



**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 300**

**[EPA-HQ-SFUND-2004-0004; FRL-10011-56-Region 7]**

**National Oil and Hazardous Substances Pollution Contingency Plan; National Priorities List: Deletion of the Annapolis Lead Mine Superfund Site**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Proposed rule; notice of intent.

**SUMMARY:** The Environmental Protection Agency (EPA) Region 7 is issuing a Notice of Intent to Delete the Annapolis Lead Mine Superfund Site (Site) located in Annapolis, Missouri, from the National Priorities List (NPL) and requests public comments on this proposed action. The NPL, promulgated pursuant to section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, is an appendix of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The EPA and the state of Missouri, through the Missouri Department of Natural Resources (MDNR), have determined that all appropriate response actions under CERCLA have been completed, other than operation and maintenance, monitoring and five-year reviews. However, this deletion does not preclude future actions under Superfund.

**DATES:** Comments must be received on or before **[insert date 30 days after date of publication in the Federal Register]**.

**ADDRESSES:** Submit your comments, identified by Docket ID no. EPA-HQ-SFUND-2004-0004, by one of the following methods:

- <https://www.regulations.gov>. Follow on-line instructions for submitting comments. Once submitted, comments cannot be edited or removed from Regulations.gov. The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (i.e. on the web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit <https://www.epa.gov/dockets/commenting-epa-dockets>.
- Email: [gunter.jason@epa.gov](mailto:gunter.jason@epa.gov) or [kramer.elizabeth@epa.gov](mailto:kramer.elizabeth@epa.gov)

- Phone: Public comment by phone may be made by calling Jason Gunter at (913) 551-7358, or Elizabeth Kramer at 913-551-7186.
- Written comments submitted by mail are temporarily suspended and no hand deliveries will be accepted. We encourage the public to submit comments via <https://www.regulations.gov>.

*Instructions:* Direct your comments to Docket ID no. EPA-HQ-SFUND-2004-0004. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at <https://www.regulations.gov>, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information through <https://www.regulations.gov> or email that you consider to be CBI or otherwise protected. The <https://www.regulations.gov> website is an "anonymous access" system, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to the EPA without going through <https://www.regulations.gov>, your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the

Internet. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

*Docket:* All documents in the docket are listed in the <https://www.regulations.gov> index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in the hard copy. Publicly available docket materials are available either electronically in <https://www.regulations.gov>.

The EPA is temporarily suspending its Docket Center and Regional Records Centers for public visitors to reduce the risk of transmitting COVID-19. In addition, many site information repositories are closed and information in these repositories, including the deletion docket, has not been updated with hardcopy or electronic media. For further information and updates on EPA Docket Center services, please visit us online at <https://www.epa.gov/dockets>.

The EPA continues to carefully and continuously monitor information from the Centers for Disease Control and Prevention (CDC), local area health departments, and our Federal partners so that we can respond rapidly as conditions change regarding COVID.

**FOR FURTHER INFORMATION CONTACT:** Jason Gunter, Remedial Project Manager, U.S. Environmental Protection Agency, Region 7 office, SEMD/LMSE, 11201 Renner Boulevard, Lenexa, Kansas 66219; (913) 551-7358; email: gunter.jason@epa.gov.

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**I. Introduction**

The EPA Region 7 is proposing to delete the Annapolis Lead Mine Superfund Site (Site) from the National Priorities List (NPL) and is requesting public comment on this proposed action. The NPL constitutes appendix B of 40 CFR part 300, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which the EPA promulgated pursuant to section 105 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended. The EPA maintains the NPL as the list of sites that appear to present a significant risk to

public health, welfare, or the environment. Sites on the NPL may be the subject of remedial actions financed by the Hazardous Substance Superfund (Fund). As described in 40 CFR 300.425(e) (3) of the NCP, sites deleted from the NPL remain eligible for Fund-financed remedial actions if future conditions warrant such actions.

The EPA will accept comments on the proposal to delete this Site for thirty (30) days after publication of this document in the *Federal Register*.

Section II of this preamble explains the criteria for deleting sites from the NPL. Section III of this preamble discusses procedures the EPA is using for this action. Section IV of this preamble discusses the Site and demonstrates how it meets the deletion criteria.

## **II. NPL Deletion Criteria**

The NCP establishes the criteria the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425(e), sites may be deleted from the NPL where no further response is appropriate. In making such a determination pursuant to 40 CFR 300.425(e), the EPA will consider, in consultation with the state, whether any of the following criteria have been met:

- i. Responsible parties or other persons have implemented all appropriate response actions required;

ii. All appropriate Fund-financed response under CERCLA has been implemented, and no further response action by responsible parties is appropriate; or

iii. The remedial investigation has shown that the release poses no significant threat to public health or the environment and, therefore, the taking of remedial measures is not appropriate.

Pursuant to CERCLA section 121(c) and the NCP, the EPA conducts Five-Year Reviews (FYRs) to ensure the continued protectiveness of remedial actions where hazardous substances, pollutants, or contaminants remain at a site above levels that allow for unlimited use and unrestricted exposure. The EPA conducts such FYRs even if a site is deleted from the NPL. The EPA may initiate further action to ensure continued protectiveness at a deleted site if new information becomes available that indicates it is appropriate. Whenever there is a significant release from a site deleted from the NPL, the deleted site may be restored to the NPL without application of the hazard ranking system.

