

**SECOND FIVE-YEAR REVIEW REPORT FOR  
STANDARD MINE SUPERFUND SITE  
GUNNISON COUNTY, COLORADO**



**Prepared by**

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## LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
BERA	Baseline Ecological Risk Assessment
BHHRA	Baseline Human Health Risk Assessment
CCR	Colorado Code of Regulations
CCWC	Coal Creek Watershed Coalition
CDPHE	Colorado Department of Public Health & Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Chemical of Concern
DRMS	Colorado Division of Reclamation, Mining and Safety
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
gpm	Gallons per Minute
IC	Institutional Control
ICIAP	Institutional Control Implementation and Assurance Plan
ln	Natural Log
MCL	Maximum Contaminant Level
mg/L	Milligrams per Liter
µg/dL	Micrograms per Deciliter
µg/L	Micrograms per Liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PA/SI	Preliminary Assessment/Site Inspection
PFAS	Per- and Polyfluoroalkyl Substances
PRG	Preliminary Remediation Goal
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
UU/UE	Unlimited Use and Unrestricted Exposure
WQS	Water Quality Standard
WTP	Water Treatment Plant

## 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 is preparing this FYR pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the second FYR for the Standard Mine Superfund site (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/UF).

The Site consists of one sitewide operable unit (OU), which includes all contaminated media present or discharging from the Site. This FYR addresses the sitewide OU.

The EPA's remedial project manager (RPM) Jessica Duggan led the FYR. Participants included the EPA's community involvement coordinator (CIC) Valerie Doornbos, the EPA's site attorney Matthew Kryman, the Colorado Department of Public Health & Environment's (CDPHE) project manager Kathleen Knox, Mark Mikos, Jeff Litteral and Tara Tafi from the Colorado Division of Reclamation, Mining and Safety (DRMS), Brian Barrett from the U.S. Forest Service (USFS) and Treat Suomi and Jill Billus from FYR support contractor Skeo. The review began on October 7, 2024, and the FYR site inspection took place on October 10, 2024.

The EPA has determined in the five-year review that the cleanup at the Standard Mine Superfund site does not present unacceptable risk for people and the environment. Exposure to contaminated soil or waste are not occurring. Source control measures are in place. They limit unacceptable discharges of water from the mine. Monitoring of Elk Creek and capped waste areas is ongoing. The EPA will determine the need for more cleanup after finishing a water quality monitoring program in 2027. The agency will also plan for land-use restrictions at the Site. The EPA, CDPHE and USFS will put the restrictions in place. They will help prevent future exposures to contaminated soil or waste.

Appendix A lists the references used in the preparation of this FYR Report. Appendix B provides a chronology of major site events.

### Site Background

The Site is in Gunnison County, Colorado, about five miles west of the town of Crested Butte (Figure 1). The Site is an abandoned hard rock mine located in west central Colorado at an elevation of about 11,000 feet above mean sea level. The Site is in Gunnison National Forest and includes about 10 acres of USFS-managed land and private mining claims that were disturbed by historical mining activity. The Site also includes impacted surface water downstream of this area.

Two mines historically operated on-site: the former Standard Mine (also known as the Micawber Mine) and the smaller Elk Lode Mine (referenced as Level 98). The Standard Mine operated from 1951 to 1974 and primarily mined for silver, lead, zinc and copper ore. Very little information is available for the smaller Elk Lode Mine, but records indicate it operated from 1880 to 1882. Historical mining activities generated mine wastes such as tailings and waste rock and contaminated soil and sediment with heavy metals. Contaminated water discharging from the mine workings also impacted the water quality in Elk Creek and, to a lesser extent, Coal Creek. Figure 1 shows the locations of these surface water bodies at the Site.

Historically, the Site had waste piles and open and unmarked adits and mine shafts. The Site includes several discrete areas of mining disturbance, or levels into the mine: Level 1, Level 2, Level 3, Level 4, Level 5 and Level 98. Appendix C summarizes the characteristics of each area prior to cleanup. Figure 2 shows the locations of the mine features as well as the mine waste repository constructed as part of the Site's initial cleanup. Figure C-1 in Appendix C is a cross-section interpretation of the mine workings.

The area near the Site is unoccupied but has been used for recreational purposes such as hiking, biking and camping in the summer and skiing, snowshoeing and snowmobiling in the winter. Vehicular access to the Site is restricted, thus limiting site use. However, recreational users and trespassers have occasionally visited the Site. The only viable road to the Site passes through several gates on the Mt. Emmons Project property, which includes its water treatment plant (WTP), that are controlled by Mt. Emmons Mining Company.

The Site is entirely within the Elk Creek Basin. Elk Creek forms on-site and flows south toward Coal Creek, which is the drinking water source for Crested Butte. Copley Lake and several natural seeps discharge into Elk Creek downstream of the Site. The Crested Butte municipal water intake is located on Coal Creek about two miles downstream from the confluence with Elk Creek. Both Elk Creek and Coal Creek are designated as a water supply. Coal Creek is also used for recreational purposes, mainly fishing.

