dermal	Aluminum	20900	mg/kg	20900	mg/kg	M	1.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.1E-03
	Antimony	15.9	mg/kg	15.9	mg/kg	M	8.7E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.4E-02
	Arsenic	11.4	mg/kg	11.4	mg/kg	M	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.2E-03
	Barium	322	mg/kg	322	mg/kg	M	1.8E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.3E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	11.5	mg/kg	11.5	mg/kg	M	6.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-03
	Iron	22700	mg/kg	22700	mg/kg	M	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.8E-03
	Lead	1126	mg/kg	1126	mg/kg	M	6.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	644	mg/kg	644	mg/kg	M	3.5E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.3E-03
	Vanadium	47.2	mg/kg	47.2	mg/kg	M	2.6E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.4E-02
	Zinc	110	mg/kg	110	mg/kg	M	6.0E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-05
	(Total)												4.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	3.0E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1v Adult Resident CTE Soil at Property 20331
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20331
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	20900	mg/kg	20900	mg/kg	M	1.0E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.0E-02
	Antimony	15.9	mg/kg	15.9	mg/kg	M	7.6E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.9E-02
	Arsenic	11.4	mg/kg	11.4	mg/kg	M	5.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-02
	Barium	322	mg/kg	322	mg/kg	M	1.5E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	7.7E-04
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	11.5	mg/kg	11.5	mg/kg	M	5.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-02
	Iron	22700	mg/kg	22700	mg/kg	M	1.1E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-02
	Lead	1126	mg/kg	1126	mg/kg	M	5.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	644	mg/kg	644	mg/kg	M	3.1E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.2E-03
	Vanadium	47.2	mg/kg	47.2	mg/kg	M	2.3E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.2E-03
	Zinc	110	mg/kg	110	mg/kg	M	5.3E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.8E-04
	(Total)												8.8E-02
Dermal	Aluminum	20900	mg/kg	20900	mg/kg	M	1.1E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.1E-04
	Antimony	15.9	mg/kg	15.9	mg/kg	M	8.7E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.4E-03
	Arsenic	11.4	mg/kg	11.4	mg/kg	M	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.2E-04
	Barium	322	mg/kg	322	mg/kg	M	1.8E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.3E-04
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	11.5	mg/kg	11.5	mg/kg	M	6.3E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	22700	mg/kg	22700	mg/kg	M	1.2E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.8E-04
	Lead	1126	mg/kg	1126	mg/kg	M	6.2E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	644	mg/kg	644	mg/kg	M	3.5E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.3E-04
	Vanadium	47.2	mg/kg	47.2	mg/kg	M	2.6E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.4E-03
	Zinc	110	mg/kg	110	mg/kg	M	6.0E-07	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-06
	(Total)												4.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	9.2E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1v Child Resident RME Soil at Property 20331
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20331
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	20900	mg/kg	20900	mg/kg	M	2.7E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.7E-01
	Antimony	15.9	mg/kg	15.9	mg/kg	M	2.0E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	5.1E-01
	Arsenic	11.4	mg/kg	11.4	mg/kg	M	1.5E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.9E-01
	Barium	322	mg/kg	322	mg/kg	M	4.1E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.1E-02
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	11.5	mg/kg	11.5	mg/kg	M	1.5E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.9E-01
	Iron	22700	mg/kg	22700	mg/kg	M	2.9E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.1E-01
	Lead	1126	mg/kg	1126	mg/kg	M	1.4E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	644	mg/kg	644	mg/kg	M	8.2E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	5.9E-02
	Vanadium	47.2	mg/kg	47.2	mg/kg	M	6.0E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	8.6E-02
	Zinc	110	mg/kg	110	mg/kg	M	1.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.7E-03
	(Total)												2.3E+00
Dermal	Aluminum	20900	mg/kg	20900	mg/kg	M	7.5E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.5E-03
	Antimony	15.9	mg/kg	15.9	mg/kg	M	5.7E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	9.5E-02
	Arsenic	11.4	mg/kg	11.4	mg/kg	M	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.1E-02
	Barium	322	mg/kg	322	mg/kg	M	1.2E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	8.2E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	11.5	mg/kg	11.5	mg/kg	M	4.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-02
	Iron	22700	mg/kg	22700	mg/kg	M	8.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-02
	Lead	1126	mg/kg	1126	mg/kg	M	4.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	644	mg/kg	644	mg/kg	M	2.3E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	4.1E-02
	Vanadium	47.2	mg/kg	47.2	mg/kg	M	1.7E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	9.4E-02
	Zinc	110	mg/kg	110	mg/kg	M	3.9E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.3E-04
	(Total)												3.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.6E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1v Child Resident CTE Soil at Property 20331
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20331
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	20900	mg/kg	20900	mg/kg	M	9.4E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	9.4E-02
	Antimony	15.9	mg/kg	15.9	mg/kg	M	7.1E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.8E-01
	Arsenic	11.4	mg/kg	11.4	mg/kg	M	5.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-01
	Barium	322	mg/kg	322	mg/kg	M	1.4E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	7.2E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	11.5	mg/kg	11.5	mg/kg	M	5.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-01
	Iron	22700	mg/kg	22700	mg/kg	M	1.0E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-01
	Lead	1126	mg/kg	1126	mg/kg	M	5.0E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	644	mg/kg	644	mg/kg	M	2.9E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.1E-02
	Vanadium	47.2	mg/kg	47.2	mg/kg	M	2.1E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.0E-02
	Zinc	110	mg/kg	110	mg/kg	M	4.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.6E-03
	(Total)												8.2E-01
Dermal	Aluminum	20900	mg/kg	20900	mg/kg	M	1.0E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.0E-03
	Antimony	15.9	mg/kg	15.9	mg/kg	M	8.0E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.3E-02
	Arsenic	11.4	mg/kg	11.4	mg/kg	M	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.7E-03
	Barium	322	mg/kg	322	mg/kg	M	1.6E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.2E-03
	Cadmium	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	11.5	mg/kg	11.5	mg/kg	M	5.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-03
	Iron	22700	mg/kg	22700	mg/kg	M	1.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-03
	Lead	1126	mg/kg	1126	mg/kg	M	5.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	644	mg/kg	644	mg/kg	M	3.2E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	5.8E-03
	Vanadium	47.2	mg/kg	47.2	mg/kg	M	2.4E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.3E-02
	Zinc	110	mg/kg	110	mg/kg	M	5.5E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.8E-05
	(Total)												4.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	8.6E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1w Adult Resident RME Soil at Property 20349
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20349
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	11700	mg/kg	11700	mg/kg	M	1.6E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.6E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	15.3	mg/kg	15.3	mg/kg	M	2.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.0E-02
	Barium	235	mg/kg	235	mg/kg	M	3.2E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.6E-03
	Cadmium	4.4	mg/kg	4.4	mg/kg	M	6.0E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.0E-03
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.8E-02
	Iron	24200	mg/kg	24200	mg/kg	M	3.3E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.7E-02
	Lead	1130	mg/kg	1130	mg/kg	M	1.5E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	833	mg/kg	833	mg/kg	M	1.1E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	8.2E-03
	Vanadium	34	mg/kg	34	mg/kg	M	4.7E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	6.7E-03
	Zinc	426	mg/kg	426	mg/kg	M	5.8E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.9E-03
	(Total)												2.2E-01
Dermal	Aluminum	11700	mg/kg	11700	mg/kg	M	6.4E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.4E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	15.3	mg/kg	15.3	mg/kg	M	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.4E-03
	Barium	235	mg/kg	235	mg/kg	M	1.3E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	9.2E-04
	Cadmium	4.4	mg/kg	4.4	mg/kg	M	2.4E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	9.6E-04
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	7.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-03
	Iron	24200	mg/kg	24200	mg/kg	M	1.3E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.9E-03
	Lead	1130	mg/kg	1130	mg/kg	M	6.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	833	mg/kg	833	mg/kg	M	4.6E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	8.1E-03
	Vanadium	34	mg/kg	34	mg/kg	M	1.9E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.0E-02
	Zinc	426	mg/kg	426	mg/kg	M	2.3E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.8E-05
	(Total)												3.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.5E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1w Adult Resident CTE Soil at Property 20349
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20349
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	11700	mg/kg	11700	mg/kg	M	5.6E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.6E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	15.3	mg/kg	15.3	mg/kg	M	7.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-02
	Barium	235	mg/kg	235	mg/kg	M	1.1E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	5.6E-04
	Cadmium	4.4	mg/kg	4.4	mg/kg	M	2.1E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.1E-03
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	6.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-02
	Iron	24200	mg/kg	24200	mg/kg	M	1.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-02
	Lead	1130	mg/kg	1130	mg/kg	M	5.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	833	mg/kg	833	mg/kg	M	4.0E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.9E-03
	Vanadium	34	mg/kg	34	mg/kg	M	1.6E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.3E-03
	Zinc	426	mg/kg	426	mg/kg	M	2.0E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.8E-04
	(Total)												7.6E-02
Dermal	Aluminum	11700	mg/kg	11700	mg/kg	M	6.4E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.4E-05
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	15.3	mg/kg	15.3	mg/kg	M	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.4E-04
	Barium	235	mg/kg	235	mg/kg	M	1.3E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	9.2E-05
	Cadmium	4.4	mg/kg	4.4	mg/kg	M	2.4E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	9.6E-05
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	7.0E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-04
	Iron	24200	mg/kg	24200	mg/kg	M	1.3E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.9E-04
	Lead	1130	mg/kg	1130	mg/kg	M	6.2E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	833	mg/kg	833	mg/kg	M	4.6E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	8.1E-04
	Vanadium	34	mg/kg	34	mg/kg	M	1.9E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.0E-03
	Zinc	426	mg/kg	426	mg/kg	M	2.3E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.8E-06
	(Total)												3.4E-03
												Total Hazard Index Across All Exposure Routes/Pathways	7.9E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1w Child Resident RME Soil at Property 20349
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20349
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	11700	mg/kg	11700	mg/kg	M	1.5E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.5E-01
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	15.3	mg/kg	15.3	mg/kg	M	2.0E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.5E-01
	Barium	235	mg/kg	235	mg/kg	M	3.0E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.5E-02
	Cadmium	4.4	mg/kg	4.4	mg/kg	M	5.6E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.6E-02
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	1.6E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.5E-01
	Iron	24200	mg/kg	24200	mg/kg	M	3.1E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.4E-01
	Lead	1130	mg/kg	1130	mg/kg	M	1.4E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	833	mg/kg	833	mg/kg	M	1.1E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	7.6E-02
	Vanadium	34	mg/kg	34	mg/kg	M	4.3E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	6.2E-02
	Zinc	426	mg/kg	426	mg/kg	M	5.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.8E-02
	(Total)												2.0E+00
Dermal	Aluminum	11700	mg/kg	11700	mg/kg	M	4.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.2E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	15.3	mg/kg	15.3	mg/kg	M	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.5E-02
	Barium	235	mg/kg	235	mg/kg	M	8.4E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	6.0E-03
	Cadmium	4.4	mg/kg	4.4	mg/kg	M	1.6E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	6.3E-03