### **III. Deletion Procedures**

The following procedures apply to deletion of the Site:

(1) The EPA consulted with the state of Missouri before developing this Notice of Intent to Delete.

(2) The EPA provided the state of Missouri 30 working days for review of this document prior to publication of it today.

(3) In accordance with the criteria discussed above, the EPA has determined that no further response is appropriate.

(4) The state of Missouri, through MDNR, has concurred with deletion of the Site from the NPL.

(5) Concurrently with the publication of this Notice of Intent to Delete in the *Federal Register*, a notice is being published in a major local newspaper, the Mountain Echo, in Ironton, Missouri. The newspaper notice announces the 30-day public comment period concerning the Notice of Intent to Delete the Site from the NPL.

(6) The EPA has placed copies of documents supporting the proposed deletion in the deletion docket and has made these items available for public inspection and copying at the Site information repositories identified above.

If comments on this document are received within the 30-day public comment period, the EPA will evaluate and respond appropriately to the comments before making a final decision to delete. If necessary, the EPA will prepare a Responsiveness Summary to address any significant public comments received. After the public comment period, if the EPA determines it is still appropriate to delete the Site, the Regional Administrator will publish a final Notice of Deletion in the *Federal Register*.

Public notices, public submissions, and copies of the Responsiveness Summary, if prepared, will be made available to interested parties and in the Site information repositories listed above.

Deletion of a site from the NPL does not itself create, alter, or revoke any individual's rights or obligations. Deletion of a site from the NPL does not in any way alter the EPA's right to take enforcement actions, as appropriate. The NPL is designed primarily for informational purposes and to assist EPA management. Section 300.425(e)(3) of the NCP states that the deletion of a site from the NPL does not preclude eligibility for future response actions, should future conditions warrant such actions.

#### **IV. Basis for Site Deletion**

The following information provides the EPA's rationale for deleting the Site from the NPL:

##### *A. Site Background and History*

##### *i. Site Location and Geography*

The Site is listed under CERCLIS ID MO0000958611 and is located east of Annapolis, Iron County, Missouri, on the east side of Iron County Road (ICR) 138 approximately three eighths of one mile north of Missouri State Highway (Highway) 49. The geographic coordinates of the Site are latitude 37°21'40" N and longitude 90°40'30" W. The Site is located on the Des Arc,

Missouri Quadrangle 7.5-Minute Topographic Map in sections 13 and 14, township 31 North, range 3 East.

The Site is situated on relatively rugged terrain that slopes westward toward Sutton Branch Creek. The Site is largely forested except for the chat/tailings area, and the road cut for ICR 138. The land surrounding the Site is predominantly forested, with limited agricultural production and isolated residential properties within 1,000 meters of the Site.

The Site consists of three operable units (OUs). OU1 is defined as the Sutton Branch Creek floodplain from the Probable Point of Entry (PPE) to the confluence with Big Creek and includes the historical mining area. OU2 is defined as Big Creek from the mouth of Sutton Branch Creek downstream to the confluence with the St. Francois River, which is a total of approximately 20 miles of stream. OU3 is defined as the town of Annapolis.

OU1 includes the historical mining area and the Sutton Branch Creek Floodplain. The total area of OU1 is approximately 200 acres. Prior to the removal action, the dominant feature of the Site was a chat/tailings residue pile that covered approximately 10 acres in the northern portion of the Site. The pile was composed of grey- to tan-colored material that resembled fine-grained sand. The material was highly erodible, resulting in steep-sided features and an outwash area that

fanned westward to Sutton Branch Creek, which flows north to south on the west side of ICR 138. The chat/tailings residue dominated the substrate of Sutton Branch Creek for approximately 0.75 mile, where Sutton Branch Creek merged with Big Creek. Tailings originating at the Site could be seen as greyish creek bed sediments in Sutton Branch Creek and in portions of the flood plain.

OU2 includes Big Creek from the confluence with Sutton Branch Creek to the residential soil in the town of Annapolis. The EPA sampled OU2 in 2006 and 2007 and determined that no remedial action was necessary to ensure protection of human health and the environment. A No Action Record of Decision (ROD) for OU2 was issued on June 28, 2007.

OU3 is located in Southern Iron County in the Old Lead Belt of southeast Missouri. OU3 covers the town of Annapolis. Lead mining occurred near the town from approximately 1919 to 1940. The EPA signed a ROD for OU3 on June 29, 2007. The EPA determined that the CERCLA action necessary for OU3 was to remove lead contamination from the driveway of one residence. The lead contamination in the property's driveway exceeded 400 parts per million (ppm), the EPA screening level for lead. The driveway was removed and taken by dump truck to the existing lead-contaminated-material repository at OU1. The contaminated

driveway was replaced with uncontaminated gravel. No additional remedial response action is necessary for OU3.