Shallow and deep groundwater is located beneath the Site. Joints associated with regional bedrock formations and faults in the Elk Creek Basin are the main pathway of groundwater flow near the mine and from the shallow subsurface to the mine workings. A persistent continuous aquifer has not been identified at the Site. There are no current or anticipated future uses of the limited groundwater present at the Site. No drinking water wells are located within or adjacent to the Site, and the nearest drinking water well is located about four miles from the Site.

Figure 1: Site Vicinity Map

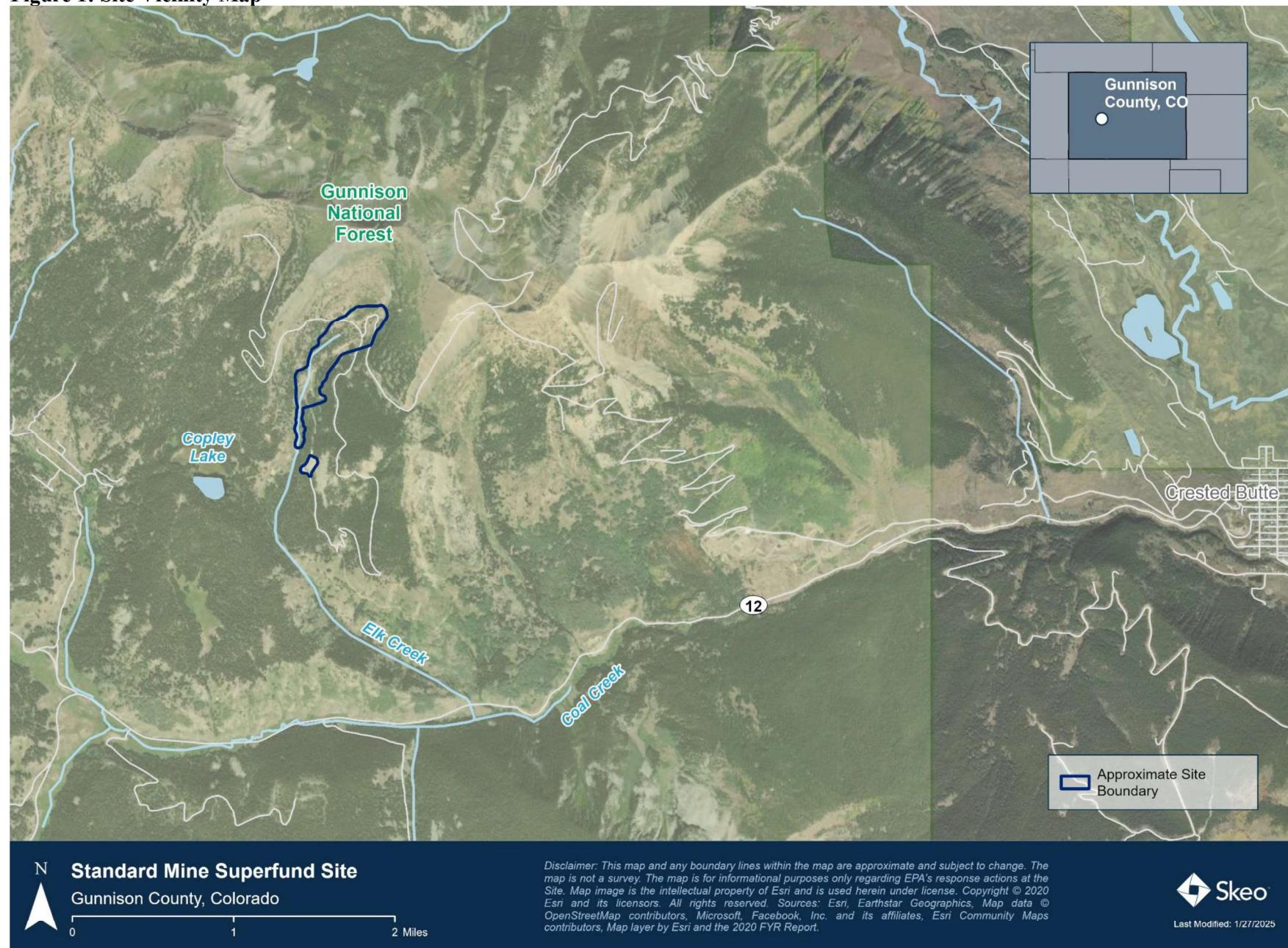
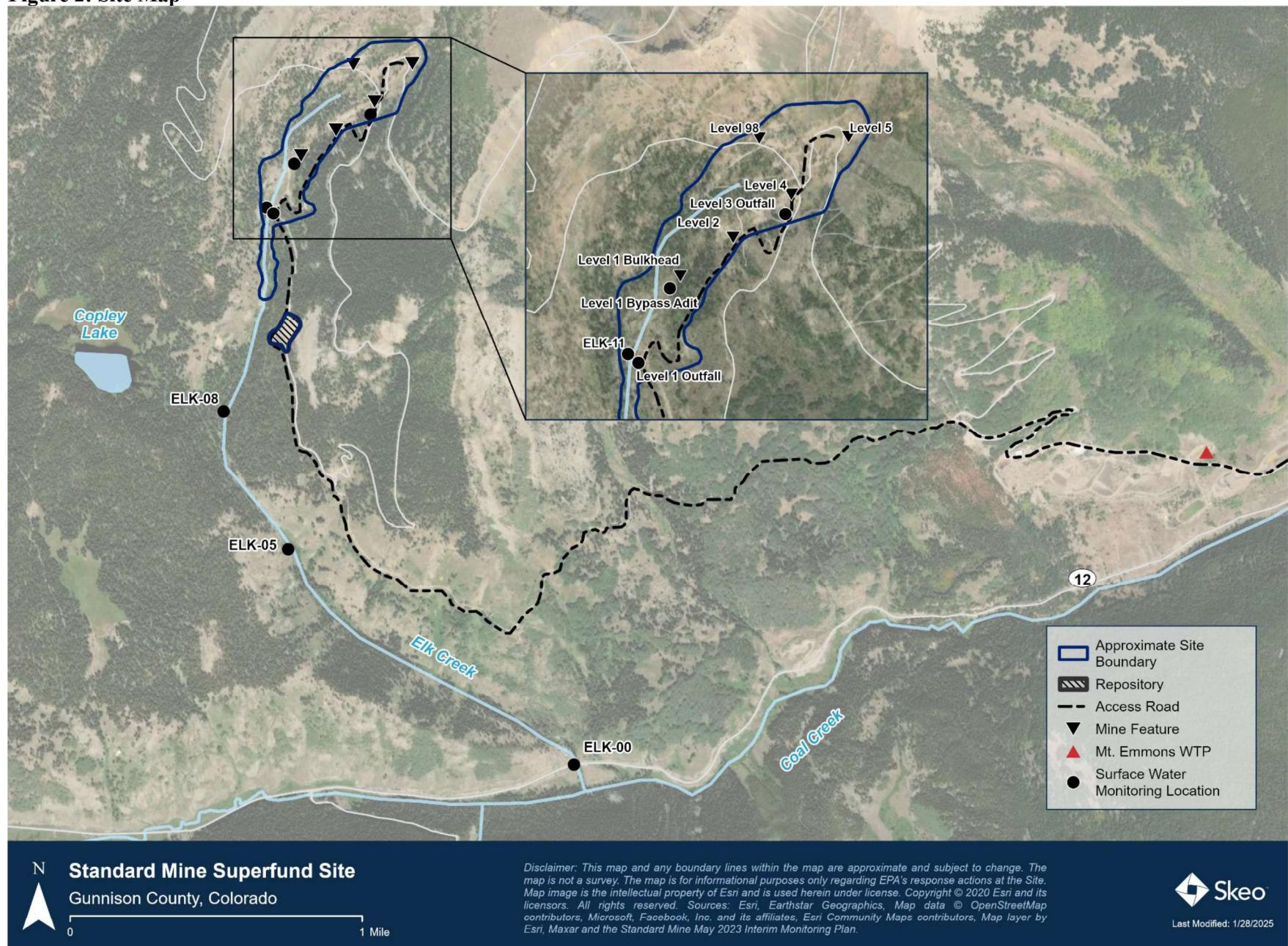


