FIRST FIVE-YEAR REVIEW REPORT FOR

WASHINGTON COUNTY LEAD DISTRICT – OLD MINES SUPERFUND SITE

WASHINGTON COUNTY, MISSOURI

Prepared by

U.S. Environmental Protection Agency
Region 7
Lenexa, Kansas

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LIST OF ABBREVIATIONS & ACRONYMS

ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
COC	Contaminant of concern
EBL	Elevated blood lead
EPA	U.S. Environmental Protection Agency
FYR	Five-Year Review
HHRA	Human Health Risk Assessment
ICs	Institutional Controls
IQ	Intelligence quotient
IROD	Interim Record of Decision
ISA	Integrated Science Assessment
MoDNR	Missouri Department of Natural Resources
NPL	National Priorities List
NTP	National Toxicology Program
O&M	Operation and Maintenance
OU	Operable Unit
PA/SI	Preliminary Assessment/Site Inspection
ppm	parts per million
RA	Remedial action
RAL	Remedial action level
RAO	Remedial action objectives
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSE	Removal Site Evaluation
TBC	To be considereds
TCRA	Time-Critical Removal Action
µg/L	micrograms per liter
µg/dL	micrograms per deciliter
UU/UE	Unlimited use and unrestricted exposure
WCLD	Washington County Lead District
XRF	X-ray fluorescence

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy to determine whether the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 C.F.R. §300.430(f)(4)(ii)), and considering EPA policy.

This is the first FYR for the Washington County Lead District (WCLD) – Old Mines Superfund Site. The triggering action for this statutory review is the on-site construction start date of the OU1 remedial action. The FYR has been prepared because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of five OUs. OU1 addresses residential soils and will be the only OU addressed in this FYR. The four OUs that are not addressed in this FYR are:

- OU2 – Groundwater, as it remains in the remedial investigation/feasibility study (RI/FS) phase without a Record of Decision (ROD); an Interim Record of Decision (IROD) is scheduled for completion in 2022.
- OU3 – Mine Waste, as it started the RI/FS process in September 2019; a ROD is scheduled for completion in 2025.
- OU4 – Surface Water and Sediment, as it started the RI/FS process in September 2019; a ROD is scheduled for completion in 2025.
- OU5 – Railroad Lines, as it was added as an operable unit on April 28, 2021.

The WCLD – Old Mines Superfund Site FYR was led by Katy Maynard, EPA Remedial Project Manager (RPM). Participants included:

- Mihai Lefticariu, Project Manager, Remedial Project Management Unit, Superfund Section, Missouri Department of Natural Resources (MoDNR)
- Steve Sturgess, EPA RPM
- Kristen Nazar, EPA Region 7 Office of Regional Counsel
- Elizabeth Kramer, EPA Community Involvement Coordinator
- Randy Brown, EPA Hydrogeologist
- Venessa Madden, EPA Ecological Risk Assessor
- Todd Phillips, EPA Human Health Risk Assessor

The review began on November 10, 2020.

Site Background

The WCLD – Old Mines Site covers an area of approximately 90 square miles in the northeastern portion of Washington County, Missouri, approximately 70 miles south of St. Louis. A site map is

included in Appendix B. The Site includes any media impacted by heavy metals related to historical mining and milling activities.

This Site is located within the Old Lead Belt, where heavy metal mining has occurred since the early 1700s and industrial mining has occurred since the 1800s. This area is one of the world's largest lead mining districts, having produced more than nine million tons of pig lead. It is estimated that some 250 million tons of mill waste tailings and chat were produced in the Old Lead Belt from ore milling and beneficiation processes. The chat has been used extensively as aggregate for ballast in railroads, aggregate in concrete and asphalt, and construction fill. Tailings have been used as agricultural amendments due to the lime content.

Continuous lead mining began in Washington County in 1721 at the surface and near-surface (typically ten feet or less below ground surface) in an area north of Potosi, Missouri. Galena, the main lead ore, was mined in both the red clay residuum, which generally ranged in thickness from a few feet to over 30 feet, and the underlying dolomite bedrock. Originally, the predominant method of mining was hand-mining and cleaning of ore from small pits and shafts in the residuum resulting in spacing between pits and shafts for mine stability. The Missouri Geological Survey reported that the density of surface lead mining in Washington County was extensive. In 1799, deeper mining began in the county, and by the late 1800s a large number of mines penetrated the dolomite bedrock to 100 feet below ground surface (bgs) or deeper.