The Iron County area is within the St. Francois Mountains Physiographic Province of Missouri. Geologically, this area is characterized by lower Paleozoic carbonates and siliciclastics onlapping the Precambrian highland mass. Faults cutting basement and Paleozoic rocks are responsible for much of the Mississippi Valley-type mineralization present in the vicinity of the Site. Stratigraphy associated with completed groundwater wells includes unconsolidated valley alluvium typically 20-25 feet thick, and the underlying Cambrian sandstones and dolomites. Cambrian formations within 4 miles of the Site include, in descending stratigraphic order, Potosi, Derby-Doerun, Davis, Bonne Terre, and Lamotte. The Potosi Formation is moderately permeable and is a medium to massively bedded dolomite. The Davis Formation is comprised of a shale and dolomite sequence with low permeability; however, vertical jointing facilitates localized movement of groundwater. The Bonne Terre Formation has several facies and lithologic changes and is quite permeable; it also contains the area's lead deposits. In the vicinity of the Site, the Bonne Terre Formation rests upon the Precambrian basement rocks.

On-site soils are mainly dark brown, Midco cherty silt loam, typically found on 0- to 3-percent slopes downgradient of upland areas. Typically, the surface layer is dark brown cherty

loam approximately 7 inches thick. Below this to a depth of 60 inches or more are brown strata of very cherty sandy loam and extremely cherty sandy loam. In some areas, the dark surface layer is more than 10 inches thick. Excessively drained areas, including sandy soils mainly composed of chat with gravel bars, are near or in the stream channels. Permeability is moderately rapid in the Midco soil, and surface water runoff is slow. The available water capacity is low.

ii. Former Use and History of Contamination

Galena ore (lead-bearing ore) was mined from the Site beginning in the 1920s. Mining activities continued sporadically until 1940. The mine had one shaft to 450 feet below the ground surface (BGS) with several hundred feet of lateral shafts to work the ore bodies. In addition to mining the ore, various equipment was used on site to crush and mill the ore to concentrate the lead. Annapolis Lead Company, a now-defunct company, owned/operated the mine from 1919 to 1931, when the majority of ore was extracted. Production figures from 1923 to 1931 indicated that approximately 1,173,000 tons of mining waste containing elevated metals was generated during that time period. The Ozark Lead Mining Corporation, a now-defunct company, owned the property from 1931 to 1934 but apparently did not conduct mining activities. Basic Metals Mining Corporation, also now defunct, owned the mine from 1934 to 1941 and conducted

mining activities for a short time between 1938 and 1940 (no production figures were located for that time period).

Apparently, no mining occurred on site after that time. American Waste Material Corporation owned the property for several months in 1942 then sold the property to H. Hoffman, Fred S. Fuld, and J. J. Rubenstein, who deeded their rights to St. Joseph Lead Company in 1952. In 1982, St. Joseph Lead Company sold the surface rights to Larry W. and Oneta Mayberry, but retained the mineral rights until 1987. The Doe Run Company has owned the mineral rights from 1987 until present. From 1982 through the present, the surface rights to various tracts within the Site were conveyed to several owners.

Site features included numerous former mining operation buildings, located primarily in the northern portion of the Site. Most of the buildings have deteriorated to where only foundations are present. An exception is a single story of a once multi-storied structure near the center of the Site, which was last used as a residence in 1997. Mining refuse, including boulder-sized chunks of waste rock, is interspersed among the former buildings.

### iii. Sampling and Removal Activities

MDNR collected sediment and surface water samples near OU1 in September 1992. The analyses showed sediments in Sutton Branch Creek contained elevated lead, copper, nickel, and zinc

concentrations. Lead levels in the creek water were near threshold concentrations for safe drinking water and protection of aquatic life, as established by Missouri water quality standards at that time. The state of Missouri conducted no source area sampling of sediment, soil, surface water, or groundwater.

The EPA's contractor conducted a Screening Site Inspection in June 1996, collecting data primarily on background information, waste and source sampling, groundwater exposure pathways, surface water exposure pathways, soil exposure pathways, and air exposure pathways. Results of this report were documented in the Removal Assessment.

In March 1997, the EPA collected dust and wipe samples from the then-existing on-site residence, and an X-Ray Fluorescence Spectrometer (XRF) was used to screen surface soils at the Site. Results from these samples, along with the results from blood-lead samples taken from the children living at the residence on the Site, were used in making a determination that individuals living on the Site were being adversely impacted. In May 1997, the EPA performed a removal action which resulted in the Iron County Division of Family Services relocating the children and their immediate family from the Site. The EPA completed an Expanded Site Inspection and Removal Assessment (ESI/RA) of the northern segment of the Site in February 1999. Data collected

during the ESI/RA indicated that the Site has had an impact on the environment, primarily through the surface water pathway.

A removal action was conducted in 2004, as discussed in further detail below. During this removal action, 152,868 cubic yards of lead-contaminated soil was excavated and placed in a repository constructed on site. The repository was capped and vegetated to prevent future exposure risk. Excavated areas were either backfilled or regraded to prevent ponding, and vegetated.