Figure 2: Site Map



## FIVE-YEAR REVIEW SUMMARY FORM

<b>SITE IDENTIFICATION</b>		
<b>Site Name:</b> Standard Mine		
<b>EPA ID:</b> CO0002378230		
<b>Region:</b> 8	<b>State:</b> Colorado	<b>City/County:</b> Gunnison National Forest/Gunnison
<b>SITE STATUS</b>		
<b>NPL Status:</b> Final		
<b>Multiple OUs?</b> No	<b>Has the Site achieved construction completion?</b> No	
<b>REVIEW STATUS</b>		
<b>Lead agency:</b> The EPA		
<b>Author name:</b> Jessica Duggan and Jill Billus		
<b>Author affiliation:</b> The EPA's Region 8 and Skeo		
<b>Review period:</b> 10/7/2024 – 5/21/2025		
<b>Date of site inspection:</b> 10/10/2024		
<b>Type of review:</b> Statutory		
<b>Review number:</b> 2		
<b>Triggering action date:</b> 6/10/2020		
<b>Due date (five years after triggering action date):</b> 6/10/2025		

## **II. RESPONSE ACTION SUMMARY**

### **Basis for Taking Action**

The EPA conducted a preliminary assessment (PA) and expanded site inspection (SI) in 1999. The EPA added the Site to the Superfund program's National Priorities List (NPL) in September 2005 based on elevated concentrations of metals in site soils and in Elk Creek surface water and sediment.