Barite (barium sulfate), another local mineral, became valuable after the Civil War and barite mining began to boom in the area in 1926. Most of the barite was mined from the residuum. Many of the subsequent large, mechanized barite mining operations reworked lands that had previously been hand-mined since there was often barite ore in the undisturbed space between the pits and shafts generated from earlier surface lead mining. Remnants of mining activities throughout the area include strip mines, mineshafts, mine dumps, tailings areas, small smelters, tailings ponds and associated dams. Generally, large tailing piles from either lead or barite mining or both were not created within the Site area since the waste rock was placed back in the existing pits. However, there are some tailings piles, numerous tailings impoundments, associated dams, and leachate ponds associated with the more recent barite mining. Limited investigation of these tailings has shown primarily lead levels present above residential, health-based screening levels. No human-made clay liners are known to be present beneath these tailings. These deposits may have contaminated soil, sediments, surface water, and groundwater. These materials also may have been transported by wind and water erosion or manually relocated to other areas throughout the county.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Washington County Lead District – Old Mines		
EPA ID: MON000705027		
Region: 7	**State:** MO	**City/County:** Old Mines / Washington County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** No

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Katy Maynard
Author affiliation: EPA Remedial Project Manager
Review period: 11/10/2021 - 4/29/2021
Date of site inspection: 3/24/2021
Type of review: Statutory
Review number: 1
Triggering action date: 4/19/2017
Due date *(five years after triggering action date)*: 4/19/2022

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The human health risk assessment (HHRA), completed in February 2010 by the EPA, identified lead as the primary contaminant of concern (COC) for soil. Arsenic and colbalt were also identified as COCs in residential soil. The primary threat to human health from residential property soils at the Site is through ingestion (by mouth) of lead-contaminated soil.

Response Actions

In 2005, the EPA and MoDNR conducted a Pre-CERCLIS Screening Assessment and a Preliminary Assessment/Site Inspection (PA/SI). The Pre-CERCLIS Screening Assessment focused on a general qualitative assessment of the Site, while the PA/SI evaluated sampling data to assess the impact of contamination on nearby human health and the environment. Thirty-five of 71 residential properties were found to have lead in soil at concentrations exceeding the EPA residential screening level for lead in soil of 400 ppm.

In 2006, the EPA initiated a Removal Site Evaluation (RSE) that continued to evaluate residential properties for metals contamination in yard soil. The RSE was completed in February 2009, after time-critical removal actions (TCRAs) were initiated at the Site. A total of 242 out of 889 residential properties sampled were identified with a soil lead concentration exceeding 400 ppm during the RSE. Subsequent soil sampling conducted after the RSE brought these totals up to 292 out of 980 residential properties with soil lead contamination exceeding 400 ppm.

As part of the site investigations described above, groundwater sampling of private drinking water wells was conducted. During investigation at this Site, groundwater samples were collected from 856 privately-owned drinking water wells for analysis of lead, cadmium, barium, and arsenic. Lead was detected in 116 samples at concentrations above the remedial action level (RAL) of 15 micrograms per liter (µg/L). Cadmium was detected in 8 samples at levels that exceeded the RAL of 5 µg/L. Barium was detected in 11 samples at concentrations that exceeded the RAL of 2,000 µg/L.

In December 2005, the EPA formally approved commencing a TCRA at the Site. The objective of the removal action was to eliminate or reduce potential ingestion exposure of lead and other heavy metals to residents from drinking water and/or soil. Alternative drinking water (e.g., bottled water or a filer) was offered to residences where drinking water exceeded the federal drinking water standards for lead, arsenic, barium, and cadmium. Additionally, from commencement of the TCRA to approval of the ROD, the EPA has excavated, removed, and replaced lead-contaminated soils and/or wastes from approximately 62 properties where soil lead concentrations exceeded 1,200 ppm, and those properties where soil lead concentrations exceeded 400 ppm where there was known to be a child 84 months of age or younger with an elevated blood lead (EBL) level greater than 10 micrograms per deciliter (µg/dL).

In September 2011, the EPA signed a ROD for the cleanup of lead-contaminated residential property soils at the Site.

The removal action objectives (RAOs) for the remedy selected are:

- Reduce the risk of exposure of young children (under seven years old) to lead such that an individual child or group of similarly exposed children have no greater than a 5 percent chance of exceeding a blood lead level of 10 µg/dL.
- Remove residential surface soils contaminated with lead exceeding 400 ppm and arsenic exceeding 22 ppm.