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	4.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-02
	Iron	24200	mg/kg	24200	mg/kg	M	8.7E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-02
	Lead	1130	mg/kg	1130	mg/kg	M	4.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	833	mg/kg	833	mg/kg	M	3.0E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	5.3E-02
	Vanadium	34	mg/kg	34	mg/kg	M	1.2E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	6.8E-02
	Zinc	426	mg/kg	426	mg/kg	M	1.5E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.1E-04
	(Total)												2.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.2E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1w Child Resident CTE Soil at Property 20349
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20349
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	11700	mg/kg	11700	mg/kg	M	5.2E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.2E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	15.3	mg/kg	15.3	mg/kg	M	6.8E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-01
	Barium	235	mg/kg	235	mg/kg	M	1.1E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	5.3E-03
	Cadmium	4.4	mg/kg	4.4	mg/kg	M	2.0E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.0E-02
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	5.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-01
	Iron	24200	mg/kg	24200	mg/kg	M	1.1E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-01
	Lead	1130	mg/kg	1130	mg/kg	M	5.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	833	mg/kg	833	mg/kg	M	3.7E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.7E-02
	Vanadium	34	mg/kg	34	mg/kg	M	1.5E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.2E-02
	Zinc	426	mg/kg	426	mg/kg	M	1.9E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.4E-03
	(Total)												7.1E-01
Dermal	Aluminum	11700	mg/kg	11700	mg/kg	M	5.9E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.9E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	15.3	mg/kg	15.3	mg/kg	M	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.7E-03
	Barium	235	mg/kg	235	mg/kg	M	1.2E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	8.4E-04
	Cadmium	4.4	mg/kg	4.4	mg/kg	M	2.2E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	8.8E-04
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	6.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-03
	Iron	24200	mg/kg	24200	mg/kg	M	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-03
	Lead	1130	mg/kg	1130	mg/kg	M	5.7E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	833	mg/kg	833	mg/kg	M	4.2E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.5E-03
	Vanadium	34	mg/kg	34	mg/kg	M	1.7E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	9.5E-03
	Zinc	426	mg/kg	426	mg/kg	M	2.1E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.1E-05
	(Total)												3.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	7.4E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1x Adult Resident RME Soil at Property 20397
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20397
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	852	mg/kg	852	mg/kg	M	1.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	852	mg/kg	852	mg/kg	M	4.7E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1x Adult Resident CTE Soil at Property 20397
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20397
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	852	mg/kg	852	mg/kg	M	4.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	852	mg/kg	852	mg/kg	M	4.7E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1x Child Resident RME Soil at Property 20397
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20397
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	852	mg/kg	852	mg/kg	M	1.1E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	852	mg/kg	852	mg/kg	M	3.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1x Child Resident CTE Soil at Property 20397
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20397
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	852	mg/kg	852	mg/kg	M	3.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	852	mg/kg	852	mg/kg	M	4.3E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1y Adult Resident RME Soil at Property 20428
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20428
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	833	mg/kg	833	mg/kg	M	1.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	833	mg/kg	833	mg/kg	M	4.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1y Adult Resident CTE Soil at Property 20428
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20428
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	833	mg/kg	833	mg/kg	M	4.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	833	mg/kg	833	mg/kg	M	4.6E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1y Child Resident RME Soil at Property 20428
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20428
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	833	mg/kg	833	mg/kg	M	1.1E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	833	mg/kg	833	mg/kg	M	3.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1y Child Resident CTE Soil at Property 20428
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20428
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	833	mg/kg	833	mg/kg	M	3.7E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	833	mg/kg	833	mg/kg	M	4.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1z Adult Resident RME Soil at Property 20437
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20437
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	1386	mg/kg	1386	mg/kg	M	1.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	1386	mg/kg	1386	mg/kg	M	7.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1z Adult Resident CTE Soil at Property 20437
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20437
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	1386	mg/kg	1386	mg/kg	M	6.6E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	1386	mg/kg	1386	mg/kg	M	7.6E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1z Child Resident RME Soil at Property 20437
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20437
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	1386	mg/kg	1386	mg/kg	M	1.8E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	1386	mg/kg	1386	mg/kg	M	5.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1z Child Resident CTE Soil at Property 20437
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20437
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	1386	mg/kg	1386	mg/kg	M	6.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	1386	mg/kg	1386	mg/kg	M	6.9E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1aa Adult Resident RME Soil at Property 20758
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20758
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	76	mg/kg	76	mg/kg	M	1.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	76	mg/kg	76	mg/kg	M	4.2E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1aa Adult Resident CTE Soil at Property 20758
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20758
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	76	mg/kg	76	mg/kg	M	3.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	76	mg/kg	76	mg/kg	M	4.2E-07	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1aa Child Resident RME Soil at Property 20758
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20758
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	76	mg/kg	76	mg/kg	M	9.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	76	mg/kg	76	mg/kg	M	2.7E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1aa Child Resident CTE Soil at Property 20758
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20758
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	76	mg/kg	76	mg/kg	M	3.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	76	mg/kg	76	mg/kg	M	3.8E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1bb Adult Resident RME Soil at Property 20767
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20767
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	486	mg/kg	486	mg/kg	M	6.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	486	mg/kg	486	mg/kg	M	2.7E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1bb Adult Resident CTE Soil at Property 20767
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20767
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	486	mg/kg	486	mg/kg	M	2.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	486	mg/kg	486	mg/kg	M	2.7E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1bb Child Resident RME Soil at Property 20767
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20767
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	486	mg/kg	486	mg/kg	M	6.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	486	mg/kg	486	mg/kg	M	1.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1bb Child Resident CTE Soil at Property 20767
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20767
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	486	mg/kg	486	mg/kg	M	2.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	486	mg/kg	486	mg/kg	M	2.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1cc Adult Resident RME Soil at Property 20918
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20918
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9200	mg/kg	9200	mg/kg	M	1.3E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.3E-02
	Antimony	6.7	mg/kg	6.7	mg/kg	M	9.2E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.3E-02
	Arsenic	11.5	mg/kg	11.5	mg/kg	M	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.3E-02
	Barium	1400	mg/kg	1400	mg/kg	M	1.9E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	9.6E-03
	Cadmium	8.6	mg/kg	8.6	mg/kg	M	1.2E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.2E-02
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.8E-02
	Iron	27200	mg/kg	27200	mg/kg	M	3.7E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	5.3E-02
	Lead	1309	mg/kg	1309	mg/kg	M	1.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	812	mg/kg	812	mg/kg	M	1.1E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	7.9E-03
	Vanadium	27.1	mg/kg	27.1	mg/kg	M	3.7E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	5.3E-03
	Zinc	1420	mg/kg	1420	mg/kg	M	1.9E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.5E-03
	(Total)												2.4E-01
Dermal	Aluminum	9200	mg/kg	9200	mg/kg	M	5.0E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.0E-04
	Antimony	6.7	mg/kg	6.7	mg/kg	M	3.7E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	6.1E-03
	Arsenic	11.5	mg/kg	11.5	mg/kg	M	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.3E-03
	Barium	1400	mg/kg	1400	mg/kg	M	7.7E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.5E-03
	Cadmium	8.6	mg/kg	8.6	mg/kg	M	4.7E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.9E-03
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	7.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-03
	Iron	27200	mg/kg	27200	mg/kg	M	1.5E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.1E-03
	Lead	1309	mg/kg	1309	mg/kg	M	7.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	812	mg/kg	812	mg/kg	M	4.4E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.9E-03
	Vanadium	27.1	mg/kg	27.1	mg/kg	M	1.5E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.2E-03
	Zinc	1420	mg/kg	1420	mg/kg	M	7.8E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.6E-04
	(Total)												4.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.8E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1cc Adult Resident CTE Soil at Property 20918
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20918
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9200	mg/kg	9200	mg/kg	M	4.4E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.4E-03
	Antimony	6.7	mg/kg	6.7	mg/kg	M	3.2E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	8.0E-03
	Arsenic	11.5	mg/kg	11.5	mg/kg	M	5.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-02
	Barium	1400	mg/kg	1400	mg/kg	M	6.7E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.4E-03
	Cadmium	8.6	mg/kg	8.6	mg/kg	M	4.1E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.1E-03
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	6.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-02
	Iron	27200	mg/kg	27200	mg/kg	M	1.3E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.9E-02
	Lead	1309	mg/kg	1309	mg/kg	M	6.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	812	mg/kg	812	mg/kg	M	3.9E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.8E-03
	Vanadium	27.1	mg/kg	27.1	mg/kg	M	1.3E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.9E-03
	Zinc	1420	mg/kg	1420	mg/kg	M	6.8E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.3E-03
	(Total)												8.4E-02
Dermal	Aluminum	9200	mg/kg	9200	mg/kg	M	5.0E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.0E-05
	Antimony	6.7	mg/kg	6.7	mg/kg	M	3.7E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	6.1E-04
	Arsenic	11.5	mg/kg	11.5	mg/kg	M	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.3E-04
	Barium	1400	mg/kg	1400	mg/kg	M	7.7E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.5E-04
	Cadmium	8.6	mg/kg	8.6	mg/kg	M	4.7E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.9E-04
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	7.0E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-04
	Iron	27200	mg/kg	27200	mg/kg	M	1.5E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.1E-04
	Lead	1309	mg/kg	1309	mg/kg	M	7.2E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	812	mg/kg	812	mg/kg	M	4.4E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.9E-04
	Vanadium	27.1	mg/kg	27.1	mg/kg	M	1.5E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.2E-04
	Zinc	1420	mg/kg	1420	mg/kg	M	7.8E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.6E-05
	(Total)												4.1E-03
												Total Hazard Index Across All Exposure Routes/Pathways	8.8E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1cc Child Resident RME Soil at Property 20918
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20918
