SIXTH FIVE-YEAR REVIEW REPORT FOR ANACONDA CO. SMELTER SUPERFUND SITE DEER LODGE COUNTY, MONTANA

Prepared by

U.S. Environmental Protection Agency
Region 8
Denver, Colorado

BETSY SMIDINGER
Digitally signed by BETSY SMIDINGER
Date: 2020.09.25 16:33:33 -06'00'

Betsy Smidinger, Director
Superfund and Emergency Management Division

9/25/20

Date

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LIST OF ABBREVIATIONS AND ACRONYMS

ADLC	Anaconda-Deer Lodge County
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
ARCO	Atlantic Richfield Company
AROD	Amended Record of Decision
BLM	Bureau of Land Management
BMP	Best Management Practice
CDC	Centers for Disease Control and Prevention
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CPMP	Community Protective Measures Program
DPS	Development Permit System
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GIS	Geographic Information System
GWSWMS	Groundwater/Surface Water Management System
I&M	Inspection and Maintenance
IC	Institutional Control
ICIAP	Institutional Control Implementation and Assurance Plan
ICP	Institutional Controls Plan
IEUBK	Integrated Exposure Uptake Biokinetic
LTIM	Long-term Inspection and Maintenance
LRES	Land Reclamation Evaluation System
MCL	Maximum Contaminant Level
MDEQ	Montana Department of Environmental Quality
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
µg/dL	Microgram per deciliter
µg/L	Microgram per liter
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OM&M	Operation, Monitoring and Maintenance
OU	Operable Unit
POC	Point of Compliance
ppb	Parts per Billion
PRP	Potentially Responsible Party
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RDU	Remedial Design Unit
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SHRC	Smelter Hill Repository Complex
TBC	To-Be-Considered Criteria
TI	Technical Impracticability
UU/UE	Unlimited Use/Unrestricted Exposure
USGS	United States Geological Survey
VMP	Vegetative Monitoring Plan

WLIP	Waste Left In Place
WMA	Waste Management Area

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if 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 (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the sixth FYR for the Anaconda Co. Smelter Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. 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).

EPA has decided in this report that the cleanup activities completed to date at the Anaconda Co. Smelter Superfund site are protective of current and potential land uses in these areas. For remediated areas and those areas where cleanups are planned, a program to inform and educate residents on ways to reduce exposure to potentially contaminated soils and dust is place. Operation, maintenance, and monitoring are being conducted at the Site that can identify potential issues and provide opportunities to address these issues in a timely manner.

Due to its vastness of size and diversified areas of remedial concern, EPA manages the Site in five operable units (OUs). This FYR Report addresses all five OUs. EPA further divided two of these OUs into subareas to make cleanup and long-term site management more efficient (Figure 1 and Figure 2).

Early in the remedial investigation screening process that began shortly after the Anaconda Smelter NPL Site was listed in 1983, several principal threat waste sources were identified at the Site. These were identified as Arbiter OU 12, Beryllium OU 9, and Flue Dust OU 11. In 1991, EPA issued a ROD for the Flue Dust OU. In 1991, EPA issued an Action Memorandum for the Arbiter and Beryllium OUs using CERCLA's removal authority.

Most of the requirements identified in the Flue Dust OU ROD and the Arbiter and Beryllium OUs Action Memorandum were completed years ago. However, the final long-term O&M requirements for these actions was deferred to OU4. These three repositories were grouped together as the Smelter Hill Repository Complex. Long-term Smelter Hill Repository Complex O&M will be developed, approved and implemented, and with the completion and implementation of a long-term O&M Plan, these three OUs will achieve all the remedial requirements for the ARWW&S OU. Specifically, the removal actions for the Arbiter and Beryllium OUs are now considered final remedial actions consistent with the ARWW&S OU remedy. Therefore, for the purposes of this FYR, OU9 and OU12 are not specifically assessed.

Summaries of the OUs are listed in the order that the responses in the OUs occurred:

- Mill Creek OU (OU15) – Former suburban community located adjacent to and downwind of the smelter complex.
- Flue Dust OU (OU11) – Byproduct of copper smelting containing very high levels of metals and arsenic, stockpiled at nine locations on and near Smelter Hill.
- Old Works/East Anaconda Development Area (Old Works OU) (OU7) – Historic milling and smelting

areas located immediately east of Anaconda, including former smelter properties conveyed from Atlantic Richfield to Anaconda-Deer Lodge County (ADLC) for redevelopment. These subareas include:
    - Historic structures
    - Golf course
    - West Industrial Area
    - East Industrial Area (includes Red Sands, Arbiter and sewage treatment facility)
    - East Anaconda Yards
    - Drag Strip
    - Mill Creek Addition
    - Aspen Hills
- Community Soils OU (OU16) – Soils and dust on residential and commercial properties and abandoned railroads in Anaconda, town of Opportunity and adjacent rural areas sitewide.
- Anaconda Regional Waste, Water and Soils (ARWW&S OU) (OU4) – All remaining contamination and impacts to surface water, groundwater, waste source areas and non-residential soils not cleaned up under other OUs. This OU includes the following subareas also referred to as remedial design units (RDUs):
    - Uplands
        - Stucky Ridge
        - Lost Creek
        - Smelter Hill and Cashman Concentrate
        - Mount Haggin
        - West Galen
        - North and South Opportunity
        - Fluvial Tailings
    - Anaconda Ponds
    - Active Railroads/Blue Lagoon
    - Opportunity Ponds
    - Warm Springs Creek
    - Slag
        - Main Granulated Slag Pile
        - West Slag Pile
        - Anaconda Landfill Slag
    - Old Works Surface Water and Groundwater
        - Surface reclamation for this area was conducted under OU7.
    - Smelter Hill Facility
        - Contains waste from the Beryllium (OU9) removal and the Arbiter (OU12) removal
    - Dutchman Wetland Area

EPA remedial project manager (RPM) Charles Coleman led the FYR. Participants included Montana Department of Environmental Quality (MDEQ) project manager Joel Chavez, and Ryan Burdge and Claire Marcussen from EPA FYR support contractor Skeo. The review began on 8/16/2019. Representatives from the potentially responsible party (PRP) Atlantic Richfield Company (ARCO) were notified of the initiation of the FYR. Appendix A lists the documents used to prepare this FYR Report. Appendix B provides a brief site chronology.

Site Background

The 300-square-mile Site is located in the southern end of Montana's Deer Lodge Valley basin and includes the towns of Anaconda and Opportunity (Figure 1). From 1884 to 1980, smelter operations and ore processing activities released metal contamination from smelter stack emissions and from large volumes of ore-processing wastes such as flue dust, mill tailings and furnace slag. The nearly 100 years of smelting and ore-processing resulted in airborne emissions of arsenic and metals (principally cadmium, copper, lead and zinc) into the environment over a large area. The releases contaminated the air and soil, and contaminants in waste and soil have leached to groundwater, which discharges to nearby surface water and sediment. The Site consists of residential, commercial, agricultural (crops), pasture, rangeland, forests, riparian and wetland areas impacted by former smelter operations.

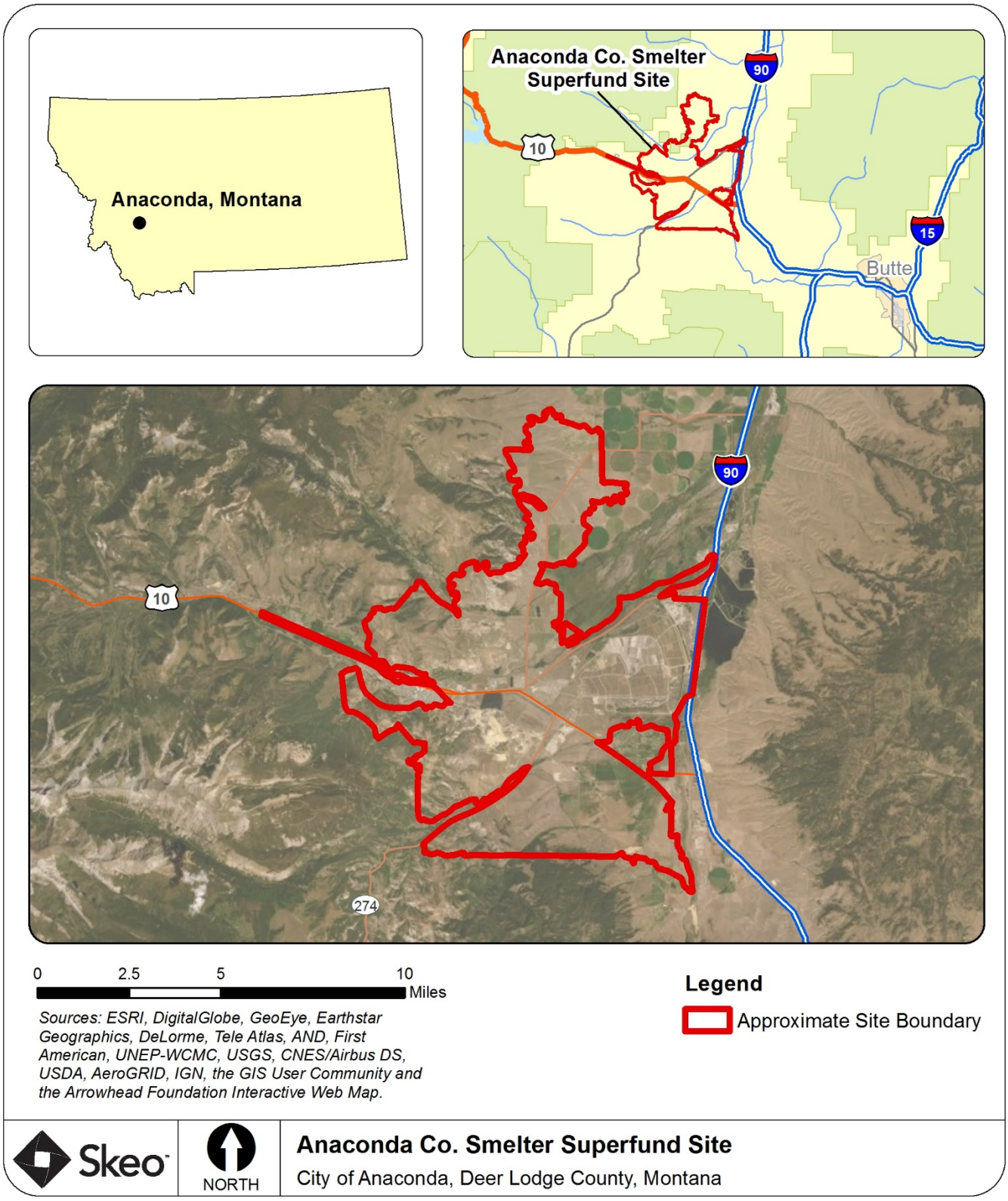
Most of the Site is in the valley, with steep slopes located in the mountainous areas at the western edge of the Site. The valley floor exhibits a gentle northeast-to-east slope direction toward the upper Clark Fork River. Five principal perennial streams (Lost Creek, Warm Springs Creek, Mill Creek, Willow Creek and Silver Bow Creek) intersect the Site and are tributaries of the Upper Clark Fork River System. The streams in the valley are classified for use as drinkable, swimmable and fishable. However, none of the streams is currently used for drinking water supplies. A portion of surface water flow in Mill Creek, Willow Creek, Warm Springs Creek, Silver Bow Creek, Lost Creek, and the Clark Fork River is dedicated to agricultural use through ditch irrigation.

Former site operations contaminated groundwater in the alluvial and bedrock aquifers. The alluvial aquifer underlies the floor of the southern Deer Lodge basin and is bounded laterally and vertically by the bedrock aquifer. Site groundwater occurs primarily in the alluvial aquifer as valley through-flow and as groundwater recharge from the surrounding bedrock aquifer of the steep mountains adjacent to the valley. Groundwater entering the alluvial aquifer generally flows in a direction perpendicular to the valley margin.

Water use in the area is controlled primarily by surface land ownership, water rights and major land use. Groundwater is used as water supply for irrigation in portions of the Site. Consumption is limited to domestic purposes from small-capacity water wells in the Aspen Hills subdivision on the back side of Smelter Hill, the community of Opportunity, and rural homes. The city of Anaconda is permitted for the use of groundwater and surface water from its public water supply; the wells and reservoirs are outside of and upgradient from the Site.

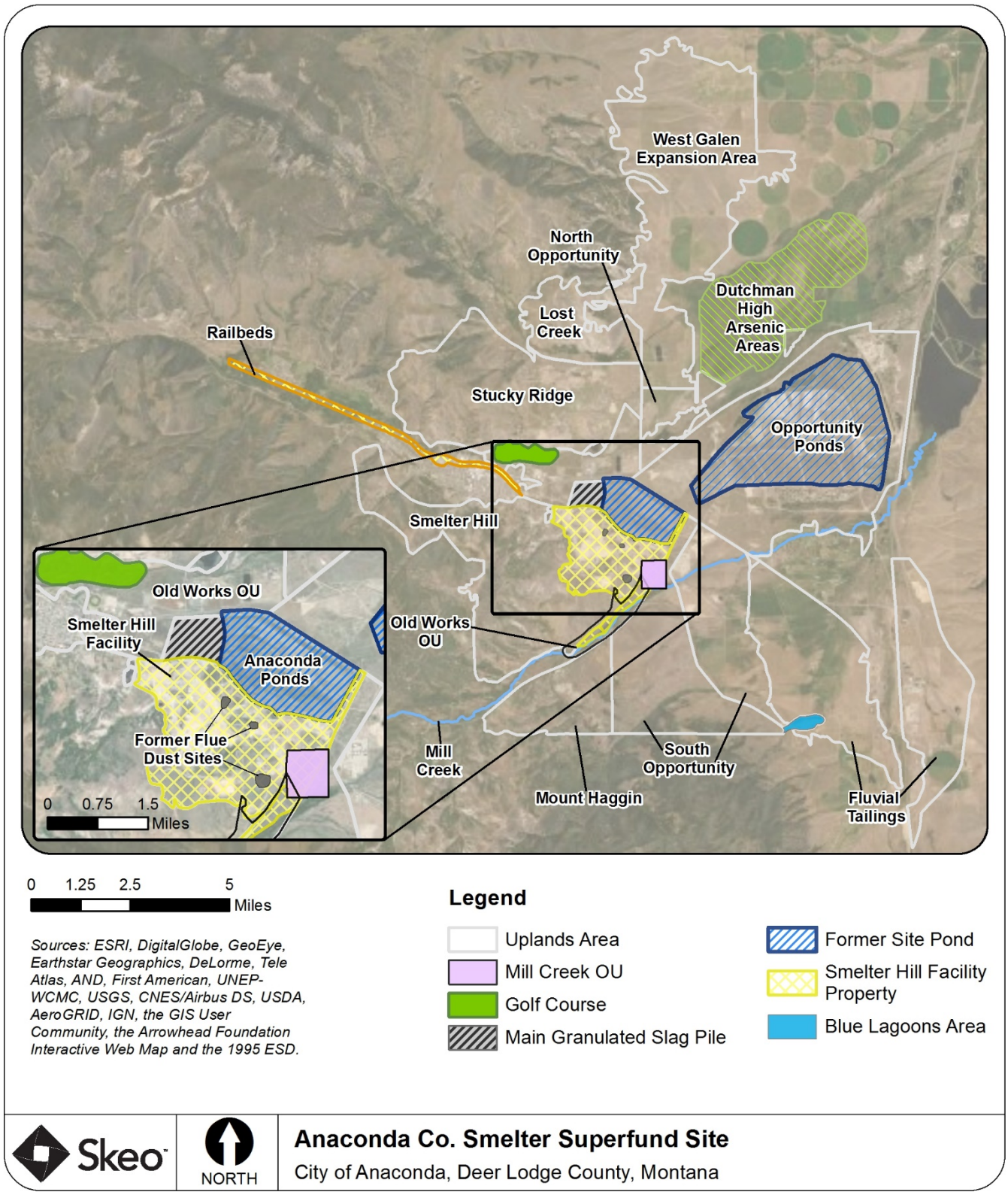
Starting in 1994, ARCO began reuse activities by turning 250 acres of the Site into a golf course, which opened to the public in 1997. More recently, dozens of new commercial developments have been created on remediated on-site properties, including a natural gas power plant, regional prison, a campus of excellence for the disabled and a Class III landfill. Thousands of acres of agricultural lands have been reclaimed and put back into productive use. Thousands of acres of former waste disposal sites have been capped and now provide wildlife habitat, including nearly 1,000 acres of new wetlands.

Figure 1: Site Vicinity



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 2: Site Areas



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FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Anaconda Co. Smelter		
EPA ID: MTD093291656		
Region: 8	**State:** MT	**City/County:** Anaconda/Deer Lodge
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the Site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA		
Author name: EPA RPM Charles Coleman with support from Skeo		
Author affiliation: EPA Region 8 and Skeo		
Review period: 8/16/2019 – 9/1/2020		
Date of site inspection: 10/9/2019		
Type of review: Statutory		
Review number: 6		
Triggering action date: 9/25/2015		
Due date *(five years after triggering action date)*: 9/25/2020		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action and Response Actions

Site Investigations and Removal Actions

Following the closure of smelting operations in September 1980, waste remained on site. The State and EPA were concerned over possible release of hazardous substances, primarily heavy metals, from the smelter wastes into surface water, groundwater, and air. The Anaconda Co. voluntarily entered into an agreement with EPA and the State for a study to identify and quantify hazardous materials at the smelter. Following the sampling and analysis of the results, EPA placed the Site on the Superfund program's National Priorities List (NPL) in September 1983 to address the contamination. EPA prioritized remedial response at the various OUs based on their potential risk to human health and the environment.

Mill Creek OU (OU15) - A child exposure study conducted in 1985 by the Center for Disease Control (CDC) and an endangerment assessment completed by ARCO in 1986 showed unacceptable human health risks to Mill Creek residents from exposure to fugitive dusts, soil and drinking groundwater contaminated from smelter operations. EPA considered the Mill Creek OU as the highest-priority OU requiring a response because environmental testing of the community and biological testing of preschool children demonstrated that contamination in the soils and

dust posed a current imminent and substantial endangerment to the health of community residents. EPA signed an Action Memorandum in 1986 to permanently relocate high-risk residents of Mill Creek and eliminate exposure to contaminated media containing arsenic. Between 1986 and 1987, EPA and the Federal Emergency Management Agency temporarily relocated residents of Mill Creek.

Flue Dust OU (OU11) - Flue dust, a byproduct of copper smelting, contains high concentrations of arsenic and heavy metals and was present at nine areas. The presence of flue dust stockpiled at nine locations on and near Smelter Hill triggered unacceptable environmental and future human health risks and posed a leaching concern to groundwater.

Old Works OU (OU7) - The 1994 risk assessment completed for the Old Works and East Anaconda Development areas showed that the current and future recreational and worker exposure to arsenic in soil could result in unacceptable risks. In addition, arsenic in soil was shown to be toxic to vegetation and wildlife and metals in Warm Springs Creek posed risks to aquatic ecological receptors. In 1991, EPA addressed the immediate concern of releases of contaminants to Warm Springs Creek and to human health through stabilization of the Red Sands adjacent to Warm Springs Creek, repair of breaks in Warm Springs Creek levees, and the installation of fencing to limit access to certain areas of the Old Works site.

Community Soils OU (OU16) - A 1996 risk assessment and additional sampling in 2002 and 2010 for the Community Soils OU showed unacceptable risks due to residential and worker exposure to arsenic and lead in soil.

ARWW&S OU (OU4) - The 1998 risk assessment for the ARWW&S OU identified potential impacts to surface and groundwater from soils and waste sources such as tailings and slag as well as human and environmental risks associated with arsenic-contaminated soils that have not been addressed by the other OUs. In addition, the 1998 risk assessment showed mining wastes could impact groundwater and surface water above regulatory criteria protective of human health and the environment for arsenic and heavy metals.

Table 1 lists site contaminants of concern (COCs) by media.

Table 1: Sitewide COCs, by Media

COC	Media				
	Flue Dust	**Soil and Indoor Dust**	**Mining Waste**	**Groundwater**	**Surface Water**
Arsenic	X	X	X	X	X
Beryllium				X	
Cadmium	X		X	X	X
Copper	X		X	X	X
Lead	X	X	X	X	X
Zinc			X	X	X
Notes: Blank = not a COC X = COC in the medium					

Remedial Actions

Remedy Selection

Mill Creek OU (OU15)

EPA selected an interim remedial action for the Mill Creek OU in the Site's 1987 Record of Decision (ROD) to provide permanent relocation of all Mill Creek residents and temporarily stabilize the area by consolidating debris from demolition activities on Smelter Hill. Final disposition of the demolition debris and the contaminated soils in Mill Creek will be addressed as part of the final remedy for the Site. EPA signed a ROD Amendment (AROD) in 1988 to correct several typographic errors in the 1987 ROD. No changes were made to the 1987 remedy.

EPA did not present formal remedial action objectives (RAOs), but the ROD and AROD identified the goal of the interim remedy to provide permanent protection for the health of current residents in Mill Creek community and interim protection of the health of future short-term visitors in the area. The ROD and AROD did not present cleanup criteria since the remedy was an interim remedy focused on eliminating exposure to current residents of the Mill Creek area and did not address the removal or remediation of contaminated soils. The 1988 Mill Creek OU interim remedy consisted of:

- Permanent relocation of all residents.
- Demolition of homes and buried foundations.
- Consolidation and disposal of debris in the Smelter Hill Waste Management Area (WMA).
- Restoration through regrading and revegetation.
- Monitoring and maintenance of vegetative cover.
- Implementation of institutional controls to restrict access and land use.

Flue Dust OU (OU11)

EPA selected the cleanup plan for this OU in the 1991 interim ROD to address flue dust at the nine discrete source areas on the Site through removal, treatment and containment.

EPA did not present formal RAOs, but the ROD identified the goal of the remedy to eliminate public health threats to current residents of the area. The 1991 ROD did not present numeric cleanup criteria for flue dust. The 1991 ROD provided general remedial goals of preventing exposure to treated flue dust waste and preventing the migration of contaminants out of the repository into underlying soils or groundwater. In addition, the 1991 ROD identified the remedial goal of treating the flue dust to render the material as nonhazardous.

The 1991 flue dust remedy consisted of:

- Removal and treatment via cement/silicate-based stabilization
- Disposal of treated residuals in an on-site engineered repository located in the Smelter Hill WMA
- Groundwater monitoring
- Implementation of institutional controls to limit site use and access
- Monitoring groundwater around the repository and to ensure the integrity of the cap

Old Works OU (OU7)

In 1994 EPA signed the ROD for OU7. In the ROD, EPA subdivided the OU into six subareas based on similarities of waste characteristics and present/future land uses:

- Historic Structures
- Golf Course
- West Industrial Area
- East Industrial Area (includes Red Sands, Arbiter, and sewage treatment facility)
- East Anaconda Yards (includes Benny Goodman Park)
- Drag Strip

EPA selected a combination of engineered covers, soil treatment, surface water runoff controls, and engineering and institutional controls as the long-term cleanup for the OU to address arsenic in soil, waste and debris. EPA issued an Explanation of Significant Differences (ESD) for this OU in 1995 that expanded the boundary of OU7 to include additional areas for remediation to the south along Mill Creek. The response action would allow economic development (i.e., construction of a golf course in the Old Works area). EPA issued an ESD in 2020. The Old Works Golf Course was envisioned to be a permanent dedicated development that would generate enough revenue to pay for monitoring, operations and maintenance of the remedy as well as golf course operations. However, golf use and revenues have not always made this a financially viable operation. As a result, EPA modified the remedy to describe the additional remedial actions that will be implemented in the event the Old Works Golf Course is no longer used as a golf course in the future. The ESD provides a conversion remedy for the Old Works Golf Course and describes institutional controls to be implemented by parties other than ADLC.

Table 2 provides a summary of the RAOs and remedy components along with the cleanup goals for arsenic.

Table 2: Old Works OU – RAOs and Remedy Components (OU7)

Media	RAOs	Remedy Components
Soil	• Reduce surface soil arsenic concentrations to acceptable levels. • Prevent direct human contact with waste materials exceeding acceptable levels. • Minimize infiltration and deep percolation of metal-laden pore water to groundwater. • Minimize erosion and metal loading via transport of waste and contaminated soil to Warm Springs Creek. • Preservation, to the extent practical, of historic features at the Site.	• Construct engineered covers over waste materials in recreational and potential commercial/industrial areas exceeding arsenic levels of 1,000 milligrams per kilogram (mg/kg) • Treat soils exceeding arsenic levels of 1,000 mg/kg in recreational and potential commercial/industrial areas using innovative revegetation treatment techniques. • Cover or treat soils exceeding arsenic levels of 500 mg/kg in current commercial/industrial areas. • Remediate potential future residential or commercial/industrial areas to the appropriate soil arsenic action levels through the ADLC Development Permit System (DPS). • Construct controls to manage surface water runoff from Stucky Ridge, Smelter Hill and throughout the OU. • Upgrade or repair levees adjacent to Warm Springs Creek to contain the 100-year peak flood event and prevent erosion of waste materials into Warm Springs Creek. • Replace bridges or culverts to ensure the safe passage of the 100-year peak flood event. • Preserve historic features. • Implement institutional controls to protect engineered controls and manage future land and water use. • Implement long-term monitoring.
Notes: Source: 1994 Old Works/East Anaconda Development Area ROD.		

Community Soils OU (OU16)

EPA selected the remedy for this OU in the 1996 ROD to address all remaining residential and commercial contaminated soils in Anaconda, Opportunity and the surrounding area. EPA signed an AROD in 2013 that expanded on the 1996 remedy by adding a cleanup level for lead in soils and cleanup levels for arsenic and lead in accessible interior dust with a complete exposure pathway, as well as the expansion of the institutional controls to provide for a health education program through the ADLC Community Protective Measures Program (CPMP). The remedy was further expanded in the 2017 ESD to ensure sampling and cleanup rely on a comprehensive health and education program, including an interior dust program in residential living spaces. In addition, the 2017 ESD modified the remediation depth for arsenic-contaminated soils.

EPA issued an ESD in June 2020 to further modify the remedy. Following the issuance of the 2017 ESD, ATSDR conducted an exposure investigation in Anaconda in 2018 and submitted a report with their findings and recommendations, on which EPA based changes to the Expand Attic Dust Cleanup through a Comprehensive Attic Dust Abatement Program. In addition, the ESD provides alternate institutional control programs to support the remedy if Anaconda-Deer Lodge County is unable to perform their IC programs. Although the 1996 Community Soils OU ROD identified the potential for contingency measures if the IC programs fail to achieve remedial requirements, it did not recognize that alternative ICs could be implemented by parties other than ADLC.