The remedy components for the remedy selected are:

- Excavation and removal of surface soil above 400 ppm lead to soil with lead below 400 ppm or to a depth of 12 inches. A visual marker barrier will be placed at the base of 12-inch excavations where lead levels are at or exceed 1,200 ppm.
- Clean fill and topsoil replacement along with revegetation
- Disposal of excavated soil at a repository
- Vacuum cleaner distribution
- Health education
- Institutional Controls (ICs)

Status of Implementation

The selected remedy for OU1 is ongoing. While sampling of properties is ongoing, a total of 1,526 properties have been sampled throughout the Site. Each property is sampled following the guidance in the Lead Handbook (EPA, 2003). All samples are analyzed with a field portable X-ray fluorescence (XRF) instrument, with 10% of the samples sent to a certified laboratory for confirmation and instrument-to-lab correlation. A total of 582 properties qualified for remediation. Approximately 70 properties have been remediated under a removal action.

The remedial action (RA) includes the excavation and disposal of lead-contaminated residential soils. Remedy implementation began on April 19, 2017, under an RA contract. A total of 193 properties have been remediated under an RA. An RA contract is currently ongoing. Excavated soils are transported to the Indian Creek Repository within the site boundaries for disposal. At 16 properties (8% of those remediated) where soil lead concentration remains greater than or equal to 1,200 ppm at 12 inches bgs, a highly visible, orange plastic warning barrier has been placed at the base of excavations to alert anyone accessing the subsurface of the remaining presence of contamination beneath the clean backfill. The EPA continues to develop the ICs for residential properties where contamination remains at depth.

The sampling of and remediation of residential properties is ongoing throughout the Site. The anticipated completion date of all residential yard remediation is 2037.

IC Summary Table

ICs are required on properties with greater than or equal to 1,200 ppm lead at 12 inches bgs and where surface contamination was left in place at the direction of the property owner. There are currently 16 properties that have visual barrier placed and are potentially subject to additional ICs. At present, there are no applicable zoning ordinances in Washington County for residential properties. The EPA has entered into a Cooperative Agreement with the Missouri Department of Health and Senior Services to provide health education along with the development and implementation of a Voluntary Institutional Control Program through the Washington County Health Department. Along with this effort, there are potential additional ICs and other informational tools that could be used. These may include the following:

- Establishing a registry of residential properties with soil lead concentrations greater than 1,200 ppm at 12 inches bgs, with barrier placed, with the Washington County Health Department.
- Evaluation of yards subject to the ICs during each FYR to ensure the remedy remains protective.
- Homeowner, builder and developed education programs to establish best management practices, possibly including building permitting, that address proper handling and disposal of heavy metal soil contamination to prevent contamination of clean properties and re-contamination of remediated properties.

Per the 2011 ROD for the Site, further evaluation of additional measures such as deed restrictions and notices, restrictive covenants, or easements will be considered, if necessary, with collaboration among property owners, local citizens, county and state governments/officials.

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soil	Yes	Yes	Residential properties with lead concentrations remaining ≥ 1,200 ppm at 12 inches bgs and/or surface soils remaining ≥ 400 ppm.	Restrict excavation deeper than 12 inches at impacted parcels and/or manage the handling/disposal of this soil.	To be determined. The EPA will work with the local governments to establish the preferred ICs.

Systems Operations/Operation & Maintenance

Operation and maintenance (O&M) activities for the OU1 residential property remedy are limited to review and verification of IC effectiveness. Since the ICs are not yet in place, the EPA periodically inspects completed properties to assure that the soil/rock cover remains protective. The EPA will draft the O&M plan and work in collaboration with MoDNR. O&M will consist of maintaining the protectiveness of the remedy, and will include ensuring ICs are properly continued, maintained, and remain effective upon final development.

III. PROGRESS SINCE THE LAST REVIEW

This is the first FYR for the Site. With continual access attempts for sampling and remediation and work occurring within the Site, there is routine communication with the public.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by an ad placed in the local newspaper, The Independent Journal, on 2/4/2021, stating that there was a FYR ongoing and inviting the public to submit any comments to the EPA.

An additional ad will be placed in the local newspaper to inform the public about the completion of the FYR process. The results of the review and the report will be made available at the site information repository located online at: https://www.epa.gov/superfund/washingtoncountyoldmines.

No interviews were conducted as part of the FYR.