#### iv. NPL Listing

The Site was proposed for listing on the NPL on March 9, 2004 (69 FR 10646). It was listed on the NPL on July 22, 2004 (69 FR 43755) due to elevated levels of heavy metals, particularly lead, which were present throughout the Site. In addition, surface water bodies downstream of the Site contained elevated concentrations of site-related hazardous substances that could pose a threat to recreational fisheries and wetlands in the area.

#### *B. Remedial Investigation and Feasibility Study (RI/FS)*

##### i. Scope of Remedial Investigation

The Remedial Investigation (RI), with expanded sections on surface water, sediments, and soil, was completed in August 2005. The purpose of the RI was to determine the nature and extent of contamination. A Hydrology and Flood Plain Report was

conducted to evaluate the existing conditions and behavior of the Sutton Branch Creek flood plain.

The Contaminants of Concern included:

<b>Soil</b>	<b>Sediment</b>	<b>Surface Water</b>
Lead	Arsenic	Arsenic
Cadmium	Cadmium	Cadmium
Zinc	Lead	Lead
	Zinc	Zinc

Based on information collected during the RI along with historical documentation, four lead-contaminated source areas were delineated for assessment purposes: the heavily-eroded chat and tailings waste pile, the outwash area of the chat and tailings waste pile, the former mining operations area, and the mill slime pond. An estimated 51,677 cubic yards of lead-contaminated tailings, chat, and soil (above 500 mg/kg) were calculated for these four areas.

The RI concluded that thousands of cubic yards of mining waste (tailings) migrated to the Sutton Branch Creek floodplain via the surface water pathway. Waste management practices likely included dumping mining waste along a former railroad spur that was located in the western portion of the Site. To assess the extent of metals-contaminated soils and sediments at the Site, the EPA conducted an investigation of Sutton Branch Creek and the soils within its floodplain. The 100-year floodplain of

Sutton Branch Creek contains elevated lead concentrations, especially in the depositional areas south of Highway 49.

#### ii. Ecological Risk Assessment

In August 2005, the EPA prepared a baseline ecological risk assessment (BERA), which evaluated risk to aquatic and terrestrial systems at the Site. The BERA addressed risks to aquatic and terrestrial biota, or animal and plant life, by comparing the maximum measured concentrations of contaminants of concern (COCs) to ambient water quality criteria and conservative toxicity criteria.

The EPA determined that the principal threat for OU1 was the ecological risk to both the aquatic and terrestrial environments. Living organisms within both ecosystems had elevated exposure to mining-related metals, and the metals could cause adverse effects on some receptors in each ecosystem.

#### iii. Human Health Risk Assessment

In August 2005, the EPA also prepared a baseline Human Health Risk Assessment (HHRA). The HHRA evaluated current and potential future risks to human health associated with the presence of heavy metals, particularly lead, in soils, surface water, sediment, and groundwater at the Site.

Based on the results of field investigations and the HHRA, the EPA concluded that surficial lead residual contamination in the mine operations area was generally below levels of concern

for lead; however, hotspots exist under the 18" engineered soil cover in limited areas that could be associated with unacceptable exposures to lead. Unacceptable exposure could be realized for both future construction workers and future residents. In addition, lead exposures for recreational visitors to the floodplain soils could reach unacceptable levels, but lead exposures for recreational users to surface water and sediment in Sutton Branch Creek did not appear to cause unacceptable risk.

In addition, for all other COCs, cancer risks and non-cancer hazards for recreational exposures in the floodplain and creek fell within the acceptable risk range for cancer and noncancer hazards. These results suggested that recreational exposure to COCs other than lead may be in an acceptable range.

#### iv. Findings from Feasibility Study

The EPA screened the following alternatives in the Feasibility Study (FS):

- *Alternative 1:* No Further Action.
- *Alternative 2:* Phosphate Amendment of Flood Plain Soils with In-Stream Stabilization Techniques and Limited Sediment Removal.
- *Alternative 3:* Excavation of Sediments in Sutton Branch Creek.
- *Alternative 4:* Excavation of Sediments in Sutton Branch Creek and Soil Cap.

- *Alternative 5: Complete Source Removal and On-Site Disposal.*
- *Alternative 6: Complete Source Removal and Disposal in an Off-Site Landfill.*

After screening the alternatives, the EPA concluded that all of the action alternatives would result in significant reductions in metal loadings to surface water from floodplain sources. The EPA selected Alternative 2 as the preferred remedy for the Site.

### *C. Selected Remedy*

#### *i. Components of the Selected Remedy*

The selected remedy for OU1 included the following actions:

- Addition of phosphate to floodplain soils (away from the outer edge of the riparian zone) during the dry season to improve the density of vegetation and to reduce the bioavailability of lead to terrestrial receptors.
- Mining wastes in heavily forested, thickly vegetated areas, such as the riparian buffer, will not be subject to excavation, consolidation, or capping.
- Excavation of sediments from Sutton Branch Creek in pockets, or depositional areas. The amount of excavation will be determined during the Remedial Design (RD) phase.
- Placement of excavated sediments in the existing repository area and cap with a simple soil cover.