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9200	mg/kg	9200	mg/kg	M	1.2E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.2E-01
	Antimony	6.7	mg/kg	6.7	mg/kg	M	8.6E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.1E-01
	Arsenic	11.5	mg/kg	11.5	mg/kg	M	1.5E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.9E-01
	Barium	1400	mg/kg	1400	mg/kg	M	1.8E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	8.9E-02
	Cadmium	8.6	mg/kg	8.6	mg/kg	M	1.1E-04	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.1E-01
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	1.6E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.5E-01
	Iron	27200	mg/kg	27200	mg/kg	M	3.5E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	5.0E-01
	Lead	1309	mg/kg	1309	mg/kg	M	1.7E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	812	mg/kg	812	mg/kg	M	1.0E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	7.4E-02
	Vanadium	27.1	mg/kg	27.1	mg/kg	M	3.5E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.9E-02
	Zinc	1420	mg/kg	1420	mg/kg	M	1.8E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.1E-02
	(Total)												2.2E+00
Dermal	Aluminum	9200	mg/kg	9200	mg/kg	M	3.3E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.3E-03
	Antimony	6.7	mg/kg	6.7	mg/kg	M	2.4E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	4.0E-02
	Arsenic	11.5	mg/kg	11.5	mg/kg	M	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.1E-02
	Barium	1400	mg/kg	1400	mg/kg	M	5.0E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.6E-02
	Cadmium	8.6	mg/kg	8.6	mg/kg	M	3.1E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.2E-02
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	4.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-02
	Iron	27200	mg/kg	27200	mg/kg	M	9.7E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.4E-02
	Lead	1309	mg/kg	1309	mg/kg	M	4.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	812	mg/kg	812	mg/kg	M	2.9E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	5.2E-02
	Vanadium	27.1	mg/kg	27.1	mg/kg	M	9.7E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.4E-02
	Zinc	1420	mg/kg	1420	mg/kg	M	5.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.7E-03
	(Total)												2.7E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.5E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1cc Child Resident CTE Soil at Property 20918
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 20918
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9200	mg/kg	9200	mg/kg	M	4.1E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.1E-02
	Antimony	6.7	mg/kg	6.7	mg/kg	M	3.0E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	7.5E-02
	Arsenic	11.5	mg/kg	11.5	mg/kg	M	5.1E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-01
	Barium	1400	mg/kg	1400	mg/kg	M	6.3E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.1E-02
	Cadmium	8.6	mg/kg	8.6	mg/kg	M	3.8E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.8E-02
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	5.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-01
	Iron	27200	mg/kg	27200	mg/kg	M	1.2E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-01
	Lead	1309	mg/kg	1309	mg/kg	M	5.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	812	mg/kg	812	mg/kg	M	3.6E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.6E-02
	Vanadium	27.1	mg/kg	27.1	mg/kg	M	1.2E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.7E-02
	Zinc	1420	mg/kg	1420	mg/kg	M	6.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.1E-02
	(Total)												7.9E-01
Dermal	Aluminum	9200	mg/kg	9200	mg/kg	M	4.6E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.6E-04
	Antimony	6.7	mg/kg	6.7	mg/kg	M	3.4E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	5.6E-03
	Arsenic	11.5	mg/kg	11.5	mg/kg	M	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.8E-03
	Barium	1400	mg/kg	1400	mg/kg	M	7.0E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.0E-03
	Cadmium	8.6	mg/kg	8.6	mg/kg	M	4.3E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.7E-03
	Cobalt	12.8	mg/kg	12.8	mg/kg	M	6.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-03
	Iron	27200	mg/kg	27200	mg/kg	M	1.4E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.9E-03
	Lead	1309	mg/kg	1309	mg/kg	M	6.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	812	mg/kg	812	mg/kg	M	4.1E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.3E-03
	Vanadium	27.1	mg/kg	27.1	mg/kg	M	1.4E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.5E-03
	Zinc	1420	mg/kg	1420	mg/kg	M	7.1E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.4E-04
	(Total)												3.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	8.2E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1dd Adult Resident RME Soil at Property 23264
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23264
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	434	mg/kg	434	mg/kg	M	5.9E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	434	mg/kg	434	mg/kg	M	2.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1dd Adult Resident CTE Soil at Property 23264
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23264
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	434	mg/kg	434	mg/kg	M	2.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	434	mg/kg	434	mg/kg	M	2.4E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1dd Child Resident RME Soil at Property 23264
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23264
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	434	mg/kg	434	mg/kg	M	5.5E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	434	mg/kg	434	mg/kg	M	1.6E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1dd Child Resident CTE Soil at Property 23264
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23264
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	434	mg/kg	434	mg/kg	M	1.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	434	mg/kg	434	mg/kg	M	2.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ee Adult Resident RME Soil at Property 23378
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23378
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5770	mg/kg	5770	mg/kg	M	7.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.9E-03
	Antimony	23.3	mg/kg	23.3	mg/kg	M	3.2E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	8.0E-02
	Arsenic	6	mg/kg	6	mg/kg	M	8.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.7E-02
	Barium	940	mg/kg	940	mg/kg	M	1.3E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.4E-03
	Cadmium	11.6	mg/kg	11.6	mg/kg	M	1.6E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.6E-02
	Cobalt	34.9	mg/kg	34.9	mg/kg	M	4.8E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-01
	Iron	21700	mg/kg	21700	mg/kg	M	3.0E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.2E-02
	Lead	4252	mg/kg	4252	mg/kg	M	5.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	2570	mg/kg	2570	mg/kg	M	3.5E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.5E-02
	Vanadium	9.8	mg/kg	9.8	mg/kg	M	1.3E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.9E-03
	Zinc	672	mg/kg	672	mg/kg	M	9.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.1E-03
	(Total)												3.7E-01
Dermal	Aluminum	5770	mg/kg	5770	mg/kg	M	3.2E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.2E-04
	Antimony	23.3	mg/kg	23.3	mg/kg	M	1.3E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.1E-02
	Arsenic	6	mg/kg	6	mg/kg	M	9.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.3E-03
	Barium	940	mg/kg	940	mg/kg	M	5.1E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.7E-03
	Cadmium	11.6	mg/kg	11.6	mg/kg	M	6.3E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.5E-03
	Cobalt	34.9	mg/kg	34.9	mg/kg	M	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.4E-03
	Iron	21700	mg/kg	21700	mg/kg	M	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-03
	Lead	4252	mg/kg	4252	mg/kg	M	2.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	2570	mg/kg	2570	mg/kg	M	1.4E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	2.5E-02
	Vanadium	9.8	mg/kg	9.8	mg/kg	M	5.4E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	3.0E-03
	Zinc	672	mg/kg	672	mg/kg	M	3.7E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.2E-04
	(Total)												6.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	4.4E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ee Adult Resident CTE Soil at Property 23378
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23378
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5770	mg/kg	5770	mg/kg	M	2.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.8E-03
	Antimony	23.3	mg/kg	23.3	mg/kg	M	1.1E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.8E-02
	Arsenic	6	mg/kg	6	mg/kg	M	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.6E-03
	Barium	940	mg/kg	940	mg/kg	M	4.5E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.3E-03
	Cadmium	11.6	mg/kg	11.6	mg/kg	M	5.6E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.6E-03
	Cobalt	34.9	mg/kg	34.9	mg/kg	M	1.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.6E-02
	Iron	21700	mg/kg	21700	mg/kg	M	1.0E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-02
	Lead	4252	mg/kg	4252	mg/kg	M	2.0E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	2570	mg/kg	2570	mg/kg	M	1.2E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	8.8E-03
	Vanadium	9.8	mg/kg	9.8	mg/kg	M	4.7E-06	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	6.7E-04
	Zinc	672	mg/kg	672	mg/kg	M	3.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.1E-03
	(Total)												1.3E-01
Dermal	Aluminum	5770	mg/kg	5770	mg/kg	M	3.2E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.2E-05
	Antimony	23.3	mg/kg	23.3	mg/kg	M	1.3E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.1E-03
	Arsenic	6	mg/kg	6	mg/kg	M	9.8E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.3E-04
	Barium	940	mg/kg	940	mg/kg	M	5.1E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.7E-04
	Cadmium	11.6	mg/kg	11.6	mg/kg	M	6.3E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.5E-04
	Cobalt	34.9	mg/kg	34.9	mg/kg	M	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.4E-04
	Iron	21700	mg/kg	21700	mg/kg	M	1.2E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-04
	Lead	4252	mg/kg	4252	mg/kg	M	2.3E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	2570	mg/kg	2570	mg/kg	M	1.4E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	2.5E-03
	Vanadium	9.8	mg/kg	9.8	mg/kg	M	5.4E-08	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	3.0E-04
	Zinc	672	mg/kg	672	mg/kg	M	3.7E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.2E-05
	(Total)												6.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.4E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ee Child Resident RME Soil at Property 23378
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23378
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5770	mg/kg	5770	mg/kg	M	7.4E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.4E-02
	Antimony	23.3	mg/kg	23.3	mg/kg	M	3.0E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	7.4E-01
	Arsenic	6	mg/kg	6	mg/kg	M	7.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-01
	Barium	940	mg/kg	940	mg/kg	M	1.2E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.0E-02
	Cadmium	11.6	mg/kg	11.6	mg/kg	M	1.5E-04	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.5E-01
	Cobalt	34.9	mg/kg	34.9	mg/kg	M	4.5E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E+00
	Iron	21700	mg/kg	21700	mg/kg	M	2.8E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	4.0E-01
	Lead	4252	mg/kg	4252	mg/kg	M	5.4E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	2570	mg/kg	2570	mg/kg	M	3.3E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.3E-01
	Vanadium	9.8	mg/kg	9.8	mg/kg	M	1.3E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.8E-02
	Zinc	672	mg/kg	672	mg/kg	M	8.6E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.9E-02
	(Total)												3.4E+00
Dermal	Aluminum	5770	mg/kg	5770	mg/kg	M	2.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.1E-03
	Antimony	23.3	mg/kg	23.3	mg/kg	M	8.3E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.4E-01
	Arsenic	6	mg/kg	6	mg/kg	M	6.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-02
	Barium	940	mg/kg	940	mg/kg	M	3.4E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.4E-02
	Cadmium	11.6	mg/kg	11.6	mg/kg	M	4.2E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.7E-02
	Cobalt	34.9	mg/kg	34.9	mg/kg	M	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.2E-02
	Iron	21700	mg/kg	21700	mg/kg	M	7.8E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-02
	Lead	4252	mg/kg	4252	mg/kg	M	1.5E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	2570	mg/kg	2570	mg/kg	M	9.2E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.6E-01
	Vanadium	9.8	mg/kg	9.8	mg/kg	M	3.5E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.9E-02
	Zinc	672	mg/kg	672	mg/kg	M	2.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.0E-04
	(Total)												4.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	3.9E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ee Child Resident CTE Soil at Property 23378
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23378
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5770	mg/kg	5770	mg/kg	M	2.6E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.6E-02
	Antimony	23.3	mg/kg	23.3	mg/kg	M	1.0E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.6E-01
	Arsenic	6	mg/kg	6	mg/kg	M	2.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.9E-02
	Barium	940	mg/kg	940	mg/kg	M	4.2E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.1E-02
	Cadmium	11.6	mg/kg	11.6	mg/kg	M	5.2E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.2E-02
	Cobalt	34.9	mg/kg	34.9	mg/kg	M	1.6E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.2E-01
	Iron	21700	mg/kg	21700	mg/kg	M	9.7E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.4E-01
	Lead	4252	mg/kg	4252	mg/kg	M	1.9E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	2570	mg/kg	2570	mg/kg	M	1.2E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	8.2E-02
	Vanadium	9.8	mg/kg	9.8	mg/kg	M	4.4E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	6.3E-03