Data Review

Since the remedy is under construction, environmental data is collected and analyzed to determine whether site cleanup levels have been met. Data is evaluated as it is collected from each residential property. A total of 1,526 residential properties have been sampled to date. Each property is sampled

following the guidance in the Lead Handbook (EPA, 2003). All samples are analyzed with a field portable XRF instrument, with 10% of the samples sent to a certified laboratory for confirmation and instrument-to-lab correlation. Of the 1,526 residential properties sampled, a total of 582 qualified for remediation, or approximately 38% of the sampled properties. Starting in 2006, EPA RAs remediated approximately 70 residential properties. From 2017 to 2021, the EPA RAs remediated 193 properties for a total of 263 residential properties. At the current planned rate of sampling and cleanup, the EPA anticipates it will take more than 15 years to finish the cleanup of OU1.

Site Inspection

The inspection of the Site was conducted on March 24, 2021. In attendance were Katy Maynard, EPA, and Mihai Lefticariu, MoDNR. The purpose of the inspection was to assess the protectiveness of the remedy.

On March 24, 2021, the EPA and MoDNR assessed the current conditions of several properties throughout the Site. The assessment of current conditions involved visual inspection of the areas of the property that were remediated. Two of the properties assessed had minimal barrier exposed. At one of the properties, the barrier was exposed where the driveway and a yard cell met between the residence and a well head. This may have been brought to the surface if work was done on the water line from the well to the residence. At the other of the two properties where minimal barrier was exposed, the barrier was exposed at the base of a tree. It is common around trees for the full depth of excavation not to occur so to not cause harm to the tree; instead as much material as possible is excavated. The barrier was likely placed on top of existing roots making it shallow and easy for the barrier to become exposed. The remedy is considered intact at this property. At the remaining property assessed, there was what appeared to be barrier at the surface. However, it was not connected to anything and there was no evidence of disturbance to the property such that barrier would have been brought to the surface. It is unknown whether this piece of orange plastic mesh was part of the barrier placed. The remedy is considered intact at this property.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

The OU1 remediation work is ongoing. Of those properties where work has been completed, the remedy is functioning as intended. The EPA continues to work with the state and local governments to establish the preferred ICs for this OU.

At the Site, 1,526 residential properties have been sampled for lead contamination, and of the of 582 properties that qualified 263 have been cleaned up since work began in 2006. A total of 27 properties were transferred from WCLD – Richwoods Site to the WCLD – Old Mines Site for remediation. Nineteen of these properties were transferred due to a property owner denying access or not being able to be contacted. This work is ongoing, and the EPA will continue to sample and remediate properties with greater than 400 ppm of lead in soil, and place institutional controls on any properties with lead levels remaining at or above 1,200 ppm at depth. In the future, the EPA will work with property owners and local municipalities in an attempt to place ICs on properties with lead levels remaining at or above 1,200 ppm at depth.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

The cleanup levels selected for the Site were 400 ppm lead and 22 ppm arsenic in residential soils. The cleanup level for lead was derived based on the 1994 and 1998 soil lead guidance documents (EPA, 1994, 1998), which identify 10 µg/dL as the blood lead level of concern. Since the 1994 and 1998 guidance documents were completed, comprehensive reviews of the updated human health scientific literature have been presented in the National Toxicology Program (NTP) Monograph on Health Effects of Low-Level Lead (NTP, 2012), the EPA's Integrated Science Assessment (ISA) for Lead (EPA, 2013), and the Agency for Toxic Substances and Disease Registry's (ATSDR) Toxicological Profile for Lead (ATSDR, 2020). As described below, these publications demonstrate sufficient evidence of significant adverse health effects in young children at blood lead levels below 5 µg/dL. If the blood lead level of concern is revised to a value less than 10 µg/dL, the resulting cleanup level for lead in soil that is based on human health risks to a child receptor would be lower than the value currently listed in the ROD.

The residential soil clean-up level for lead at this Site has been determined to be within the range that is protective of ecological receptors that would utilize residential environments. This conclusion is based on modeled risks to wildlife, which includes sensitive ecological receptors, such as the American Robin. Robins are common migratory songbirds in residential areas that tend to be highly exposed to contaminated soil due to ingestion of soil invertebrates. Because robins are a sensitive ecological receptor, other wildlife species that are less sensitive should also be protected.

Changes in Standards and TBCs

For lead in soil, the EPA's Office of Solid Waste and Emergency Response Directives 9355.4-12 (EPA, 1994) and 9200.4-27P (EPA, 1998) were identified as federal chemical-specific To Be Considered (TBC) guidance documents. However, since 1994 and 1998 when those documents were issued, increasing evidence has shown that blood lead levels below 10 µg/dL may also have negative health impacts. Comprehensive reviews of the updated human health scientific literature are presented in the NTP Monograph on Health Effects of Low-Level Lead (NTP, 2012), the EPA's ISA for Lead (EPA, 2013), and the ATSDR Toxicological Profile for Lead (ATSDR, 2020). As described below, these publications demonstrate sufficient evidence of significant adverse health effects in young children at blood lead levels below 5 µg/dL.