Using the data collected by the EPA for the PA/SI, the USFS conducted an engineering evaluation/cost analysis (EE/CA) in 2002 to determine the feasibility of various cleanup alternatives at the Site. The EE/CA concluded that further evaluation was needed prior to selecting a removal alternative. The EPA conducted a removal assessment in 2005 and 2006 and identified risks to human and environmental receptors from adit discharges, waste rock and an eroding tailings impoundment. To address the most imminent threats, the EPA conducted time-critical removal actions at the Site in 2006 and 2007. The removal actions, which included construction of a permanent waste repository to store mine wastes, are addressed in more detail in the Response Actions section of this FYR Report.

Between 2005 and 2010, the EPA, other federal and state agencies, and a local watershed group conducted multiple investigations in support of a remedial investigation (RI) and feasibility study (FS) for the Site. The work also included mapping of the mine workings (2006 to 2009) and a pilot-scale passive treatment system (2007). The EPA finalized the RI Report in May 2010. The RI Report included a baseline human health risk assessment (BHHRA) and baseline ecological risk assessment (BERA), the results of which, in part, formed the basis for taking action, discussed below.

The risk assessments in the 2010 RI Report included addenda to the BHHRA and BERA originally prepared in 2008. The 2010 BHHRA Addendum and BERA Addendum, respectively, reflected post-removal action conditions.

The EPA's BHHRA evaluated risks for on-site recreational visitors and recreational visitors along site drainages, which included surface streams flowing from the Site. The only increased risk to human health from exposure to site contaminants documented in the pre-removal action BHHRA was for exposure of child all-terrain vehicle riders to inhalation of manganese dust at the Site. The risk to child all-terrain vehicle riders exposed to site soils present after the removal action was reevaluated in the 2010 BHHRA Addendum using new soil data. The BHHRA Addendum concluded that there are no remaining unacceptable human health risks to recreational visitors posed by site soil after the removal actions.

The BHHRA did not evaluate groundwater exposures in the risk assessments because there are no current or reasonably anticipated uses for site groundwater. However, wells installed near the Site showed elevated concentrations of metals relative to the federal maximum contaminant levels (MCLs) and Colorado groundwater standards. The Site's 2011 Record of Decision (ROD) states there is a potential risk from groundwater if unanticipated use of the groundwater as a drinking water source occurs, but there are no current or anticipated future uses of the limited groundwater at the Site.

The EPA's BERA indicated unacceptable risks to fish and benthic organisms exposed to Elk Creek surface water and sediment. Levels of chemicals of concern (COCs) in Elk Creek surface water exceeded Colorado water quality standards, surface water toxicity tests showed elevated fish mortality, and population surveys showed reduced abundance and diversity in aquatic organisms. Levels of COCs in Elk Creek sediments and sediment pore water also exceeded benchmarks. Sediment toxicity tests showed elevated mortality of benthic invertebrates, and population surveys indicated reduced abundance and diversity of benthic macroinvertebrates.

The BERA also indicated potential risks to plants, soil invertebrates, birds and mammals; however, the BERA further noted it is unlikely the existing contamination is significantly affecting birds or mammals given the small size of the Site, the compromised habitat and the abundance of quality habitat adjacent to the Site. While risks to plants and invertebrates may be present, the presence of vegetation over most of the Site and the conservative nature of the assessment did not suggest unacceptable risk levels for the Site as a whole.

In addition to risks evaluated in the BHHRA and BERA, there were concerns about a potential sudden release of mine water and debris from behind a blockage in the Level 1 adit and the potential for human exposure to contaminated soils in the site repository if it was not maintained.

The primary COCs at the Site identified in the Site's 2011 ROD are cadmium, lead and zinc in surface water.

## **Response Actions**

### ***Removal Actions***

The EPA signed an Action Memorandum in June 2006 documenting the need for a time-critical removal action at the Site. The 2006 memorandum cited elevated levels of contamination in waste piles and the tailings impoundment, erosion of the tailings impoundment, and the potential for a failure of the tailings impoundment that could cause mass loading of metals into Elk Creek and subsequently into Coal Creek and Crested Butte's water supply. Table 1 summarizes the actions completed under the 2006 Action Memorandum.

The EPA signed a second Action Memorandum in July 2007 to address additional items identified at the Site during the EE/CA. Table 1 summarizes the actions completed under the 2007 Action Memorandum.