Table 3 provides a summary of the RAOs and remedy components and cleanup goals for arsenic and lead.

Table 3: Community Soils OU – RAOs and Remedy Components (OU16)

Media	RAOs	Remedy Components
Soil	• Reduce surface soil arsenic and lead concentrations in residential and commercial/ industrial areas to acceptable levels. • Prevent direct human contact with waste materials exceeding acceptable levels.	***Residential Soils*** • Remove soil arsenic above 250 mg/kg and lead above 400 mg/kg to a depth of 12 inches for on-site disposal in a soil management area and replace with clean soil and a vegetative or other protective barrier. • Treat or other measures (e.g., capping, tilling, liming) in areas where specific site conditions dictate that removal is not implementable. • Remediate future residential areas at the time of development exceeding the arsenic and lead action levels of 250 mg/kg and 400 mg/kg, respectively, through the ADLC DPS. • Develop an interior dust abatement program to sample and clean up interior dust exceeding the lead and arsenic concentrations of 400 mg/kg and 250 mg/kg, respectively, in all living spaces with a complete exposure pathway. ○ The 2020 ESD identifies a comprehensive long-term attic dust abatement program that would provide for attic dust cleanup. • Revise the Superfund Planning District where necessary. • Implement institutional controls to provide educational information to all residents describing potential risks, and recommendations to reduce exposure to residual contaminants in soils, and to ensure the long-term viability of this remedy. • Track information and data on lead concentrations/locations in the ADLC data base/Geographic Information System (GIS) for public access to be used by regulators, prospective home buyers, lenders, contractors and other interested parties. ***Commercial Soils*** • Remove soil arsenic above 500 mg/kg to a depth of 12 inches and replace with clean soil and a vegetative or other protective barrier. • Remediate future commercial or industrial areas at the time of development that exceed the arsenic action level of 500 mg/kg through the ADLC DPS. ***Railroad Beds*** • Construct engineered covers over all contaminated railroad bed material in the community of Anaconda. • Separate railbeds from residential and commercial/industrial areas with a barrier to restrict access to the railbed and to control surface runoff from the railbed using retaining walls and/or curbing. • Maintain existing institutional controls to restrict access.
Notes: *Sources:* The 1996 Community Soils ROD, the 2013 Community Soils AROD, and the 2017 Community Soils ESD.		

ARWW&S OU (OU4)

The final cleanup priority for the Site was to address all remaining contamination, including large volumes of wastes, slag, tailings, debris and non-residential soil (not cleaned up under other OUs), groundwater and surface water spread over 200 square miles of agricultural, pasture, rangeland, forests, riparian and wetland areas. EPA selected the cleanup plan in the 1998 ROD, then expanded the remedy and changed several remedy components in a 2011 AROD. EPA issued a ROD Amendment in June 2020 to provide for a fundamental change to the ROD consisting of an expansion of the amount of work to be completed in the upland areas north, west and south of Anaconda; a period of monitoring of surface water in that area after completion of the additional work; and waiver of certain state of Montana total recoverable surface water standards if those standards are not met after the technically practicable additional work is completed.

The 2020 ROD Amendment also provides for a significant change consisting of an alternative institutional control program to support the remedy if Anaconda – Deer Lodge County is unable to perform its institutional control program, as well as four additional minor modifications to the original remedy.

Table 4 provides a summary of the RAOs and remedy components for soil and waste, surface water and groundwater. The remedies for this OU also used the same cleanup goals established in previous OUs and included a soil cleanup goal for arsenic on the steep slopes (Table 5). The ARWW&S OU ROD also identified cleanup goals for surface water and groundwater (Table 6 and I-2). EPA determined groundwater and surface water restoration to be technically impracticable in certain areas and selected an alternative remedial strategy focused on exposure prevention and containment.

Table 4: ARWW&S OU – RAOs and Remedy Components (OU4)

Media	RAOs	Remedy Components
Soils and Waste	• Prevent direct contact with elevated arsenic concentrations. • Minimize surface water percolation and COC transport to groundwater. • Minimize surface water erosion and COC transport to surface water to meet water quality Applicable or Relevant and Appropriate Requirements (ARARs). • Minimize movement and wind erosion of COCs onto adjacent lands. • Reduce COC levels in waste and highly contaminated soils in order to allow reestablishment of vegetation. • Allow final closure of WMAs to be compatible with the existing and anticipated future land use with minimal future maintenance activities. • Meet state selective mine closure reclamation ARARs.	• Clean up future residential and commercial soils at the time of development that exceed soil cleanup goals through the ADLC DPS. • Soil cover or in-situ treatment to reduce surficial arsenic concentrations to below the designated arsenic action levels. • Establish vegetative covers over contaminated soil and waste. • Partially remove waste materials and place in a WMA with a soil cover and revegetate areas adjacent to streams. • Merge Old Works WMA and Old Works Wastes wastes-left-in-place (WLIP) areas into a larger Old Works WMA. • Merge Smelter Hill and Opportunity Ponds WMAs and the Triangle WLIP into Smelter Hill/Opportunity Ponds WMA. • Manage two high arsenic areas (concentrations 1,000 mg/kg to 2,500 mg/kg) to minimize human exposure where steep slopes prevent safe operation of conventional reclamation equipment (Smelter Hill) or where well-vegetated areas with wetlands and unique wildlife habitat are present (Dutchman Wetland Area). • Disposal of abandoned railroad wastes into a WMA. • Implement institutional controls and monitoring.
Surface Water	• Minimize source contamination to surface waters that would result in exceedances of state of Montana water quality standards. • Return surface water to its beneficial use by reducing loading sources of COCs.	• Reclaim contaminated soils. • Engineered stormwater management. • Selective source removal from fluvially deposited tailings and stream bank stabilization with placement. Place removed material within a designated WMA. • TI waiver of the arsenic human health standard for surface water to the chronic and acute aquatic life federal and state standards of 150 micrograms per liter (µg/L) and 340 µg/L, respectively, within the TI zone. • Implement institutional controls and monitoring.
Groundwater	• Return usable groundwaters to their beneficial uses wherever practicable within a timeframe. • Prevent further migration of the plume. • Prevent exposure to contaminated groundwater. • Minimize COC transport to the bedrock and alluvial aquifers.	*Alluvial and Bedrock Aquifers* - Monitor domestic wells and replace as needed for users within or adjacent to the TI zones (Figure K-1) to meet standards. *Alluvial Aquifers Underlying Portions of the Old Works and North and South Opportunity Subareas* • Soil covers and removal of sources. • TI waiver of the arsenic human health standard. • Railroad embankment removal above the Blue Lagoon. *Bedrock Aquifers and a Portion of the Alluvial Aquifer in the Old Works/Stucky Ridge and Smelter Hill Subareas* • TI waiver of the arsenic human health standard.

Media	RAOs	Remedy Components
		Portions of the valley alluvial aquifers underneath the Old Works/Stucky Ridge, Smelter Hill and Opportunity Ponds Subareas • Points-of-compliance (POC) monitoring at the perimeter boundary of the designated WMA. If contamination spreads beyond the WMA boundary, implement an analysis of contingency measures. • Construct a groundwater/surface water management system (GWSWMS) along a section of the D-cell dike of the Opportunity Ponds area to passively treat impacted groundwater. • Implement institutional controls and monitoring.
Notes: *Sources:* The 1998 ROD and the 2011 ROD Amendment for the Anaconda Regional Water, Waste and Soil OU.		

Table 5: Summary of Sitewide Soil Cleanup Goals (mg/kg)

COC	Residential Land Use	Commercial/Industrial Land Use	Recreational/Open Space/Agricultural	Steep Slope Soils
Arsenic[a]	250	500	1,000	2,500
Lead[b]	400	-	-	-

Notes:
a. Established in the 1998 ARWW&S OU ROD
b. Established in in the Community Soils 2013 OU ROD Amendment.
- = no cleanup goal established for this receptor.
mg/kg = milligrams per kilogram.

Table 6: ARWW&S OU Groundwater and Surface Water Cleanup Goals

COC	Surface Water (µg/L)[a]			Groundwater (µg/L)	
	State			State[b]	Federal[c]
	Aquatic Life - Acute	Aquatic Life - Chronic	Human Health	Human Health	
Arsenic	340	150	10[c]	10[d]	10[d]
Beryllium	None	None	4	4	4
Cadmium	2.13	0.27	5	5	5
Copper	14	9.33	1,000	1,000	1,300[e]
Iron	None	1,000	300	N/A	N/A
Lead	81.65	3.18	15	15	15[e]
Zinc	120	110	2,000	2,000	N/A

Notes:
a. The current surface water performance standards were established in the 2011 ROD amendment and are shown in Table I-2 along with the contingent replacement standards that are based on the current federal dissolved standards adopted under the 2020 ROD Amendment.
b. Montana Numeric Water Quality Standards – Circular DEQ-7. August 2010 and from Montana Numeric Water Quality Standards – Circular WQB-7. December 1995.
c. National Primary Drinking Water Regulations, U.S. Environmental Protection Agency, for maximum contaminant levels (MCLs), obtained from 40 C.F.R. Parts 141 and 142.
d. This standard is waived in the surface water and groundwater within the TI zones.
e. Action level for copper from 40 CFR § 141.51(b) and action level for lead from 40 CFR § 141.80(b).
µg/L = micrograms per liter.
Source: Table 3-1 of the 2011 ROD Amendment for the Anaconda Regional Waste, Waste and Soils OU.

Status of Implementation

The following sections provide a summary of remedies implemented at each OU.

Mill Creek OU (OU15)

EPA entered into a Consent Decree with ARCO in January 1988 to implement the permanent relocation remedy for Mill Creek residents (Figure C-1). The permanent relocation of residents was completed in the fall of 1988. Completion of the home demolition and site stabilization activities was completed in late 1988. Demolition debris and contaminated soils were disposed of on Smelter Hill. Foundations were buried on site and the area was regraded and vegetated. Fencing was installed along with signage to control access and maintain the vegetation. Adjacent contaminated soil areas (Mill Creek Triangle, Mill Creek Industrial Park, and the Aspen Hills Railroad Loop) were consolidated into the Old Works OU (Mill Creek Subarea) for further evaluation under the remedial investigation/feasibility study for that OU[1] while final reclamation of soils in the Mill Creek Addition (town site) area were addressed as part of the ARWW&S OU. Water issues (groundwater and surface water) were deferred to the ARWW&S OU.

Flue Dust OU (OU11)

EPA entered into a Consent Decree with ARCO to implement the flue dust remedy in December 1992. In December 1993, ARCO treated more than 500,000 cubic yards of flue dust from nine locations on and near Smelter Hill. ARCO placed the treated flue dust in an on-site repository meeting Resource Conservation and Recovery Act Subtitle C design requirements that include a bentonite/high-density polyethylene liner, leachate collection and detection system, cover soil and vegetation. ARCO completed the closure of the repository in November 1994 (Figure C-2). The flue dust repository is part of the Smelter Hill Repository Complex, which includes the Arbiter, Beryllium, 2004 Beryllium and Aspen Hills repositories. Following inspections of the remedial actions, EPA approved both an Interim Post-Closure O&M Plan and the Remedial Action Construction Completion Report for the Smelter Hill Repository Complex in 1996.

The previous FYR identified the issue that large volumes of contaminated leachate continue to be generated in the flue dust repository from seasonal shallow groundwater influx to the repository. In response to this issue, ARCO completed upgrades to the stormwater system and constructed a leachate collection and evaporation system in 2018 and 2019. The system recently underwent commissioning and trial operations in February 2020, which identified the need for two updates. The updates include a valve and additional instrumentation and controls equipment/appurtenances for the system prior to it becoming fully functional. The Remedial Action Completion Report for OU11 was signed on July 23, 2020.

Old Works OU (OU7)

AR implemented cleanup activities in 1994 by subarea (Figure C-3). Between 1994 and 1997, ARCO remediated arsenic-contaminated soils, graded, constructed eight sedimentation ponds to control surface water run-on to the Site from the adjacent uplands, and placed riprap along the banks of Warm Springs Creek to protect against erosion. ARCO constructed a soil cover and drainage controls at the Red Sands area located adjacent to the golf course from 1996 to 1998. This construction also included the reclamation of previously excavated Arbiter removal areas. ARCO constructed drainage controls at the East Anaconda Yards from 1997 to 1998. In 2004, additional hazardous waste materials and beryllium were discovered, and these materials were excavated and placed in a repository at Smelter Hill WMA. The Drag Strip soil remediation consisted of deep tilling and in-situ treatment (lime addition) and drainage controls, which ARCO began in late 1998 and completed in 1999. In 2007, ARCO covered several areas with soil and reseeded previously reclaimed areas at the Drag Strip Area due to slower than expected vegetation establishment. The Industrial Area contains privately-owned properties within the Old Works OU, including the Anaconda Industrial Park and the former Arbiter Plant. ARCO constructed engineered covers and drainage controls at the Industrial Area between 2002 and 2007.

[1] Since the anticipated land uses, site characteristics, and COCs are similar to areas in the Old Works OU, the Mill Creek OU areas (Aspen Hills Addition, repositories for Old Works waste located on Smelter Hill, and Mill Creek Addition town area) were included in the Old Works OU selected remedy as part of the 1995 ESD.

As of 2017, about 900 acres have been cleaned up and are ready for reuse, and nearly 20 businesses have located in the area. Additionally, the county has used the area for its operations, including a Class III landfill. ARCO has completed most of the land reclamation remedial action work.

Reclamation of several areas inside the boundary of the Old Works OU is addressed under the ARWW&S OU and Community Soils OU for logistical reasons. In addition, the inactive railroad lines and residential areas are addressed under the Community Soils OU. The active railroad lines in the East Anaconda Yard, impacted soils along the southern portion of Stucky Ridge, and remaining impacted soils in the Aspen Hills and Mill Creek Addition are addressed under the ARWW&S OU. The remaining work in the Old Works OU is limited to several properties where landowners have not granted access. A Consent Decree will direct the long-term management and redevelopment of this area.

Community Soils OU (OU16)

Between 2002 and 2010, ARCO remediated arsenic-contaminated soils from about 350 yards and about 40 acres of commercial property, which includes railroad beds along commercial properties (Figure C-4). Cleanup activities included contaminated soil/waste removal, backfilling with clean soil, and revegetation or installation of gravel or similar materials (depending on the use of the property). ARCO completed the capping of the in-town railroad line, including the west yards, in 2015. Capping of the east rail yard is ongoing. Following the signing of the 2013 AROD, additional cleanup of residential soils for lead as well as attic dust was required. ARCO began sampling residences in 2016 to identify areas requiring remediation. In 2017, approximately 500 yards were remediated, and another 500 yards were sampled. In addition, sampling began in 2019 for people living in the Superfund Overlay District who have requested sampling of their yards or accessible attic dust for arsenic and lead. As of mid-August 2019, ARCO had remediated 1,008 properties. EPA expects the sampling and yard removals to be completed by the end of 2025 for properties where access is granted.

ARWW&S OU (OU4)

Since 2000, ARCO continues to progress with implementing the selected remedy for the ARWW&S OU (Figure C-5), including closure of waste areas and treatment of over 12,000 acres of soil. Over 300,000 cubic yards of waste areas have been consolidated into WMAs, over 30,000 feet of streambanks have been stabilized, and over 140,000 feet of engineered stormwater controls have been constructed. Because of the size and complexity of this OU, EPA and MDEQ have subdivided the OU into RDUs to facilitate design and implementation of the selected remedy. Table 7 provides a summary of remediated acres completed through 2019. Remediation has been completed at the Smelter Hill Facility Area (RDU 14) in 2019 and ARCO is in the process of preparing the Remedial Action Completion Report for this RDU. The GWSWMS constructed in 2014 consists of two decant structures, conveyance channels and a large retention pond, which serves as an interceptor trench to capture groundwater and allow for metals to be removed passively resulting in minimized migration of COCs from the WMAs (Figure C-6).

Table 7: Summary of Acres, by RDU in OU4 Remediated through 2019

Area	Total Remedial Design Acres[a]	Acres Not Requiring a Direct Remedial Action[b]	Acres Requiring a Direct Remedial Action[c]	Remediated Acres[d]
RDU 1 - Stucky Ridge*	3,888	1,632	2,256	1,037
RDU 2 - Lost Creek Uplands*	1,480	650	830	121
RDU 3 - Smelter Hill Uplands*	3,453	1,622	1,831	271
RDU 4 - Anaconda Ponds WMA	662	0	662	678
RDU 5 - Active Railroads/Blue Lagoon	80	25	55	135
RDU 6 - South Opportunity Uplands*	956	266	690	367[e]
RDU 7 - North Opportunity Uplands*	798	35	763	807
RDU 8 - Opportunity Ponds	7,388	2,556	4,832	7,422
RDU 9 - Fluvial Tailings*	5,015	2,924	2,091	1,455[e]
RDU 10 - Warm Springs Creek	80	36	44	98
RDU 11 - Cashman Concentrate	2	0	2	1

RDU 12 - Slag	197	0	197	0
RDU 13 - Old Works WMA[f]	0	0	0	1,266
RDU 14 - Smelter Hill Facility Area*	1,368	443	925	1,367
RDU 15 - Mount Haggin Uplands*	776	639	137	0
West Galen Expansion Area*	6,367	1,863	4,504	6,389

Notes:

a. Number of remedial design acres (includes areas designated No Action) are only forecasted estimates. Actual acres remediated may differ slightly.
b. Number of acres not requiring a direct remedial action because of the high quality of the vegetation cover, historic value, land use or other remedial decision modifying factor.
c. Number of acres where a remedial design was prepared to perform a direct remedial action.
d. Number of acres that have received a remedial action through 2019 and are based on actual construction and reflect changes made during construction, except where noted.
e. Number of remediated acres through 2018.
f. Administratively, there are no remedial design areas in this RDU. The remedial design for this area and remedial action implemented are areas in the Old Works OU.

* Implementation of soil reclamation and stormwater controls is ongoing.

Institutional Control (IC) Review

Institutional controls are a component of all remedies at the Site. The decision documents for the Community Soils OU and ARWW&S OU identified ADLC's comprehensive zoning ordinance, also referred to as the Development Permit System (DPS) and CPMP, as institutional controls that notify, inform and educate the public about reducing people's exposure to contamination when soils are disturbed or land use changes. Since the previous FYR, EPA worked with ARCO and ADLC to complete the Institutional Controls Implementation and Assurance Plan (ICIAP), which was finalized in 2020 (Table 8). The ICIAP outlines the governmental, proprietary and information ICs as required by the site decision documents.

Governmental

The governmental ICs applied to the Site are the ADLC's Master Plan and DPS. The Master Plan identifies the OUs within ADLC and establishes a Superfund Study Area. The Master Plan creates a Superfund Planning Area Overlay Development District, as the principal tool for establishing ICs, which requires all development within the Site to occur on lands only after the level of contamination poses no significant health risk. This overlay also controls access to potentially contaminated groundwater and protects the integrity of remedial measures by regulating development.

The DPS implements the Master Plan by requiring a permit for any subdivision of land, clearing, grading, excavation, construction, reconstruction, or any development or building activity, with certain exceptions. Development must be consistent with the DPS requirements and approved by the County Administrator. DPS requirements, or performance standards, have been identified by development district for the permitted or special permitted uses of that district. The DPS generally requires a grading plan, an erosion and runoff control plan, and requires a remediation plan. The remediation plan must address where remedial structures are in place; or in unremediated areas or areas remediated to a previous land use that would now exceed the following arsenic trigger levels: residential use – 250 mg/kg; commercial/industrial use – 500 mg/kg; and recreational use – 1,000 mg/kg. Any new development activity or land use anywhere on the Site, such as drilling wells, excavation, or new construction, will be regulated by the County under the DPS, irrespective of land ownership.

The DPS requires soil sampling at all new residential construction within the Superfund Planning Area Overlay District. Soils exceeding the 250 mg/kg soil arsenic concentration or 400 mg/kg soil lead concentration will be cleaned up through the DPS with preference given to removal. In areas where site-specific conditions dictate that removal is not implementable, other measures (i.e., capping, tilling, ICs, etc.) will be taken to reduce concentrations to below the arsenic and lead action levels or prevent exposure. For future commercial development, final remediation of arsenic contamination in commercial/industrial areas to the action level of 500

mg/kg will be implemented through the ADLC-DPS at the time development occurs, except as otherwise determined by EPA, in consultation with the affected property owner.

The DPS also includes an area referred to as the Superfund Domestic Well Overlay (Figure K-1). In order to prevent the consumption of water containing arsenic at concentrations greater than the human health standard identified in the OU4 ROD Amendment, a development permit, along with a well permit, is required pursuant to the DPS for any digging or drilling of new domestic wells within the Superfund Domestic Well Overlay.

Proprietary Controls.
Proprietary controls are controls (e.g., restrictive covenants and easements) on land use that are considered private in nature because they tend to affect a single parcel of property and are established by private agreement between the property owner and a second party who, in turn, can enforce the controls. Certain restrictive covenants have been imposed through various conveyance and other instruments on portions of the Site which have been designated as WMAs and high arsenic areas.

Informational Devices and Other Program Services.
Informational devices are tools implemented by the ADLC and serve to provide information and educate the community about the presence of residual contamination that remains within the Site and the measures to reduce risk (Table 9). Consistent with the requirements of the Community Soils OU ROD and ROD Amendment and the ARWW&S OU ROD, a Community Protective Measures Program (CPMP), an Interior/Exterior Dust Program, a Soil Swap Program and a Blood Lead Monitoring Program have been developed as primary ICs for the Site.

Table 8: Summary of Planned and/or Implemented Institutional Controls (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)
Groundwater (OU4)	Yes	Yes	Domestic Well AOC (Figure K-1)	Prevent human exposure to arsenic from drinking groundwater within and adjacent to the TI zones that exceeds human health standards.	Final Domestic Well Monitoring Program Quality Assurance Project Plan (QAPP), Revision 1 August 2016 ADLC's DPS August 11, 2015
Dust/Soil (OU4 and OU16)	Yes	Yes	Superfund Overlay (Figure K-2)	Notify, inform and educate the public about reducing their exposure to contamination when soils are disturbed or land use changes.	Community Protective Measures Program (CPMP) ADLC's Development Permit System (DPS) February 20, 2020
Soil (OU11 and OU15)	Yes	Yes	Superfund Overlay (Figure K-2)	Restrict access and land use.	CPMP ADLC's DPS February 20, 2020

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 (OU7)	Yes	Yes	Superfund Overlay (Figure K-2)	Protect engineered controls and manage future land and water use.	CPMP ADLC's DPS February 20, 2020
Surface Water (OU4)	Yes	Yes	TBD	Restrict use and protect remedy (applies to bank stabilization and stormwater management structures).	TBD

Table 9: Summary of Informational IC Components

Informational Device	Components
CPMP	• Community Outreach • Community Awareness and Education • Public Inquiries • Geographic Information System
Interior/Exterior Dust Program[a]	• Home Renovation Kit • Instructions on proper use of the provided tools to help confine dust when renovating • Guide to proper cleanup and disposal of materials when the work is complete. • Provide use of a HEPA vacuum for dust removal.
Soil Swap Program	• Provide raised structures and clean soil for eligible vegetable gardens, designated play areas, or excavation areas less than one (1) cubic yard in accordance with the Soil Swap Plan
Blood Lead Monitoring Program[b]	• Provide voluntary blood lead monitoring services to individuals who live within the Superfund Overlay through 2030. • Resident children age 6 and under as well as expectant or nursing mothers will be particularly encouraged to participate. • Outreach through a variety of means such as community/education outreach efforts, referrals from local physicians, and the Women, Infants and Children (WIC) program. • Blood lead data will be used to identify specific children, if any, with blood lead levels greater than 5 micrograms per deciliter (µg/dL) and to provide general information on exposure trends over time to support EPA's five-year review remedy protectiveness evaluations.

Notes:

a. Applicable to persons or entities engaged in eligible home renovation, remodeling or demolition for homes located within the Superfund Overlay and constructed before 1980

b. The program will follow U.S. Department of Housing and Urban Development guidelines for collecting blood lead levels data and will adhere to state and federal requirements for: obtaining informed consent of participants; maintaining confidentiality of personal and medical information; and reporting results.

Source: Anaconda Smelter NPL Site Institutional Controls Implementation and Assurance Plan. February 2020.

Systems Operations/Operation and Maintenance (O&M)

O&M activities include vegetative monitoring and inspection and maintenance activities of engineered stormwater controls and industrial gravel covers. In addition, there are O&M plans specific to some areas requiring groundwater, surface water and leachate monitoring.

Engineering Control Inspections

Sitewide engineering control inspections are conducted according to the 2016 Final Engineered Controls Inspection and Maintenance (I&M) Plan, Revision 2. Starting in 2017, all engineered controls within parcels of real property conveyed by ARCO to ADLC (ADLC Parcels) are inspected and maintained in accordance with the 2016 Final Anaconda-Deer Lodge County (ADLC) Parcels Superfund Inspection and Maintenance (I&M) Plan. The I&M Plan requires inspection to identify areas requiring erosion repairs, sediment removals/cleanouts and weed spraying to ensure the integrity and operations of engineered covers, stormwater runoff conveyance systems and stormwater ponds are maintained. The results of the 2018 Draft Final 2018 Engineered Controls Inspection and Maintenance (I&M) Report prepared by ARCO in 2019 indicate no issues or concerns beyond routine erosion repairs, sediment removals/cleanouts and weed spraying for stormwater channels, stormwater detection basins and engineered covers.

Vegetation Monitoring

AR conducts vegetation monitoring according to the 2013 Vegetation Management Plan (VMP). The VMP describes the vegetation management process and identifies the performance targets and quantitative standards (for non-steep-slope upland areas, WMAs and steep-slope areas) used to determine when a remediated property has achieved compliance. The vegetation performance monitoring consists of observation of vegetation, erosion and best management practice (BMP) conditions. Short-term performance monitoring starts during the second growing season following seeding to verify attainment of RAOs. Once it appears that RAOs have been achieved (expected in three to five years following seeding and no longer than 10 years after seeding), the evaluation area is assessed for compliance determination using the Land Reclamation Evaluation System (LRES) post-remediation procedure.

In general, a LRES score of 115 and a vegetation cover criterion of 30% are used in non-steep-slope upland areas and WMAs, respectively, as the performance standard indicating attainment of RAOs and allowing for transition of the area into the long-term inspection and maintenance (LTIM) phase. Compliance determination for steep-slope evaluation areas is based on achieving a U.S. Bureau of Land Management (BLM) erosion score of 45 or less, which serves as the record for attainment of RAOs and allows for transition of the area into the LTIM.

Based on the wide range of post-remedial action soil contaminant concentration levels, land ownership and the various types of anticipated land uses, the VMP further divides properties into six categories for the purposes of monitoring, maintenance, institutional controls and compliance determination.