	Zinc	672	mg/kg	672	mg/kg	M	3.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.0E-02
	(Total)												1.2E+00
Dermal	Aluminum	5770	mg/kg	5770	mg/kg	M	2.9E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.9E-04
	Antimony	23.3	mg/kg	23.3	mg/kg	M	1.2E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.9E-02
	Arsenic	6	mg/kg	6	mg/kg	M	9.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.0E-03
	Barium	940	mg/kg	940	mg/kg	M	4.7E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.4E-03
	Cadmium	11.6	mg/kg	11.6	mg/kg	M	5.8E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.3E-03
	Cobalt	34.9	mg/kg	34.9	mg/kg	M	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.8E-03
	Iron	21700	mg/kg	21700	mg/kg	M	1.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-03
	Lead	4252	mg/kg	4252	mg/kg	M	2.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	2570	mg/kg	2570	mg/kg	M	1.3E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	2.3E-02
	Vanadium	9.8	mg/kg	9.8	mg/kg	M	4.9E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	2.7E-03
	Zinc	672	mg/kg	672	mg/kg	M	3.4E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.1E-04
	(Total)												6.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.3E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ff Adult Resident RME Soil at Property 23575
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23575
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	180	mg/kg	180	mg/kg	M	2.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	180	mg/kg	180	mg/kg	M	9.8E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ff Adult Resident CTE Soil at Property 23575
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23575
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	180	mg/kg	180	mg/kg	M	8.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	180	mg/kg	180	mg/kg	M	9.8E-07	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ff Child Resident RME Soil at Property 23575
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23575
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	180	mg/kg	180	mg/kg	M	2.3E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	180	mg/kg	180	mg/kg	M	6.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ff Child Resident CTE Soil at Property 23575
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 23575
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	180	mg/kg	180	mg/kg	M	8.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	180	mg/kg	180	mg/kg	M	9.0E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1gg Adult Resident RME Soil at Property 30079
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30079
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9750	mg/kg	9750	mg/kg	M	1.3E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.3E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	7.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-02
	Barium	278	mg/kg	278	mg/kg	M	3.8E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.9E-03
	Cadmium	2.2	mg/kg	2.2	mg/kg	M	3.0E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.0E-03
	Cobalt	11.1	mg/kg	11.1	mg/kg	M	1.5E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.1E-02
	Iron	14000	mg/kg	14000	mg/kg	M	1.9E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.7E-02
	Lead	276	mg/kg	276	mg/kg	M	3.8E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1310	mg/kg	1310	mg/kg	M	1.8E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.3E-02
	Vanadium	25.7	mg/kg	25.7	mg/kg	M	3.5E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	5.0E-03
	Zinc	449	mg/kg	449	mg/kg	M	6.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.1E-03
	(Total)												1.4E-01
Dermal	Aluminum	9750	mg/kg	9750	mg/kg	M	5.3E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.3E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	9.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.1E-03
	Barium	278	mg/kg	278	mg/kg	M	1.5E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.1E-03
	Cadmium	2.2	mg/kg	2.2	mg/kg	M	1.2E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	4.8E-04
	Cobalt	11.1	mg/kg	11.1	mg/kg	M	6.1E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-03
	Iron	14000	mg/kg	14000	mg/kg	M	7.7E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-03
	Lead	276	mg/kg	276	mg/kg	M	1.5E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1310	mg/kg	1310	mg/kg	M	7.2E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.3E-02
	Vanadium	25.7	mg/kg	25.7	mg/kg	M	1.4E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.8E-03
	Zinc	449	mg/kg	449	mg/kg	M	2.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.2E-05
	(Total)												2.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.7E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1gg Adult Resident CTE Soil at Property 30079
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30079
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9750	mg/kg	9750	mg/kg	M	4.7E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.7E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.1E-03
	Barium	278	mg/kg	278	mg/kg	M	1.3E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.7E-04
	Cadmium	2.2	mg/kg	2.2	mg/kg	M	1.1E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.1E-03
	Cobalt	11.1	mg/kg	11.1	mg/kg	M	5.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-02
	Iron	14000	mg/kg	14000	mg/kg	M	6.7E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	9.6E-03
	Lead	276	mg/kg	276	mg/kg	M	1.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1310	mg/kg	1310	mg/kg	M	6.3E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.5E-03
	Vanadium	25.7	mg/kg	25.7	mg/kg	M	1.2E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.8E-03
	Zinc	449	mg/kg	449	mg/kg	M	2.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.2E-04
	(Total)												5.0E-02
Dermal	Aluminum	9750	mg/kg	9750	mg/kg	M	5.3E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.3E-05
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	9.3E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.1E-04
	Barium	278	mg/kg	278	mg/kg	M	1.5E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.1E-04
	Cadmium	2.2	mg/kg	2.2	mg/kg	M	1.2E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	4.8E-05
	Cobalt	11.1	mg/kg	11.1	mg/kg	M	6.1E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-04
	Iron	14000	mg/kg	14000	mg/kg	M	7.7E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-04
	Lead	276	mg/kg	276	mg/kg	M	1.5E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1310	mg/kg	1310	mg/kg	M	7.2E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.3E-03
	Vanadium	25.7	mg/kg	25.7	mg/kg	M	1.4E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.8E-04
	Zinc	449	mg/kg	449	mg/kg	M	2.5E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.2E-06
	(Total)												2.9E-03
												Total Hazard Index Across All Exposure Routes/Pathways	5.3E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1gg Child Resident RME Soil at Property 30079
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30079
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9750	mg/kg	9750	mg/kg	M	1.2E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.2E-01
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	7.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-01
	Barium	278	mg/kg	278	mg/kg	M	3.6E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.8E-02
	Cadmium	2.2	mg/kg	2.2	mg/kg	M	2.8E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.8E-02
	Cobalt	11.1	mg/kg	11.1	mg/kg	M	1.4E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.7E-01
	Iron	14000	mg/kg	14000	mg/kg	M	1.8E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.6E-01
	Lead	276	mg/kg	276	mg/kg	M	3.5E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1310	mg/kg	1310	mg/kg	M	1.7E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.2E-01
	Vanadium	25.7	mg/kg	25.7	mg/kg	M	3.3E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.7E-02
	Zinc	449	mg/kg	449	mg/kg	M	5.7E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.9E-02
	(Total)												1.3E+00
Dermal	Aluminum	9750	mg/kg	9750	mg/kg	M	3.5E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.5E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	6.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-02
	Barium	278	mg/kg	278	mg/kg	M	1.0E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	7.1E-03
	Cadmium	2.2	mg/kg	2.2	mg/kg	M	7.9E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.2E-03
	Cobalt	11.1	mg/kg	11.1	mg/kg	M	4.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.3E-02
	Iron	14000	mg/kg	14000	mg/kg	M	5.0E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	7.2E-03
	Lead	276	mg/kg	276	mg/kg	M	9.9E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1310	mg/kg	1310	mg/kg	M	4.7E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	8.4E-02
	Vanadium	25.7	mg/kg	25.7	mg/kg	M	9.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.1E-02
	Zinc	449	mg/kg	449	mg/kg	M	1.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.4E-04
	(Total)												1.9E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.5E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1gg Child Resident CTE Soil at Property 30079
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30079
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	9750	mg/kg	9750	mg/kg	M	4.4E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.4E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.5E-02
	Barium	278	mg/kg	278	mg/kg	M	1.2E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.2E-03
	Cadmium	2.2	mg/kg	2.2	mg/kg	M	9.8E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	9.8E-03
	Cobalt	11.1	mg/kg	11.1	mg/kg	M	5.0E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-01
	Iron	14000	mg/kg	14000	mg/kg	M	6.3E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	8.9E-02
	Lead	276	mg/kg	276	mg/kg	M	1.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1310	mg/kg	1310	mg/kg	M	5.9E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.2E-02
	Vanadium	25.7	mg/kg	25.7	mg/kg	M	1.2E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.6E-02
	Zinc	449	mg/kg	449	mg/kg	M	2.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.7E-03
	(Total)												4.6E-01
Dermal	Aluminum	9750	mg/kg	9750	mg/kg	M	4.9E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.9E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	5.7	mg/kg	5.7	mg/kg	M	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.9E-03
	Barium	278	mg/kg	278	mg/kg	M	1.4E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.0E-03
	Cadmium	2.2	mg/kg	2.2	mg/kg	M	1.1E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	4.4E-04
	Cobalt	11.1	mg/kg	11.1	mg/kg	M	5.6E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-03
	Iron	14000	mg/kg	14000	mg/kg	M	7.0E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.0E-03
	Lead	276	mg/kg	276	mg/kg	M	1.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1310	mg/kg	1310	mg/kg	M	6.6E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.2E-02
	Vanadium	25.7	mg/kg	25.7	mg/kg	M	1.3E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.2E-03
	Zinc	449	mg/kg	449	mg/kg	M	2.3E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.5E-05
	(Total)												2.7E-02
												Total Hazard Index Across All Exposure Routes/Pathways	4.9E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1hh Adult Resident RME Soil at Property 30126
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30126
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12200	mg/kg	12200	mg/kg	M	1.7E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.7E-02
	Antimony	4.3	mg/kg	4.3	mg/kg	M	5.9E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.5E-02
	Arsenic	5.9	mg/kg	5.9	mg/kg	M	8.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.7E-02
	Barium	4690	mg/kg	4690	mg/kg	M	6.4E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.2E-02
	Cadmium	1.6	mg/kg	1.6	mg/kg	M	2.2E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.2E-03
	Cobalt	5	mg/kg	5	mg/kg	M	6.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-02
	Iron	19900	mg/kg	19900	mg/kg	M	2.7E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.9E-02
	Lead	442	mg/kg	442	mg/kg	M	6.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	754	mg/kg	754	mg/kg	M	1.0E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	7.4E-03
	Vanadium	24.5	mg/kg	24.5	mg/kg	M	3.4E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.8E-03
	Zinc	101	mg/kg	101	mg/kg	M	1.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.6E-04
	(Total)												1.7E-01
Dermal	Aluminum	12200	mg/kg	12200	mg/kg	M	6.7E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.7E-04
	Antimony	4.3	mg/kg	4.3	mg/kg	M	2.4E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.9E-03
	Arsenic	5.9	mg/kg	5.9	mg/kg	M	9.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-03
	Barium	4690	mg/kg	4690	mg/kg	M	2.6E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.8E-02
	Cadmium	1.6	mg/kg	1.6	mg/kg	M	8.7E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.5E-04
	Cobalt	5	mg/kg	5	mg/kg	M	2.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.1E-04
	Iron	19900	mg/kg	19900	mg/kg	M	1.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-03
	Lead	442	mg/kg	442	mg/kg	M	2.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	754	mg/kg	754	mg/kg	M	4.1E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.4E-03
	Vanadium	24.5	mg/kg	24.5	mg/kg	M	1.3E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.4E-03
	Zinc	101	mg/kg	101	mg/kg	M	5.5E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.8E-05
	(Total)												4.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.1E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1hh Adult Resident CTE Soil at Property 30126
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30126
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12200	mg/kg	12200	mg/kg	M	5.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.8E-03
	Antimony	4.3	mg/kg	4.3	mg/kg	M	2.1E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	5.2E-03
	Arsenic	5.9	mg/kg	5.9	mg/kg	M	2.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.4E-03