**Table 1: Removal Action Activities**

<b>Decision Document</b>	<b>Removal Action Activities</b>
2006 Action Memorandum	<ul style="list-style-type: none"><li>• Installation of erosion controls and sediment catch basins on Elk Creek to reduce the impact of site activities on water quality in the creek.</li><li>• Installation of surface water controls to minimize contamination of Elk Creek from erosion and leaching of site wastes.</li><li>• Treatment of surface water from the tailings impoundment with subsequent discharge to Elk Creek.</li><li>• Demolition of mining-related structures, with debris recycled or disposed of in a nearby landfill.</li></ul>
2007 Action Memorandum	<ul style="list-style-type: none"><li>• Road improvements.</li><li>• Removal of general on-site debris (non-waste material) from work areas.</li><li>• Construction of a permanent waste repository and associated infrastructure. The repository is a 1.6-acre landfill located 0.3 miles south of Level 1 (shown on Figure 2).</li><li>• Mixing of tailings material with waste rock to help solidify the liquefied tailings prior to transport to the site repository.</li><li>• Excavation of tailings and waste rock, with placement and compaction in the on-site repository.</li><li>• Capping of the repository with 12 inches of compacted soil and 12 inches of riprap from a nearby borrow source.</li><li>• Site grading and installation of erosion control features to support construction and stabilization efforts and to reduce scouring or erosion of soil and sediment into Elk Creek.</li><li>• Treatment of excavated areas and other impacted areas with lime, fertilizer, compost and/or borrow soil and seeding to provide stability from erosion and a vegetative cap.</li><li>• Realignment and stabilization of Elk Creek in a natural configuration similar to that found upstream and downstream of the Site. The effort included tailings removal from the creek.</li><li>• Construction of wetlands along the realigned Elk Creek channel.</li></ul>

#### ***Remedial Actions***

The EPA selected a remedy for the Site in a September 2011 ROD. The selected remedy addresses all contaminant sources remaining at the Site after the removal actions. The selected remedy consists of two phases, with interim monitoring performed after the first phase to determine the success of the Phase 1 remedy and to determine the need for Phase 2. The remedy also includes long-term monitoring and maintenance activities for those areas addressed during the removal actions.

Table 2 summarizes the media-specific remedial action objectives (RAOs) defined in the ROD as well as the major remedy components.

In December 2022, the EPA issued a memorandum to the site file to document a minor modification to the 2011 ROD. The memorandum documented a five-year extension to the interim monitoring period. Originally, the 2011 ROD indicated that the interim monitoring period after Phase 1 would last three to five years. The minor remedy modification extends the interim monitoring period another five years, such that Phase 2 will be considered if water quality standards are not met within 10 years after Phase 1 is implemented. During the five-year extension period, the bulkhead installed at Level 1 as part of the remedy will be closed to minimize discharge from that level, and the effects of this condition on surface water quality will be monitored.

**Table 2: RAOs and Remedy Components**

Media	RAO <sup>a</sup>	Remedy Component <sup>b</sup>
Surface water	<ul style="list-style-type: none"> <li>Reduce in-stream metal concentrations and sediment loading to the extent practicable in Elk Creek to lessen water quality impacts and maximize reasonably attainable water uses in Elk Creek.</li> <li>Reduce water flow through mine workings and contaminated soils to reduce metal loading to Elk Creek.</li> </ul>	<u>Phase 1: Source control and interim monitoring</u> <ul style="list-style-type: none"> <li>Level 3 contaminant controls (sealing contaminant sources, including the raises/winzes to Level 4 and Level 2, and directing water out of the mine).</li> <li>Construction of a flow-through bulkhead in Level 1.</li> <li>Waste rock stabilization and implementation of adit discharge controls at Level 5 and Level 98 (to direct adit drainage around the waste rock).</li> <li>Institutional controls to prevent excavation into contaminated soils, sediments and mine waste material and to prevent disturbance of the elements of the removal and remedial actions.</li> <li>Interim water quality monitoring to determine if Phase 2 is necessary (extended to a 10-year period by the EPA's 2022 memorandum to the site file).</li> <li>Signage and fencing as needed to protect remedial components.</li> </ul>
Soil and waste rock/tailings	<ul style="list-style-type: none"> <li>Control and/or reduce run-on and runoff from tailings/waste rock piles to minimize generation of contaminated runoff and groundwater and to reduce sediment loading of streams.</li> <li>Reduce human exposure to dust and ecological impacts from impacted soils and waste rock by maintaining the vegetative cover over treated soils and waste rock.</li> </ul>	<u>Phase 2: Water treatment (if necessary)</u> <ul style="list-style-type: none"> <li>Passive water treatment system at Level 1 with subsequent discharge to Elk Creek.</li> <li>Signage and fencing as needed to protect remedial components.</li> </ul> <u>Long-term operation and maintenance (O&amp;M) of remedy components</u> <ul style="list-style-type: none"> <li>Mine waste repository and areas impacted by repository construction.</li> <li>Revegetated/stabilized/armored residual soils and waste rock at Level 1, Level 2, Level 3, Level 5 and Level 98.</li> <li>Reconstructed Elk Creek channel and run-on/runoff and erosion controls.</li> <li>Level 3 contaminant controls.</li> <li>Flow-through bulkhead in Level 1.</li> <li>Institutional controls.</li> <li>Passive water treatment system, if implemented.</li> </ul>

*Notes:*

- RAOs defined in Section 8 of the 2011 ROD.
- Remedy components defined in Section 12 of the 2011 ROD.