- Category 1 – unrestricted-use properties having soil with less than 250 mg/kg arsenic and allows for unrestricted land use with no long-term monitoring requirements.
- Category 2 – upland properties with low-to-moderate residual soil arsenic and metal levels up to 1,700 mg/kg having enhanced reclamation.[2]
- Category 3 – upland properties with moderate-to-high residual soil arsenic and metal levels (≥1,701 mg/kg) having enhanced reclamation and design.[3]

[2] Consists of a set of pre-construction elements that may include assessment of soil organic amendment requirements, review of lime amendment sources and tillage depth, field review of remedial boundaries, and review of seed mixtures as a final check that the approved remedial prescription provides the greatest potential for success of the remedy and vegetation establishment.

[3] Enhanced design elements may include stripping high contaminant-impacted areas, cover soil application, and introduction of stormwater engineered controls or special land use restrictions.

- Category 4 – upland properties with moderate-to-high residual soil arsenic and metal levels (≥1,701 mg/kg) having enhanced reclamation and a Land Management Plan where enhanced design is not feasible.[4]
- Category 5 – high arsenic concentration areas.
- Category 6 – WMAs.

A summary of the vegetative monitoring for short-term performance and long-term inspection sites is provided in annual reports. The 2019 Vegetation Annual Report indicates that routine maintenance and repairs continue to ensure the maintenance and integrity of the vegetative covers through weed control, fertilization and mowing. Minor maintenance includes re-seeding and stockpile removal. Major maintenance includes the reevaluation of the remediation performed in an area and additional reworking of an area.

The 2019 Vegetation Annual Report identified the following areas where major maintenance was required:

- Old Works WMA (OU4 RDU 13)
    - East of the Sewage Lagoon – showed continued vehicle disturbance associated with activity at the county facility to the north in 2018. ARCO collected soil samples in barren areas in fall 2014 and suggested that additional remedial activities are warranted. However, the area is under consideration for further development by ADLC related to expansion of the existing sewage treatment lagoons. Thus, implementation of major maintenance activities will be deferred until final decisions related to the sewage lagoon expansion project have been determined.
    - Aspen Hills – Railroad Loop may require soil testing to identify additional remedial action, if any, necessary to repair areas with low vegetation cover.
- ARWW&S OU
    - Stucky Ridge (RDU 1) – large bare areas require additional remediation as part of the ongoing remedial action in this area.
    - Anaconda Ponds (RDU 4) – previously reclaimed west-facing dike might require additional remedial action after the main granulated slag pile is developed or remediated.
    - Opportunity Ponds (RDU 8) – Based on VMS inspection in 2018, ARCO completed additional remediation on the east-facing dike by placing six inches of cover soil and seed.
    - North Opportunity Ponds (RDU 7) – EPA has approved additional remediation in the vicinity of the airport.
    - Smelter Hills Facilities (RDU 14) – small bare areas are being evaluated for additional remedial action that may include cover soil placement and reseeding.
    - West Galen Expansion Area – ARCO collected soil samples in 2014 and is currently evaluating if additional remedial action is necessary to repair bare areas on part of the area. Remedial alternatives or remedial maintenance are being discussed with the landowner.

Smelter Hill Repository Complex (SHRC)

Vegetation and engineering controls inspections for this area also include the Flue Dust OU (OU11), which are conducted according to the 2013 VMP and 2016 I&M Plan. In addition, groundwater and leachate monitoring activities are conducted according to the 2004 Final SHRC Post-Closure O&M Plan. ARCO recently finalized revisions to the 2004 O&M plan in the Smelter Hill Repository Complex (SHRC) Long-Term Operation, Monitoring, and Maintenance (OM&M) Plan. The 2020 O&M plan supersedes the 2004 O&M plan to address the leachate monitoring requirements for the SHRC to include the O&M of the long-term leachate management system constructed in August 2019 near the Flue Dust OU (OU11).

[4] The plan identifies long-term inspection and maintenance requirements and/or institutional controls that are necessary to protect the integrity of the remedy.

AR conducts the following activities, as required by the 2020 O&M Plan.

- Quarterly monitoring of repository leak detection and leachate collection risers in the Arbiter, Beryllium, and Flue Dust Repositories.
- Monthly water elevation measures in the Flue Dust Repository collection sump and surrounding piezometers, or as needed.
- Annual groundwater monitoring of wells MW-1, MW-2, MW-3, MW-4 and MW-65 for COCs.
- Operating and maintaining the long-term leachate management system as needed to pump, treat, and evaporate leachate from the Flue Dust Repository.
- Maintaining surface water diversion structures in the SHRC area to appropriately convey storm water runoff.
- Maintaining the function and integrity of the repository final cap systems.

The 2018 vegetation inspection indicated that vegetative cover was between 30% and 59% for all five repositories (criteria for repositories are achieving at least 30% vegetation cover by acceptable plant species), with the best vegetative cover present on the Arbiter Repository. Infrequent occurrences of noxious weeds exist on the repositories. Overall, the vegetation compliance standards continue to be met at all five repositories (Flue Dust, Arbiter, Beryllium, 2004 Beryllium and Aspen Hills).

Leachate from the Flue Dust, Arbiter and Beryllium repositories is only pumped if the trigger levels as specified in the O&M Plan are exceeded. The Aspen Hills and 2004 Beryllium repositories do not have or require leachate management. According to the 2018 Monitoring Report, the Arbiter and Beryllium repositories were last pumped during the third quarter of 2016 and have not required pumping since then. Figures H-1 and H-2 show that the amount of leachate generated at these two repositories has plateaued. However, the Flue Dust repository has required routine pumping since 2016, which EPA believes may be due to seasonal shallow groundwater influx to the repository (Figure H-3). In response, ARCO completed construction of the leachate collection and evaporation system in 2019 to address the excess leachate production. The system recently underwent commissioning and shakedown in February 2020, which identified the need for two updates prior to being fully operational in 2020. The updates include a valve and additional instrumentation and controls equipment/appurtenances for the system prior to it becoming fully functional.

Anaconda Smelter Development Repositories

AR currently operates the Anaconda Smelter Development Repositories to dispose of waste materials generated from remedial activities on site and materials subject to ADLC DPS regulations. The repositories encompass about 42 acres and are separated into two sub-cells of the Opportunity Ponds (OU4 RDU 8). The O&M activities for these repositories are conducted according to the 2009 Final Anaconda Smelter Development Repository Operation and Management (O&M) Plan, Revision 1. The plan specifies requirements for sampling of materials prior to disposal in the repository as well as consolidation, grading and fugitive dusts. The results summarized in the 2018 O&M Report for this area indicate that nothing unusual was required beyond routine O&M activities.

Slag Piles

AR conducts O&M activities on the Main Granulated Slag Pile and the West Stack Slag Pile sites (OU4 RDU 12) as required in the 2003 Final Operation and Closure/Reclamation Plan for each of these two areas. The O&M activities include inspection of:

- The cover to identify any noxious weeds and erosion
- Stormwater conveyance structures
- Site security
- Fugitive dust BMPs

Monitoring reports indicate that an inactive gully on the east side of the Main Granulated Slag Pile was noted during the 2016 inspection, most likely due to a breach in the adjacent roadside berm during a high rain event. In 2018, this erosion appeared to be increasing in size and depositing sediment below the road. However, off-road vehicle tracks were visible, and an apparent trespasser had used debris to write a name on the north side of the

slag pile. ARCO also observed that there is wind-blown slag identified north of the northern channel that may be negatively affecting the vegetation. Additionally, the Main Granulated Slag Pile Final Operation and Closure/Reclamation Plan is being updated to identify additional BMPs that may be implemented, as necessary, to further reduce fugitive dust from the Main Granulated Slag Pile. No major concerns were observed as part of O&M activities for the West Slag pile.

Active Railroad (OU4 RDU 5)

The Butte, Anaconda & Pacific Railway conducts the O&M activities of the active railroad areas that remediated between 2006 and 2019. To verify that the remedy remains intact and functions to limit exposure to humans or potential environmental receptors (e.g., rivers) Butte, Anaconda & Pacific Railway conducts the following O&M activities:

- Visual inspections of the engineered covers, surface water conveyances, stream crossings and railroad embankments
- Corrective actions (e.g., weed spraying, repair erosional features) pertaining to inspections completed as soon as reasonably possible to include weather considerations, equipment, and resource availability.

According to the 2019 O&M report, an area of erosion was addressed by placement of aggregate rock in a localized area and some weeds were removed in a surface water conveyance to allow for proper flow. In addition, the Mill Creek and Willow Creek trestles (Mile Marker 21.36 and 19.29), respectively were removed in the fall of 2019 to remove the existing timber structures and impacted materials within the 100-year floodplain and replacing the timber trestles with corrugated metal open span structures and clean fill materials.

Old Works Golf Course

The Golf Course was constructed as an EPA-approved dedicated development as part of, and in conjunction with, the remedy. As such, there are certain operations and management activities that must be performed as part of Golf Course operations to maintain the effectiveness and protectiveness of the remedy. The operation and maintenance of the golf course/remedy is implemented by both ADLC and AR under the Old Works Golf Course Operation and Maintenance Plan. ADLC is responsible for all mowing, fertilizing, watering, aerating, vertical mowing, top dressing, weed and pest control, irrigation and minor repairs and replacements as may be necessary to maintain the function and effectiveness of the following Golf Course remedial features.

- Vegetated grass-covered greens (course, tee boxes, driving range, nursery area, bunkers) underlain by Greensmix, different soil types as applicable and drainage gravel
- Non-woven geotextile, a geomembrane liner, and the perforated pipe drainage system that routes infiltrating water into the underdrain system
- Maintaining water levels and rip rap in course lake features during the operational period
- Formal bunkers (located within irrigated areas) containing 4 inches to 6 inches of slag material that is used at the Golf Course as the functional equivalent of sand
- Minor and major repairs requiring an excavation by the Golf Course operator must be coordinated through the ADLC Superfund Program.
- Maintaining roads, paths, fencing

ARCO is responsible for the following O&M activities:

- Placement and removal of winter fencing on the perimeter of some formal bunkers as necessary to reduce slag migration onto fairways
- Placing and removing winter fencing on the perimeter of the informal bunkers as necessary
- Inspecting the informal bunker edges on an annual basis to determine if repairs and replacements are necessary to prevent excessive slag migration into the irrigated and/or non-irrigated rough areas or into Warm Springs Creek

- Replacement of the irrigation system's low-pressure automatic recirculation control valves installed in irrigation pipes, located near Warm Springs Creek, to prevent infiltration into groundwater and run-off and erosion of contaminated material into the creek as required
- Repairs and replacements of the manually operated valves in lake features during the non-operational period
- Maintenance of the lake features water level and riprap during the non-operational period
- Inspection and maintenance of the sediment ponds
- Annual inspection of the Warm Springs Creek corridor for damage to the riparian vegetation or riprap erosion protection or for removal or breach of beaver dams as soon as practicable
- Inspection of the bridge abutments and pylons after major storm events to ensure there is no debris attached to the bridges and that erosion is not releasing mine waste or contaminated soil into the creek.

Dutchman Wetland Area (Dutchman)

The Dutchman is the largest remaining contiguous wetland/riparian habitat in the Upper Clark Fork River Basin and covers about 3,447 acres in OU4. No tailings are present at the Dutchman, but the soil has been impacted by historical emissions from the region's smelters, and EPA has designated much of the area as a high-arsenic area. EPA did not require any remedial action at the Dutchman as existing vegetation was adequate to meet the performance standard for high arsenic areas. Pursuant to the high arsenic area remedy decision, ARCO conducts O&M activities to protect the wetlands according to the 2014 Dutchman Property Management Plan. Activities include monitoring and repairing existing perimeter fences, constructing new fence along property boundaries, monitoring and repairing trailheads, conducting noxious weed, vegetation, and streambank inspections, and performing wildlife surveys for big game and birds. Results of the 2019 Draft Final Dutchman Wetlands Site 2018 Operation, Monitoring and Maintenance (OM&M) Report indicate that all routine repairs, weed control and maintenance activities were completed as needed. In addition, big game presence and over 80 bird species were identified during wildlife monitoring.

Groundwater and Surface Water Management System Operations and Maintenance

Several site areas have O&M plans that specify required O&M activities for monitoring the groundwater and surface water management system. In addition, there also are sitewide monitoring requirements for surface water and groundwater, as summarized in the following sections.

Lower Willow Creek – ARCO initiated monitoring activities for the Lower Willow Creek project area in spring 2014 in conjunction with developing the 2015 Final Riparian Area Vegetation & Bank Stability Monitoring Plan for Willow Creek and Warm Springs Creek. This plan was developed specifically for the remedial actions required for Lower Willow Creek and Warm Springs Creek and provides the framework for monitoring remedy establishment and progress toward RAOs. Monitoring activities include assessing bank stability and erosion, collecting data to determine if Lower Willow Creek is meeting the revegetation and site stability performance targets, evaluating vegetative cover of streambank vegetation for long-term channel stability, evaluating noxious weed levels, and identifying maintenance and corrective actions, as necessary. The 2018 Monitoring Report concludes that, overall, the herbaceous and woody plant species and bank treatments are effectively stabilizing the streambank and riparian areas at the Lower Willow Creek project site. This report showed vegetation cover across the monitored banks increased significantly from 15% in 2014 up to 82% in 2018. In addition, ongoing general repair and maintenance is planned for the fencing enclosures, primarily within the private property, potentially expanding the size and height of the enclosures to protect planted trees and shrubs from horse grazing.

Opportunity Ponds – Groundwater and surface water are monitored at the Opportunity Ponds area (RDU 8) according to the 2014 Opportunity Ponds Remedial Design Unit (RDU) 8 GWSWMS Operation, Maintenance, and Monitoring Plan. The objectives of the monitoring are to ensure the GWSWMS is capturing groundwater within the interceptor trench to minimize migration of COCs from the WMA and meet the performance standards for groundwater. In addition, O&M activities ensure that the integrity of the system is maintained. The 2018 Monitoring Report concluded that quarterly inspections of all structures in the GWSWMS indicated that nothing beyond routine maintenance and repairs such as addressing noxious weeds, repairs to some damaged Levelogger

cables and cleaning staff gauges were warranted. A summary of the surface water and groundwater monitoring results is presented in the Data Review section of this FYR Report.

Sitewide Long-term Groundwater Monitoring – Due to the potential for smelter waste and contaminated soils to contaminate groundwater, ARCO completes sitewide annual groundwater monitoring to:

- Determine compliance with performance standards for the five COCs (arsenic, cadmium, copper, lead and zinc) at established POC groundwater monitoring wells.
- Assess performance of revegetation, BMPs and engineered controls constructed as part of the remedial actions completed to date at the Site (e.g., COC levels in groundwater remain stable or decrease and groundwater plumes do not expand).
- Monitor groundwater conditions in plume areas to identify trends.

The monitoring requirements are specified in the 2016 Final Long-Term Groundwater Monitoring Program Quality Assurance Project Plan (Long-term QAPP). They include the following activities:

- Semi-annual sampling of POC groundwater monitoring wells to ensure that contaminated groundwater is not exiting the WMAs.
- Semi-annual sampling at town of Opportunity well MW-9, the downgradient edge of the South Opportunity TI zone, to verify that arsenic is not exiting the TI zone above cleanup levels.
- Semi-annual sampling at the engineered-cover wells in the Opportunity Ponds WMA for five years following cover installation to evaluate changes in groundwater conditions resulting from the installation of a final cover.
- Conduct one round of groundwater sampling at the event-driven wells if the water levels reach the trigger elevation of 5,165.5 feet in MW-213 located within the Old Works WMA (to understand how periodic increases in groundwater COC concentrations are related to hydrologic conditions and waste within the WMA).
- Five-Year-Performance Wells – wells, springs and surface expressions of groundwater designed to monitor the performance of the remedy over the remainder of the Site during low and high water.

A summary of the monitoring results is presented in the Data Review section of this FYR Report.

Domestic Well Monitoring

AR samples domestic wells within the ARWW&S OU domestic well AOC to determine if the wells meet the water quality performance standards outlined in the 2011 AROD. ARCO conducts the sampling in accordance with objectives and procedures documented in the 2016 Final Revision 1 Domestic Well Monitoring Program Quality Assurance Project Plan (Domestic QAPP). It includes the following activities:

- Annual sampling at previously sampled domestic wells that had total recoverable arsenic results > 5.0 µg/L or parts per billion (ppb) and ≤ 10.0 µg/L. Once results show arsenic concentrations ≤ 5.0 µg/L for three consecutive years, scheduled sampling will be discontinued and only sampled per domestic well owner request (see third bullet).
- Conduct before-use sampling at all new domestic wells developed under a development permit issued by ADLC.
- Conduct sampling at domestic wells within the domestic well AOC per the request of well owners. This excludes domestic wells that have had a reverse osmosis treatment system installed under the previous domestic well programs and for other wells is limited to no more than once per year.
- Implement the Domestic Well Reverse Osmosis and Replacement Well Installation program at domestic wells with total recoverable arsenic results > 10 µg/L. Domestic well owners with total recoverable arsenic results > 10 µg/L will be offered potable water until the Domestic Well Reverse Osmosis Installation program has been implemented.

In addition, annual maintenance and baseline reverse osmosis treatment system sampling is also conducted on previously installed reverse osmosis treatment systems under the Domestic Well Reverse Osmosis and Replacement Well Installation program.

A summary of the monitoring results is presented in the Data Review section of this FYR Report.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR Report as well as the recommendations from the previous FYR and the status of those recommendations.

Table 10: Protectiveness Determinations/Statements from the 2015 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
4 – ARWW&S	Undetermined	The remedy at the OU4 is expected to be protective of human health and the environment upon completion of the remaining remedial actions including soil reclamation and stormwater controls for the RDUs (1, 2, 3, 6, 7, 9, 14, 15, and West Galen), and removal of tailings along Warm Springs Creek. Completion and implementation of either a re-use or closure plan for the remaining slag piles (Main Granulated Slag, West Stack Slag, and landfill) must be completed and implemented. Additionally, the final ICIAP must be completed and implemented (including long-term funding) at the NPL site. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.
7 – Old Works	Undetermined	The remedy at OU7 is expected to be protective of human health and the environment upon completion of remaining remedial actions at the OU, including capping of the following parcels (McDowell, Kittleson, Warner and RDM), and access control of the Historic Structure Area. Additionally, a final ICIAP and final Golf Course O&M plan must be completed and implemented (including long-term funding). In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas
11 – Flue Dust	Protective	The remedy for the Flue Dust OU currently protects human health and the environment because the waste has been treated (stabilized) to below TCLP standards for arsenic, cadmium and lead and has been encapsulated within a lined repository with access strictly controlled by fencing, gates, and security. However, for the remedy to remain protective in the long-term, corrective actions must be taken to eliminate seasonal ground water from entering the repository and a leachate management plan must be completed and implemented to properly manage the leachate.
15 –Mill Creek	Protective	The remedy for the Mill Creek OU currently protects human health because former Mill Creek residents were permanently relocated from the site and soils were temporarily stabilized to limit fugitive dust. However, for the remedy to be protective in the long term, final soil remediation under ARWW&S OU RDU 6 South Opportunity Uplands must be implemented, and the final Institutional Controls Implementation and Assurance Plan (ICIAP) must be completed and implemented (including long-term funding) at the NPL site.
16 – Community Soils	Not Protective	The remedy for the Community Soils OU is not protective because exposure to lead contamination in residential soil and dust is not currently controlled. The following actions need to be taken to ensure protectiveness: implementation of the 2015 Residential Soil/Dust Remedial Action Work Plan and completion and implementation (including long-term funding) of the final ICIAP.

Table 11: Status of Recommendations from the 2015 FYR Report

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
16 – Community Soils 7 – Old Works 4 – ARWW&S 15 – Mill Creek	Long-term effectiveness of ADLC's Institutional Controls program.	Finalize the ICIAP and implement program to ensure that the institutional controls program has adequate funding.	Completed	The ICIAP was finalized and approved by EPA in February 2020. ADLC finalized their IC Program in June 2020.	6/15/2020
11 – Flue Dust	Unexpected leachate production in the flue dust repository.	Implement corrective actions under O&M to address seasonal shallow groundwater influx to the repository. Develop and implement Leachate Management Plan.	Completed	In 2019, ARCO completed construction of the leachate collection and evaporation system. The system is fully operational and Remedial Action Completion report was approved in July 2020. Operation and maintenance of the system will be conducted in accordance with the final SHRC O&M Plan approved in July 2020.	6/3/2020
4 – ARWW&S	Develop slag as a resource or complete closure of slag piles.	Assess efficacy of current BMPs. Complete a plan and schedule to develop the Main Granulated, West Stack and Anaconda Landfill Slag piles and initiate closure.	Completed	Final Operation and Closure Plans for the Main Granulated Slag and West Stack Slag were approved in June 2020. These plans provide for the upgrade of BMPs and provide a process for the development/closure of the slag piles.	6/30/2020
4 – ARWW&S	Potential ecological risk in upland areas with elevated lead contamination.	Evaluate terrestrial risk due to lead in surface soils in upland areas.	Completed	In December 2019, ARCO completed a study to evaluate the efficacy of treating shallow soils with a phosphorous-enriched fertilizer and lime amendment to reduce the bioavailability of lead in soil to passerine birds. The initial results suggest there was not an appreciable reduction of lead bioavailability. EPA has consulted with the U.S. Fish and Wildlife Service, and ARCO has agreed to conduct additional bird monitoring in this area.	12/23/2019

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
16 – Community Soils 7 – Old Works 4 – ARWW&S	Complete remaining remedial actions.	• Implement Residential Soils Remedial Action Work Plan. • Complete and implement remaining Old Works OU Individual Site Work Plans. • Implement remaining ARWW&S OU RDUs Remedial Action Work Plans.	Ongoing	Remediation continues for these three OUs and the completed remedy will be addressed during the next FYR.	Not applicable
7 – Old Works	Long-term O&M of the Old Works golf course as a cap over waste.	Complete, implement and fund Old Works Golf Course Operations and Maintenance Plan.	Completed	AR completed the Final Old Works Golf Course O&M Plan in 2019.	9/26/2019
7 – Old Works	Access to Old Works historic areas with high concentrations of arsenic in soil.	Complete and implement Land Management Plan for the Old Works.	Addressed in Next FYR	EPA is anticipating completing the Land Management Plan for the Old Works in late 2020.	Not applicable

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available by a newspaper posting in the *Montana Standard* on June 14 and June 21, 2020 (Appendix D). It stated that the FYR was underway and invited the public to submit any comments to EPA. The results of the review and the report will be made available at the Site's information repository, Arrowhead Foundation Library, located at 118 East Seventh Street, Anaconda, Montana, 59711.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy implemented to date**.** The interviews are summarized below.

EPA contractors conducted interviews with representatives from the local technical assistance group, Arrowhead Foundation. Overall, they reported local sentiment is that the process has taken a long time, but that results from the remedial work in the hills and community is visible. Respondents indicated that communication and dissemination of information has improved in recent years, but noted it is challenging to successfully communicate risk and remedy considerations to the general public. At the time of the interview, respondents expressed concerns about the long-term funding for institutional controls and sampling, but acknowledged those details were expected to be finalized in the near future.

Data Review

Due to the potential for smelter waste and contaminated soils to create leachate and contaminate groundwater, ARCO completes area-specific groundwater monitoring to assess performance of revegetation, BMPs and engineered controls at the SHRC (RDU 14) and the Opportunity Ponds area. In addition, to evaluate the effectiveness of remediation of smelter wastes and soils on downgradient groundwater and surface water, ARCO conducts regional groundwater and surface water sampling to monitor regional groundwater contaminant trends. Also, the Site is covered by the Domestic Well Monitoring program to determine if the wells meet the water quality performance standards outlined in the 2011 AROD. If wells are found to be contaminated, well owners are provided with potable water until a reverse osmosis treatment system is installed.

ARWW&S OU (OU4)

RDU 14 – SHRC

AR monitors groundwater on an annual basis to evaluate the effectiveness of the repositories to contain waste.

Groundwater

AR collected annual groundwater samples from the SHRC monitoring wells (MW-1, MW-2, MW-3, MW-4 and MW-65) (Figure H-4). Table H-1 summarizes the results of the sampling events, including monitoring well water level data, pH values and analytical results.

The groundwater monitoring analytical results indicate that all constituents in MW-1, MW-2, MW-3, MW-4 and MW-65 were consistent with historical background levels during the 2018 annual sampling event. Only dissolved arsenic in MW-3 was detected above the current MCL of 10 µg/L over the past four years, but concentrations are showing a decrease over the last five years. Arsenic was detected slightly above the MCL in 2015 (10.1 µg/L) and then at 13.9 µg/L in 2018. A duplicate sample in 2018 showed arsenic at 2.2 µg/L, therefore there is uncertainty in the concentration in 2018. The monitoring results support that revegetation, BMPs and engineered controls remain effective at preventing further contamination to groundwater in the area of the SHRC.

RDU 8 – Opportunity Ponds

Groundwater and surface water are monitored at the Opportunity Ponds area to ensure the GWSWMS is capturing groundwater to minimize migration of COCs from WMAs and meet the performance standards for groundwater.

Surface Water

The GWSWMS passively treats arsenic-contaminated groundwater exiting the Opportunity Ponds WMA. Any residual water slowly flows through a wetland as the final polishing step (Figure C-6).

AR collects surface water from the decant structures and retention pond twice a year, in spring and summer. The April and July 2019 data show that total arsenic concentrations entering the GWSWMS from the decant structures ranged from 0.78 µg/L at the North Decant Structure (SW-003S) to 151 µg/L at the South Decant Structure (SW-002S) (Figure H-5, Table H-2). Total iron concentrations ranged from 1,180 µg/L at SW-003S to 7,930 µg/L at SW-002S. However, upon exiting the GWSWMS at SW-001, total arsenic concentrations were much lower, ranging from 1.3 µg/L to 1.6 µg/L, and dissolved arsenic ranged from 0.91 to 1.3 µg/L; these concentrations are below the surface water criteria of 10 µg/L for human health and 150 µg/L for aquatic life. Total iron concentrations ranged from 892 µg/L to 1,550 µg/L, all of which exceed the human health criteria of 300 µg/L based on aesthetics (color); two values exceeded the aquatic life criteria of 1,000 µg/L. The total arsenic and iron concentrations exiting the GWSWMS at SW-005 in April were 1.3 µg/L and 241 µg/L, respectively. Both concentrations are below human health and aquatic life criteria. There was no discharge from SW-005 from July to October 2019, indicating that all water in the Retention Pond was being infiltrated to groundwater downgradient of the system.

Decreasing arsenic and iron surface water concentrations between the North and South Decant Structures and SW-001 at the conveyance channel indicates that passive treatment of the waters is effectively taking place within the GWSWMS as designed.