	Barium	4690	mg/kg	4690	mg/kg	M	2.2E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.1E-02
	Cadmium	1.6	mg/kg	1.6	mg/kg	M	7.7E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	7.7E-04
	Cobalt	5	mg/kg	5	mg/kg	M	2.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.0E-03
	Iron	19900	mg/kg	19900	mg/kg	M	9.5E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.4E-02
	Lead	442	mg/kg	442	mg/kg	M	2.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	754	mg/kg	754	mg/kg	M	3.6E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.6E-03
	Vanadium	24.5	mg/kg	24.5	mg/kg	M	1.2E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.7E-03
	Zinc	101	mg/kg	101	mg/kg	M	4.8E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.6E-04
	(Total)												5.8E-02
Dermal	Aluminum	12200	mg/kg	12200	mg/kg	M	6.7E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.7E-05
	Antimony	4.3	mg/kg	4.3	mg/kg	M	2.4E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.9E-04
	Arsenic	5.9	mg/kg	5.9	mg/kg	M	9.7E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-04
	Barium	4690	mg/kg	4690	mg/kg	M	2.6E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.8E-03
	Cadmium	1.6	mg/kg	1.6	mg/kg	M	8.7E-10	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.5E-05
	Cobalt	5	mg/kg	5	mg/kg	M	2.7E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.1E-05
	Iron	19900	mg/kg	19900	mg/kg	M	1.1E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-04
	Lead	442	mg/kg	442	mg/kg	M	2.4E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	754	mg/kg	754	mg/kg	M	4.1E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.4E-04
	Vanadium	24.5	mg/kg	24.5	mg/kg	M	1.3E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.4E-04
	Zinc	101	mg/kg	101	mg/kg	M	5.5E-07	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.8E-06
	(Total)												4.4E-03
												Total Hazard Index Across All Exposure Routes/Pathways	6.3E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1hh Child Resident RME Soil at Property 30126
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30126
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12200	mg/kg	12200	mg/kg	M	1.6E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.6E-01
	Antimony	4.3	mg/kg	4.3	mg/kg	M	5.5E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.4E-01
	Arsenic	5.9	mg/kg	5.9	mg/kg	M	7.5E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.5E-01
	Barium	4690	mg/kg	4690	mg/kg	M	6.0E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.0E-01
	Cadmium	1.6	mg/kg	1.6	mg/kg	M	2.0E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.0E-02
	Cobalt	5	mg/kg	5	mg/kg	M	6.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-01
	Iron	19900	mg/kg	19900	mg/kg	M	2.5E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.6E-01
	Lead	442	mg/kg	442	mg/kg	M	5.7E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	754	mg/kg	754	mg/kg	M	9.6E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	6.9E-02
	Vanadium	24.5	mg/kg	24.5	mg/kg	M	3.1E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	4.5E-02
	Zinc	101	mg/kg	101	mg/kg	M	1.3E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.3E-03
	(Total)												1.6E+00
Dermal	Aluminum	12200	mg/kg	12200	mg/kg	M	4.4E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.4E-03
	Antimony	4.3	mg/kg	4.3	mg/kg	M	1.5E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.6E-02
	Arsenic	5.9	mg/kg	5.9	mg/kg	M	6.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-02
	Barium	4690	mg/kg	4690	mg/kg	M	1.7E-03	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.2E-01
	Cadmium	1.6	mg/kg	1.6	mg/kg	M	5.7E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.3E-03
	Cobalt	5	mg/kg	5	mg/kg	M	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.0E-03
	Iron	19900	mg/kg	19900	mg/kg	M	7.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.0E-02
	Lead	442	mg/kg	442	mg/kg	M	1.6E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	754	mg/kg	754	mg/kg	M	2.7E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	4.8E-02
	Vanadium	24.5	mg/kg	24.5	mg/kg	M	8.8E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	4.9E-02
	Zinc	101	mg/kg	101	mg/kg	M	3.6E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.2E-04
	(Total)												2.9E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.8E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1hh Child Resident CTE Soil at Property 30126
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30126
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12200	mg/kg	12200	mg/kg	M	5.5E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.5E-02
	Antimony	4.3	mg/kg	4.3	mg/kg	M	1.9E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	4.8E-02
	Arsenic	5.9	mg/kg	5.9	mg/kg	M	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.8E-02
	Barium	4690	mg/kg	4690	mg/kg	M	2.1E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.0E-01
	Cadmium	1.6	mg/kg	1.6	mg/kg	M	7.2E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	7.2E-03
	Cobalt	5	mg/kg	5	mg/kg	M	2.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.5E-02
	Iron	19900	mg/kg	19900	mg/kg	M	8.9E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-01
	Lead	442	mg/kg	442	mg/kg	M	2.0E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	754	mg/kg	754	mg/kg	M	3.4E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.4E-02
	Vanadium	24.5	mg/kg	24.5	mg/kg	M	1.1E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.6E-02
	Zinc	101	mg/kg	101	mg/kg	M	4.5E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-03
	(Total)												5.5E-01
Dermal	Aluminum	12200	mg/kg	12200	mg/kg	M	6.1E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.1E-04
	Antimony	4.3	mg/kg	4.3	mg/kg	M	2.2E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.6E-03
	Arsenic	5.9	mg/kg	5.9	mg/kg	M	8.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.0E-03
	Barium	4690	mg/kg	4690	mg/kg	M	2.4E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.7E-02
	Cadmium	1.6	mg/kg	1.6	mg/kg	M	8.0E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	3.2E-04
	Cobalt	5	mg/kg	5	mg/kg	M	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.4E-04
	Iron	19900	mg/kg	19900	mg/kg	M	1.0E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.4E-03
	Lead	442	mg/kg	442	mg/kg	M	2.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	754	mg/kg	754	mg/kg	M	3.8E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.7E-03
	Vanadium	24.5	mg/kg	24.5	mg/kg	M	1.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	6.8E-03
	Zinc	101	mg/kg	101	mg/kg	M	5.1E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.7E-05
	(Total)												4.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.9E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ii Adult Resident RME Soil at Property 30172
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30172
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	693	mg/kg	693	mg/kg	M	9.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	693	mg/kg	693	mg/kg	M	3.8E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ii Adult Resident CTE Soil at Property 30172
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30172
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	693	mg/kg	693	mg/kg	M	3.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	693	mg/kg	693	mg/kg	M	3.8E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ii Child Resident RME Soil at Property 30172
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30172
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	693	mg/kg	693	mg/kg	M	8.9E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	693	mg/kg	693	mg/kg	M	2.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ii Child Resident CTE Soil at Property 30172
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30172
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	693	mg/kg	693	mg/kg	M	3.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	693	mg/kg	693	mg/kg	M	3.5E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1jj Adult Resident RME Soil at Property 30177
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30177
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	16300	mg/kg	16300	mg/kg	M	2.2E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.2E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.4	mg/kg	9.4	mg/kg	M	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.3E-02
	Barium	447	mg/kg	447	mg/kg	M	6.1E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.1E-03
	Cadmium	5	mg/kg	5	mg/kg	M	6.8E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.8E-03
	Cobalt	10	mg/kg	10	mg/kg	M	1.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.6E-02
	Iron	30800	mg/kg	30800	mg/kg	M	4.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	6.0E-02
	Lead	686	mg/kg	686	mg/kg	M	9.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	821	mg/kg	821	mg/kg	M	1.1E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	8.0E-03
	Vanadium	36.4	mg/kg	36.4	mg/kg	M	5.0E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	7.1E-03
	Zinc	361	mg/kg	361	mg/kg	M	4.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.6E-03
	(Total)												2.0E-01
Dermal	Aluminum	16300	mg/kg	16300	mg/kg	M	8.9E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.9E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.4	mg/kg	9.4	mg/kg	M	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.1E-03
	Barium	447	mg/kg	447	mg/kg	M	2.4E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.7E-03
	Cadmium	5	mg/kg	5	mg/kg	M	2.7E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.1E-03
	Cobalt	10	mg/kg	10	mg/kg	M	5.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-03
	Iron	30800	mg/kg	30800	mg/kg	M	1.7E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.4E-03
	Lead	686	mg/kg	686	mg/kg	M	3.7E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	821	mg/kg	821	mg/kg	M	4.5E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	8.0E-03
	Vanadium	36.4	mg/kg	36.4	mg/kg	M	2.0E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.1E-02
	Zinc	361	mg/kg	361	mg/kg	M	2.0E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.6E-05
	(Total)												3.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.3E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1jj Adult Resident CTE Soil at Property 30177
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30177
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	16300	mg/kg	16300	mg/kg	M	7.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.8E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.4	mg/kg	9.4	mg/kg	M	4.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-02
	Barium	447	mg/kg	447	mg/kg	M	2.1E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.1E-03
	Cadmium	5	mg/kg	5	mg/kg	M	2.4E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.4E-03
	Cobalt	10	mg/kg	10	mg/kg	M	4.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-02
	Iron	30800	mg/kg	30800	mg/kg	M	1.5E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.1E-02
	Lead	686	mg/kg	686	mg/kg	M	3.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	821	mg/kg	821	mg/kg	M	3.9E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.8E-03
	Vanadium	36.4	mg/kg	36.4	mg/kg	M	1.7E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.5E-03
	Zinc	361	mg/kg	361	mg/kg	M	1.7E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.8E-04
	(Total)												6.9E-02
Dermal	Aluminum	16300	mg/kg	16300	mg/kg	M	8.9E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.9E-05
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.4	mg/kg	9.4	mg/kg	M	1.5E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.1E-04
	Barium	447	mg/kg	447	mg/kg	M	2.4E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.7E-04
	Cadmium	5	mg/kg	5	mg/kg	M	2.7E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.1E-04
	Cobalt	10	mg/kg	10	mg/kg	M	5.5E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-04
	Iron	30800	mg/kg	30800	mg/kg	M	1.7E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.4E-04
	Lead	686	mg/kg	686	mg/kg	M	3.7E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	821	mg/kg	821	mg/kg	M	4.5E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	8.0E-04
	Vanadium	36.4	mg/kg	36.4	mg/kg	M	2.0E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.1E-03
	Zinc	361	mg/kg	361	mg/kg	M	2.0E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.6E-06
	(Total)												3.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	7.2E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1jj Child Resident RME Soil at Property 30177
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30177
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	16300	mg/kg	16300	mg/kg	M	2.1E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.1E-01
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.4	mg/kg	9.4	mg/kg	M	1.2E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.0E-01
	Barium	447	mg/kg	447	mg/kg	M	5.7E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.9E-02
	Cadmium	5	mg/kg	5	mg/kg	M	6.4E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.4E-02
	Cobalt	10	mg/kg	10	mg/kg	M	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.3E-01
	Iron	30800	mg/kg	30800	mg/kg	M	3.9E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	5.6E-01
	Lead	686	mg/kg	686	mg/kg	M	8.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	821	mg/kg	821	mg/kg	M	1.0E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	7.5E-02
	Vanadium	36.4	mg/kg	36.4	mg/kg	M	4.7E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	6.6E-02
	Zinc	361	mg/kg	361	mg/kg	M	4.6E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-02
	(Total)												1.8E+00
Dermal	Aluminum	16300	mg/kg	16300	mg/kg	M	5.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.8E-03
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.4	mg/kg	9.4	mg/kg	M	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.4E-02
	Barium	447	mg/kg	447	mg/kg	M	1.6E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.1E-02
	Cadmium	5	mg/kg	5	mg/kg	M	1.8E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	7.2E-03
	Cobalt	10	mg/kg	10	mg/kg	M	3.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-02
	Iron	30800	mg/kg	30800	mg/kg	M	1.1E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.6E-02