Table 3 summarizes the Site's surface water cleanup levels identified in the 2011 ROD. They are contaminant concentrations expected to be protective of ecological receptors. Protective levels for aquatic receptors exposed to surface water are based on the Colorado water quality standards for Elk Creek that were established to protect the designated uses of the water (5 Colorado Code of Regulations [CCR] 1002-35, Stream Segment 11, Upper Gunnison Basin).

In addition to the Colorado water quality standards, MCLs under the federal Safe Drinking Water Act also apply to Segment 11 due to its designation as a drinking water supply. MCLs for all site contaminants are less stringent than surface water quality standards. Therefore, surface water cleanup levels are based on water quality standards for ecological COCs. All surface water cleanup levels are a function of water hardness.

**Table 3: 2011 ROD Surface Water Cleanup Levels for Elk Creek and Coal Creek<sup>a</sup>**

COC	Cleanup Level (micrograms per liter [ $\mu\text{g/L}$ ])		Basis	Assessment Endpoint
Cadmium	Chronic	$(1.10162 - [\ln(\text{hardness}) * 0.041838]) * e^{0.7998[\ln(\text{hardness})] - 4.4451}$	WQS <sup>b</sup>	Presence of a fish population in lower Elk Creek
	Acute	$(1.136672 - [\ln(\text{hardness}) * 0.041838]) * e^{0.9151[\ln(\text{hardness})] - 3.6236}$		
Lead	Chronic	$(1.46203 - [\ln(\text{hardness}) * 0.145712]) * e^{1.273[\ln(\text{hardness})] - 4.705}$	WQS <sup>b</sup>	Presence of a fish population in lower Elk Creek
	Acute	$(1.46203 - [\ln(\text{hardness}) * 0.145712]) * e^{1.273[\ln(\text{hardness})] - 1.46}$		
Zinc	Chronic	$0.986e^{(0.8525[\ln(\text{hardness})] + 0.9109)}$		
	Acute	$0.978e^{(0.8525[\ln(\text{hardness})] + 1.0617)}$		

*Notes:*

- Cleanup levels defined in Table 18 of the 2011 ROD as “COC Concentrations Expected to Provide Adequate Protection of Ecological Receptors.”
- WQS – Water Quality Standard, 5 Colorado Code of Regulations 1002-35, Stream Segment 11, Upper Gunnison River Basin; chronic.

ln = natural log.

Section 12.4.1 of the ROD states that cleanup levels were not established for aquatic receptors exposed to sediments because it was determined that sediment contamination would be addressed by reducing the source of sediments rather than by reducing contaminant concentrations in existing sediments. Cleanup levels also were not developed for terrestrial receptors due to the presence of elevated metal concentrations in non-impacted portions of the Site and the uncertainties in the risk evaluation.

The 2011 ROD also indicates that the Site’s remedy does not address groundwater outside of the mine workings for several reasons. There is no evidence of a continuous aquifer at the Site that would produce a reliable drinking water supply. There is isolated, naturally occurring contamination of groundwater related to the flow of water past highly mineralized rock; however, metal concentrations away from the mineralized areas are generally low. Due to the relatively small size of the area of impact and the extensive costs of thoroughly investigating the fate of contaminants in the complex fractured bedrock system, no additional groundwater investigation or remediation was proposed. It was anticipated that the contaminant source controls would reduce the amount of water that becomes contaminated in the mine and would likely reduce impacts to localized groundwater.

### **Status of Implementation**

The EPA’s Region 8 is the lead agency for the cleanup of the Site and the CDPHE is the support agency. Because the Site is partially located on USFS property, the EPA and the CDPHE are coordinating with the USFS on all cleanup activities.

The construction of major Phase 1 components for source control occurred between 2015 and 2017. The completed work includes:

- Construction of a bypass adit adjacent to and north of the Level 1 adit. The bypass adit allowed access and dewatering of Level 1. Construction of the bypass adit rendered extensive rehabilitation of Level 1 unnecessary. The original Level 1 portal was closed permanently in 2017.
- Rehabilitation of the Level 1 adit to the selected bulkhead location (less extensive than originally anticipated).
- Installation of a flow-through bulkhead in Level 1. The bulkhead is a concrete plug with a valve used to stop or control the flow of water from Level 1. Remedy elements associated with the bulkhead include flow monitoring devices and pressure monitoring instrumentation. Remote access to the data from the instrumentation is available through a telemetry system and solar power charging setup (installed in 2018).
- Implementation of Level 3 contaminant controls, including rehabilitation of the Level 3 adit, plugging and installing seals on raises/winzes to prevent the flow of seepage from Level 3 from passing through

mineralized areas on its way to lower levels, and sealing select areas of the Level 3 adit floor. Although not required by the ROD, the shaft of Level 4 was also backfilled.

- Re-opening the site repository to accept waste rock and soils. The repository was closed again in 2017.

The USFS implemented the remedial components at Levels 5 and 98. Surface work at Level 5 and Level 98 (waste rock stabilization, adit discharge controls and some revegetation) was completed in 2019. Additional revegetation, including installation of about a half-acre of wetland plants, was completed in 2020.