Groundwater

The 2019 dissolved arsenic concentrations collected from the monitoring wells downgradient of the GWSWMS ranged between 0.56 µg/L at MW-268 (NW-2S) to 1.80 µg/L at MW-271 (NW-4D), with all concentrations being well below the arsenic groundwater quality standard of 10 µg/L in the dissolved fraction, per the requirements outlined in the 2011 AROD for the ARWW&S OU (Table H-3). Arsenic is the most prevalent COC detected, while the other COCs (cadmium, copper, lead and zinc) were routinely below detection or below the cleanup criteria. The 2019 groundwater sampling results demonstrate that the GWSWMS is minimizing the migration of COCs from the WMA and meeting the long-term RAOs and performance standards for groundwater at the Opportunity Ponds RDU 8 site.

Domestic Well Monitoring

Domestic well monitoring started in 2004 and was formalized in the 2009 Ground Water Monitoring Sampling and Analysis Plan Addendum. It includes sampling about 20% of the domestic wells each year, with the goal of sampling all domestic wells every five years.

AR samples domestic wells in the ARWW&S OU domestic well AOC to determine if the wells meet the arsenic water quality performance standards outlined in the 2011 ROD Amendment.

Eighty-one domestic wells in the AOC were sampled in 2018. They included:

- Fourteen domestic wells that had been previously sampled and had historical total recoverable arsenic results > 5.0 µg/L and ≤ 10.0 µg/L.
- Eight new domestic wells under the ADLC New Well Permit program.
- Fifty-nine domestic wells within the AOC per the request of the well owners. This represents a significant increase from the previous year and was due to 41 requests resulting from ADLC outreach in the Lost Creek area.

Two new reverse osmosis treatment systems were installed within the Domestic Well AOC, one in 2016 and one in 2018, due to initial and confirmation total recoverable arsenic results above 10 µg/L. In addition, one of the 80 wells sampled in 2018 exceeded the arsenic criteria of 10 µg/L, which resulted in the owner drilling a new well.

Sitewide Long-term Groundwater Monitoring

AR completes sitewide annual groundwater monitoring to monitor the effectiveness of revegetation, BMPs and engineered controls on groundwater conditions downgradient of the Site. The most current site conditions are reflected in the 2018 Long-Term Groundwater Monitoring Low and High Water Table Events Data Summary Report, published in June 2019. In addition, several data sets were received that will be included in the 2019 Long-term Groundwater Monitoring Low and High Water Table Events Data Summary Report in order to provide additional data for this FYR. The Long-term QAPP also requires monitoring of specific wells, springs and surface expressions of groundwater every five years (Five-Year Performance Wells) to monitor the performance of the remedy over the remainder of the Site.

AR conducts semi-annual sampling of POC groundwater monitoring wells to ensure that contaminated groundwater is not exiting the two WMAs (Opportunity Ponds/Smelter Hill WMA and Old Works WMA). The groundwater monitoring wells within the site monitoring well network were sampled in 2018 (Figure H-6) during the low and high water table events. Event-driven samples were also sampled during the high water table event in 2018, as required by the Long-term QAPP. Further, several wells are sampled to evaluate the South Opportunity TI zone and engineered covers in the WMAs. Sample results are compared to performance standards as specified in the ARWW&S OU 2011 ROD Amendment (Table H-4).

Opportunity Ponds/Smelter Hill WMA

Fifteen POC wells were sampled during both events and all COC sample results were below the applicable water quality performance standards (Table H-4).

Old Works WMA

AR monitors four POC wells in the Old Works WMA (Table H-4). In addition, ARCO monitors water levels in MW-213. Event-driven samples are conducted if water levels in MW-213 exceed the benchmark elevation of 5,156.5 feet above mean sea level. Ten additional event-driven wells (IW-01, MW-204, MW-206, MW-206d, MW-208, MW-209, MW-213, MW-240, MW-241 and MW- 242) are located in this area to understand how periodic increases in groundwater COC concentrations are related to hydrologic conditions and waste in the WMA. According to the Long-Term QAPP, if dissolved cadmium exceeds 15 µg/L for any event well, that well will subsequently be sampled semi-annually, on a schedule coinciding with ongoing POC well monitoring, until the dissolved cadmium is less than 15 µg/L.

The monitoring results for the POC wells shows that all COC sample results were below the applicable water quality performance standards (Table H-4). However, due to MW-213 exceeding the elevation trigger level, 10 additional event driven wells were sampled. The results of these wells show that cadmium exceeds the event well threshold of 15 µg/L, as specified in the Long-term QAPP. Therefore, ARCO added well MW-213 to the semi-annual sampling list as of 2019.

South Opportunity/Yellow Ditch Area

Four of the six POC wells were sampled during the low water table event in this area to assess the water quality along the north boundary of the South Opportunity TI zone (Table H-4). Monitoring wells MW-264 and MW-274 were not sampled because the wells were dry. All six of the POC wells were sampled during the high water table event. Samples from the POC wells are analyzed for dissolved arsenic, as required by the Long-term QAPP. All arsenic sample results were below the water quality performance standard of 10 µg/L.

Town of Opportunity Well

AR conducts semi-annual sampling at the town of Opportunity well (MW-9) to verify that arsenic is not exiting the TI zone at the downgradient edge of the South Opportunity TI zone. Both low and high water table arsenic sample event results were below the water quality performance standard of 10 µg/L (Table H-4).

Engineered Cover Wells
AR has conducted semi-annual sampling wells within the Opportunity Ponds WMA at eight wells for five years following cover installation to evaluate changes in groundwater conditions resulting from the installation of a final cover on the 2,200-acre tailings ponds. By 2016, six of the eight wells had met the five-year sampling schedule and did not require further sampling. The remaining two wells (MW-82 and MW-82M) were sampled during the low water table and the high water table sampling events in 2018 and analyzed for dissolved arsenic, cadmium, copper, lead and zinc. All COC sampling results were below the applicable water quality performance standards (Table H-4).

FYR Monitoring
Most of the wells, seeps and springs to be monitored on a five-year basis were sampled twice in 2019, during low water table in the spring and high flow during the summer. Most of the FYR wells identified in the Long-term QAPP were sampled in 2019. The data submission is ongoing; therefore, the data received to date were incorporated into this report (Table H-5). The main objective of sampling the FYR wells, seeps and springs is to evaluate how the arsenic concentrations are changing in various areas in response to remedial activities. Many of the arsenic concentrations were low, with concentrations below the MCL of 10 µg/L. However, one well, A2-BR, shows significantly higher concentrations, which is to be expected, as the location is within the Opportunity Ponds/Smelter Hill WMA. The concentrations in well A2-BR in 2019 in the spring and summer were lower than the average concentration reported in the previous FYR (Table 12). However, concentrations have increased in MW-249s and are nearly twice the average concentration observed in 2009. Similar increases occurred in a spring sample and a seep sample collected from the Mt. Haggin/Smelter Hill TI zone, as shown in Table 12 below. The increases are consistent with the two previous FYRs.

Table 12: Summary of FYR Sample Locations with the Highest Arsenic Concentrations

FYR Sample	Sample Type	Location	Dissolved Arsenic Concentration (µg/L)		
			2019	2014 Average[a]	2009 Average
A2-BR	Groundwater	Opportunity Ponds/Smelter Hill WMA	1,050 (Low) 807 (High)	1,053	1,254
MW-249s	Groundwater	Mount Haggin/Smelter Hill Area	109 (High)	80.3	51.8
SST-1	Spring	Mount Haggin/Smelter Hill TI zone	109 (High)	44.02	28.4
SP98-36	Seep	Mount Haggin/Smelter Hill TI zone	304 (Low)	63.6	49.7

Notes:
a. Calculated from the percent change reported in the 2015 FYR Table 10-2 for MW-249s, Table 10-4 for well A2-BR and Table 10-5 for spring and seep samples SST-1 and SP98-36, respectively.
High – High water table event is in late June/July time-frame
Low – Low water table event is in the March/April/May time-frame
µg/L – micrograms per liter

Sitewide Long-term Surface Water Monitoring

Surface water monitoring is conducted by the U.S. Geological Survey (USGS) in the four major streams within the ARWW&S OU where surface waters exit the OUs:

- Lost Creek
- Warm Springs Creek
- Mill Creek
- Willow Creek

Table H-6 shows a tabulation of exceedances of chronic aquatic life standards from 2015 to 2019. During this period, there have been no exceedances for arsenic or zinc at any of the monitoring locations. Total cadmium,

copper and lead exceed the chronic standard at times except at Lost Creek near Galen, Montana (station 12323850), which only had one copper exceedance. According to Montana Circular DEQ-7, the state ARAR for surface water quality, one exceedance per three years on average is allowable. Consistent with the previous FYR conclusions, metals concentrations in surface water increase during high flow conditions, with the highest flows causing some exceedances of chronic aquatic standards. There is no indication of increases in dissolved metals in surface water as a result of groundwater discharge.

Site Inspection

The site inspection took place on 10/9/2019. Participants included EPA RPM Charles Coleman, EPA remediation oversight contractor Ben Simpson with CDM Smith, and Ryan Burdge and Claire Marcussen from EPA FYR support contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedies that have been completed to date. Site inspection participants toured the Site by vehicle. A completed site inspection checklist for each OU is available in Appendix F. Site photographs are available in Appendix G.

OU15 Mill Creek OU
The Mill Creek relocation area appeared to be clear of debris from building demolition and all treated soil areas have been restored with a grass vegetative cover.

OU11 Flue Dust
OU11 consists of a repository that contains consolidated flue dust that had been stored at nine locations. The cover is vegetated and in good condition. Adjacent and downgradient of this WMA is a recently completed leachate collection and evaporation system to reduce the volume of leachate that has historically been present.

OU7 Old Works OU
Several areas of this OU have been remediated with capping of waste areas to support commercial redevelopment. Several properties were observed in reuse, including the Jack Nicklaus Old Works golf course and a Class III landfill. Mountain bike or motor bike tracks were observed on the capped red sand area next to the golf course along a paved recreational trail. Placement of additional engineering controls is recommended to ensure the integrity of the capped area is maintained. Site participants also observed the Mill Creek Addition area located within a fenced area that has been remediated to support future commercial/industrial redevelopment.

OU16 Community Soils OU
Several residential properties were observed where remediation has been completed, to include excavation, backfill and installation of cover. Covers were either sod in areas where grass had existed and gravel in the driveway areas.

OU4 ARWW&S OU
Several RDUs were visited and various stages of soil remediation and reclamation were observed. Depending on the depth to groundwater and slope of the area, different types of soil treatments were used such as tillage, lime application and soil stripping. Different types of reclamation included final covers that were soil caps and grass vegetation in the large low-lying areas and planted trees on steep slopes or along creeks. In areas along the railroad, the restoration included stabilization and gravel. Different types of engineered stormwater runoff controls were viewed that included drainage ditches lined with riprap or riprap with grout along the steep slopes. Site participants also viewed sedimentation basins, experimental wetlands and groundwater/surface water management systems in the lower-lying areas. All areas where soil treatment and reclamation has been completed appeared to have well-established vegetative covers. All stormwater controls appeared to be unobstructed and areas of erosion were not observed. Any erosion or sparse vegetation areas are routinely maintained, especially following snow melt. Several properties have been remediated to support redevelopment. A summary of the RDUs visited included:

- RDU 1 Stuckey Ridge Uplands
- RDU 3 Smelter Hill Uplands

- RDU 4 Anaconda Ponds
- RDU 5 Active Railroad/Blue Lagoon areas
- RDU 6 South Opportunity
- RDU 7 North Opportunity Uplands
- RDU 8 Opportunity Ponds
- RDU 9 Fluvial Tailings
- RDU 10 Warm Springs Creek
- RDU 12 Slag
    - Main Granulated Slag Pile
    - West Stack Slag Pile
    - Anaconda Landfill Slag Pile
- RDU 14 Smelter Hill Facility Areas
    - Smelter Stack
    - Arbiter Repository
    - Beryllium Repository
- West Galen RDU

In October 2019, contractor staff met with representatives of the Arrowhead Foundation, the community's technical assistance group for the Site. The Arrowhead Foundation is the designated site information repository. It is located at 118 East 7th Street, Anaconda, Montana 59711. EPA provides documents to the foundation. The foundation has established a document library for the Site.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

The remedies implemented to date to address smelter waste, contaminated soil and dust in all OUs (OU15, OU16, OU11, OU7 and OU4) assessed in this FYR are effective in eliminating direct exposure and minimizing the migration of contaminants to groundwater and downgradient surface water. Remediation continues for all five OUs through active remediation such as removal, excavation, treatment and capping of smelter waste, soil and dust, as well as use of BMPs and engineered controls to minimize contaminant migration. For OU16, community soils, ARCO began cleanup of residential soils in the late 1980s under removal authority and continues long-term remedial actions started in 2002. As of mid-August 2019, ARCO had remediated 1,008 properties. EPA expects the sampling and yard removals to be completed by the end of 2025 for properties where access is granted. Remedial actions are being prioritized to address contamination in residential soils where young children are living. An institutional controls program to inform and educate residents on ways to reduce exposure to potentially contaminated soils and dust is already in place to minimize exposures.

In 2019, ARCO completed construction of the leachate collection and evaporation system at the Flue Dust OU (OU11) to address seasonal shallow groundwater influx to the repository. The system is now fully operational. EPA is expanding the surface water remedy of the ARWW&S OU to address exceedances of state water quality standards in site streams and tributaries during high flows and storm events. In addition, the Site is covered by the Domestic Well Monitoring program to determine if the wells meet the water quality performance standards. If the well doesn't meet standards, well owners are provided with potable water until a treatment system is installed.

During the site inspection, participants observed mountain bike or motor bike tracks on the capped red sand area next to the golf course along a paved recreational trail within the Old Works OU. Placement of additional engineering controls is recommended to ensure the integrity of the capped area is maintained. Also, trespassing regularly occurs on the Main Slag pile and a review of the O&M inspection reports noted off-road vehicle tracks were reported to be visible. ARCO also observed that there is wind-blown slag identified north of the northern channel, which may be negatively affecting the vegetation. ARCO is currently sampling areas immediately

downwind from the slag pile to confirm if elevated concentrations of COCs have migrated from the slag; this information will be used to update the Final Operation and Closure/Reclamation Plan to identify additional BMPs that may be implemented, as necessary, to further reduce fugitive dust from the main granulated slag pile. In addition, ARCO noted in 2016 and 2018 that sediment runoff on the east side of the Main Granulated Slag Pile has deposited sediment below the road.

Monitoring for the groundwater remedy indicates that arsenic, cadmium, copper, lead and zinc results were below water quality performance standards in all POC wells during sampling events in April and July 2018.

Institutional controls are a component of all OUs at the Site. The 2020 ESDs and ROD Amendment identify various programs to achieve these requirements: Development Permit System (DPS) and Community Protective Measures Program (CPMP), which have been and will be implemented by ADLC. The RODs for the Community Soils OU and the ARWW&S OU identified ADLC's DPS and CPMP as institutional controls that notify, inform and educate people about reducing their exposure to contamination when soils are disturbed or land use changes. ADLC's Superfund program works closely with the Planning Department to guide developers through the DPS process to ensure developers understand and adhere to Superfund protocols. In addition, new domestic wells require a permit through ADLC's Environmental Health Department. In conjunction with the well installation permit, applicants are required to obtain an administrative development permit through ADLC's Planning Department. Additional institutional controls include ADLC's Soil Swap program, which has been expanded to include the option of raised structures for residents who want a vegetable garden and/or play area (e.g., a sandbox) or have clean topsoil for existing gardens. Residents who would like information on their property can contact ADLC.[5] ARCO has finalized the ICIAP in 2020 which outlines the governmental, proprietary and information ICs as required by the site decision documents.

EPA prioritizes remedial actions to address contamination in residential soils where young children are living. For properties that are not remediated, an institutional controls program to inform and educate residents on ways to reduce exposure to potentially contaminated soils and dust is in place. ADLC maintains a database that tracks whether properties have been sampled and/or remediated. If a property has not been sampled previously, ADLC, in consultation with ARCO, can direct soil and interior dust sampling through the "test by request" program. This program has been incorporated into 2015 Community Soils OU Remedial Action Work Plan and will continue after completion of the remedial action. EPA works closely with ADLC in the implementation of institutional controls.

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

Question B Summary:

This FYR completed a review of state and federal standards selected in decision documents as the ARARs for the surface water and groundwater remedies. The review (Appendix I) indicated that the only ARAR that has become more stringent is the acute state surface water criteria for cadmium. EPA and MDEQ are in the process of expanding the ARWW&S OU surface water remedy to address exceedances of state water quality standards in site streams and tributaries during high flows and storm events. The most current ARARs for surface water will be incorporated as required once the surface water remedy is expanded.

Soil cleanup goals were also reviewed to determine if they remain valid based on any changes in toxicity criteria. The review indicated that the cleanup goals remain valid; decision documents considered the most current toxicity information available for arsenic and lead (Appendix J). Residential lead cleanup levels set for this Site were presented in OU16 Community Soils 2013 AROD. For lead in soil, EPA's Office of Solid Waste and Emergency

[5] If you have a project that could disturb soil (such as tree planting or fence or underground sprinkler) or you would like to renovate your house or have a garden, contact the ADLC Coordinator at 406-563-7019. If you want your yard tested or obtain information about testing please call 406-563-7476.

Response Directives 9355.4-12 (EPA, 1994) and 9200.4-27P (EPA, 1998), were identified as federal chemical-specific To Be Considered 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. The cleanup level was derived based on the 1994 and 1998 lead guidance documents, 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 levels for lead listed in the decision document will need to be revisited.

Remedies for the Site include institutional controls to prevent, for example, residential development in areas that have been remediated to commercial levels for arsenic. Thus, land use could change, but as long as institutional controls are in place and enforced to ensure these areas are cleaned up to the residential standard, the remedy will remain protective.

The RAOs of preventing direct exposure to soil, dust and waste have been reached for those properties where the soil remedies have been completed. The remedies continue to progress toward meeting the RAOs associated with potential exposures to smelter-contaminated soils, dust and waste through remediating these media through removal, treatment or capping. Once all contaminant sources are remediated, progress can be made on achieving the groundwater and surface water RAOs, which include minimizing the migration of source contamination to those media and restoring those media to beneficial use where practical.

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

No other information has become available that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR Report:
Flue Dust OU (OU11), Mill Creek (OU15)

Issues and Recommendations Identified in the FYR Report:

OU(s): ARWW&S OU (OU4)	**Issue Category: Operations and Maintenance**			
	Issue: Monitoring reports in 2016 and 2018 noted that sediment from the Main Slag Pile is being deposited below the road in the area east of the slag pile an inactive gully on the east side of the Main Slag Pile has formed, depositing sediment below the road.			
	Recommendation: Remediate this area and evaluate the need for additional BMPs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2022

OU(s): ARWW&S OU (OU4)	Issue Category: Operations and Maintenance			
	Issue: Elevated levels of metals have been detected in areas surrounding the Main Slag Pile.			
	Recommendation: Complete delineation of areas near the Main Slag Pile and conduct a risk assessment to determine if additional actions are needed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2022

OU(s): ARWW&S OU (OU4)	Issue Category: Operations and Maintenance			
	Issue: ARCO noted in the slag pile monitoring reports that there is wind-blown slag identified north of the northern channel.			
	Recommendation: Implement additional BMPs, as necessary, to further reduce fugitive dust migration, and include in an updated Operation and Closure/Reclamation Plan.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2022

OU(s): ARWW&S OU (OU4)	Issue Category: Site Access/Security			
	Issue: Monitoring reports and site inspection observations indicate that trespassing is occurring on the Main Slag Pile.			
	Recommendation: Improve engineering controls to prevent or minimize trespassing as practicable.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2022

OU(s): Old Works OU (OU7)	Issue Category: Site Access/Security			
	Issue: Monitoring reports and site inspection observations indicate that trespassing is occurring on the capped red sand area next to the golf course along a paved recreational trail.			
	Recommendation: Improve engineering controls to prevent or minimize trespassing as practicable.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
Yes	Yes	PRP	EPA	9/30/2022

OTHER FINDINGS

- Completion and implementation of a reuse or closure plan for remaining slag piles (Main Granulated Slag, West Stack Slag and landfill) must be completed and implemented.
- The final Golf Course O&M Plan must be implemented, and additional engineering controls should be considered, to prevent trespassers from damaging the capped red sand area next to the golf course.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: ARWW&S OU (OU4)	*Protectiveness Determination:* Will be Protective
Protectiveness Statement: The remedy will be protective of human health and the environment upon completion of the remaining remedial actions, including soil reclamation and stormwater controls for the RDUs (1, 2, 3, 6, 7, 9, 15 and West Galen). In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.	

Protectiveness Statement(s)	
Operable Unit: Old Works OU (OU7)	*Protectiveness Determination:* Will be Protective
Protectiveness Statement: The remedy will be protective of human health and the environment upon completion of remaining remedial actions at the OU, including capping of the following parcels (McDowell, Warner and RDM), and access controls for the Historic Structure Area and capped red sand area adjacent to the golf course. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.	

Protectiveness Statement(s)	
Operable Unit: Flue Dust OU (OU11)	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy is protective of human health and the environment.	

Protectiveness Statement(s)	
Operable Unit: Mill Creek OU (OU15)	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy is protective of human health and the environment.	

Protectiveness Statement(s)	
Operable Unit: Community Soils OU (OU16)	*Protectiveness Determination:* Will be Protective
Protectiveness Statement: The remedy will be protective of human health and the environment upon completion of remaining remedial actions at the OU including soil/waste removal, backfilling with clean soil, and revegetating or installing gravel or similar materials. Actions completed to date have effectively eliminated potential exposure pathways. In the interim, institutional controls are in place that notify, inform and educate people about reducing their exposure to contamination when soils are disturbed or land use changes. ADLC's Superfund program also works closely with the Planning Department to guide developers through the DPS process to ensure developers understand and adhere to Superfund protocols.	

VIII. NEXT REVIEW

The next FYR Report for the Anaconda Co. Smelter Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2009 ARWW&S Short-Term Groundwater Monitoring Sampling and Analysis Plan (SAP) Addendum No. 1. Prepared by Pioneer Technical Services, Inc. for Atlantic Richfield Company, March 23, 2009.

2018 Anaconda Smelter Development Repository Operation and Management Report. Draft Final. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. March 2019.

2018 Domestic Well Monitoring Data Summary Report (DSR). Draft Final. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by ARCO. March 2019.

2018 Engineered Controls Inspection and Maintenance (I&M) Report. Draft Final. Anaconda Smelter NPL Site. Prepared Pioneer Technical Services, Inc. March 2019.

2018 Long-Term Groundwater Monitoring Low and High Water Table Events Data Summary Report (DSR). Draft Final. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. June 2019.

2018 Opportunity Ponds Remedial Design Unit (RDU) 8 Groundwater and Surface Water Management System Operation, Maintenance, and Monitoring Report. Draft Final. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. March 2019.

2018 Smelter Hill Repository Complex (SHRC) Monitoring and Maintenance Report. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. March 2019.

2018 Vegetation Monitoring Annual Report. Draft Final. Anaconda Smelter NPL Site. Old Works/East Anaconda Development Area OU and Anaconda ARWW&S OU. June 2019.

2018 Willow Creek Riparian Vegetation and Bank Stability Monitoring Report. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by TREC, Inc. March 2019.

2019 Opportunity Ponds Remedial Design Unit (RDU) 8 Groundwater and Surface Water Management System Operation, Maintenance, and Monitoring Report. Draft Final. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. March 2020.

Community Soils Remedial Action Work Plan/Final Design Report. Final. Prepared by Pioneer Technical Services, Inc. February 2020.

Dutchman Wetlands Site 2018 Operation, Monitoring and Maintenance (OM&M) Report. Draft Final. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. April 2019.

Explanation of Significant Differences. Community Soils Operable Unit. Anaconda Smelter NPL Site. May 2017.

Explanation of Significant Differences. Community Soils Operable Unit. Anaconda Smelter NPL Site. June 2020.

Explanation of Significant Differences: Old Works/East Anaconda Development Area Site. Anaconda Co. Smelter. EPA ID: MTD093291656. EPA Region 8. November 1995.

Explanation of Significant Differences. Old Works/East Anaconda Development Area Site. Anaconda Smelter NPL Site. June 2020.

Fifth FYR - Anaconda Smelter Superfund Site. Prepared by EPA Region 8. Helena, Montana. September 2015.

Old Works Golf Course Operations and Maintenance Plan. Final. Prepared by September 2019. Prepare by ARCO and the ADLC.

Pre/Post-Treatment In Vitro Bioaccessibility Sampling Data Summary. Memorandum. Anaconda Smelter Superfund Site. Prepared by CDM Smith. December 2019.

Proposed Plan for Record of Decision Amendment Anaconda Regional Water, Waste and Soils Operable Unit. Anaconda Smelter Superfund Site, Anaconda, MT. June 2017.

RDU 12 – Main Granulated Slag Pile and West Stack Slag Pile Annual Reports. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by ARCO. February 2019.

Record of Decision Amendment, Anaconda Regional Water, Waste and Soils Operable Unit OU, Anaconda Smelter NPL Site, Anaconda, Montana. EPA Region 8 and DEQ. September 2011.

Record of Decision Amendment, Community Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, Montana. EPA Region 8 and DEQ. September 2013.

Record of Decision: Anaconda Smelter/Mill Creek, MT. EPA Region 8. October 1987.

Record of Decision Amendment: Anaconda Smelter/Mill Creek, MT. EPA Region 8. January 1988.

Record of Decision. Anaconda Company Smelter. EPA ID: MTD093291656. EPA Region 8. September 1991.

Record of Decision, Anaconda Regional Water, Waste and Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, Montana. EPA Region 8 and DEQ. September 1998.

Record of Decision, Community Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, MT. EPA Region 8 and DEQ. October 1996.

Record of Decision: Old Works/East Anaconda Development Area Site, Anaconda, MT. EPA Region 8. July 1994.

Record of Decision Amendment: Regional Water, Waste and Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, MT. EPA Region 8. June 2020.

Remedial Design Unit (RDU) 5 Active Railroad Superfund 2019 Annual Operations and Maintenance (O&M) Report. Draft Final. Prepared by Butte, Anaconda & Pacific Railway. May 11, 2020.

Residential Soils/Dust Remedial Action Work Plan/Final Design Report. Final. Prepared by Pioneer Technical Services, Inc. August 2015.

Smelter Hill Repository Complex (SHRC) Long-Term Leachate Management System Construction Completion Report (CCR). Draft Final. Prepared by Pioneer Technical Services, Inc. February 2020.

Smelter Hill Repository Complex (SHRC) Long-Term Leachate Management System Shakedown Summary Report. Draft Final. Prepared by Pioneer Technical Services, Inc. February 2020.