- Stabilization of the Sutton Branch Creek channel with large rock and/or other material to prevent washouts and stream channel meandering. The extent of stabilization will be determined during the RD phase.
- Implementation of institutional controls.
- Performance of annual monitoring to determine remedial effectiveness. The monitoring frequency will be evaluated to determine whether it should be more frequent or can be extended to periods beyond annual monitoring.
- MDNR will manage post-removal maintenance of the protective cover consistent with all federal and state laws.

ii. Remedial Action Objectives (RAOs)

1. RAOs for Soils and Source Materials

The RAOs for soils and source materials were based on the findings of the BERA and HHRA. These RAOs were designed to address the potential ecological risks associated with direct exposure to COCs in mine and mill wastes, and in the affected soils surrounding the wastes. Terrestrial vertebrates, specifically vermivores whose diet consists of earthworms and other soil-dwelling invertebrates, were identified as the receptors of concern based on the information from the BERA. Ecological risks associated with source material erosion (as sediment) and seepage/runoff were addressed in other RAOs. Due to these findings, the following RAO was developed:

Limit the exposure of terrestrial biota to COCs in surficial materials that would potentially result in excessive ecological risks associated with intake of site COCs.

The human health exposure routes were addressed at much of OU1. However, surficial contamination in the southern portion of OU1 could cause unacceptable exposures. Due to this minor risk, the following RAO was developed:

Limit human ingestion of COCs from on-site soils or source materials that would potentially result in cancer risks greater than  $10^{-6}$  (one in one million), non-carcinogenic hazard indexes greater than 1 (1 or lower means adverse noncancer effects are unlikely), or unacceptable blood lead levels that present human health risks.

## 2. RAOs for Surface Water and Sediment

Aquatic and terrestrial biota are exposed to COCs in surface waters or sediments derived from mill wastes. Site-specific, risk-based contaminant levels for aquatic biota have not been established for the Site. However, consensus-based sediment quality guidelines were used as reference material. Sediment with elevated COC concentrations may pose risks to benthic, or bottom-level, communities that live and feed in sediment deposits and benthic feeders that may ingest sediment. Applicable or relevant and appropriate requirements (ARARs) for sediments were not developed for the Site, but consensus-based

guidelines can be followed. Based on the discussion presented above, a surface water RAO and a sediment RAO have been developed. These RAOs address the interactions between source materials and surface waters and the potential exposure of aquatic biota to COCs from mill waste. The surface water and sediment RAOs are as follows:

a. Limit the exposure of aquatic biota to waters contaminated with COCs in Sutton Branch Creek in excess of chronic and acute Federal Ambient Water Quality Criteria (AQWC) for such COCs.

b. Limit the risks to aquatic biota by controlling erosion and transport of lead-contaminated mill wastes and sediments containing lead-contaminated mill wastes in classified perennial or state-listed ephemeral streams or rivers.

iii. Explanations of Significant Differences (ESDs)

1. September 9, 2008 Explanation of Significant Differences #1 (ESD #1)

The 2005 OU1 ROD included addition of phosphate to floodplain soils (away from the outer edge of the riparian zone) during the dry season to improve the density of vegetation and to reduce the bioavailability of lead to terrestrial receptors. The significant difference under ESD #1 was the exclusion of phosphate application as part of the remedy.

Since the signing of the 2005 OU1 ROD, pilot testing of phosphate application to residential soils was conducted in Region 7 and reductions in bioavailability were achieved by tilling phosphoric acid into the soil. A second finding of the pilot testing was that surface application of fertilizer-grade phosphate was ineffective in reducing bioavailability. This meant that to have an impact upon bioavailability, phosphoric acid would have to be tilled into the lead-contaminated riparian areas.

A vegetative cover reduces the potential for human exposure to lead in soils under the vegetation. Tilling up the established vegetation would, for at least the short term, increase the exposure potential to lead in such soils until regrowth of the vegetative cover. The efficacy of applying the phosphate fertilizer to the riparian areas as described in the ROD was reevaluated. The EPA, in consultation with MDNR, made the decision to leave the vegetation in place and omit the phosphate treatment because (1) the current vegetative cover was sufficient and removing it could cause more harm than good, and (2) surface application of phosphate fertilizer would not result in significant reductions in bioavailability of the lead in the target soils/sediments.

2. May 29, 2019 Explanation of Significant Differences #2 (ESD #2)

The 2005 OU1 ROD's selected alternative regarding institutional controls provided for the imposition of restrictive covenants or easements. The EPA determined that the voluntary environmental covenants described in the 2005 OU1 ROD were not obtainable due to property owners refusing to sign and record the environmental covenants. Therefore, the EPA determined that an alternative to environmental covenants was required. Under ESD #2, the EPA could record notices of contamination for each tract of contaminated land that did not have an environmental covenant.

The use of a notice of contamination differs significantly from the use of an environmental covenant described in the ROD. An environmental covenant can prohibit certain uses of a property and can also require that certain actions be taken, thus achieving all the ROD's objectives. A notice of contamination cannot prohibit or mandate certain uses or actions and only provides information that may inform human behavior. A notice of contamination may be effective in achieving the ROD's objectives of providing notice to prospective purchasers and occupants that there may be contaminants in the subsurface soils and groundwater and ensuring that future owners are aware of engineered controls put into place as part of the Site's

remedial action and under the prior removal action. Thus, by recording a notice of contamination with the Iron County recorder of deeds office, the goals of minimizing exposures to contamination remaining at OU1 and limiting the possibility of the spread of contamination may be achieved. The EPA also will conduct annual reviews of the deeds to ensure that the notices remain in effect.