In 2012, the NTP Monograph (NTP, 2012) examined the degree of evidence for adverse health effects at blood lead levels of 5 µg/dL and 10 µg/dL, and found sufficient evidence of many different types of health effects at both levels. The NTP concluded, "*In children,* there is *sufficient* evidence that blood lead levels <5 µg/dL are associated with increased diagnosis of attention-related behavioral problems, greater incidence of problem behaviors, and decreased cognitive performance as indicated by (1) lower academic achievement, (2) decreased intelligence quotient (IQ), and (3) reductions in specific cognitive measures." Further, the NTP found "*sufficient* evidence that blood Pb levels <5 µg/dL are associated with antisocial behavioral problems or actual criminal behavior in children from six to 15 years of age." For adults, the NTP found "*sufficient* evidence that blood Pb levels <5 µg/dL are associated with decreased renal function" and "*sufficient* evidence that maternal blood Pb levels <5 µg/dL are associated with reduced fetal growth." Although the evidence was less strong, the NTP also found associations of

blood lead levels <5 µg/dL with delayed puberty and decreased kidney function in children and with essential tremor in adults.

The EPA's 2013 ISA for Lead (EPA, 2013) states, "it is clear that lead exposure in childhood presents a risk; further, there is no evidence of a threshold below which there are no harmful effects on cognition from lead exposure." Although the ISA reports, "clear evidence of cognitive function decrements (as measured by Full Scale IQ, academic performance, and executive function) in young children (4 to 11 years old) with mean or group blood lead levels measured at various life stages and time periods between two (2) and eight (8) µg/dL," it is critical to note that there is not a threshold for toxicity somewhere between blood lead levels of 2 and 8 µg/dL. Rather, a "threshold for cognitive function decrements is not discernable from the available evidence." Although there are a greater number of studies available to support significant effects at 5 µg/dL, significant cognitive function decrements in children have been found at all levels examined, which in 2013, was as low as 2 µg/dL.

Most recently, based on literature searches from 2013 to 2019, the ATSDR's 2020 Toxicological Profile for Lead (ATSDR, 2020) reviewed 694 epidemiological studies that evaluated the health effects of lead in all organ systems. This updated Toxicological Profile concluded that "[f]or the most studied endpoints (neurological, renal, cardiovascular, hematological, immunological, reproductive, and developmental) effects occur at the lowest blood lead studied (≤5 µg/dL)." Some of the more recent studies included in the Toxicological Profile provide "supporting evidence that exposures to Pb may produce effects on cognitive function in populations whose blood lead are well below five (5) µg/dL and may extend to levels below one (1) µg/dL."

The cleanup level selected for the Site was 400 ppm lead in residential soils and was based on the 1994 and 1998 soil lead guidance documents (EPA, 1994, 1998) which identify 10 µg/dL as the blood lead level of concern. If the blood lead level of concern is revised to a value less than 10 µg/dL, the resulting cleanup level for lead in soil that is based on human health risks to a child receptor would be lower than the value currently listed in the ROD.

Changes in Toxicity and Other Contaminant Characteristics

Other than lead, for which increasing evidence supports a lower blood lead level of concern than was used at the time of the ROD, toxicity values for the other site chemicals of concern have not changed in a way that could impact remedy protectiveness.

Changes in Risk Assessment Methods

Changes in risk assessment methodology have occurred since the risk assessments were completed in 2010. For example, in May 2013, arsenic screening levels for ingestion of soil began to be calculated with the relative bioavailability factor of 0.6. Also, the EPA has completed an update of standard default exposure factors (EPA, 2014); thus, many of the exposure assessment input parameters in the original risk assessment are different than values currently recommended. In addition, the Integrated Exposure Uptake Biokinetic Model for Lead in Children was recently updated and includes updated default input parameters (EPA, 2021). Nevertheless, these changes do not have a significant impact on the conclusions of the risk assessment.

Changes in Exposure Pathways

The EPA is not aware of any changes in land use, routes of exposure, contaminants, toxic byproducts, or physical site conditions.

Expected Progress Towards Meeting RAOs

The remedy is progressing towards meeting the RAO through ongoing remediation of residential properties. Under the RA for OU1, 193 properties have been remediated.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

The EPA is not aware of any additional information that could impact the protectiveness of the remedy at this time.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None.