Smelter Hill Repository Complex (SHRC) Long-Term Operation, Monitoring, and Maintenance (OM&M) Plan. Draft Final. Prepared by Pioneer Technical Services, Inc. May 2020.

Surface Water Technical Impracticability (TI) Evaluation Report. Final. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. April 2017.

APPENDIX B – SITE CHRONOLOGY

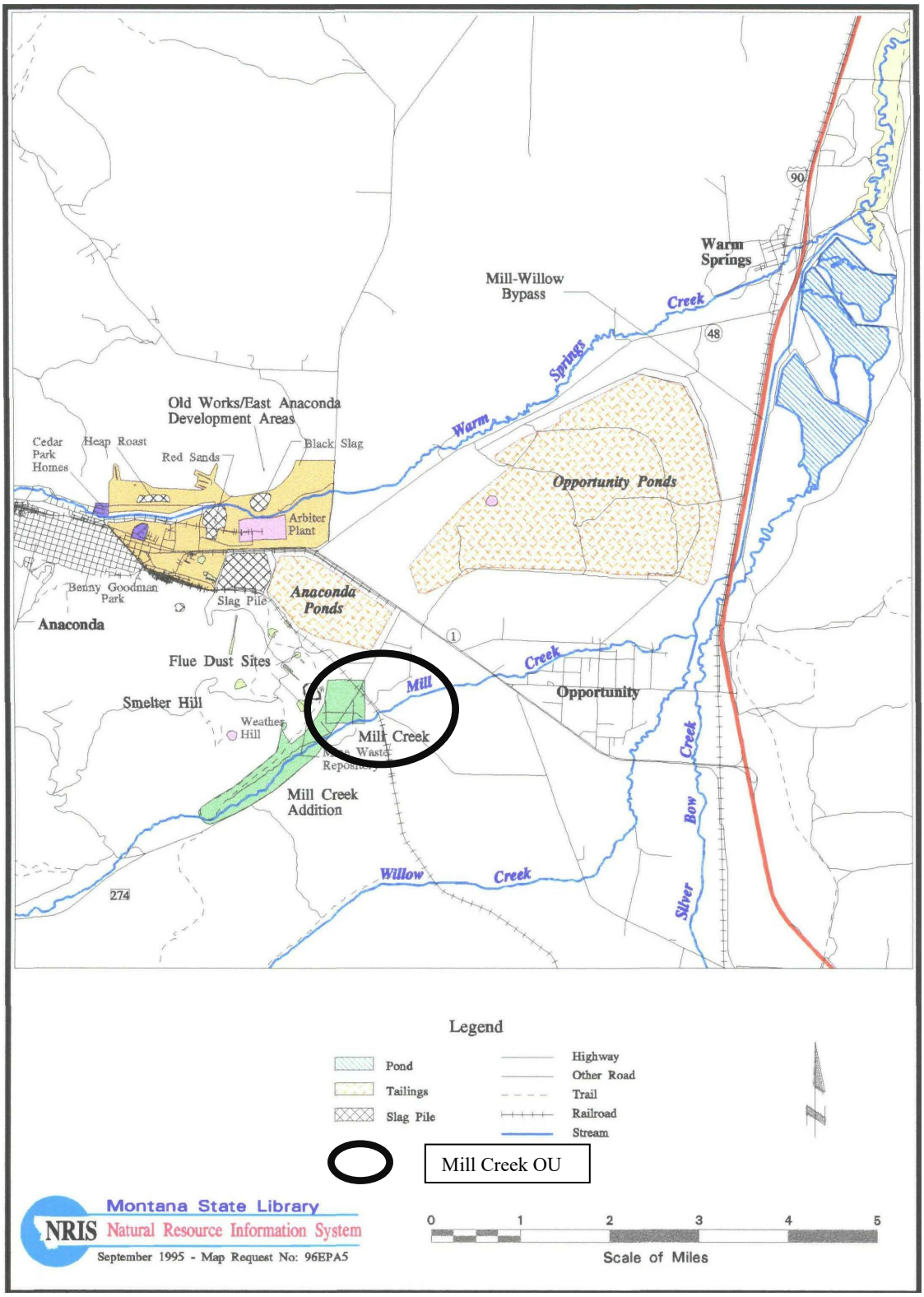
Table B-1: Site Chronology

Event	Date
Smelting operations in Anaconda	1884 - 1980
Smelter shutdown/demolition	1980 - 1986
EPA proposed Site for listing on NPL	1982
EPA finalized Site's listing on NPL	1983
EPA signed Mill Creek OU15 ROD	October 1987
EPA and Federal Emergency Management Agency relocated Mill Creek residents and completed site demolition	1986 - 1988
EPA signed an AROD for OU15	January 6, 1988
PRP completed Mill Creek final remedial action	1988
EPA signed Flue Dust OU11 ROD	September 1991
PRP completed the Anaconda Yards time-critical removal action for residential soil removal	1991 - 1992
PRP completed flue dust treatment and disposal	1992
PRP completed Old Works time-critical removal action soil stabilization	1992
PRP completed Arbiter non-time-critical removal action (former OU 12)	1994
PRP completed Beryllium non-time-critical removal action (former OU 9)	1992 - 1996
PRP began Stucky Ridge remedial action	1994
EPA signed Site's first FYR Report	1994
EPA signed the Old Works OU ROD	March 1994
EPA signed Old Works OU ESD	November 6, 1995
PRP completed golf course construction in Old Works area	1994 - 1997
EPA signed Community Soils OU 16 ROD	September 1996
PRP completed Red Sands remedial action	1996 -1998
Aspen Hills and East Anaconda Yards remedial action began	1996
EPA signed ARWW&S OU ROD	September 1998
PRP completed OU7 Drag Strip remedial action	1998 - 1999
EPA signed Site's second FYR Report	1999
PRP began implementation of stormwater controls in the ARWW&S OU	2000
PRP began Smelter Hill remedial action in Nazer Gulch as part of RDU 3	2001
PRP completed the Anaconda Ponds (RDU 4) remedial action	2002 - 2004
PRP completed the Stucky Ridge Area 4 remedial action	2002
PRP completed the Aspen Hills/Loop Track remedial action at the Old Works OU	2002
PRP completed Triangle Waste remedial action	2002
PRP began Opportunity Ponds reclamation remedial action	2002
PRP completed Cashman Concentrate remedial action	2003
PRP began removal of contaminated community soils	2002
PRP began West Galen remedial action	2005
EPA signed Site's third FYR Report	2005
PRP began reclamation of areas adjacent to railroad	2006
PRP began South Opportunity (RDU 6) remedial action	2006
PRP completed A1 Lumber Area remedial action	2009
PRP completed Railroad Right of Way (RDU 5) West Valley Railroad Line removal	2009
PRP substantially completed North Opportunity (RDU 7) remedial action	2009 - 2010
EPA signed Site's fourth FYR Report	2010
PRP began Fluvial Tailings (RDU 9) remedial action	2010
PRP completed ADLC Property remedial action in Old Works OU	2010

Event	Date
PRP completed Phase 1 of residential property remediation	2010
EPA signed ARWW&S OU AROD	2011
PRP began Smelter Hill Facilities (RDU 14) remedial action	2011
PRP completed remedial action for portion of Yellow Ditch (part of RDU 9)	2011
PRP completed Powell Vista Area remedial action	2011
PRP completed remedial action on property adjacent to railroad property in Anaconda as part of Community Soils OU	2011
PRP completed Anaconda Local Development Corporation property remedial action as part of Old Works OU	2011 - 2012
PRP completed Arbiter Industrial Complex properties remedial action as part of Old Works OU	2005 - 2012
PRP completed Lower Willow Creek remedial action (part of RDU 9)	2012 - 2013
PRP finalized Anaconda Site VMP	2013
PRP completed remedial actions at multiple properties in Old Works	2012 - 2014
PRP completed waste removal and reclamation at the Active Railroad/Blue Lagoon (RDU 5), including the following areas: Mill and Willow Creek trestles, Blue Lagoon, Son of Blue Lagoon, Mill Creek Flood Irrigation Area, a portion of the Yellow Ditch, a portion of the East Anaconda Yards, railroad beds within the main portion of the town of Anaconda, West Anaconda Yards, West Valley line, and West Valley Historic Railroad Spurs	2010 - 2014
EPA signed the Community Soils OU AROD	2013
PRP began Launderville Area remedial action	2014
PRP substantially completed Opportunity Ponds (RDU 8) remedial action	2004 - 2014
EPA signed the fifth FYR	September 25, 2015
PRP and ADLC completed the draft ICP	2017
EPA signed the Community Soils OU ESD	June 19, 2017
PRP completed Final Surface Water TI Evaluation Report	2017
PRP completed construction of leachate collection and evaporation system at Flue Dust OU11	2019
EPA issued Proposed Plan to Amend 1998 ROD and 2011 AROD for ARWW&S OU to expand surface water remedy	2019
Draft Remedy Coordination, Funding, and Settlement Agreement by and Between Anaconda-Deer Lodge County and ARCO released for public comment	February 20, 2020
EPA Administrator signs the ROD Amendment for ARWW&S, OU 4	June 12, 2020
EPA signs the ESD for the Old Works/East Anaconda Development Area (OW/EADA) OU 7	June 12, 2020
EPA signed the Remedial Action Completion Reports for Beryllium (OU9), Flue Dust (OU11) and Arbiter (OU12)	July 23, 2020

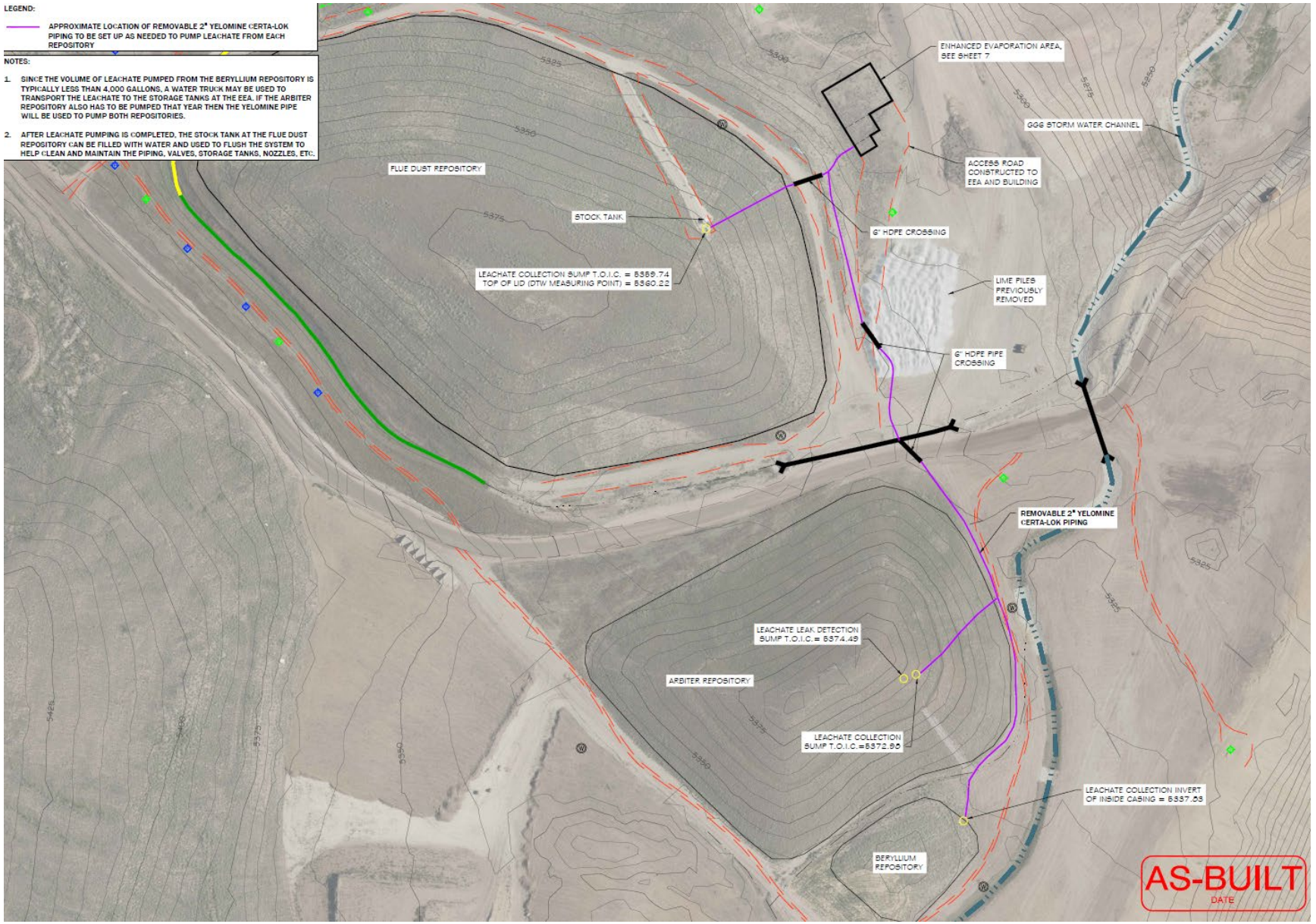
APPENDIX C – SITE MAPS

Figure C-1: Mill Creek OU (OU15)



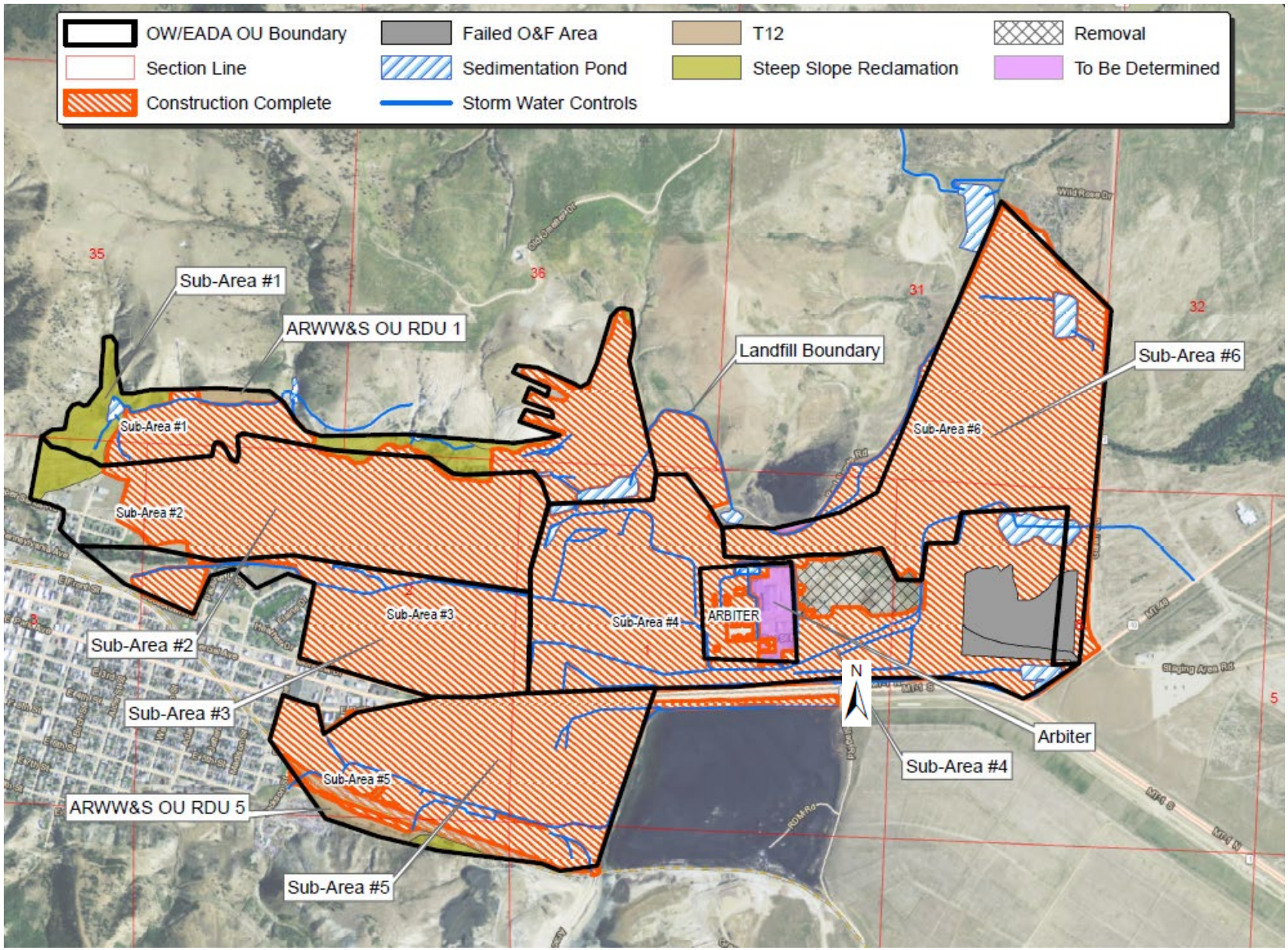
Source: Explanation of Significant Differences-Anaconda Smelter Superfund Site Old Works/East Anaconda Development Area Operable Unit (OU 7) Anaconda, Deer Lodge County, Montana. October 1995.

Figure C-2: Flue Dust OU (OU11)



Source: Smelter Hill Repository Complex (SHRC) Long-Term Leachate Management System Shakedown Summary Report. Draft Final. Prepared by Pioneer Technical Services, Inc. February 2020.

Figure C-3: Old Works OU (OU7)

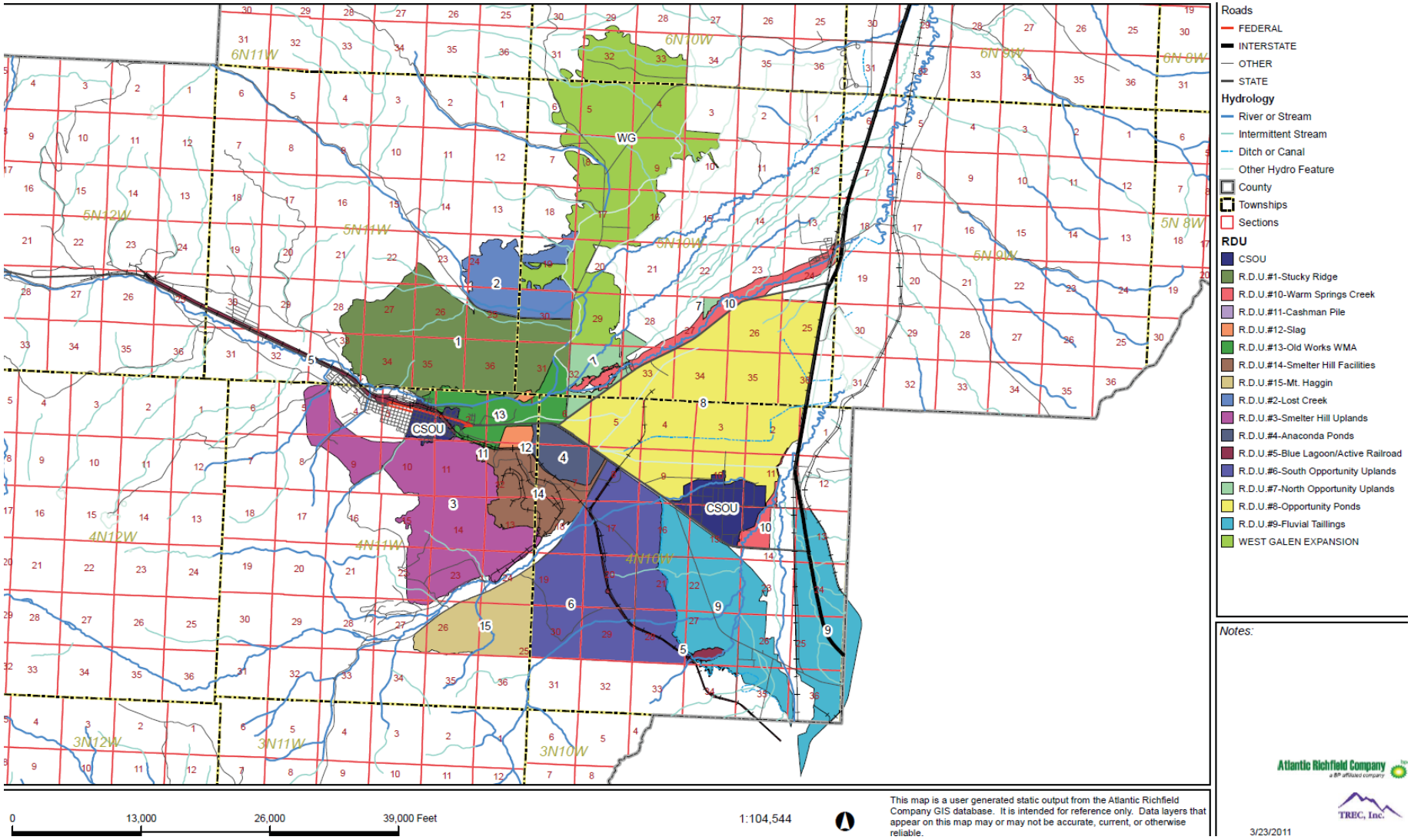


Source : Fifth FYR - Anaconda Smelter Superfund Site. Prepared by EPA Region 8. Helena, Montana. September 2015.

Figure C-4: Community Soils OU as of 2018

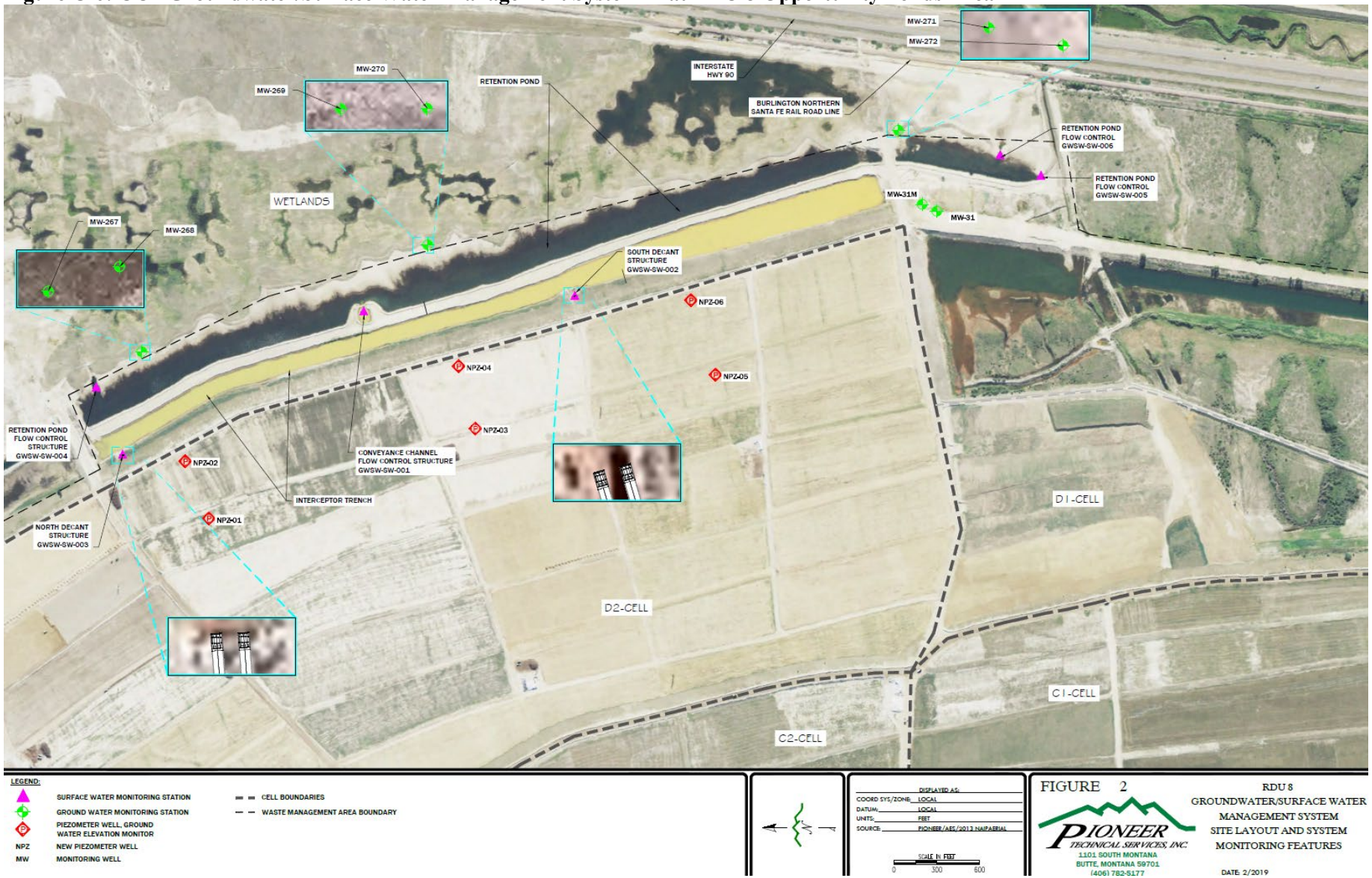
Source: Community Update Presentation. Prepared by EPA Region 8. March 2019

Figure C-5: ARWW&S OU (OU 4) and Associated Remedial Decision Units



Source: Anaconda Smelter NPL Site, Anaconda Regional Water, Waste & Soils Operable Unit, Final Surface Water Technical Impracticability (TI) Evaluation Report. Prepared by Atlantic Richfield. April 2017.

Figure C-6: OU4 Groundwater/Surface Water Management System in at RDU 8 Opportunity Ponds Area



Source: Draft Final 2018 Opportunity Ponds Remedial Design Unit (RDU) 8 Groundwater and Surface Water Management System Operation, Maintenance, and Monitoring Report. Prepared by Atlantic Richfield Company. March 2019.

APPENDIX D – PRESS NOTICE

EPA
United States
Environmental Protection
Agency

EPA Conducting Five-Year Review of Anaconda Smelter Superfund Site Remediation

The U.S. Environmental Protection Agency (EPA) is conducting a five-year review of the cleanup work at the Anaconda Smelter Superfund Site. The review assesses the effectiveness and protectiveness of the remedy's cleanup actions and institutional controls to date.

Part of the process is to interview key people involved with the site and EPA welcomes public comments regarding work done at any of the OUs. Comments on the protectiveness of the remedy will be carefully considered and may help to determine recommendations for the future.