In addition to the filing of notices of contamination, the EPA will conduct reviews every five years of the protectiveness of the remedy as required by section 121(c) of CERCLA. During these reviews, the EPA will again engage the owners of all properties where the notices of contamination have been recorded and attempt to gain landowner consent to the use of an environmental covenant. For properties that have been conveyed to new owners, the EPA will engage those new owners to determine whether they will agree to the use of environmental covenants. Due to the current impossibility of placing environmental covenants on all affected properties, the EPA determined that this is the most prudent and protective manner to address land use.

#### *D. Response Actions*

##### *i. Removal Action*

In September 2003, the EPA proposed a time-critical removal action for the Site. The goal of the removal action was to

identify, consolidate, and stabilize the lead-contaminated waste mine tailings on site. The time-critical removal action work began at the Site in May 2004. When the removal action began at the Site, settling basins were constructed to manage storm water runoff. Earth-moving equipment was used to form the tailings and contaminated soil into a mound in the middle of the ravine where the pile was originally located. All areas in the tailings pile vicinity that had a mean lead surface concentration greater than 1,000 ppm were delineated and excavated. Excavations proceeded to the lesser of a depth of 18 inches or until a lead level below 400 ppm was achieved. All excavated areas were backfilled with clean material (< 240 ppm lead) and excavated soil was consolidated into the on-site tailings pile. The tailings pile was graded and compacted with an engineered protective cover installed over the tailings. The protective cover consists of uncontaminated clay and topsoil, allowing for the establishment of vegetative cover.

#### ii. Remedial Action

The RI determined that additional actions were required after the completion of the Removal Action. The EPA developed the RD, which was reviewed by MDNR and approved by the EPA on June 14, 2007. Remedial action (RA) on-site construction commenced on July 25, 2007.

The following paragraphs describe the specific components of the selected remedy.

1. Erosion Work around the Repository and the Historical Mining Area

This included the area around the former mining area containing significant erosion. Work in this area was required to protect the integrity of the existing soil repository and to prevent further runoff into Sutton Branch Creek. The specific areas of work included the following:

- *Point of Entry (POE) Area:* Work at the POE Area included constructing the channel between the repository and the settling basin.
- *Borrow Area:* The Borrow Area was a major erosional area. It was stabilized to minimize future erosion. This included regrading, placement of rock for cover/erosion control, and diverting potential runoff around this area through channelization.
- *North Area Erosion:* This area was stabilized with rock to minimize future erosion.
- *North Hillside Erosion:* This area was regraded and stabilized with rock to minimize future erosion.

- *North Lower Erosion:* This area was regraded, covered with rock, and two benches were constructed to slow the water entering the Site.
- *Repository Drainage Extension:* This area consisted of an extension of the rock drainage around the perimeter of the existing repository, along with a 6-foot rock blanket around the inside perimeter of the drainage channel.

## 2. Additional Blanket on Northeast Side

This area required regrading and a rock blanket on the northeast side

## 3. Removal and Disposal of Sediment/Soil

The selected remedy included excavation and vacuum dredging of contaminated sediment from Sutton Branch Creek. Contaminated sediment in the depositional areas (pools) was removed to reduce the potential of downstream migration of contaminated sediment. Approximately 500 cubic yards (yd<sup>3</sup>) of contaminated sediment required removal.

The contaminated sediment was removed until the natural substrate was uncovered. The banks of excavated areas were stabilized as needed. To minimize disturbance of the natural substrate, the EPA used the most non-invasive technique to remove the fine sediment. The specific areas that required removal are:

- *POE Area:* This included the area where the mine runoff historically entered Sutton Branch Creek. The EPA removed approximately 115 yd<sup>3</sup> of sediment/floodplain soil and placed approximately 100 yd<sup>3</sup> of riprap to achieve stability. The removed sediment/soil was placed in the new repository cell.
- *Sycamore Tree Area:* This included the area of Sutton Branch Creek where a sycamore tree caused the east stream bank to erode. This tree was removed, and the east bank was stabilized. The EPA removed approximately 135 yd<sup>3</sup> of sediment/floodplain soil and placed approximately 100 yd<sup>3</sup> of riprap to achieve stability. The removed sediment/soil was placed in the new repository cell.
- *Beaver Dam Area:* This included the area of Sutton Branch Creek where a breached beaver dam was trapping sediment. The remnants of the beaver dam were removed along with the sediment on the east and west banks and in the channel. The EPA removed approximately 185 yd<sup>3</sup> of sediment/floodplain soil and placed approximately 60 yd<sup>3</sup> of riprap for stabilization. The removed sediment/soil was placed in the new repository cell.
- *Bridge Area:* this was the furthest downstream section (furthest southern point) of the project. This section required two separate removals: one preceding the other stream work and one following the other stream work. During the first

stage, approximately 40 yd<sup>3</sup> of sediment was removed from the large hole under the bridge using vacuum dredging and placed in the new repository cell. During the second stage, approximately 30 yd<sup>3</sup> of sediment was removed and placed in the new repository cell.