	Lead	686	mg/kg	686	mg/kg	M	2.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	821	mg/kg	821	mg/kg	M	2.9E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	5.2E-02
	Vanadium	36.4	mg/kg	36.4	mg/kg	M	1.3E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	7.2E-02
	Zinc	361	mg/kg	361	mg/kg	M	1.3E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.3E-04
	(Total)												2.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.1E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1jj Child Resident CTE Soil at Property 30177
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30177
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	16300	mg/kg	16300	mg/kg	M	7.3E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.3E-02
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	9.4	mg/kg	9.4	mg/kg	M	4.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-01
	Barium	447	mg/kg	447	mg/kg	M	2.0E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.0E-02
	Cadmium	5	mg/kg	5	mg/kg	M	2.2E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.2E-02
	Cobalt	10	mg/kg	10	mg/kg	M	4.5E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-01
	Iron	30800	mg/kg	30800	mg/kg	M	1.4E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.0E-01
	Lead	686	mg/kg	686	mg/kg	M	3.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	821	mg/kg	821	mg/kg	M	3.7E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.6E-02
	Vanadium	36.4	mg/kg	36.4	mg/kg	M	1.6E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.3E-02
	Zinc	361	mg/kg	361	mg/kg	M	1.6E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.4E-03
	(Total)												6.5E-01
Dermal	Aluminum	16300	mg/kg	16300	mg/kg	M	8.2E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.2E-04
	Antimony	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	9.4	mg/kg	9.4	mg/kg	M	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.7E-03
	Barium	447	mg/kg	447	mg/kg	M	2.2E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.6E-03
	Cadmium	5	mg/kg	5	mg/kg	M	2.5E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.0E-03
	Cobalt	10	mg/kg	10	mg/kg	M	5.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-03
	Iron	30800	mg/kg	30800	mg/kg	M	1.5E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.2E-03
	Lead	686	mg/kg	686	mg/kg	M	3.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	821	mg/kg	821	mg/kg	M	4.1E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.3E-03
	Vanadium	36.4	mg/kg	36.4	mg/kg	M	1.8E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.0E-02
	Zinc	361	mg/kg	361	mg/kg	M	1.8E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.0E-05
	(Total)												3.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	6.8E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1kk Adult Resident RME Soil at Property 30182
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30182
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12000	mg/kg	12000	mg/kg	M	1.6E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.6E-02
	Antimony	3.7	mg/kg	3.7	mg/kg	M	5.1E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.3E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	4520	mg/kg	4520	mg/kg	M	6.2E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.1E-02
	Cadmium	1.1	mg/kg	1.1	mg/kg	M	1.5E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.5E-03
	Cobalt	9.3	mg/kg	9.3	mg/kg	M	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.2E-02
	Iron	14200	mg/kg	14200	mg/kg	M	1.9E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.8E-02
	Lead	404	mg/kg	404	mg/kg	M	5.5E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	962	mg/kg	962	mg/kg	M	1.3E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	9.4E-03
	Vanadium	29.6	mg/kg	29.6	mg/kg	M	4.1E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	5.8E-03
	Zinc	177	mg/kg	177	mg/kg	M	2.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.1E-04
	(Total)												1.5E-01
Dermal	Aluminum	12000	mg/kg	12000	mg/kg	M	6.6E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.6E-04
	Antimony	3.7	mg/kg	3.7	mg/kg	M	2.0E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.4E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	4520	mg/kg	4520	mg/kg	M	2.5E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.8E-02
	Cadmium	1.1	mg/kg	1.1	mg/kg	M	6.0E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.4E-04
	Cobalt	9.3	mg/kg	9.3	mg/kg	M	5.1E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-03
	Iron	14200	mg/kg	14200	mg/kg	M	7.8E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-03
	Lead	404	mg/kg	404	mg/kg	M	2.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	962	mg/kg	962	mg/kg	M	5.3E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.4E-03
	Vanadium	29.6	mg/kg	29.6	mg/kg	M	1.6E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	9.0E-03
	Zinc	177	mg/kg	177	mg/kg	M	9.7E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.2E-05
	(Total)												4.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.9E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1kk Adult Resident CTE Soil at Property 30182
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30182
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12000	mg/kg	12000	mg/kg	M	5.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.8E-03
	Antimony	3.7	mg/kg	3.7	mg/kg	M	1.8E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	4.4E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	4520	mg/kg	4520	mg/kg	M	2.2E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.1E-02
	Cadmium	1.1	mg/kg	1.1	mg/kg	M	5.3E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.3E-04
	Cobalt	9.3	mg/kg	9.3	mg/kg	M	4.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-02
	Iron	14200	mg/kg	14200	mg/kg	M	6.8E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	9.7E-03
	Lead	404	mg/kg	404	mg/kg	M	1.9E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	962	mg/kg	962	mg/kg	M	4.6E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.3E-03
	Vanadium	29.6	mg/kg	29.6	mg/kg	M	1.4E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.0E-03
	Zinc	177	mg/kg	177	mg/kg	M	8.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.8E-04
	(Total)												5.2E-02
Dermal	Aluminum	12000	mg/kg	12000	mg/kg	M	6.6E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.6E-05
	Antimony	3.7	mg/kg	3.7	mg/kg	M	2.0E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.4E-04
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	4520	mg/kg	4520	mg/kg	M	2.5E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.8E-03
	Cadmium	1.1	mg/kg	1.1	mg/kg	M	6.0E-10	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.4E-05
	Cobalt	9.3	mg/kg	9.3	mg/kg	M	5.1E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-04
	Iron	14200	mg/kg	14200	mg/kg	M	7.8E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-04
	Lead	404	mg/kg	404	mg/kg	M	2.2E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	962	mg/kg	962	mg/kg	M	5.3E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	9.4E-04
	Vanadium	29.6	mg/kg	29.6	mg/kg	M	1.6E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	9.0E-04
	Zinc	177	mg/kg	177	mg/kg	M	9.7E-07	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.2E-06
	(Total)												4.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	5.6E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1kk Child Resident RME Soil at Property 30182
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30182
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12000	mg/kg	12000	mg/kg	M	1.5E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.5E-01
	Antimony	3.7	mg/kg	3.7	mg/kg	M	4.7E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.2E-01
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	4520	mg/kg	4520	mg/kg	M	5.8E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.9E-01
	Cadmium	1.1	mg/kg	1.1	mg/kg	M	1.4E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.4E-02
	Cobalt	9.3	mg/kg	9.3	mg/kg	M	1.2E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.0E-01
	Iron	14200	mg/kg	14200	mg/kg	M	1.8E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.6E-01
	Lead	404	mg/kg	404	mg/kg	M	5.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	962	mg/kg	962	mg/kg	M	1.2E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	8.8E-02
	Vanadium	29.6	mg/kg	29.6	mg/kg	M	3.8E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	5.4E-02
	Zinc	177	mg/kg	177	mg/kg	M	2.3E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.5E-03
	(Total)												1.4E+00
Dermal	Aluminum	12000	mg/kg	12000	mg/kg	M	4.3E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.3E-03
	Antimony	3.7	mg/kg	3.7	mg/kg	M	1.3E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.2E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	4520	mg/kg	4520	mg/kg	M	1.6E-03	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.2E-01
	Cadmium	1.1	mg/kg	1.1	mg/kg	M	3.9E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.6E-03
	Cobalt	9.3	mg/kg	9.3	mg/kg	M	3.3E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-02
	Iron	14200	mg/kg	14200	mg/kg	M	5.1E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	7.3E-03
	Lead	404	mg/kg	404	mg/kg	M	1.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	962	mg/kg	962	mg/kg	M	3.4E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.1E-02
	Vanadium	29.6	mg/kg	29.6	mg/kg	M	1.1E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.9E-02
	Zinc	177	mg/kg	177	mg/kg	M	6.3E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.1E-04
	(Total)												2.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.7E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1kk Child Resident CTE Soil at Property 30182
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30182
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	12000	mg/kg	12000	mg/kg	M	5.4E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.4E-02
	Antimony	3.7	mg/kg	3.7	mg/kg	M	1.7E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	4.1E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	4520	mg/kg	4520	mg/kg	M	2.0E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	1.0E-01
	Cadmium	1.1	mg/kg	1.1	mg/kg	M	4.9E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.9E-03
	Cobalt	9.3	mg/kg	9.3	mg/kg	M	4.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-01
	Iron	14200	mg/kg	14200	mg/kg	M	6.4E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	9.1E-02
	Lead	404	mg/kg	404	mg/kg	M	1.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	962	mg/kg	962	mg/kg	M	4.3E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	3.1E-02
	Vanadium	29.6	mg/kg	29.6	mg/kg	M	1.3E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.9E-02
	Zinc	177	mg/kg	177	mg/kg	M	7.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.6E-03
	(Total)												4.8E-01
Dermal	Aluminum	12000	mg/kg	12000	mg/kg	M	6.0E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.0E-04
	Antimony	3.7	mg/kg	3.7	mg/kg	M	1.9E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.1E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	4520	mg/kg	4520	mg/kg	M	2.3E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.6E-02
	Cadmium	1.1	mg/kg	1.1	mg/kg	M	5.5E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	2.2E-04
	Cobalt	9.3	mg/kg	9.3	mg/kg	M	4.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-03
	Iron	14200	mg/kg	14200	mg/kg	M	7.1E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.0E-03
	Lead	404	mg/kg	404	mg/kg	M	2.0E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	962	mg/kg	962	mg/kg	M	4.8E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	8.6E-03
	Vanadium	29.6	mg/kg	29.6	mg/kg	M	1.5E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	8.2E-03
	Zinc	177	mg/kg	177	mg/kg	M	8.9E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.0E-05
	(Total)												4.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.2E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1ll Adult Resident RME Soil at Property 30271
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30271
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5780	mg/kg	5780	mg/kg	M	7.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.9E-03
	Antimony	6.2	mg/kg	6.2	mg/kg	M	8.5E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.1E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1410	mg/kg	1410	mg/kg	M	1.9E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	9.7E-03
	Cadmium	3.3	mg/kg	3.3	mg/kg	M	4.5E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.5E-03
	Cobalt	14.3	mg/kg	14.3	mg/kg	M	2.0E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.5E-02
	Iron	16100	mg/kg	16100	mg/kg	M	2.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.2E-02
	Lead	926	mg/kg	926	mg/kg	M	1.3E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1280	mg/kg	1280	mg/kg	M	1.8E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.3E-02
	Vanadium	15.9	mg/kg	15.9	mg/kg	M	2.2E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.1E-03
	Zinc	181	mg/kg	181	mg/kg	M	2.5E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.3E-04
	(Total)												1.6E-01
Dermal	Aluminum	5780	mg/kg	5780	mg/kg	M	3.2E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.2E-04
	Antimony	6.2	mg/kg	6.2	mg/kg	M	3.4E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	5.6E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1410	mg/kg	1410	mg/kg	M	7.7E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.5E-03
	Cadmium	3.3	mg/kg	3.3	mg/kg	M	1.8E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	7.2E-04
	Cobalt	14.3	mg/kg	14.3	mg/kg	M	7.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-03
	Iron	16100	mg/kg	16100	mg/kg	M	8.8E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-03
	Lead	926	mg/kg	926	mg/kg	M	5.1E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1280	mg/kg	1280	mg/kg	M	7.0E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.2E-02
	Vanadium	15.9	mg/kg	15.9	mg/kg	M	8.7E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	4.8E-03
	Zinc	181	mg/kg	181	mg/kg	M	9.9E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.3E-05
	(Total)												3.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.9E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1II Adult Resident CTE Soil at Property 30271