Issues and Recommendations Identified in the Five-Year Review:	
OU(s): 1	**Issue Category: Institutional Controls**
	Issue: The EPA needs to develop an IC Plan as required for properties with residual lead concentrations greater than or equal to 1,200 ppm remaining at 12-inches bgs and for properties where access to sample and remediate cannot be gained during the RA.
	Recommendation: - Work with property owners to agree to enter into environmental covenants, file individual deed notices, and/or work with local governments to establish a registry of properties that meet the IC requirement. This will help inform the community leaders of the potential issue if properties are excavated deeper than 12 inches below ground surface for utility improvements, construction projects, etc. - Develop homeowner, builder and developed education programs, or create new building codes, to address heavy metal soil contamination and best management practices. - Per the 2011 Record of Decision for the Site, further evaluation of additional measures such as deed restrictions and notices, restrictive covenants or easements will be considered, if necessary, with collaboration among property owners, local citizens, county and state governments/officials.

Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA	EPA/State	11/22/2024

OU(s): 1	Issue Category: Institutional Controls			
	Issue: The EPA needs to implement ICs as required for properties with residual lead concentrations greater than or equal to 1,200 ppm remaining at 12-inches bgs and for properties where access to sample and remediate cannot be gained during the RA.			
	Recommendation: - Work with property owners to agree to enter into environmental covenants, file individual deed notices, and/or work with local governments to establish a registry of properties that meet the IC requirement. This will help inform the community leaders of the potential issue if properties are excavated deeper than 12 inches below ground surface for utility improvements, construction projects, etc. - Develop homeowner, builder and developed education programs, or create new building codes, to address heavy metal soil contamination and best management practices. - Per the 2011 Record of Decision for the Site, further evaluation of additional measures such as deed restrictions and notices, restrictive covenants or easements will be considered, if necessary, with collaboration among property owners, local citizens, county and state governments/officials.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA/State	11/22/2024

OTHER FINDINGS

In addition, the following is a recommendation identified during the FYR, but not does affect current and/or future protectiveness:

- There have been some changes to the current Center for Disease Control and Prevention acceptable reference value blood lead concentrations to be protective for child blood lead levels. Region 7 will examine the need to revise the soil cleanup levels based on updated EPA soil lead policy, if and when it is updated, and determine whether additional actions should be taken to further reduce the risk of future elevated blood levels in young children at the Site.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit:1	*Protectiveness Determination:* Will be Protective
Protectiveness Statement: The remedy at OU1 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities at residential properties completed to date have adequately addressed the soil exposure pathways that could result in unacceptable risk at the remediated residential properties.	

VIII. NEXT REVIEW

The next FYR report for the WCLD – Old Mines Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Reference List

ATSDR. 2020. Toxicological Profile for Lead. U.S. Department of Health and Human Services. August.

EPA. 1994. Memorandum: OSWER Directive: Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. Office of Solid Waste and Emergency Response. Washington, D.C. OSWER Directive 9355.4-12. August.