People may send written comments by mail or email through July 15, 2020 to:

Dana Barnicoat
Community Involvement Coordinator
U.S. EPA
10 West 15th Street, Suite 3200,
Helena, MT 59626
Barnicoat.dana@epa.gov
406-560-6261

APPENDIX E – INTERVIEW FORMS

Anaconda Smelter Superfund Site		**Five-Year Review Interview Form**	
Site Name:	**Anaconda Smelter**	**EPA ID No.:**	**MTD093291656**
Interviewer Name:	**Ryan Burdge**	**Affiliation:**	**Skeo**
Subject Name:	**Arrowhead Foundation**	**Affiliation:**	**Arrowhead Foundation**
Time:	**12:00 p.m.**	**Date:**	**10/09/2019**

Interview Format (circle one): **In Person** **Phone** **Mail** **Other:**

Interview Category: **Residents**

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

   Yes.

2. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

   Yes, EPA has provided Arrowhead with site information and we help disperse the information to the public. There have been times with limited information shared, mainly during consent decree negotiations. The process of Arrowhead sharing information does work, but there can be a lag in turnaround time. We do host meetings and use social media to encourage more engagement. The majority of community interest is people asking when the yard will be done, or that it was not done well. The yard cleanups is a long process. Takes a long time to get out there and do the work, causes frustrations.

3. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

   Overall, like that it is getting cleaned up even though a long process. We will have a cleaner town and properties.

   The hardest part is for people to understand the science. Even when an EPA scientist comes here to present, the information goes in one ear and out the other for many folks. A lot of people here talk about cancers and illnesses in the community.

   From a land buyer perspective, it is tough for a prospective buyer to come in and see a big document with land covenants. Updating the covenants is a huge process since each deed has all the covenants attached. ARCO solution is to say we will take off the covenants if buyer signs covenant not to sue but this is still unclear.

4. Can you think of anything EPA could have done during the cleanup to better communicate if there were any risks associated with the site (as appropriate, if individual was present during cleanup)?

   EPA has not done a good job about communicating arsenic and lead risk. People missed the connection as to why EPA was doing X to make it cleaner. It was difficult for Arrowhead to find an unbiased technical advisor. Some residents do not really understand the cleanup. They just generally view it as "I get a new yard." It is still not clear when EPA gives them notes on the cleanup, where the soil comes from, etc. The

contractors are helpful, but there is a lack of up front information. There could be more education about the borrow materials and more education on the process and timeline. People do like the sod.

If EPA really wants an opinion, they will need to go to the people. The public will not show up at meetings. Now in the digital age the information should be structured and designed for digital sharing in mind. The Arrowhead document repository has a lot of information but it is not everything. We have discussed creating a space that is more accessible and more focused on the most important information.

5. What have been the effects of this Site on the surrounding community?

   It is hard to separate the economic devastation from the smelter shutdown and CERCLA from it taking 30 years to conduct the cleanups. Only in recent years have some businesses have been interested in located here. It has taken a long time to get to this point.

6. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

   Yes, people motorbike and ride ATVs in the hills and do trespass the stack on smelter hill. We want public trails and also do not want the capped areas to get wrecked. The public would like a greenway from Whitehall to Anaconda.

7. Are you aware of any new information that would affect the protectiveness of the remedy?

   No.

8. Do you have any additional concerns about future land use? Other ideas about redevelopment?

   No.

9. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

   There are outstanding questions about how the institutional controls will work, including the liability and who pays for sampling and soil work. Also, how the enforcement of institutional controls will be funded. The local planning office has only two staff and would not be expected to monitor how folks are using properties.

   The TAG would be more effective if documents were shared sooner. Our current recommendations are for EPA to: share documents sooner, pursue planning for recreational trails, and to clarify the institutional control implementation and funding.

APPENDIX F – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST
OU4: ANACONDA REGIONAL WATER, WASTE AND SOILS (ARWW&S)

I. SITE INFORMATION

Site Name: Anaconda Co. Smelter	**Date of Inspection:** 10/8/2019
Location and Region: Anaconda, MT 8	**EPA ID: MTD093291656**
Agency, Office or Company Leading the Five-Year Review: EPA Region 8	**Weather/Temperature:** Sunny, breezy, 52F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☒ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Soil treatment with lime, organic amendments, tilling; stream stabilization; engineered stormwater controls; TI waiver for groundwater and surface water; groundwater/surface water management system to contain stormwater runoff and groundwater contamination through sedimentation ponds; domestic well monitoring program to include well replacement or addition of treatment units, where warranted.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____Name _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached:_____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached: _____

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III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A

☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☐ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☒ Remediation is still ongoing so the OU has not yet entered into O&M.

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: OU has not yet entered into O&M.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Fencing around Waste Management Areas and slag piles.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs posted at Waste Management Areas and slag piles not to trespass.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: ADLC

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: The ADLC has an Interim ICP in place whereby the ADLC works closely with the Planning Department to guide developers through the DPS process to ensure developers understand and adhere to Superfund protocol. In addition, construction of new domestic wells within the county requires a permit through ADLC's Environmental Health Department.While ICs are adequate, additional funding is required for the ADLC to continue to implement them. EPA is working with the PRP as part of a settlement that will include obtaining long-term funding for the county to implement the ICs currently in place.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☐ No vandalism evident

Remarks: Trespassing occurs around the Main Granulated Slag pile with observed graffitti and foot prints.

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☐ N/A

Remarks: Redevelopment was observed in the Opportunity Ponds area where an adult correctional facility was built following cleanup of soils to UU/UE.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: All Waste Management Areas appeared to be well vegetated following soil treatment. Vegetation monitoring is conducted to ensure areas susceptible to erosion are covered.

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident

Lengths: _____ Widths: _____ Depths: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident

Area extent: _____ Depth: _____

Remarks: Waste Management Areas are routlinely monitored for vegetative cover and erosion and any issues are addressed as part of the maintenance for the closed Waste Management Areas.

4. **Holes** ☐ Location shown on site map ☒ Holes not evident

Area extent: _____ Depth: _____

Remarks: _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established

☒ No signs of stress ☒ Trees/shrubs (indicate size and locations on a diagram)

Remarks: All the treated soil areas had a good vegetative cover. Trees are planted on the steep slopes to prevent erosion while predominantly grass is planted in the low lying areas once the soil has been treated. In some areas, soil was stripped and clean fill applied to the stripped areas followed by vegetation.

6. **Alternative Cover** (e.g., armored rock, concrete) ☒ N/A

Remarks: _____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident

Area extent: _____ Height: _____

Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Area extent: _____
☐ Ponding	☐ Location shown on site map	Area extent: _____
☐ Seeps	☐ Location shown on site map	Area extent: _____
☐ Soft subgrade	☐ Location shown on site map	Area extent: _____

Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map

☒ No evidence of slope instability

Area extent: _____

Remarks: _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

C. Letdown Channels ☒ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ No evidence of settlement

Area extent: _____ Depth: _____

Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☒ No evidence of degradation

Material type:_____ Area extent: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ No evidence of erosion

Area extent: _____ Depth: _____

Remarks: Engineered stormwater runoff controls are in place that consist of drainage channels diverting runoff away from Waste Management Areas through rip-rap-lined and rip-rap with grout-lined channels.

4. **Undercutting** ☐ Location shown on site map ☒ No evidence of undercutting

Area extent: _____ Depth: _____

Remarks: _____

5. **Obstructions** Type: _____ ☒ No obstructions

☐ Location shown on site map Area extent: _____ Size: _____

Remarks: _____

6. **Excessive Vegetative Growth** Type: _____

☒ No evidence of excessive growth

☒ Vegetation in channels does not obstruct flow

☐ Location shown on site map Area extent: _____

Remarks: _____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Gas Monitoring Probes**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

4. **Extraction Wells Leachate**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☒ Applicable ☐ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☒ Siltation not evident

Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

☒ Erosion not evident

Remarks: _____

3. **Outlet Works** ☒ Functioning ☐ N/A

Remarks: Outlets from sedimentation pond in the Opportunity Pond areas appeared to be functioning as designed. No obstructions noted.

4. **Dam** ☒ Functioning ☐ N/A

Remarks: Check dams in place are functioning.

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☒ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☒ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☐ Functioning ☒ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: _____

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☒ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☒ Others: use of sedimentation ponds to passively treat contaminated shallow groundwater and stormwater runoff in the Opportunity Pond area. Reverse osmosis units installed on potable wells exceeding criteria.

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: Water from sedimentation pond is discharged to a second impoundment as a polishing step once metals have been removed through oxidation in the sedimentation pond.

5. **Treatment Building(s)**

☒ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: Point of compliance wells were observed from a distance downgradient of the sedimentation pond in the Opportunity Pond area.

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The soil remedy is designed to prevent direct exposure and to minimize or eliminate contaminant movement to surface water and groundwater by consolidating waste in WMAs followed by closure of these areas with a cap and monitoring systems; excavation of soils and treatment of soils with lime or lime and tilling; stabilizing stream banks and construction of engineered stormwater controls. In addition, the Domestic Well Monitoring Program samples wells, and if necessary replaces wells or treatment units are installed as needed. Further institutional controls are in place to prevent exposure to contaminated soil and groundwater through county ordinances. The EPA is working with the PRP as part of a settlement that will include obtaining additional long-term funding for the county to implement the ICs currently in place.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Additional fencing or deterrent may be required on the Main Granulated Slag pile as signs of trespassing were noted.

C. Early Indicators of Potential Remedy Problems

	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. None.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. A proposed plan was released in September 2019, which proposes to implement the contingency remedies of the 1998 ROD and 2011 ROD Amendment to address contamination on the steep sloped areas of the OU through planting of vegetation, slope and drainage erosion controls, and monitoring remedy performance.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST
OU7: OLD WORKS/EAST ANACONDA DEVELOPMENT AREA

I. SITE INFORMATION

Site Name: Anaconda Co. Smelter	**Date of Inspection:** 10/8/2019
Location and Region: Anaconda, MT 8	**EPA ID: MTD093291656**
Agency, Office or Company Leading the Five-Year Review: EPA Region 8	**Weather/Temperature:** Sunny, breezy, 52F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Soil treatment with lime; stormwater controls and upgrades to existing levees adjacent to Warm Springs Creek; monitoring of vegetation, erosion.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached: _____

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III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A

☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: Groundwater monitoring is conducted as part of OU4.

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house	☐ Contractor for state
☐ PRP in-house	☒ Contractor for PRP
☐ Federal facility in-house	☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks: Fencing between the golf course and the red sands area is damaged by trespassers. There was evidence of use of all-terrain vehicles and motorbikes on the red sands.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs posted on fencing not to trespass.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: ADLC

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: The Anaconda-Deer Lodge County (ADLC) has an Interim Institutional Controls Program in place whereby the ADLC works closely with the Planning Department to guide developers through the development permit system (DPS) process to ensure developers understand and adhere to Superfund protocol. In addition, construction of new domestic wells within the county requires a permit through ADLC's Environmental Health Department.While ICs are adequate, additional funding is required for the ADLC to continue to implement them. EPA is working with the PRP as part of a settlement that will include obtaining long-term funding for the county to implement the ICs currently in place.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☐ No vandalism evident

Remarks: Vandalism of fencing noted between the golf course and the red sands area. Also all-terrain vehicles and motorbike tracks were observed on the red sands area.

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: The area appeared to be well vegetated. Vegetation monitoring is conducted to ensure areas

susceptible to erosion are covered.

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
Lengths: _____ Widths: _____ Depths: _____
Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Area extent: _____ Depth: _____
Remarks: Area is included in the sitewide vegetative cover and erosion erosion monitoring program.

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
Area extent: _____ Depth: _____
Remarks: _____

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established
☒ No signs of stress ☐ Trees/shrubs (indicate size and locations on a diagram)
Remarks: The waste management areas had a good vegetative cover except for a portion of the red sands, which were left in place as a historic feature along a paved nature trail.

6. **Alternative Cover** (e.g., armored rock, concrete) ☒ N/A
Remarks: _____

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Area extent: _____ Height: _____
Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Area extent: _____
☐ Ponding	☐ Location shown on site map	Area extent: _____
☐ Seeps	☐ Location shown on site map	Area extent: _____
☐ Soft subgrade	☐ Location shown on site map	Area extent: _____

Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map
☒ No evidence of slope instability
Area extent: _____
Remarks: _____

B. Benches ☐ Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

C. Letdown Channels ☒ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ No evidence of settlement
   Area extent: _____ Depth: _____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☒ No evidence of degradation
   Material type:_____ Area extent: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ No evidence of erosion
   Area extent: _____ Depth: _____
   Remarks: Engineered stormwater runoff controls are in place that consist of drainage channels diverting runoff away from waste management areas through rip-rap-lined and rip-rap with grout-lined channels.

4. **Undercutting** ☐ Location shown on site map ☒ No evidence of undercutting
   Area extent: _____ Depth: _____
   Remarks: _____

5. **Obstructions** Type: _____ ☒ No obstructions
   ☐ Location shown on site map Area extent: _____ Size: _____
   Remarks: _____

6. **Excessive Vegetative Growth** Type: _____
   ☒ No evidence of excessive growth
   ☒ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Area extent: _____
   Remarks: _____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

4. **Extraction Wells Leachate**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☐ Siltation not evident

Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

☐ Erosion not evident

Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A

Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☒ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☒ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☐ Functioning ☒ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: _____

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☐ Is routinely submitted on time ☐ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The soil remedy is designed to prevent direct exposure and to minimize or eliminate contaminant movement to surface water and groundwater by consolidating waste in waste management areas followed by closure of these areas with a cap and monitoring systems; excavation of soils and treatment of soils with lime or lime and tilling; stabilizing stream banks and construction of engineered stormwater controls. Further institutional controls are in place to prevent exposure to contaminated soil and groundwater through county ordinances.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

None noted.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

The portion of red sands left as a historic feature along the nature trail is being used by motor bikes and all-terrain vehicles. This activity may result in exposure to dust generated from such activities.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None noted.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST
OU11: FLUE DUST

I. SITE INFORMATION

Site Name: Anaconda Co. Smelter	**Date of Inspection:** 10/8/2019
Location and Region: Anaconda, MT 8	**EPA ID: MTD093291656**
Agency, Office or Company Leading the Five-Year Review: EPA Region 8	**Weather/Temperature:** Sunny, breezy, 52F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Soil treatment with cement and lime; stormwater controls around the flue dust repository, leachate collection and disposal (evaporation) as needed; monitoring of vegetation, erosion, groundwater and leachate levels.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____Name _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached:_____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached:_____

4. **Other Interviews** (optional) ☐ Report attached: _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A

☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house	☐ Contractor for state
☐ PRP in-house	☒ Contractor for PRP
☐ Federal facility in-house	☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Fencing around Smelter Hill Repository Complex and leachate collection and evaporation system.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs posted at Smelter Hill Repository Complex not to trespass.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: ADLC

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: The Anaconda-Deer Lodge County (ADLC) has an Interim Institutional Controls Program in place whereby the ADLC works closely with the Planning Department to guide developers through the development permit system (DPS) process to ensure developers understand and adhere to Superfund protocol. In addition, construction of new domestic wells within the county requires a permit through ADLC's Environmental Health Department. While ICs are adequate, additional funding is required for the ADLC to continue to implement them. EPA is working with the PRP as part of a settlement that will include obtaining long-term funding for the county to implement the ICs currently in place.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: The area appeared to be well vegetated. Vegetation monitoring is conducted to ensure areas susceptible to erosion are covered.

2.	**Cracks**	☐ Location shown on site map	☒ Cracking not evident
	Lengths: _____	Widths: _____	Depths: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☒ Erosion not evident
	Area extent: _____		Depth: _____
	Remarks: Area is included in the sitewide vegetative cover and erosion erosion monitoring program.		
4.	**Holes**	☐ Location shown on site map	☒ Holes not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	**Vegetative Cover**	☒ Grass	☒ Cover properly established
	☒ No signs of stress	☐ Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: The repository had a good vegetative cover.		
6.	**Alternative Cover** (e.g., armored rock, concrete)		☒ N/A
	Remarks: _____		
7.	**Bulges**	☐ Location shown on site map	☒ Bulges not evident
	Area extent: _____		Height: _____
	Remarks: _____		
8.	**Wet Areas/Water Damage**	☒ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Area extent: _____
	☐ Ponding	☐ Location shown on site map	Area extent: _____
	☐ Seeps	☐ Location shown on site map	Area extent: _____
	☐ Soft subgrade	☐ Location shown on site map	Area extent: _____
	Remarks: _____		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☒ No evidence of slope instability		
	Area extent: _____		
	Remarks: _____		
B. Benches		☐ Applicable	☒ N/A
	(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	**Flows Bypass Bench**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
2.	**Bench Breached**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
3.	**Bench Overtopped**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		

C. Letdown Channels ☒ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ No evidence of settlement
   Area extent: _____ Depth: _____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☒ No evidence of degradation
   Material type:_____ Area extent: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ No evidence of erosion
   Area extent: _____ Depth: _____
   Remarks: Engineered stormwater runoff controls are in place that consist of drainage channels diverting runoff away from waste management areas through rip-rap-lined and rip-rap with grout-lined channels.

4. **Undercutting** ☐ Location shown on site map ☒ No evidence of undercutting
   Area extent: _____ Depth: _____
   Remarks: _____

5. **Obstructions** Type: _____ ☒ No obstructions
   ☐ Location shown on site map Area extent: _____ Size: _____
   Remarks: _____

6. **Excessive Vegetative Growth** Type: _____
   ☒ No evidence of excessive growth
   ☒ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Area extent: _____
   Remarks: _____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

4. **Extraction Wells Leachate**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☐ Siltation not evident

Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

☐ Erosion not evident

Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A

Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☒ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☒ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☐ Functioning ☒ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: _____

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☐ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☐ Is routinely submitted on time ☐ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The remedy is designed to prevent exposure to flue dust and minimize or eliminate contaminant movement to underlying soil and groundwater by consolidating the stabilized flue dust in a lined and covered repository. Further institutional controls are in place to prevent exposure to contained waste through county ordinances. The EPA is working with the PRP as part of a settlement that will include obtaining additional long-term funding for the county to implement the ICs currently in place. Further, long-term monitoring of erosion and vegetation is conducted through the sitewide monitoring plan.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

None noted.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None noted.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

The newly installed leachate collection and evaporation system is expected to address the higher than expected leachate volume noted during the previous FYR.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST
OU15: MILL CREEK

I. SITE INFORMATION

Site Name: Anaconda Co. Smelter	**Date of Inspection:** 10/8/2019
Location and Region: Anaconda, MT 8	**EPA ID: MTD093291656**
Agency, Office or Company Leading the Five-Year Review: EPA Region 8	**Weather/Temperature:** Sunny, breezy, 52F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Relocation of residents, home demolition, soil excavation with disposal in Smelter Hill (OU4), regrading and restoration, monitoring and maintaining the vegetation.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____Name _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached:_____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached:_____

4. **Other Interviews** (optional) ☐ Report attached: _____

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III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☐ Up to date ☐ N/A

☐ Contingency plan/emergency response plan ☒ Readily available ☐ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house	☐ Contractor for state
☐ PRP in-house	☒ Contractor for PRP
☐ Federal facility in-house	☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Fencing around Mill Creek area is secured.

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: Signs posted not to trespass.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: ADLC

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: The Anaconda-Deer Lodge County (ADLC) has an Interim Institutional Controls Program in place whereby the ADLC works closely with the Planning Department to guide developers through the development permit system (DPS) process to ensure developers understand and adhere to Superfund protocol. In addition, construction of new domestic wells within the county requires a permit through ADLC's Environmental Health Department.While ICs are adequate, additional funding is required for the ADLC to continue to implement them. EPA is working with the PRP as part of a settlement that will include obtaining long-term funding for the county to implement the ICs currently in place.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: Area appeared to be well vegetated following soil treatment. Vegetation monitoring is conducted to ensure areas susceptible to erosion are covered.

2.	**Cracks**	☐ Location shown on site map	☒ Cracking not evident
	Lengths: _____	Widths: _____	Depths: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☒ Erosion not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
4.	**Holes**	☐ Location shown on site map	☒ Holes not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	**Vegetative Cover**	☒ Grass	☒ Cover properly established
	☒ No signs of stress	☒ Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: _____		
6.	**Alternative Cover** (e.g., armored rock, concrete)		☒ N/A
	Remarks: _____		
7.	**Bulges**	☐ Location shown on site map	☒ Bulges not evident
	Area extent: _____		Height: _____
	Remarks: _____		
8.	**Wet Areas/Water Damage**	☒ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Area extent: _____
	☐ Ponding	☐ Location shown on site map	Area extent: _____
	☐ Seeps	☐ Location shown on site map	Area extent: _____
	☐ Soft subgrade	☐ Location shown on site map	Area extent: _____
	Remarks: _____		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☒ No evidence of slope instability		
	Area extent: _____		
	Remarks: _____		

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1.	**Flows Bypass Bench**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
2.	**Bench Breached**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
3.	**Bench Overtopped**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ No evidence of settlement
   Area extent: _____ Depth: _____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type:_____ Area extent: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Area extent: _____ Depth: _____
   Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Area extent: _____ Depth: _____
   Remarks: _____

5. **Obstructions** Type: _____ ☐ No obstructions
   ☐ Location shown on site map Area extent: _____ Size: _____
   Remarks: _____

6. **Excessive Vegetative Growth** Type: _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Area extent: _____
   Remarks: _____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

4. **Extraction Wells Leachate**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☐ Siltation not evident

Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

☐ Erosion not evident

Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A

Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☐ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☐ Functioning ☐ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: _____

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☐ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: ____

D. Monitoring Data

1. **Monitoring Data**

☐ Is routinely submitted on time ☐ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The soil remedy was designed to eliminate residential exposure to contaminated soils by relocating residents; excavation of soils and deposit the soils within Smelter Hill waste management area. The area has been rezoned for industrial use. Institutional controls are in place to prevent residential exposure to contaminated soil and groundwater through county ordinances. The EPA is working with the PRP as part of a settlement that will include obtaining additional long-term funding for the county to implement the ICs currently in place.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

None noted.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None noted.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None noted.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST
OU16: COMMUNITY SOILS

I. SITE INFORMATION

Site Name: Anaconda Co. Smelter	**Date of Inspection:** 10/8/2019
Location and Region: Anaconda, MT 8	**EPA ID: MTD093291656**
Agency, Office or Company Leading the Five-Year Review: EPA Region 8	**Weather/Temperature:** Sunny, breezy, 52F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Interior dust abatement, soil excavation. Restoration of soil excavations with clean soil, vegetation or engineered covers. Capping of intown railroad line.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

   Agency _____
   Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone No.)
   Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached: _____

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III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A

☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Records readily available in on-site work trailers

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: Groundwater monitoring is conducted as part of OU4.

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house	☐ Contractor for state
☐ PRP in-house	☒ Contractor for PRP
☐ Federal facility in-house	☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: ADLC

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: The Anaconda-Deer Lodge County (ADLC) has an Interim Institutional Controls Program in place whereby the ADLC works closely with the Planning Department to guide developers through the development permit system (DPS) process to ensure developers understand and adhere to Superfund protocol. In addition, construction of new domestic wells within the county requires a permit through ADLC's Environmental Health Department. While ICs are adequate, additional funding is required for the ADLC to continue to implement them. EPA is working with the PRP as part of a settlement that will include obtaining long-term funding for the county to implement the ICs currently in place.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: The excavated areas appeared to be well maintained. Gravelled areas also appeared to be in good condition.

2.	**Cracks**	☐ Location shown on site map	☒ Cracking not evident
	Lengths: _____	Widths: _____	Depths: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☒ Erosion not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
4.	**Holes**	☐ Location shown on site map	☒ Holes not evident
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	**Vegetative Cover**	☒ Grass	☒ Cover properly established
	☒ No signs of stress	☐ Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: _____		
6.	**Alternative Cover** (e.g., armored rock, concrete)		☒ N/A
	Remarks: _____		
7.	**Bulges**	☐ Location shown on site map	☒ Bulges not evident
	Area extent: _____		Height: _____
	Remarks: _____		
8.	**Wet Areas/Water Damage**	☒ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Area extent: _____
	☐ Ponding	☐ Location shown on site map	Area extent: _____
	☐ Seeps	☐ Location shown on site map	Area extent: _____
	☐ Soft subgrade	☐ Location shown on site map	Area extent: _____
	Remarks: _____		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☒ No evidence of slope instability		
	Area extent: _____		
	Remarks: _____		

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1.	**Flows Bypass Bench**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
2.	**Bench Breached**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
3.	**Bench Overtopped**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ No evidence of settlement
   Area extent: _____ Depth: _____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type:_____ Area extent: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Area extent: _____ Depth: _____
   Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Area extent: _____ Depth: _____
   Remarks: _____

5. **Obstructions** Type: _____ ☐ No obstructions
   ☐ Location shown on site map Area extent: _____ Size: _____
   Remarks: _____

6. **Excessive Vegetative Growth** Type: _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Area extent: _____
   Remarks: _____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

4. **Extraction Wells Leachate**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☐ Siltation not evident

Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

☐ Erosion not evident

Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A

Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☐ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☐ Functioning ☐ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: _____

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☐ Is routinely submitted on time ☐ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The soil remedy is designed to prevent direct exposure by excavating contaminated soils and restoring the area with clean soil and vegetation or engineerd cover. Further institutional controls are in place to prevent residential exposure in areas that were remediated to industrial standards.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

None noted.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None noted.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None noted.