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30271
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5780	mg/kg	5780	mg/kg	M	2.8E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.8E-03
	Antimony	6.2	mg/kg	6.2	mg/kg	M	3.0E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	7.4E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1410	mg/kg	1410	mg/kg	M	6.8E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.4E-03
	Cadmium	3.3	mg/kg	3.3	mg/kg	M	1.6E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.6E-03
	Cobalt	14.3	mg/kg	14.3	mg/kg	M	6.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-02
	Iron	16100	mg/kg	16100	mg/kg	M	7.7E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.1E-02
	Lead	926	mg/kg	926	mg/kg	M	4.4E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1280	mg/kg	1280	mg/kg	M	6.1E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.4E-03
	Vanadium	15.9	mg/kg	15.9	mg/kg	M	7.6E-06	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.1E-03
	Zinc	181	mg/kg	181	mg/kg	M	8.7E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.9E-04
	(Total)												5.5E-02
Dermal	Aluminum	5780	mg/kg	5780	mg/kg	M	3.2E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.2E-05
	Antimony	6.2	mg/kg	6.2	mg/kg	M	3.4E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	5.6E-04
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1410	mg/kg	1410	mg/kg	M	7.7E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.5E-04
	Cadmium	3.3	mg/kg	3.3	mg/kg	M	1.8E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	7.2E-05
	Cobalt	14.3	mg/kg	14.3	mg/kg	M	7.8E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-04
	Iron	16100	mg/kg	16100	mg/kg	M	8.8E-05	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-04
	Lead	926	mg/kg	926	mg/kg	M	5.1E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1280	mg/kg	1280	mg/kg	M	7.0E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.2E-03
	Vanadium	15.9	mg/kg	15.9	mg/kg	M	8.7E-08	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	4.8E-04
	Zinc	181	mg/kg	181	mg/kg	M	9.9E-07	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.3E-06
	(Total)												3.3E-03
												Total Hazard Index Across All Exposure Routes/Pathways	5.8E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1II Child Resident RME Soil at Property 30271
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30271
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5780	mg/kg	5780	mg/kg	M	7.4E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.4E-02
	Antimony	6.2	mg/kg	6.2	mg/kg	M	7.9E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	2.0E-01
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1410	mg/kg	1410	mg/kg	M	1.8E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	9.0E-02
	Cadmium	3.3	mg/kg	3.3	mg/kg	M	4.2E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.2E-02
	Cobalt	14.3	mg/kg	14.3	mg/kg	M	1.8E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.1E-01
	Iron	16100	mg/kg	16100	mg/kg	M	2.1E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.9E-01
	Lead	926	mg/kg	926	mg/kg	M	1.2E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1280	mg/kg	1280	mg/kg	M	1.6E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.2E-01
	Vanadium	15.9	mg/kg	15.9	mg/kg	M	2.0E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	2.9E-02
	Zinc	181	mg/kg	181	mg/kg	M	2.3E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.7E-03
	(Total)												1.5E+00
Dermal	Aluminum	5780	mg/kg	5780	mg/kg	M	2.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.1E-03
	Antimony	6.2	mg/kg	6.2	mg/kg	M	2.2E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.7E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1410	mg/kg	1410	mg/kg	M	5.0E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.6E-02
	Cadmium	3.3	mg/kg	3.3	mg/kg	M	1.2E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	4.7E-03
	Cobalt	14.3	mg/kg	14.3	mg/kg	M	5.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-02
	Iron	16100	mg/kg	16100	mg/kg	M	5.8E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	8.2E-03
	Lead	926	mg/kg	926	mg/kg	M	3.3E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1280	mg/kg	1280	mg/kg	M	4.6E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	8.2E-02
	Vanadium	15.9	mg/kg	15.9	mg/kg	M	5.7E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	3.2E-02
	Zinc	181	mg/kg	181	mg/kg	M	6.5E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.2E-04
	(Total)												2.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.7E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1II Child Resident CTE Soil at Property 30271
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30271
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5780	mg/kg	5780	mg/kg	M	2.6E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.6E-02
	Antimony	6.2	mg/kg	6.2	mg/kg	M	2.8E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	6.9E-02
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1410	mg/kg	1410	mg/kg	M	6.3E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	3.2E-02
	Cadmium	3.3	mg/kg	3.3	mg/kg	M	1.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.5E-02
	Cobalt	14.3	mg/kg	14.3	mg/kg	M	6.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-01
	Iron	16100	mg/kg	16100	mg/kg	M	7.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.0E-01
	Lead	926	mg/kg	926	mg/kg	M	4.1E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1280	mg/kg	1280	mg/kg	M	5.7E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	4.1E-02
	Vanadium	15.9	mg/kg	15.9	mg/kg	M	7.1E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.0E-02
	Zinc	181	mg/kg	181	mg/kg	M	8.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.7E-03
	(Total)												5.1E-01
Dermal	Aluminum	5780	mg/kg	5780	mg/kg	M	2.9E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.9E-04
	Antimony	6.2	mg/kg	6.2	mg/kg	M	3.1E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	5.2E-03
	Arsenic	ND	mg/kg	ND	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	1410	mg/kg	1410	mg/kg	M	7.1E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	5.0E-03
	Cadmium	3.3	mg/kg	3.3	mg/kg	M	1.7E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	6.6E-04
	Cobalt	14.3	mg/kg	14.3	mg/kg	M	7.2E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.4E-03
	Iron	16100	mg/kg	16100	mg/kg	M	8.1E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-03
	Lead	926	mg/kg	926	mg/kg	M	4.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1280	mg/kg	1280	mg/kg	M	6.4E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.1E-02
	Vanadium	15.9	mg/kg	15.9	mg/kg	M	8.0E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	4.4E-03
	Zinc	181	mg/kg	181	mg/kg	M	9.1E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.0E-05
	(Total)												3.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	5.4E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1mm Adult Resident RME Soil at Property 30364
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30364
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	18500	mg/kg	18500	mg/kg	M	2.5E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.5E-02
	Antimony	3.5	mg/kg	3.5	mg/kg	M	4.8E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.2E-02
	Arsenic	12.2	mg/kg	12.2	mg/kg	M	1.7E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.6E-02
	Barium	1010	mg/kg	1010	mg/kg	M	1.4E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.9E-03
	Cadmium	5.1	mg/kg	5.1	mg/kg	M	7.0E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	7.0E-03
	Cobalt	9.8	mg/kg	9.8	mg/kg	M	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.5E-02
	Iron	32300	mg/kg	32300	mg/kg	M	4.4E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	6.3E-02
	Lead	842	mg/kg	842	mg/kg	M	1.2E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	748	mg/kg	748	mg/kg	M	1.0E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	7.3E-03
	Vanadium	57.5	mg/kg	57.5	mg/kg	M	7.9E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.1E-02
	Zinc	337	mg/kg	337	mg/kg	M	4.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-03
	(Total)												2.4E-01
Dermal	Aluminum	18500	mg/kg	18500	mg/kg	M	1.0E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.0E-03
	Antimony	3.5	mg/kg	3.5	mg/kg	M	1.9E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.2E-03
	Arsenic	12.2	mg/kg	12.2	mg/kg	M	2.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.7E-03
	Barium	1010	mg/kg	1010	mg/kg	M	5.5E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.9E-03
	Cadmium	5.1	mg/kg	5.1	mg/kg	M	2.8E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.1E-03
	Cobalt	9.8	mg/kg	9.8	mg/kg	M	5.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-03
	Iron	32300	mg/kg	32300	mg/kg	M	1.8E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.5E-03
	Lead	842	mg/kg	842	mg/kg	M	4.6E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	748	mg/kg	748	mg/kg	M	4.1E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.3E-03
	Vanadium	57.5	mg/kg	57.5	mg/kg	M	3.1E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.7E-02
	Zinc	337	mg/kg	337	mg/kg	M	1.8E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.1E-05
	(Total)												4.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.8E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1mm Adult Resident CTE Soil at Property 30364
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30364
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	18500	mg/kg	18500	mg/kg	M	8.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.9E-03
	Antimony	3.5	mg/kg	3.5	mg/kg	M	1.7E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	4.2E-03
	Arsenic	12.2	mg/kg	12.2	mg/kg	M	5.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-02
	Barium	1010	mg/kg	1010	mg/kg	M	4.8E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.4E-03
	Cadmium	5.1	mg/kg	5.1	mg/kg	M	2.4E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.4E-03
	Cobalt	9.8	mg/kg	9.8	mg/kg	M	4.7E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-02
	Iron	32300	mg/kg	32300	mg/kg	M	1.5E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.2E-02
	Lead	842	mg/kg	842	mg/kg	M	4.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	748	mg/kg	748	mg/kg	M	3.6E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.6E-03
	Vanadium	57.5	mg/kg	57.5	mg/kg	M	2.8E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.9E-03
	Zinc	337	mg/kg	337	mg/kg	M	1.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.4E-04
	(Total)												8.2E-02
Dermal	Aluminum	18500	mg/kg	18500	mg/kg	M	1.0E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.0E-04
	Antimony	3.5	mg/kg	3.5	mg/kg	M	1.9E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	3.2E-04
	Arsenic	12.2	mg/kg	12.2	mg/kg	M	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.7E-04
	Barium	1010	mg/kg	1010	mg/kg	M	5.5E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.9E-04
	Cadmium	5.1	mg/kg	5.1	mg/kg	M	2.8E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.1E-04
	Cobalt	9.8	mg/kg	9.8	mg/kg	M	5.4E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-04
	Iron	32300	mg/kg	32300	mg/kg	M	1.8E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.5E-04
	Lead	842	mg/kg	842	mg/kg	M	4.6E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	748	mg/kg	748	mg/kg	M	4.1E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	7.3E-04
	Vanadium	57.5	mg/kg	57.5	mg/kg	M	3.1E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.7E-03
	Zinc	337	mg/kg	337	mg/kg	M	1.8E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.1E-06
	(Total)												4.5E-03
												Total Hazard Index Across All Exposure Routes/Pathways	8.7E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1mm Child Resident RME Soil at Property 30364
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30364
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	18500	mg/kg	18500	mg/kg	M	2.4E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.4E-01
	Antimony	3.5	mg/kg	3.5	mg/kg	M	4.5E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.1E-01
	Arsenic	12.2	mg/kg	12.2	mg/kg	M	1.6E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.2E-01
	Barium	1010	mg/kg	1010	mg/kg	M	1.3E-02	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	6.5E-02
	Cadmium	5.1	mg/kg	5.1	mg/kg	M	6.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.5E-02
	Cobalt	9.8	mg/kg	9.8	mg/kg	M	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.2E-01
	Iron	32300	mg/kg	32300	mg/kg	M	4.1E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	5.9E-01
	Lead	842	mg/kg	842	mg/kg	M	1.1E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	748	mg/kg	748	mg/kg	M	9.6E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	6.8E-02
	Vanadium	57.5	mg/kg	57.5	mg/kg	M	7.4E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.1E-01
	Zinc	337	mg/kg	337	mg/kg	M	4.3E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.4E-02
	(Total)												2.2E+00
Dermal	Aluminum	18500	mg/kg	18500	mg/kg	M	6.6E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.6E-03
	Antimony	3.5	mg/kg	3.5	mg/kg	M	1.3E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.1E-02
	Arsenic	12.2	mg/kg	12.2	mg/kg	M	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.4E-02
	Barium	1010	mg/kg	1010	mg/kg	M	3.6E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	2.6E-02
	Cadmium	5.1	mg/kg	5.1	mg/kg	M	1.8E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	7.3E-03
	Cobalt	9.8	mg/kg	9.8	mg/kg	M	3.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.2E-02
	Iron	32300	mg/kg	32300	mg/kg	M	1.2E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.7E-02
	Lead	842	mg/kg	842	mg/kg	M	3.0E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	748	mg/kg	748	mg/kg	M	2.7E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	4.8E-02
	Vanadium	57.5	mg/kg	57.5	mg/kg	M	2.1E-05	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.1E-01
	Zinc	337	mg/kg	337	mg/kg	M	1.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.0E-04
	(Total)												3.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.5E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1mm Child Resident CTE Soil at Property 30364
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30364
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	18500	mg/kg	18500	mg/kg	M	8.3E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.3E-02