An on-site repository exists for disposal of the excavated sediment. Approximately 500 yd<sup>3</sup> of sediment was placed in the repository. The existing repository is located on the historical mine waste pile. The repository was constructed so that the contaminated sediment could be placed on the south side of the repository, thus greatly reducing the distance for contaminant transport. The new cell on the repository required approximately 300 yd<sup>3</sup> of clean fill to be placed on top of the contaminated sediment. The top 12 inches of this fill met the soil criteria in RD specifications and was properly graded, stabilized with jute mat, and vegetated using the criteria in the RD specifications. The vegetative cover has been inspected biannually since 2007 and has provided adequate erosion control.

Final inspection of the Site by the EPA and MDNR concluded that the soils RA had been conducted and completed in accordance with the soils RD plans and specifications; a punch list of additional work items was not needed. The remedy was complete with approval of the Final Closeout Report by the EPA and MDNR in September 2007.

### *E. Cleanup Levels*

After the RA construction was complete, the EPA began monitoring sediment, surface water, and macroinvertebrates in Sutton Branch Creek and Big Creek. This sampling was conducted biannually (each fall and spring) from 2007-2011 and was reduced to one sampling event during the second FYR, which occurred in July 2017. Sampling occurred at five different sites along Sutton Branch Creek and Big Creek. Data was collected for the following analytes in sediment and surface water: arsenic, cadmium, cobalt, copper, lead, nickel, and zinc.

A historic flooding event occurred in the greater Annapolis, Missouri, area on April 28-30, 2017. This flooding event dumped upwards of 15 inches of rain in a short period of time, resulting in widespread flooding. Numerous roads, bridges, and buildings were destroyed. Many roads were flooded through the event, including Highway 49 in Iron County. Several rivers reached major and historic levels. The U.S. Geological Survey Stream Gage #07037300 is located approximately 20 river miles downstream of the Site on Big Creek. The mean daily discharge at this gage from 2006 through 2016 was 272 cubic feet per second (cfs). The highest peak flow from 2006 through 2016 was 23,800 cfs, which occurred on March 18, 2008. In late April of 2017, during the record-breaking flood, the gage recorded a peak flow of 17,400 cfs on April 29, and a peak flow of 27,500 cfs on

April 30. The discharge on April 30 was the highest event ever recorded since the gage has been in operation, which began in 2006.

Post-flooding site inspections indicated that the flooding event washed chat tailings from the floodplain into Sutton Branch Creek and depositional areas around sampling site 3 (Sutton Branch Creek 500 feet downstream of the Highway 49 bridge). During the RA, the pool located below the Highway 49 bridge was remediated using excavation as well as a vacuum truck. This is a major depositional area. The EPA and MDNR have visually monitored this area two times per year. Over the last ten years, the lead concentration at sampling site 3 has been elevated; however, the lead levels that were discovered (2,840 ppm) after the large flood in April 2017 exceeded the lead levels that were found prior to remediation. The EPA and MDNR have continued to monitor this area along with sampling site 5 (mouth of Sutton Branch Creek at confluence with Big Creek) to determine whether this is having an impact on Big Creek. The most recent sampling event was conducted on February 14, 2019, and the results for each sampling station are as follows:

- Sampling Site 3 (Sutton Branch Creek south of Highway 49 Bridge) - 438 ppm lead
- Sampling Site 5 (Mouth of Sutton Branch Creek at confluence with Big Creek) - 19 ppm lead

As seen in the most recent data set, sediment concentrations continue to decline at the monitoring stations. The EPA will continue to monitor these areas as part of the FYRs. Corrective measures may be taken if the levels do not continue to decrease over time.

#### *F. Operation and Maintenance*

##### *i. Ongoing and Completed Operation and Maintenance*

Approximately one month after construction, the EPA and MDNR inspected the Site to observe the condition of the cap, identify any erosional features, and assess the success of each remedial component. After inspection, the EPA and MDNR considered each of these areas construction complete, although several areas were identified where improvement was required. One major issue was the concern that erosion would occur where vegetation was not established. Therefore, the EPA and MDNR focused the majority of their efforts on revegetating the Site in 2008. Approximately 1,015 trees were planted, along with a site-specific seed mix, to help stabilize the Site. Additionally, the EPA and MDNR performed inspections every six months along with monitoring and maintenance activities. Some of the trees that were planted are now over 25 feet tall and the improved vegetation has stabilized the slopes and decreased sediment accumulation in the settling basin.

During the reporting period for the second FYR, one major area of concern was the north repository drainage channel. During high water events, the water would occasionally overflow the existing channel onto the surrounding area instead of down to the settling basin. Due to the concern of the water flowing out of the channel, MDNR performed maintenance activities in October 2012. MDNR modified the north repository drainage channel as well as the channel below the repository downgradient to the settling basin. The large rock that had been placed in the channel was pulled out to the channel edges. The filter rock was left in place within the channel. The goal was to allow additional flow through the channel down to the settling basin during high water events. The report of these activities is included in the second FYR. In June 2013, MDNR performed maintenance activities to repair a leak in the outlet pipe in the settling basin. The report of these activities is included in the second FYR.