The Phase 1 portion of the remedy was determined to be operational and functional in November 2017. Following completion of the Phase 1 source controls, an operation and maintenance (O&M) program for the installed components of the remedy began. The EPA also implemented the interim monitoring program to collect data to assist in the decision of whether Phase 2 of the remedial action should be implemented. The EPA will also determine the need for signage and fencing if Phase 2 of the remedial action is implemented. The key component to the decision of whether Phase 2 should be implemented is water quality in Elk Creek and the degree to which discharge from the Site degrades Elk Creek water quality.

The first year of interim monitoring, which was originally expected to last five years, took place in 2018. A partial bulkhead closure at Level 1 was conducted in 2018. The bulkhead was fully open in 2019 and 2020. The bulkhead valve was set to limit discharge to 20 gallons per minute (gpm) in 2021 and 2022. The 20 gpm discharge limit was selected to reflect the maximum treatment rate of a Phase 2 passive system if one were needed. During the first five years of the interim monitoring period (2018 to 2022), water quality under unrestricted discharge and limited (maximum of 20 gpm) discharge scenarios were evaluated. Surface water quality standards were not met.

In December 2022, the EPA completed a minor modification to the 2011 ROD and extended the interim monitoring period from five to 10 years. It also continued surface water quality monitoring for five years. During the extended interim monitoring period (2023 to 2027), the bulkhead will be closed and monitored to evaluate the water responses over an extended closure period. The CDPHE prepared the Bulkhead Closure and Monitoring Plan in May 2023 to describe bulkhead closure, monitoring activities and contingencies. The CDPHE also updated the Site's Interim Monitoring Plan for the Phase 1 remedial action in May 2023 to incorporate updates to the monitoring plan as a result of the extension of the interim monitoring program. It also incorporates sampling of seeps resulting from the bulkhead closure.

The CDPHE fully closed the Level 1 bulkhead on June 16, 2023. In addition, the EPA's Removal Program cleaned out the settling ponds to maximize capacity as part of the bulkhead closure contingency plans. The site repository was opened to accept the material from the settling ponds and then closed again. Monthly surface water sampling, including seeps/springs monitoring and underground sampling in Levels 1 and 3 continues during the field season, generally June through October. Recent surface water data are discussed in the Data Review section of this FYR report.

### **Institutional Control Review**

The 2011 ROD required institutional controls in the form of land use restrictions to prevent excavation into contaminated soils, sediments and mine waste material and to prevent disturbance of the elements of the removal and remedial actions. The ROD further noted that land use restrictions would be implemented by landowners through the use of Environmental Covenants or Notices of Environmental Use Restrictions pursuant to Colorado's Environmental Covenants Statute, C.R.S. Section 25-15-317 *et seq.*

Institutional controls in the form of Environmental Covenants or Notices of Environmental Use Restrictions have not yet been implemented at the Site. The EPA, in consultation with the CDPHE and the USFS, is working to determine which parcels may require this type of institutional control. Figure 3 shows parcels/mining claims in relation to the Site and its remedial features.

Several areas of the Site are USFS-managed land (Figure 3). The USFS maintains the Land Status Record System, which is a record of the land ownership title, status and jurisdiction for all USFS land. Through this system, the remediated areas of the Site that are located on USFS-managed land, including the mine waste

repository, are mapped in a geographic information system-based application, which can be accessed online.<sup>1</sup> In this application, the remediated areas are identified as being subject to the institutional controls in the 2011 ROD. Any proposed work on USFS-managed land is also subject to the agency's review process. The EPA, in consultation with the CDPHE and the USFS, is working to determine the form and substance of institutional controls for the USFS-managed areas.

The EPA is also developing an institutional control implementation and assurance plan (ICIAP) to document the activities associated with implementing institutional controls and ensuring the long-term stewardship of these institutional controls for the Site.