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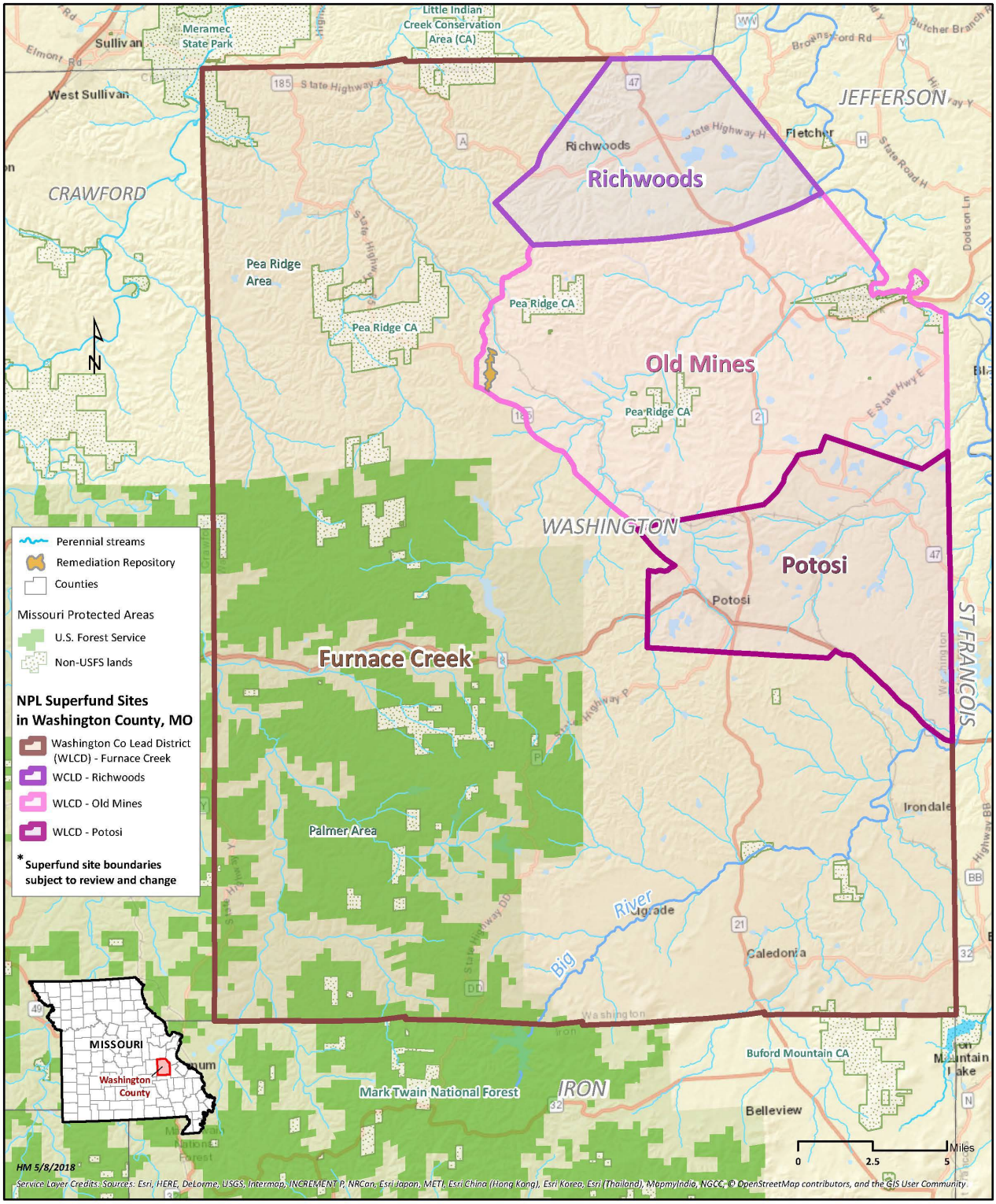
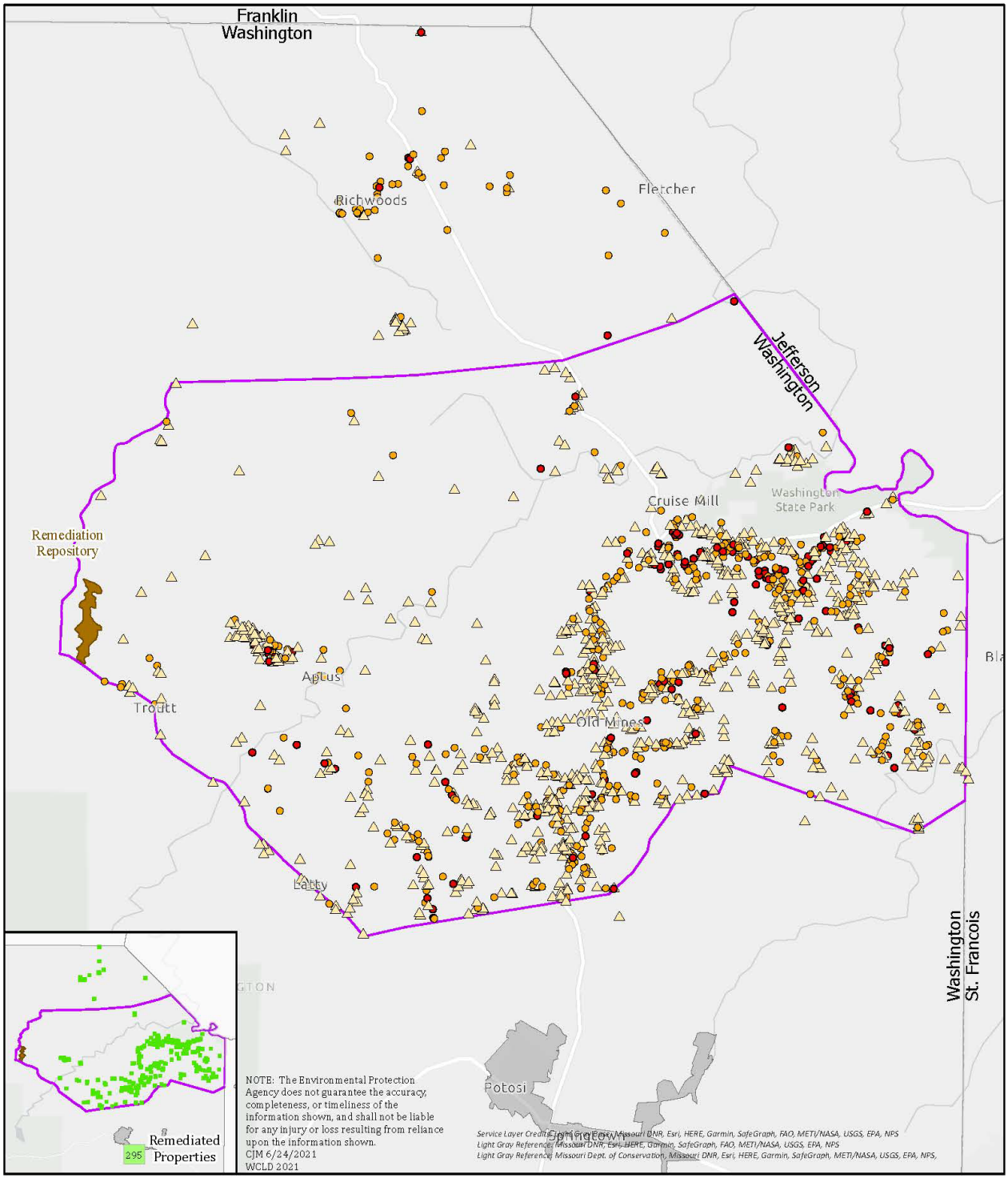
EPA. 2021a. Regional Screening Levels (RSLs) – User's Guide. <www.epa.gov/risk/regional-screening-levels-rsls>