APPENDIX G – SITE INSPECTION PHOTOS

OU7: Old Works Golf Course

OU7: Old Works Golf Course

OU7: Recreation trail to Red Sands remediation area


OU7: Damaged fence and vehicle/bike tracks between golf course and recreation trail

OU7: Red Sands remediation area used by recreational bikers

OU7: County land ready for industrial reuse

OU15: Stripped area ready for lime

OU4: Sparse vegetation on remediated area

OU4: Vegetated remediated hillside

OU4: Steep slopes showing tillage and lime pitting

OU4: No trespassing sign in lowlands


OU4: Stucky Ridge showing tilled area

OU4: Entrance to smelter hill area

OU4: Looking at main slag pile, north from smelter hill

OU11: Flue Dust leachate collection and evaporation system located near smelter hill

OU11: Flue Dust leachate collection and evaporation system

OU4: Main slag pile

OU4: North Opportunity area showing check dam for stormwater control

OU4: North Opportunity area showing check dam and stormwater channel

OU4: Organic soil amendments for reclamation of remediated areas

OU4: Remediation of contaminated soil along active railroad

OU4: Warm Springs restoration area

OU4: Remediated Opportunity Ponds area

OU4: Remediated Opportunity Ponds area

OU4: Groundwater and surface water management system

OU4: West Galen remediated lowlands

OU16: Remediated yard

OU16: Sod to be placed at a remediated yard

APPENDIX H – DATA REVIEW TABLES AND FIGURES

Figure H-1: Arbiter Repository Leachate Collection Summary

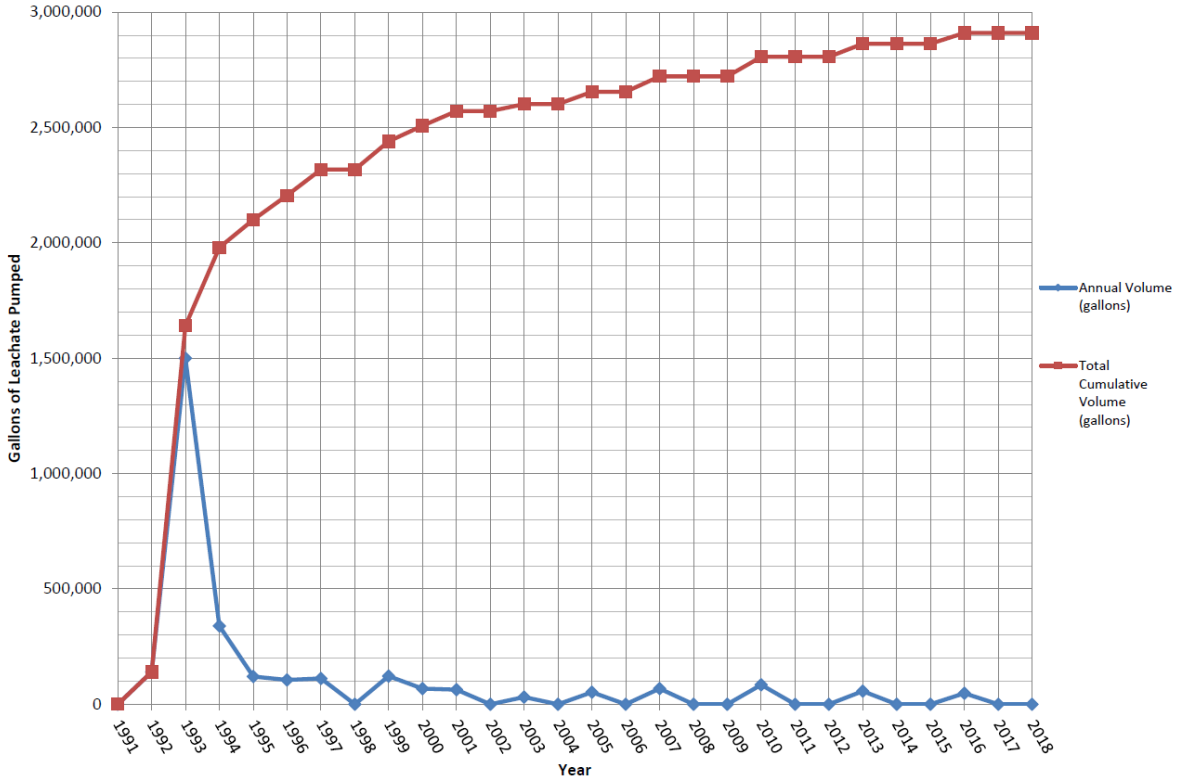


Figure H-2: Beryllium Repository Leachate Collection Summary

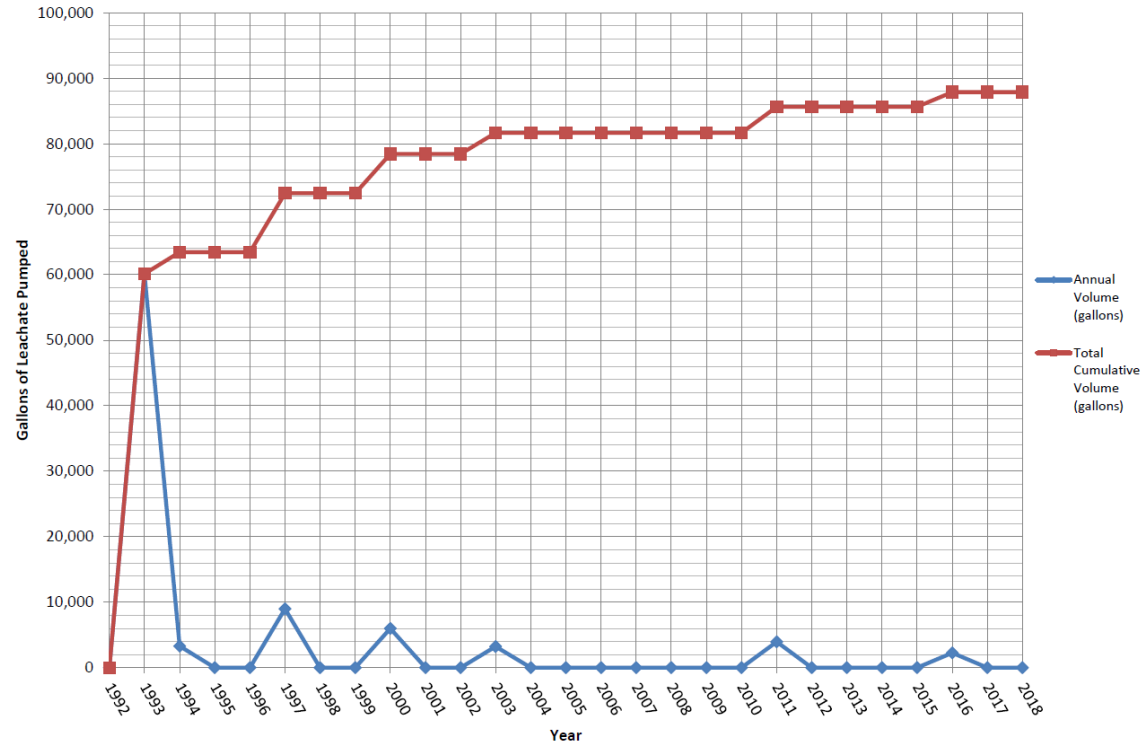


Figure H-3: Flue Dust Repository Leachate Collection Summary

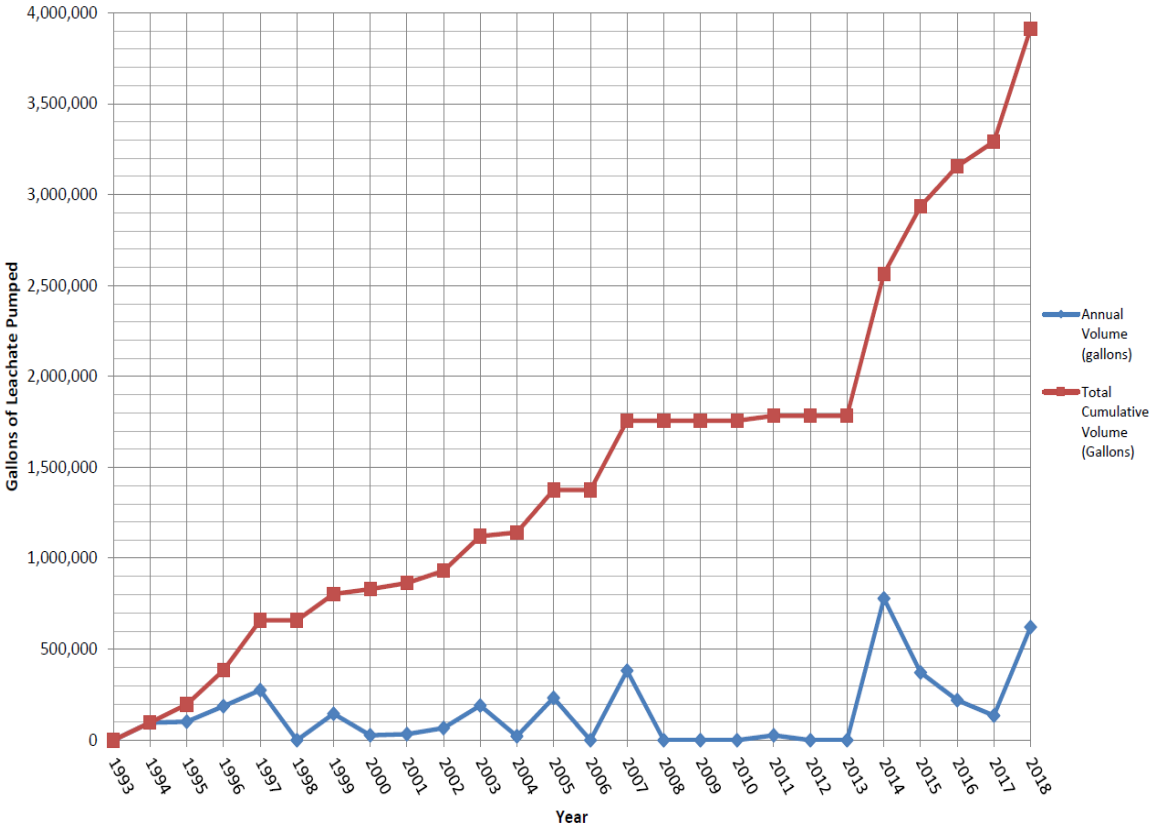
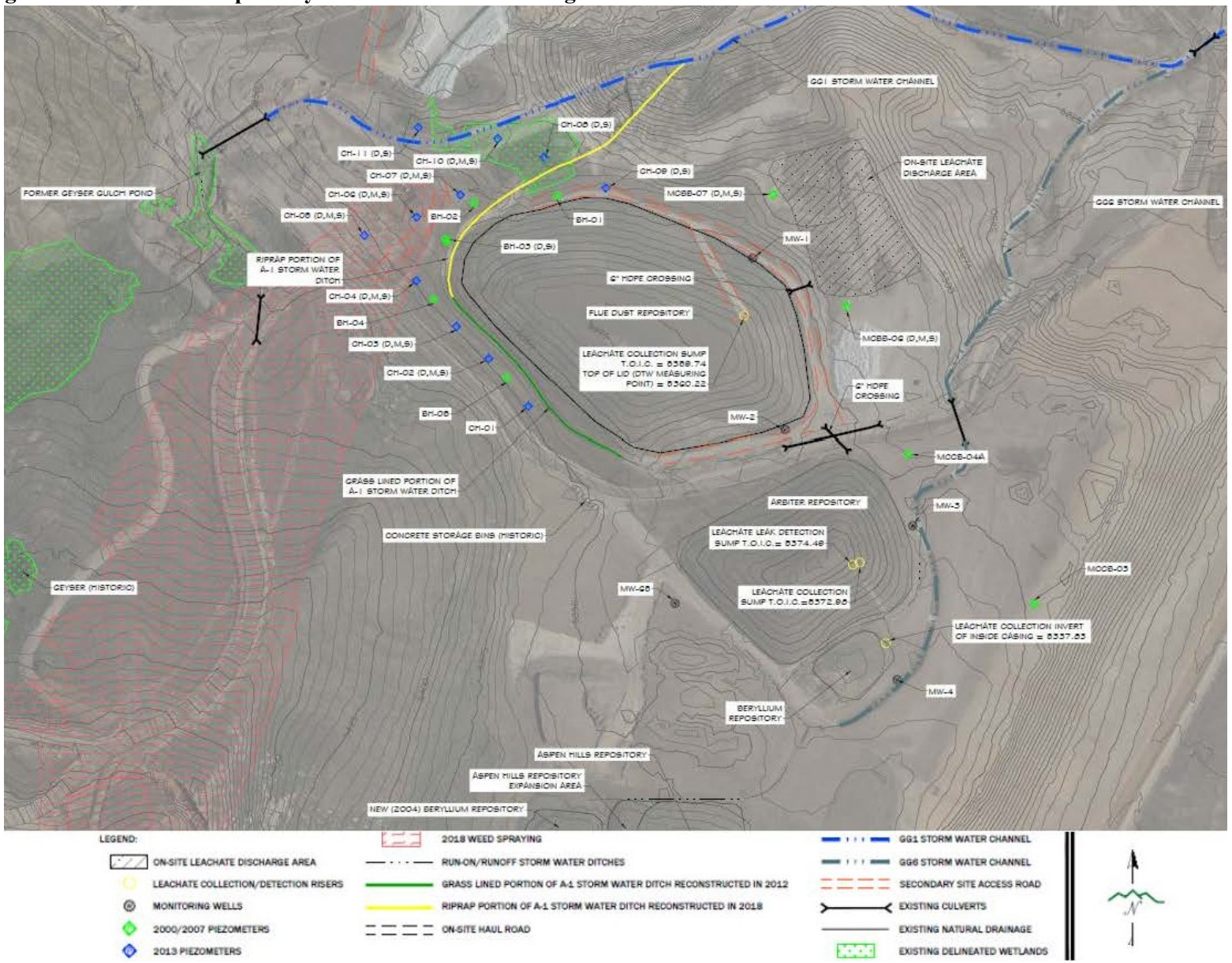


Figure H-4: Flue Dust Repository Groundwater Monitoring Locations



Source: 2018 Smelter Hill Repository Complex (SHRC) Monitoring and Maintenance (M&M) Report. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. March 2019.

Table H-1: 2018 Annual Groundwater Monitoring Results at the SHRC

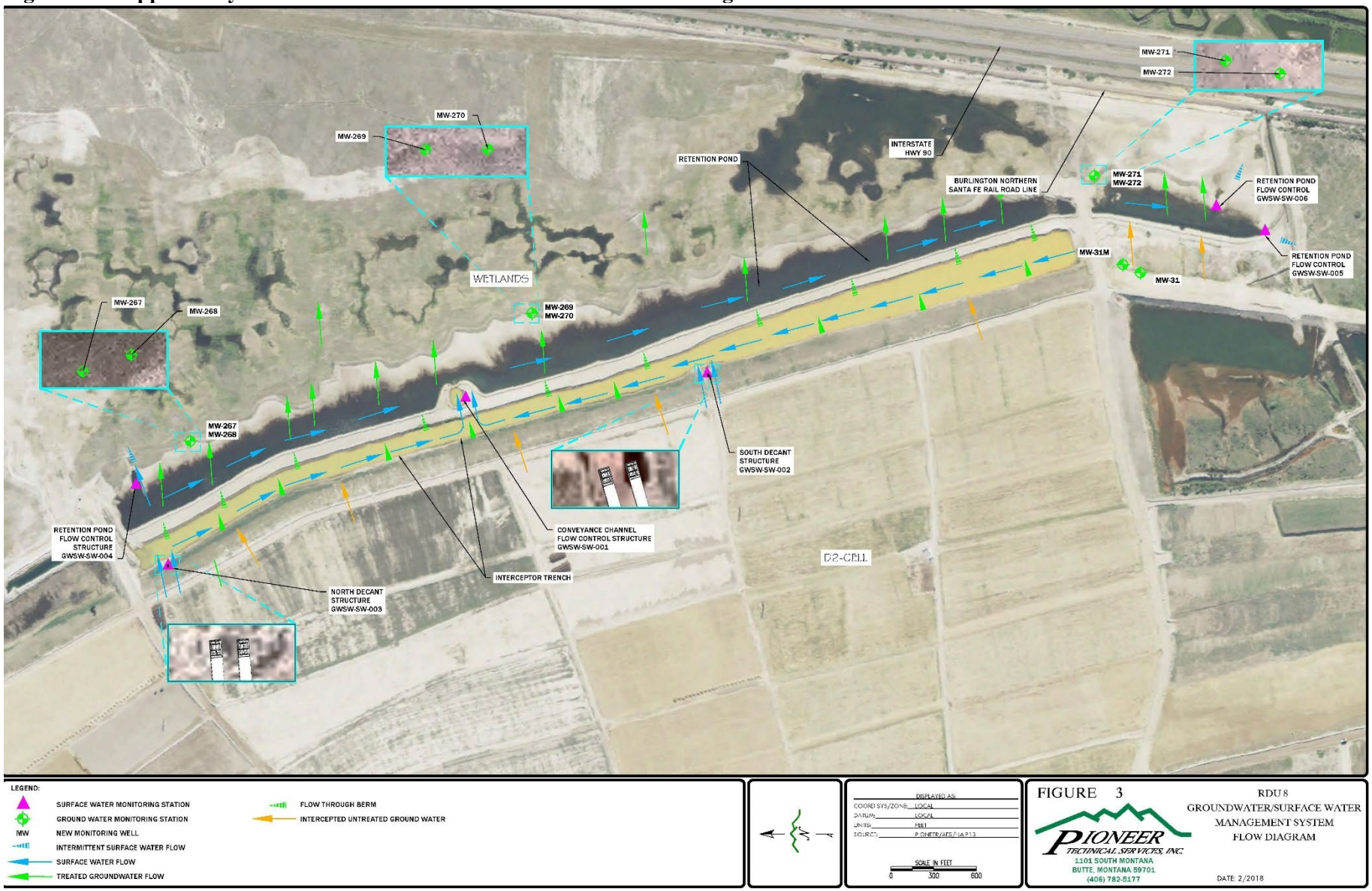
Date	Well	Field pH (SU)	Lab pH (SU)	T.O.I.C.(1) Elevation (NAD 83)	Depth to Water(2) (feet)	Water Surface Elevation(2) (NAD 83)	Depth to Well Bottom from T.O.I.C. (feet)	Well Bottom Elevation (NAD 83)	Dissolved Constituent Analysis(3)						
									Arsenic(4) (mg/L)	Beryllium(5) (mg/L)	Cadmium(6) (mg/L)	Copper(7) (mg/L)	Iron (mg/L)	Lead(8) (mg/L)	Zinc(9) (mg/L)
8/2/2018	MW-1	7.31	7.1	5330.70	118.40	5212.30	149.45	5181.25	0.0072	ND	ND	0.00045 J	ND	ND	0.0088 J
8/1/2018	MW-2	7.43	7.1	5334.25	120.02	5214.23	137.90	5196.35	0.0070	ND	ND	0.0011	ND	0.000085 J	0.0113
8/1/2018	MW-3	7.63	7.2 7.2 (d)	5329.99	125.89	5204.10	151.00	5178.99	0.0139 0.0022 (d)	ND ND (d)	ND ND (d)	0.00057 J 0.00029 J	0.0166 J ND (d)	0.000072 J 0.000071 J	0.0040 J 0.0028J
8/1/2018	MW-4	7.45	7.1	5339.41	129.84	5209.57	166.55	5172.86	0.0021	ND	ND	0.00030 J	ND	0.000077 J	0.0039 J
8/2/2018	MW-65	7.62	7.2	5345.66 (1)	107.95	5233.87	118.85 (1)	5222.97	0.0025	ND	0.000032 J	0.0022	0.0107 J	0.000058 J	0.0049 J

Notes:

1. T.O.I.C. = Top of inside well casing. T.O.I.C. elevation surveyed by Pioneer Technical Services on December 19, 2013.
   Due to engineered cover reclamation activities, MW-65 was extended on October 17, 2016 and surveyed on November 3, 2016 (formerly 5341.82).
2. All water levels were measured with an electronic depth-to-water indicator from the mark on the T.O.I.C.
3. Instrument detection limits are reported (e.g., <0.0001) if the constituent was not detected above this concentration.
4. EPA Maximum Contaminant Level (MCL) for arsenic (0.010 mg/L as of 1/23/2006).
5. MCL for beryllium is 0.004 mg/L.
6. MCL for cadmium is 0.005 mg/L.
7. Treatment Technique (TT) action level for copper is 1.3 mg/L.
8. TT action level for lead is 0.015 mg/L.
9. National Secondary Drinking Water Regulation Standard for zinc is 5 mg/L.

(d) = duplicate sample
ND = Not detected at or above adjusted reporting limit
J = Estimated quantity above detection limit but below reporting limit.
Value above MCL

Figure H-5: Opportunity Ponds Surface Water and Groundwater Monitoring Locations



Source: Draft Final 2018 Opportunity Ponds Remedial Design Unit (RDU) 8 Groundwater and Surface Water Management System Operation, Maintenance, and Monitoring Report. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. March 2019.

Table H-2: 2019 Opportunity Ponds Surface Water Data

Location	Date	Sample ID	Surface Water Measurements				Laboratory Analytical Data			Field Data		
			Height of Water Over Flume/Stop Log (ft)	Water Elevation (ft)	Flow Rate (cfs)	Flow Rate (gpm)	Total Arsenic (µg/L)	Total Iron (µg/L)	Dissolved Arsenic (µg/L)	pH (su)	Temperature (°C)	Specific Conductivity (µS/cm)
SW-001 Conveyance Channel Flow Control Structure	4/23/2019	GWSW-SW-001-042319	0.13	4886.93	0.62	278.3	1.30	892	0.91	7.91	12.1	1492.9
	4/23/2019	GWSW-SW-001D-042319*	-	-	-	-	1.30	964	0.91	7.91	12.1	1492.9
	7/23/2019	GWSW-SW-001-072319	0.09	4886.89	0.36	161.6	1.60	1530	1.3	7.92	19.3	4327.9
	7/23/2019	GWSW-SW-990-072319*	-	-	-	-	1.60	1550	1.2	7.92	19.3	4327.9
SW-002N South Decant Structure North Flume	4/23/2019	GWSW-SW-002N-042319	0.23	4889.05	0.04	16.6	86.40	7350	-	7.60	12.3	2095.5
	7/23/2019	GWSW-SW-002N-072319	0.21	4889.03	0.03	13.5	29.70	2240	-	7.71	12.8	5434.8
SW-002S South Decant Structure South Flume	4/23/2019	GWSW-SW-002S-042319	0.36	4889.18	0.12	53.9	125.00	7930	-	7.65	10.9	2131.4
	7/23/2019	GWSW-SW-002S-072319	0.36	4889.18	0.12	53.9	151.00	7450	-	7.55	11.8	5517
SW-003N North Decant Structure North Flume	4/23/2019	GWSW-SW-003N-042319	0.63	4890.63	0.46	206.5	16.20	3450	-	7.16	10.5	936.35
	7/23/2019	GWSW-SW-003N-072319	0.54	4890.54	0.37	166.1	10.70	2030	-	6.93	13.3	2087.5
SW-003S North Decant Structure South Flume	4/23/2019	GWSW-SW-003S-042319	0.44	4890.44	0.18	78.5	0.78	1270	-	7.38	9.8	1179.4
	7/23/2019	GWSW-SW-003S-072319	0.40	4890.40	0.14	62.8	0.85	1180	-	7.45	10.8	2841.1
SW-004 Retention Pond Flow Control Structure (North)	4/23/2019	No Flow, Did not Sample	No Flow	4886.70								
	7/23/2019		No Flow	4886.24								
SW-005 Retention Pond Flow Control Structure (South)	4/23/2019	GWSW-SW-005-042319	0.24	4886.69	0.78	350.1	1.3	241	-	7.27	11.0	1062.2
	7/23/2019	No Flow, Did not Sample	No Flow	4886.39								
SW-006 Retention Pond Flow Control Structure (Southeast)	4/23/2019	No Flow, Did not Sample	No Flow	4886.79								
	7/23/2019		No Flow	4886.40								
Equipment Rinsate	4/23/2019	GWSW-SW-991-042319					ND	ND	ND			
	7/23/2019	GWSW-SW-991-072319					ND	ND	ND			
Field Blank	4/23/2019	GWSW-SW-992-042319					ND	ND	ND			
	7/23/2019	GWSW-SW-992-072319					ND	ND	ND			

Notes:

[1]Eh - ORP measurements corrected relative to the standard hydrogen electrode (SHE). Measurements taken with Ag/AgCl, 4 M KCl.

[2]NT - Field parameters not taken, or meter error.

[3]J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

[4]ND - Not detected at or above adjusted reporting limit.

+ - results are believed to have been influenced by sediment disturbed during sampling

* - Duplicate Sample

** - Flow rates determined using standard wier equation - Q(cfs)=13.32H^1.5

Source: Draft Final 2019 Opportunity Ponds Remedial Design Unit (RDU) 8 Groundwater and Surface Water Management System Operation, Maintenance, and Monitoring Report. Anaconda Smelter NPL Site, ARWW&S OU. Prepared by Pioneer Technical Services, Inc. March 2020.