During the reporting period for the third FYR, the northeast branch of the drainage channel around the tailings pile that washed out was repaired. MDNR developed engineered designs to repair the channel and construct a detention pond dam to reduce the flow velocity in the channel during high rainfall events. MDNR hired a contractor to perform the repairs. The contractor finished the repairs in April 2019.

## ii. Institutional Controls

Under the selected remedy, the EPA required implementation of institutional controls at properties where elevated lead concentrations remain on site. The EPA determined that 13 parcels were subject to the institutional controls. Two different mechanisms were used as part of the Site's Institutional Control Plan: environmental covenants and notices of contamination. On May 21, 2019, one of the 13 property owners recorded an environmental covenant with the Iron County Recorder of Deeds. On August 29, 2019, the EPA recorded notices of contamination regarding the 12 remaining properties with the Iron County Recorder of Deeds.

As discussed in depth above, the use of a notice of contamination differs significantly from the use of an environmental covenant described in the ROD, but still may be effective in achieving the ROD's objectives. Therefore, as documented in 2019, the EPA issued ESD #2 that provided for the EPA to record notices of contamination instead of entering into environmental covenants at the contaminated properties. The EPA also will conduct annual reviews of the deeds to ensure that the notices remain in effect.

In addition to the filing of notices of contamination, the EPA will conduct reviews every five years of the protectiveness of the remedy as required by section 121(c) of CERCLA. During

these reviews, the EPA will again engage the owners of all properties where the notices of contamination have been recorded and attempt to gain landowner consent to the use of an environmental covenant. For properties that have been conveyed to new owners, the EPA will engage those new owners to determine whether they will agree to the use of environmental covenants.

#### *G. Five-Year Reviews*

Statutory FYRs are required for the Site due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

Two FYRs have been conducted at the Site, the most recent being the Second FYR, which was completed on September 29, 2017. The protectiveness determination was Short-term Protective, and included the following protectiveness statement: The remedy currently protects human health and the environment because soils and sediments with elevated lead levels have been excavated or capped and no unacceptable exposures are occurring. In order to be protective in the long term, to reduce the potential for future risk, ongoing pursuit of the [institutional controls] must occur along with routine Operation and Maintenance indicative of an engineered soil cover. In order for the remedy to be protective in the long term, [institutional controls] should be implemented. Additional routine maintenance

of the eroded areas around the repository should be implemented to prevent future exposure.

Issues from the Second FYR included the following:

- Institutional Controls had not been implemented. The recommendation was to implement the institutional controls by 7/31/2018. **Please note:** The EPA implemented institutional controls on 9/13/2019.
- During the reporting period for the Second FYR, significant erosion had formed on the north end of the repository drainage channel. The recommendation was to repair the drainage channel by 7/31/2018. **Please note:** MDNR repaired the area in April 2019.
- A small amount of lead-contaminated sediment (less than 60 cubic yards) was deposited below the Highway 49 bridge in the pool that was excavated during the RA after the large flood in April 2017. The EPA and MDNR will continue to monitor this area along with the mouth of Sutton Branch Creek from 2018 to 2021. If this area continues to be elevated with COCs, further action may be taken to remove the sediment from the pool above sampling site 3. As these levels have significantly declined, no response is anticipated. **Please note:** This will be assessed during the third FYR.

#### *H. Community Involvement*

Before and during the RAs, the EPA held multiple public meetings on site. The EPA has updated the public regarding the FYRs by placing ads in the local newspaper, as well as updating the local information repository and the Site's webpage. Community involvement activities associated with the deletion will include making the notice of intent to delete available for public comment. In addition, the Region 7 Superfund Records Management Service Center will construct a special document collection that will include the listed document IDs for the deletion docket documents. This collection will be available for public review and is located on the Site's webpage and the Regulations.gov website.

#### *I. Determination that the Site Meets the Criteria for Deletion in the NCP*

In accordance with 40 CFR 300.425(e), EPA Region 7 finds that the Annapolis Lead Mine Site (the subject of this deletion action) meets the substantive criteria for deletion from the NPL. The EPA has consulted with and has the concurrence of the state of Missouri. All appropriate Fund-financed response under CERCLA was implemented, and no further response action by responsible parties is appropriate.

The implemented remedy at the Site has achieved the degree of cleanup specified in the ROD for all pathways of exposure. All selected RA objectives and associated cleanup levels are consistent with agency policy and guidance. No further Superfund response is needed to protect human health and the environment.

**List of Subjects in 40 CFR Part 300**

Environmental protection, Air pollution control, Chemicals, Hazardous substances, Hazardous waste, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Superfund, Water pollution control, Water supply.

**Authority:** 33 U.S.C. 1251 *et seq.*

Dated: \_\_\_\_\_

July 2, 2020.

James Gulliford,  
Regional Administrator,  
Region 7.

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