	Antimony	3.5	mg/kg	3.5	mg/kg	M	1.6E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.9E-02
	Arsenic	12.2	mg/kg	12.2	mg/kg	M	5.5E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-01
	Barium	1010	mg/kg	1010	mg/kg	M	4.5E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.3E-02
	Cadmium	5.1	mg/kg	5.1	mg/kg	M	2.3E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.3E-02
	Cobalt	9.8	mg/kg	9.8	mg/kg	M	4.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-01
	Iron	32300	mg/kg	32300	mg/kg	M	1.4E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.1E-01
	Lead	842	mg/kg	842	mg/kg	M	3.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	748	mg/kg	748	mg/kg	M	3.3E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	2.4E-02
	Vanadium	57.5	mg/kg	57.5	mg/kg	M	2.6E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.7E-02
	Zinc	337	mg/kg	337	mg/kg	M	1.5E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.0E-03
	(Total)												7.7E-01
Dermal	Aluminum	18500	mg/kg	18500	mg/kg	M	9.3E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	9.3E-04
	Antimony	3.5	mg/kg	3.5	mg/kg	M	1.8E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	2.9E-03
	Arsenic	12.2	mg/kg	12.2	mg/kg	M	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.1E-03
	Barium	1010	mg/kg	1010	mg/kg	M	5.1E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	3.6E-03
	Cadmium	5.1	mg/kg	5.1	mg/kg	M	2.6E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.0E-03
	Cobalt	9.8	mg/kg	9.8	mg/kg	M	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-03
	Iron	32300	mg/kg	32300	mg/kg	M	1.6E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	2.3E-03
	Lead	842	mg/kg	842	mg/kg	M	4.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	748	mg/kg	748	mg/kg	M	3.7E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	6.7E-03
	Vanadium	57.5	mg/kg	57.5	mg/kg	M	2.9E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	1.6E-02
	Zinc	337	mg/kg	337	mg/kg	M	1.7E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.6E-05
	(Total)												4.1E-02
												Total Hazard Index Across All Exposure Routes/Pathways	8.1E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1nn Adult Resident RME Soil at Property 30417
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30417
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8210	mg/kg	8210	mg/kg	M	1.1E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.1E-02
	Antimony	11.5	mg/kg	11.5	mg/kg	M	1.6E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.9E-02
	Arsenic	6.5	mg/kg	6.5	mg/kg	M	8.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.0E-02
	Barium	312	mg/kg	312	mg/kg	M	4.3E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.1E-03
	Cadmium	5.5	mg/kg	5.5	mg/kg	M	7.5E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	7.5E-03
	Cobalt	17.8	mg/kg	17.8	mg/kg	M	2.4E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.1E-02
	Iron	19100	mg/kg	19100	mg/kg	M	2.6E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.7E-02
	Lead	1071	mg/kg	1071	mg/kg	M	1.5E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1580	mg/kg	1580	mg/kg	M	2.2E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.5E-02
	Vanadium	17.3	mg/kg	17.3	mg/kg	M	2.4E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.4E-03
	Zinc	342	mg/kg	342	mg/kg	M	4.7E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.6E-03
	(Total)												2.3E-01
Dermal	Aluminum	8210	mg/kg	8210	mg/kg	M	4.5E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.5E-04
	Antimony	11.5	mg/kg	11.5	mg/kg	M	6.3E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.0E-02
	Arsenic	6.5	mg/kg	6.5	mg/kg	M	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.6E-03
	Barium	312	mg/kg	312	mg/kg	M	1.7E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.2E-03
	Cadmium	5.5	mg/kg	5.5	mg/kg	M	3.0E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.2E-03
	Cobalt	17.8	mg/kg	17.8	mg/kg	M	9.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-03
	Iron	19100	mg/kg	19100	mg/kg	M	1.0E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-03
	Lead	1071	mg/kg	1071	mg/kg	M	5.9E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1580	mg/kg	1580	mg/kg	M	8.6E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.5E-02
	Vanadium	17.3	mg/kg	17.3	mg/kg	M	9.5E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.3E-03
	Zinc	342	mg/kg	342	mg/kg	M	1.9E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.2E-05
	(Total)												4.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.7E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1nn Adult Resident CTE Soil at Property 30417
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30417
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8210	mg/kg	8210	mg/kg	M	3.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.9E-03
	Antimony	11.5	mg/kg	11.5	mg/kg	M	5.5E-06	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.4E-02
	Arsenic	6.5	mg/kg	6.5	mg/kg	M	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.0E-02
	Barium	312	mg/kg	312	mg/kg	M	1.5E-04	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	7.5E-04
	Cadmium	5.5	mg/kg	5.5	mg/kg	M	2.6E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.6E-03
	Cobalt	17.8	mg/kg	17.8	mg/kg	M	8.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.8E-02
	Iron	19100	mg/kg	19100	mg/kg	M	9.2E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.3E-02
	Lead	1071	mg/kg	1071	mg/kg	M	5.1E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1580	mg/kg	1580	mg/kg	M	7.6E-04	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	5.4E-03
	Vanadium	17.3	mg/kg	17.3	mg/kg	M	8.3E-06	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.2E-03
	Zinc	342	mg/kg	342	mg/kg	M	1.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.5E-04
	(Total)												8.0E-02
Dermal	Aluminum	8210	mg/kg	8210	mg/kg	M	4.5E-05	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.5E-05
	Antimony	11.5	mg/kg	11.5	mg/kg	M	6.3E-08	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	1.0E-03
	Arsenic	6.5	mg/kg	6.5	mg/kg	M	1.1E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.6E-04
	Barium	312	mg/kg	312	mg/kg	M	1.7E-06	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.2E-04
	Cadmium	5.5	mg/kg	5.5	mg/kg	M	3.0E-09	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.2E-04
	Cobalt	17.8	mg/kg	17.8	mg/kg	M	9.7E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-04
	Iron	19100	mg/kg	19100	mg/kg	M	1.0E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.5E-04
	Lead	1071	mg/kg	1071	mg/kg	M	5.9E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1580	mg/kg	1580	mg/kg	M	8.6E-06	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.5E-03
	Vanadium	17.3	mg/kg	17.3	mg/kg	M	9.5E-08	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	5.3E-04
	Zinc	342	mg/kg	342	mg/kg	M	1.9E-06	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	6.2E-06
	(Total)												4.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	8.4E-02

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1nn Child Resident RME Soil at Property 30417
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30417
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8210	mg/kg	8210	mg/kg	M	1.0E-01	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.0E-01
	Antimony	11.5	mg/kg	11.5	mg/kg	M	1.5E-04	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	3.7E-01
	Arsenic	6.5	mg/kg	6.5	mg/kg	M	8.3E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.8E-01
	Barium	312	mg/kg	312	mg/kg	M	4.0E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	2.0E-02
	Cadmium	5.5	mg/kg	5.5	mg/kg	M	7.0E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	7.0E-02
	Cobalt	17.8	mg/kg	17.8	mg/kg	M	2.3E-04	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.6E-01
	Iron	19100	mg/kg	19100	mg/kg	M	2.4E-01	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	3.5E-01
	Lead	1071	mg/kg	1071	mg/kg	M	1.4E-02	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1580	mg/kg	1580	mg/kg	M	2.0E-02	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	1.4E-01
	Vanadium	17.3	mg/kg	17.3	mg/kg	M	2.2E-04	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	3.2E-02
	Zinc	342	mg/kg	342	mg/kg	M	4.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.5E-02
	(Total)												2.1E+00
Dermal	Aluminum	8210	mg/kg	8210	mg/kg	M	2.9E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.9E-03
	Antimony	11.5	mg/kg	11.5	mg/kg	M	4.1E-06	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	6.9E-02
	Arsenic	6.5	mg/kg	6.5	mg/kg	M	7.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-02
	Barium	312	mg/kg	312	mg/kg	M	1.1E-04	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	8.0E-03
	Cadmium	5.5	mg/kg	5.5	mg/kg	M	2.0E-07	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	7.9E-03
	Cobalt	17.8	mg/kg	17.8	mg/kg	M	6.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-02
	Iron	19100	mg/kg	19100	mg/kg	M	6.8E-03	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	9.8E-03
	Lead	1071	mg/kg	1071	mg/kg	M	3.8E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1580	mg/kg	1580	mg/kg	M	5.7E-04	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.0E-01
	Vanadium	17.3	mg/kg	17.3	mg/kg	M	6.2E-06	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	3.4E-02
	Zinc	342	mg/kg	342	mg/kg	M	1.2E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.1E-04
	(Total)												2.8E-01
												Total Hazard Index Across All Exposure Routes/Pathways	2.4E+00

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1nn Child Resident CTE Soil at Property 30417
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30417
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8210	mg/kg	8210	mg/kg	M	3.7E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.7E-02
	Antimony	11.5	mg/kg	11.5	mg/kg	M	5.1E-05	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	1.3E-01
	Arsenic	6.5	mg/kg	6.5	mg/kg	M	2.9E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	9.7E-02
	Barium	312	mg/kg	312	mg/kg	M	1.4E-03	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	7.0E-03
	Cadmium	5.5	mg/kg	5.5	mg/kg	M	2.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.5E-02
	Cobalt	17.8	mg/kg	17.8	mg/kg	M	8.0E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.7E-01
	Iron	19100	mg/kg	19100	mg/kg	M	8.5E-02	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.2E-01
	Lead	1071	mg/kg	1071	mg/kg	M	4.8E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1580	mg/kg	1580	mg/kg	M	7.1E-03	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	5.1E-02
	Vanadium	17.3	mg/kg	17.3	mg/kg	M	7.7E-05	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	1.1E-02
	Zinc	342	mg/kg	342	mg/kg	M	1.5E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.1E-03
	(Total)												7.5E-01
Dermal	Aluminum	8210	mg/kg	8210	mg/kg	M	4.1E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.1E-04
	Antimony	11.5	mg/kg	11.5	mg/kg	M	5.8E-07	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	9.6E-03
	Arsenic	6.5	mg/kg	6.5	mg/kg	M	9.8E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.3E-03
	Barium	312	mg/kg	312	mg/kg	M	1.6E-05	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	1.1E-03
	Cadmium	5.5	mg/kg	5.5	mg/kg	M	2.8E-08	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	1.1E-03
	Cobalt	17.8	mg/kg	17.8	mg/kg	M	8.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.0E-03
	Iron	19100	mg/kg	19100	mg/kg	M	9.6E-04	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	1.4E-03
	Lead	1071	mg/kg	1071	mg/kg	M	5.4E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	1580	mg/kg	1580	mg/kg	M	7.9E-05	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	1.4E-02
	Vanadium	17.3	mg/kg	17.3	mg/kg	M	8.7E-07	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	4.8E-03
	Zinc	342	mg/kg	342	mg/kg	M	1.7E-05	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.7E-05
	(Total)												3.9E-02
												Total Hazard Index Across All Exposure Routes/Pathways	7.9E-01

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1oo Adult Resident RME Soil at Property 30448
Calculation of Non-Cancer Hazards, Reasonable Maximum Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30448
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	766	mg/kg	766	mg/kg	M	1.0E-03	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	766	mg/kg	766	mg/kg	M	4.2E-05	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day

Table 7.1oo Adult Resident CTE Soil at Property 30448
Calculation of Non-Cancer Hazards, Central Tendency Exposure
WASHINGTON COUNTY LEAD DISTRICT RI/FS

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Property 30448
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	4.0E-04	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.0E-01	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	766	mg/kg	766	mg/kg	M	3.7E-04	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-01	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-03	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
Dermal	Aluminum	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	NC
	Antimony	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	6.0E-05	mg/kg-day	NA	NA	NC
	Arsenic	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Barium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.4E-02	mg/kg-day	NA	NA	NC
	Cadmium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	2.5E-05	mg/kg-day	NA	NA	NC
	Cobalt	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	NC
	Iron	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	7.0E-01	mg/kg-day	NA	NA	NC
	Lead	766	mg/kg	766	mg/kg	M	4.2E-06	mg/kg-day	NA	mg/kg-day	NA	NA	NC
	Manganese	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	5.6E-03	mg/kg-day	NA	NA	NC
	Vanadium	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	1.8E-04	mg/kg-day	NA	NA	NC
	Zinc	--	mg/kg	--	mg/kg	M	NC	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	NC
	(Total)												NC
												Total Hazard Index Across All Exposure Routes/Pathways	NC

Notes:
EPC Selected for Hazard Calculation: (M) Medium Specific.
Route EPC Value = Medium EPC Value.
NA = not available
-- = not analyzed
NC = not calculated
mg/kg = milligrams per kilogram
mg/kg-day = milligrams per kilogram - day