Table H-3: 2019 Opportunity Ponds Groundwater Data

Location	Date	Sample ID	Arsenic Dissolved (µg/L)	Cadmium Dissolved (µg/L)	Copper Dissolved (µg/L)	Iron Dissolved (µg/L)	Lead Dissolved (µg/L)	Zinc Dissolved (µg/L)	Nitrogen, Ammonia Total (mg/L)	Nitrogen, Kjeldahl Total (mg/L)	Nitrogen, NO_2 plus NO_3 Total (mg/L)	Orthophosphate as P Dissolved (mg/L)	Phosphorus Total (mg/L)	Sulfate Total (mg/L)
MW-267 (NW-2D)	4/23/2019	LTGW-GW-MW267-042319	1.60	ND	ND	ND	ND	ND	ND	ND	ND	0.0240	ND	374
	7/23/2019	LTGW-GW-MW267-072319	1.60	ND	ND	ND	ND	ND	ND	ND	ND	0.0140	ND	388
MW-268 (NW-2S)	4/23/2019	LTGW-GW-MW268-042319	0.56	ND	211	ND	ND	14.6	ND	ND	ND	ND	ND	653
	7/23/2019	LTGW-GW-MW268-072319	0.99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	958
MW-269 (NW-3D)	4/23/2019	LTGW-GW-MW269-042319	1.50	ND	ND	ND	ND	ND	ND	ND	ND	0.0200	ND	324
	7/23/2019	LTGW-GW-MW269-072319	1.60	ND	1.4	ND	0.93	ND	ND	ND	ND	0.0120	ND	332
MW-270 (NW-3S)	4/23/2019	LTGW-GW-MW270-042319	0.73	ND	38.7	ND	ND	8.2	ND	ND	ND	0.0180	ND	739
	7/23/2019	LTGW-GW-MW270-072319	0.97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	990
MW-271 (NW-4D)	4/23/2019	LTGW-GW-MW271-042319	1.70	ND	ND	537	ND	ND	ND	ND	ND	0.0130	ND	493
	7/23/2019	LTGW-GW-MW271-072319	1.70	ND	ND	563	ND	ND	ND	ND	ND	ND	ND	629
	7/23/2019	LTGW-GW-MW990-072319*	1.80	ND	ND	555	ND	ND	ND	ND	ND	ND	ND	581
MW-272 (NW-4S)	4/23/2019	LTGW-GW-MW272-042319	0.74	ND	16	ND	ND	8.5	ND	ND	ND	0.0140	ND	617
	4/23/2019	LTGW-GW-MW990-042319*	0.76	ND	25.8	ND	ND	11.7	ND	ND	ND	0.0150	ND	593
	7/23/2019	LTGW-GW-MW272-072319	1.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	666
Field Blank	4/23/2019	LTGW-GW-MW991-042319	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.6
	7/22/2019	LTGW-GW-MW991-072219	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Equipment Rinsate	4/23/2019	LTGW-GW-MW992-042319	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.7
	7/22/2019	LTGW-GW-MW992-072219	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

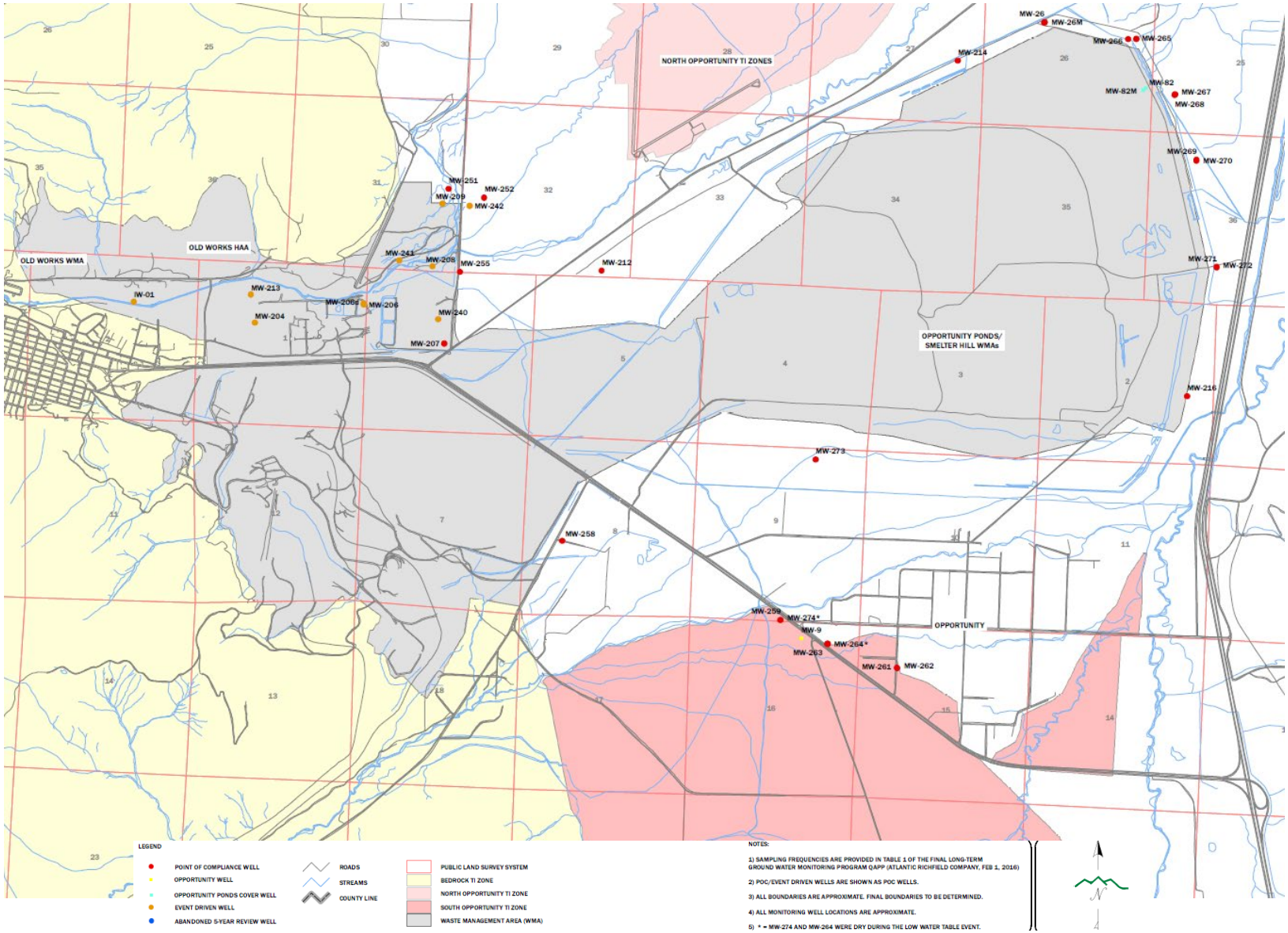
Notes:

[1]ND - Not detected at or above adjusted reporting limit.

[2]J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

* - Duplicate Sample

Figure H-6: ARWW&S OU Long-term Groundwater Monitoring Locations



Source: Draft Final 2018 Long-Term Groundwater Monitoring Low and High Water Table Events Data Summary Report (DSR). ARWW&S OU. Prepared by Pioneer Technical Services, Inc. June 2019.

Table H-4: Summary of OU4 Sitewide POC and Event Monitoring in 2018 and 2019

Area	POC Wells	Range of Dissolved Concentration (µg/L)									
		Arsenic (goal = 10)		Cadmium (goal = 5)		Copper (goal = 1,000)		Lead (goal = 15)		Zinc (goal = 2000)	
		Low	High	Low	High	Low	High	Low	High	Low	High
Opportunity Ponds/Smelter Hill WMA	MW-212 MW-214 MW-216 MW-258 MW-26 MW-26M MW-273 MW-265 to MW-272	<0.21-2.1	<0.11-2.3	<0.028 - 0.20	<0.027-0.22	<0.20-1.1	<0.22-7.5	<0.028-0.32	<0.039-1.4	<0.82-8.7	<1.9-21.9
Old Works WMA	MW-207 MW-251 MW-252 MW-255	<0.11-0.69	<0.11-0.82	<0.027-0.43	<0.027-1.8	<0.20-2.0	<0.22 – 0.4	<0.028	<0.039	<0.82-38.2	1.9-154
	Event Wells[a] IW-01 MW-204 MW-206 MW-206d MW-208 MW-209[b] MW-213 MW-240 to MW-242	NA	<0.11-1.4	NA	<0.027-11.2	NA	<0.22-**4150**	NA	<0.039-5.3	NA	<1.9-**19100**
Town of Opportunity	MW-9	< 0.21	<0.11	NA							
South Opportunity/ Yellow Ditch area	MW-261 to MW-264* MW-259 MW-274*	<0.11-1.9	<0.11-5.3	NA							
Engineered Cover Wells	MW-82 MW-82M	1.1-1.3	1.1-1.3	<0.028-0.14	<0.027-0.16	<0.2	<0.22-2.9	<0.28	<0.039-0.2	<0.82	<1.9-8.1

Notes:

a. Event driven wells MW-204, IW01, MW-206, MW-206d, MW-208, MW-209, MW-213, MW-240, MW-241 and MW- 242 were sampled because the water levels in MW-213 triggered the benchmark elevation.

b. Event driven well MW-209 and MW-241 were sampled in July 2019

Bold – value exceeds compliance goal.

High – High water table event is in July time-frame

Low – Low water table event is in the March/April time-frame

NA – not sampled

< is below detection, detection limit is listed.

* Well MW-264 and MW-274 were dry so they could not be sampled during the low water table event. They were sampled during the high water table event.

Table H-5: Summary of 2019 FYR Sampling Event

Area	FYR Well/Seep	Dissolved Concentration (µg/L)									
		Arsenic		Cadmium		Copper		Lead		Zinc	
		Low	High	Low	High	Low	High	Low	High	Low	High
Old Works	TI-A	**1**	**0.97**	**2**	**1.9**	**516**	**555**	<0.039	<0.046	**280**	**290**
	LF-4	**4.5**	**4.3**	**2.3**	**2.7**	**89**	**71**	<0.039	<0.046	**469**	**587**
	MW-205	**5.5**	**5.1**	**1.2**	**1.8**	**45.3**	**54.3**	<0.039	<0.046	**155**	**227**
	MW-72	**1.8**	**1.6**	**3.2**	**3**	**181**	**161**	<0.039	<0.046	**551**	**588**
	MW-201	**0.97**	**0.89**	**0.94**	**1.1**	**140**	**141**	<0.039	<0.046	**118**	**142**
Opportunity Ponds/Smelter Hill WMA	A2-BR	**1050**	**807**	0.027	0.03	**1.9**	**1.1**	<0.039	<0.046	1.9	2.4
	MW-210	**49.7**	**46.6**	0.027	0.03	0.22	**2.1**	<0.039	<0.046	1.9	**5.8**
	MW-227	**38.6**	**40.2**	0.027	0.03	**4.8**	**2**	<0.039	<0.049	**10.9**	**12.8**
	MW-233	**9.1**	**7.6**	NA	NA	NA	NA	NA	NA	NA	NA
	MW-244	**5.8**	**6.1**	0.027	0.03	0.22	**1**	<0.039	0.046	1.9	2.4
	MW-247	0.11	0.14	0.027	0.03	**4.6**	**1.5**	<0.039	0.046	1.9	2.4
Blue Lagoon Area	MW-257	**1.3**	**1.5**	0.027	**0.088**	**2.3**	**2.5**	<0.039	**0.053**	**1600**	**1490**
Stucky Ridge/Lost Creek	SP98-27	-	**21.9**	NA							
	MW-248d	**2.8**	**2.9**								
	MW-248e	**4.8**	**5.8**								
	MW-248s	**2.2**	**1.5**								
	FH-2	**13.4**	**14.5**								
	SP97-20	**106**	**-**								
	SP99-01	**-**	**32.8**								
	SP98-26	**-**	**22.7**								
	SP98-30	**-**	**6.2**								
	SP98-31	**-**	**10.8**								
Dutchman	MW-224	**0.74**	**2.7**	NA							
	SP-07-01	**-**	**37.3**								
	SP-07-02	**-**	**61.5**								
	SP-07-03	**-**	**29**								
Mount Haggin/Smelter Hill Area	MW-249d	**5**	**8.7**	NA							
	MW-249s	**84.4**	**109**								
	MW-250d	**1.1**	**1.2**								
	MW-250s	**35.7**	**37.8**								
	SP97-31	**-**	**72**								
	SST-26	**-**	**36.5**								
	SP98-16	**-**	**6.2**								
	SP97-12	**-**	**577**								
	F2-BR	**0.62**	**0.67**								
	SST-29	**-**	**1.9**								
	SST-1	**-**	**109**								
	SP97-19	**-**	**2.8**								
	SP98-8	**-**	**3.7**								
	SP98-20	**-**	**9.4**								
	SP98-36	**304**	**-**								
	SST-26	**-**	**36.5**								

Area	FYR Well/Seep	Dissolved Concentration (µg/L)									
		Arsenic		Cadmium		Copper		Lead		Zinc	
		Low	High	Low	High	Low	High	Low	High	Low	High
South Opportunity/ Yellow Ditch area	MW-225	**6.2**	**10.2**	NA							
	MW-231	**0.75**	**0.73**								
	MW-232	**80.7**	**123**								

Notes:
Bold – detected concentrations
< Value – below detection value; values is the detection limit.
High – High water table event is in late June/July time-frame
Low – Low water table event is in the March/April/May time-frame
NA - not applicable as these samples do not require analysis for these parameters

Table H-6: Exceedances of Chronic Aquatic Standard in OU4 Surface Water, 2015 to 2019

Station	Arsenic	Cadmium	Copper	Lead	Zinc
USGS 12323840 Lost Creek near Anaconda, Montana	0	1	10	2	0
USGS 12323850 Lost Creek near Galen, Montana	0	0	1	0	0
USGS 12323760 Warm Springs Creek near Anaconda, Montana	0	0	2	1	0
USGS 12323770 Warm Springs Creek at Warm Springs, Montana	0	0	14	5	0
USGS 12323710 Willow Creek nr Anaconda, Montana	0	3	16	14	0
USGS 12323720 Willow Creek at Opportunity, Montana	0	1	19	4	0
USGS 12323670 Mill Creek nr Anaconda, Montana	0	3	15	9	0
USGS 12323700 Mill Creek at Opportunity, Montana	0	9	17	13	0
Source: Long-term Monitoring of OU4 Surface Water. Prepared by USGS. March 2020.					

APPENDIX I – ARARS REVIEW

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed.

EPA did not develop numeric cleanup criteria in the 1987 OU ROD and 1988 AROD for the Mill Creek OU or the 1991 ROD for the Flue Dust OU. The Mill Creek OU remedy was an interim remedy to eliminate current exposures for residents of the Mill Creek area. The Flue Dust OU remedy was to remove principal threat waste. Residual soil contamination at these OUs is being addressed as part of the ARWW&S OU. None of the sitewide soil cleanup goals are ARARs.

EPA did select numeric criteria for groundwater (Table I-1) and surface water (Table I-2) for the ARWW&S OU in the 1998 ROD and revised several of the criteria in the 2011 AROD. The 2011 AROD had updated the human health standards for arsenic and zinc in groundwater and surface water, and the aquatic standards for cadmium, copper and lead in surface water. As shown in Table I-1, the State has updated the groundwater ARAR to be equal to the federal standard, which is less stringent. Thus, the original criteria used remain valid.

MDEQ updated the surface water criteria for aquatic life in June 2019. The 2020 modified remedy will ultimately comply with DEQ 2019 Circular DEQ-7, Montana Numeric Water Quality Standards or the federal chronic/acute surface water standards (Table I-2). Through the SWMP, the modified remedy includes a process to evaluate TI waivers for the State of Montana water quality standards (Montana Numeric Water Quality Standards, DEQ-7, total recoverable fraction) for cadmium, copper, lead, and zinc. For a potential waiver, compliance with ARARs would mean compliance with the federal surface water standards. Replacement performance standards are based on the dissolved (filtered) sample fraction and are national surface water quality criteria enacted by EPA pursuant to the Clean Water Act and are protective of aquatic life. Because in-stream human health standards must also be met, and the replacement standards are more stringent than the human health standards, human health is protected.

Table I-1: ARWW&S OU Groundwater ARARs Review

COC	2011 AROD ARARs State/Federal (µg/L)[a]	Current ARARs State[b]/Federal[c] (µg/L)	ARARs Changed?
Arsenic	10/10	10/10	No
Beryllium	4/4	4/4	No
Cadmium	5/5	5/5	No
Copper	1,000/1,300	1,300/1,300	State value less stringent
Iron	NA/NA	NA/NA	No
Lead	15/15	15/15	No
Zinc	2,000/NA	2000/NA	No

Notes:
a. Table 3-1 in the 2011 ARWW&S OU AROD.
b. Current state ARARs are based Montana Numeric Water Quality Standards – Circular DEQ-7. June 2019 (http://deq.mt.gov/Portals/112/Water/WQPB/Standards/PDF/DEQ7/DEQ-7.pdf, accessed 2/21/20).
c. Federal standards are based on national primary and secondary drinking water MCLs (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations, accessed 2/21/20).
NA = not available
µg/L = micrograms per liter

Table I-2: Performance Standards for Surface Water Compliance in ARWW&S OU Streams

COC	Performance Standard[1]		Contingent Replacement Standard[2]	
	Fraction	Chronic Standard	Fraction	Chronic Standard
Arsenic	Total Recoverable	150 µg/L	Dissolved	None – achieving compliance
Cadmium		0.26 µg/L		0.25 µg/L
Copper		2.85 µg/L		BLM
Lead		0.545 µg/L		0.541 µg/L
Zinc		37 µg/L		36.5 µg/L

Notes:

Compliance standards are Circular DEQ-7 (June 2019) Total Recoverable Chronic Aquatic Life Standards. If compliance standards are not met at a point-of-compliance during the compliance monitoring period, the compliance standard will be waived to the contingent replacement standard through the process established in this ARWW&S OU ROD amendment and the SWMP.

Except for copper, contingent replacement standards are based on current (i.e., 2020) published federal water quality criteria issued pursuant to Section 403(a) of the Federal Clean Water Act, 33.U.S.C. Section 1314(a). See footnote 6 for further discussion of contingent replacement standard for copper. https://www.epa.gov/wqc/national-recommended-water- quality-criteria-aquatic-life-criteria-table.

Performance standards for cadmium, copper, lead, and zinc are hardness dependent. Values shown are calculated at a hardness of 25 mg/L.

The arsenic compliance standard in lower Warm Springs Creek (at compliance station 12323770) is the arsenic human health criterion (10 µg/L).

The performance standard for cadmium is updated to reflect the June 2019 DEQ-7 standard. The contingent replacement standard for cadmium is the federal ambient water quality criteria updated March 2016.

Biotic Ligand Model in place at the time of the waiver. For every sample collected, the water quality parameters for BLM calculation will be input into the BLM to generate an Instantaneous Water Quality Criterion (IWQC) for compliance comparisons.

APPENDIX J – QUESTION B SUPPORT INFORMATION

Changes in Standards and To-be-Considered (TBCs) Values

The site decision documents selected state water quality criteria as ARARs for surface water COCs and state and federal drinking water standards as the ARARs for groundwater COCs. The review indicated that the only ARAR that has become more stringent is the acute state surface water criteria for cadmium. EPA and MDEQ are in the process of expanding the ARWW&S OU surface water remedy to address exceedances of state water quality standards that are occasionally exceeded in all site streams and tributaries during high flows and storm events. The most current ARARs for surface water will be incorporated as required once the final surface water remedy is selected.

Changes in Toxicity and Other Contaminant Characteristics

The health-based soil cleanup goals for arsenic established in the Community Soils OU 1996 ROD and the lead cleanup goal EPA developed in the 2013 AROD remain valid. The toxicity values for arsenic have not changed and the cleanup goals were based on residential and industrial exposures using site-specific factors for bioavailability of arsenic from soil and dust, contribution of soil arsenic to arsenic in dust, and fraction of soil and dust ingested from contaminated areas of the Site. For lead, EPA considered the CDC's 2012 revision to the blood lead reference level 5 micrograms per deciliter (µg/dL) in place of the current 10 µg/dL. In addition, EPA developed a range of site-specific lead cleanup goals using the Integrated Exposure Uptake Biokinetic (IEUBK) model, based on the bioavailability of lead in soil, soil to indoor dust transfer and soil ingestion rates in the IEUBK model. Based on the lead risk analysis, including uncertainties associated with estimating toxicity and exposure to lead, EPA selected 400 mg/kg as the lead cleanup action level for residential land use at the Community Soils OU, which is consistent with the current EPA regional screening levels (RSLs) for residential land uses and is the value used by the state. Any changes in EPA's lead exposure guidance and policies will be reviewed in future FYRs.

Changes in Risk Assessment Methods

Review of default and site-specific exposure parameters used in the calculation of human health risks did not reveal any instances where such parameters did not appear valid. In particular, no information was found to suggest that exposure parameters based on site-specific information and/or professional judgment should be reconsidered.

Changes in Exposure Pathways

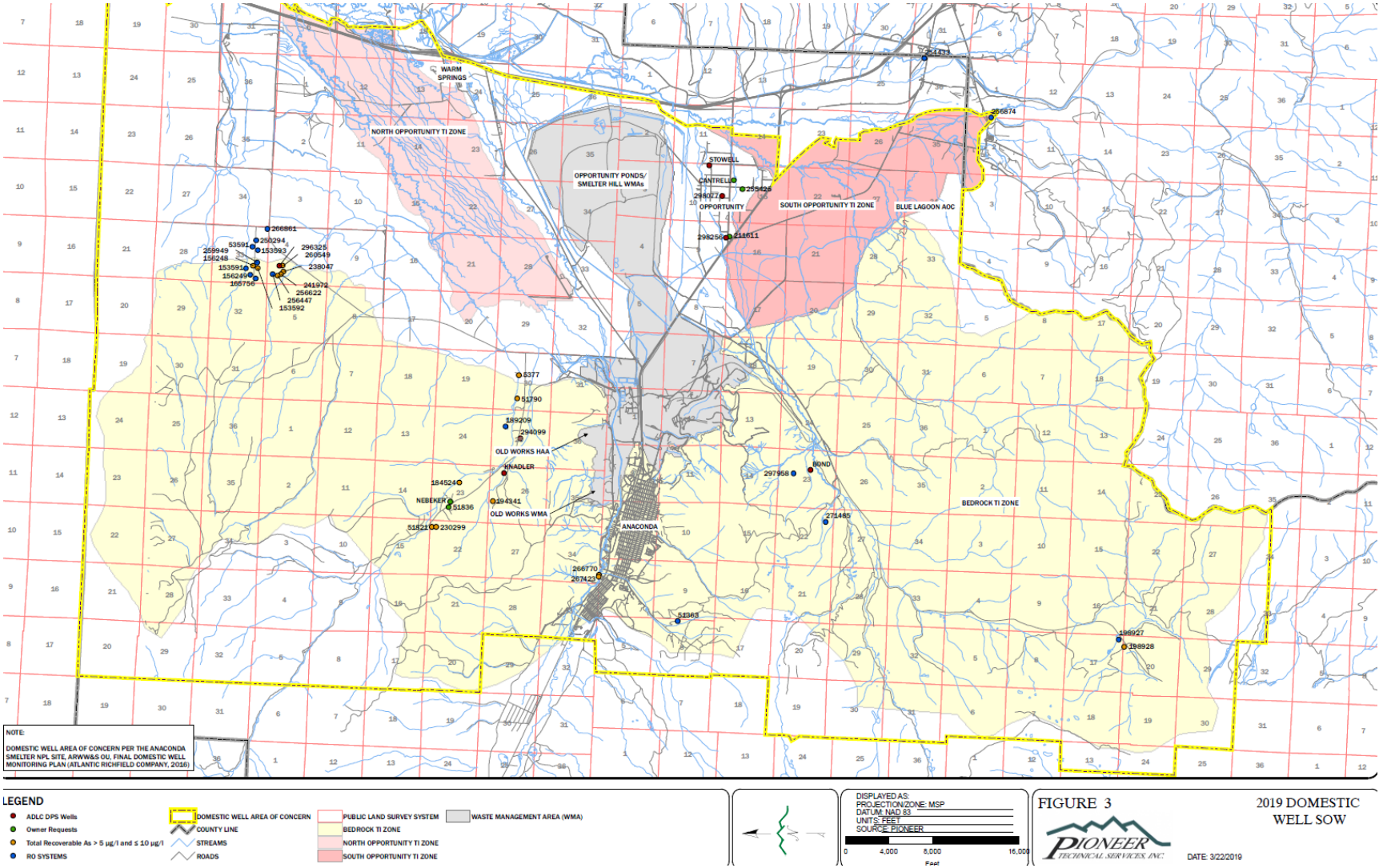
Remedies for the Site include institutional controls to prevent, for example, residential development in areas that have been remediated to the commercial target for arsenic. Thus, land use could change, but as long as institutional controls are in place and enforced to ensure these areas are cleaned up to the residential standard, the remedy will remain protective.

Expected Progress Toward Meeting RAOs

The RAOs of preventing direct exposure to soil, dust and waste have been reached for those properties where the soil remedies have been completed. The remedies continue to progress toward meeting the RAOs associated with potential exposures to smelter-contaminated soils, dust and waste through remediating these media through removal, treatment or capping. Once all contaminant sources are remediated, progress can be made on achieving the groundwater and surface water RAOs, which include minimizing the migration of source contamination to these media and restoring these media to beneficial use where practical.

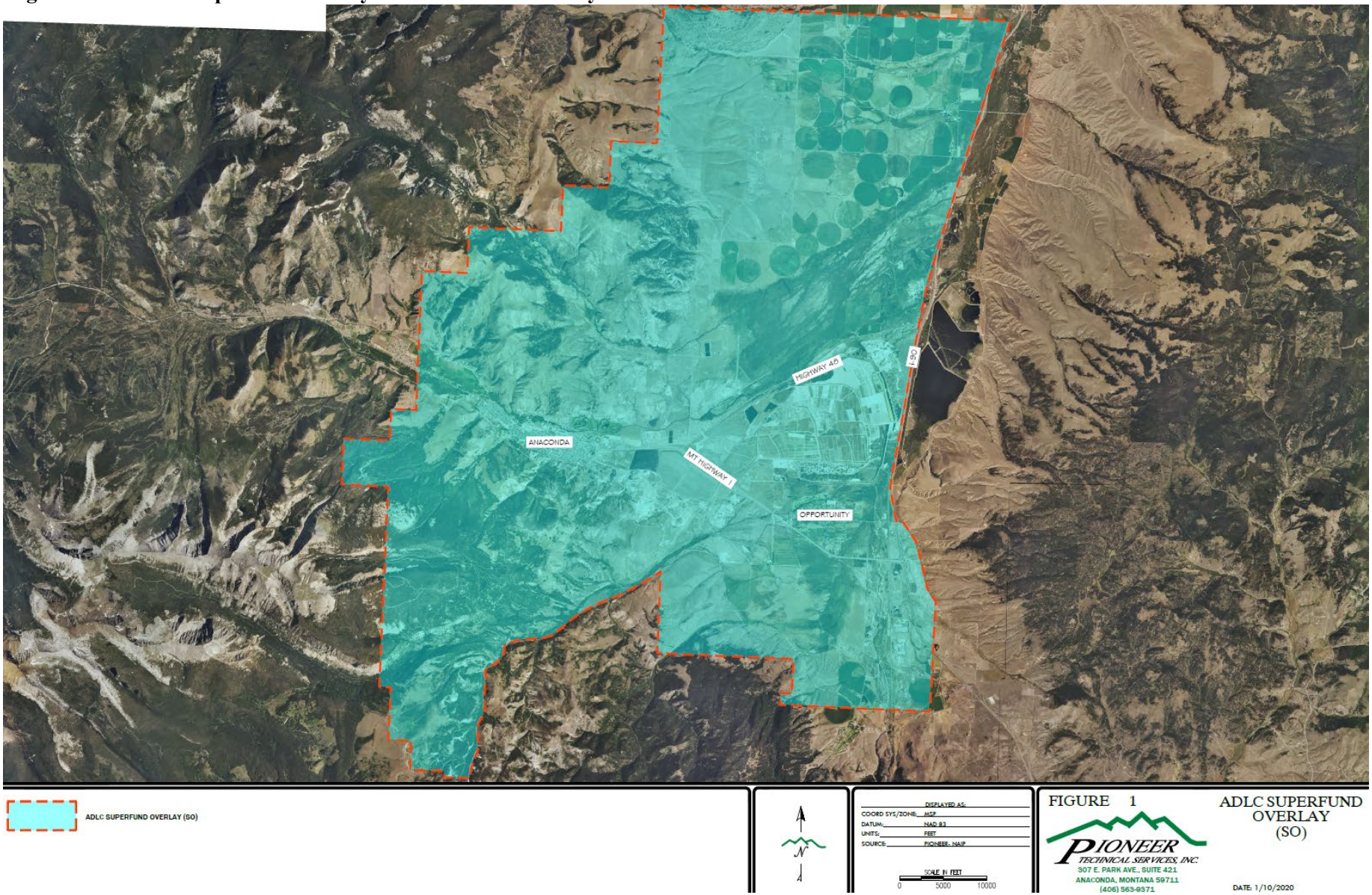
APPENDIX K – INSTITUTIONAL CONTROL MAPS

Figure K-1: ARWW&S OU Domestic Well AOC



Source: Draft Final 2018 Domestic Well Monitoring Data Summary Report. Prepared by Pioneer Technical Services, Inc. March 2019.

Figure K-2: ADLC Superfund Overlay District for Community Soils OU



Source: Final Community Soils Remedial Action Work Plan/Final Design Report. Prepared by Pioneer Technical Services, Inc. February 2020.