National Toxicology Program (NTP). 2012. National Toxicology Program Monograph on Health Effects of Low-Level Lead. National Institute of Environmental Health Sciences. June.

APPENDIX B – SITE MAPS

Washington County Lead District NPL Sites Map





Data Sources:
Property Status: EPA 2021
Remediated Status: EPA 2021
Remediation Repository: EPA 2020

Highest Non-Drip
Lead Result (ppm)
1531 Sampled Properties

- < 400
- 400 < 1200
- > 1200
- Remediation Repository
- Old Mines Superfund Focus Area

0 1.75 3.5
Miles

EPA United States Environmental Protection Agency

Old Mines
National Priorities List Superfund Site
Washington County, Mo
July, 2021

APPENDIX C – SITE INSPECTION PHOTOGRAPHS

Photograph No.: 1	Photographer: Mihai Lefticariu	Date: 3/24/2021	A78K 30364 (10008 Oakleaf Rd)
	Direction: Facing Ground Surface	Time: 12:47 PM	Five-Year Review
Description: Barrier exposed approximately where the driveway and a yard cell met between the residence and a well head			

Photograph No.: 2	Photographer: Mihai Lefticariu	Date: 3/24/2021	A78K 30177 (11093 Cannon Mines Rd)
	Direction: Facing Ground Surface	Time: 1:15 PM	Five-Year Review
Description: Barrier exposed at the base of a tree			

APPENDIX D – PUBLIC NOTICE

PUBLIC NOTICE

FIRST FIVE-YEAR REVIEW STARTED
Washington County Lead District Superfund Site
Washington County, Missouri
February 2021

EPA Region 7: Iowa, Kansas, Missouri, Nebraska, and Nine Tribal Nations

The U.S. Environmental Protection Agency (EPA) Region 7 has started the First Five-Year Review for the Washington County Lead District – Potosi, Old Mines and Richwoods Superfund Sites. Five-Year Reviews are required by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) when hazardous substances remain on-site above levels that permit unrestricted use and unlimited exposure. Five-Year Reviews provide an opportunity to evaluate the site remedy to determine whether it remains protective of human health and the environment. This Five-Year Review Report should be completed by November 2021.

EPA has assessed the ability of the public to access its records through an internet-based repository and has determined that the local community has this ability. As a result, the Administrative Records are available through these websites (see Site Documents & Data):
www.epa.gov/superfund/washingtoncountypotosi
www.epa.gov/superfund/washingtoncountyoldmines
www.epa.gov/superfund/washingtoncountyrichwoods

Questions or requests for site information and/or the Five-Year Review process can be submitted to:

Pamela Houston
U.S. EPA Community Involvement Coordinator
Email: houston.pamela@epa.gov

U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard, Lenexa, KS 66219
Toll-free: 1-800-223-0425