**Table 4: Summary of Planned Institutional Controls (ICs)**

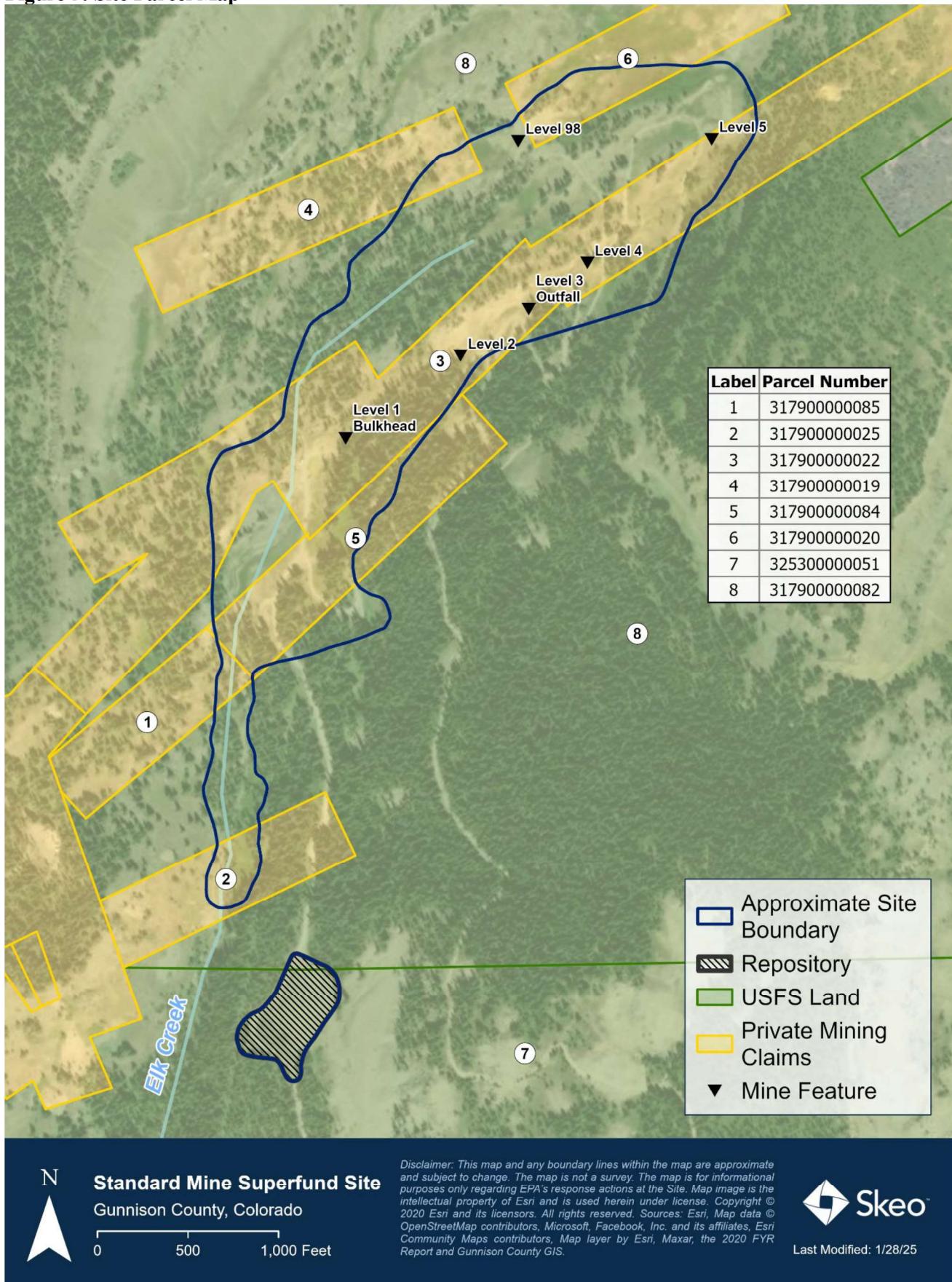
Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Contaminated soils, sediment and mine waste (including waste repository); remedial infrastructure	Yes	Yes	See Figure 3.	<p>To prevent tilling, excavation, grading, construction or any activity that disturbs the ground surface or subsurface or that would in any manner interfere with or adversely affect the implementation, integrity or protectiveness of the remedial action. Land use restrictions include, but are not limited to, activities that:</p> <ul style="list-style-type: none"> <li>• Disturb revegetated areas.</li> <li>• Disturb the mine waste repository.</li> <li>• Expose buried tailings or waste rock.</li> <li>• Access underground mine workings or disturb the Level 3 seal.</li> <li>• Disrupt or impede the free flow of adit discharges.</li> <li>• Disturb the bulkhead or associated mine pool.</li> <li>• Interfere with or disturb drainage ditches or other surface water diversions.</li> <li>• Interfere with or disturb the passive water treatment system, if implemented.</li> </ul>	<p>Environmental Covenants or Notices of Environmental Use Restrictions<sup>a</sup> (planned)</p> <p>Land Status Record System for USFS-managed land (2024)</p>

*Notes:*

- The EPA, in consultation with the CDPHE, is working to determine which parcels/mining claims require Environmental Covenants or Notices of Environmental Use Restrictions to limit land use and protect remedial components.

<sup>1</sup> Available at <https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=a6a32f0501754fdc8932b1c0090a1d83>. Search for Standard Mine, CO and select the one near Crested Butte.

**Figure 3: Site Parcel Map**



## **Systems Operations/Operation and Maintenance**

Since the Phase 1 remedy has achieved operational and functional status, the CDPHE is responsible for funding the costs associated with maintaining the remedy. However, the EPA is responsible for funding some costs associated with the interim monitoring effort.

The CDPHE conducts O&M activities consistent with the Final Operation & Maintenance Plan, dated February 4, 2019. The O&M Plan includes an O&M Manual, a Vegetation Monitoring Plan, an Interim Monitoring Plan and a Communication Plan.

O&M activities include inspection and maintenance of remedy components, vegetation monitoring and interim water quality monitoring. The CDPHE inspects the following site features annually and conducts maintenance as necessary:

- Site repository.
- Site vegetation.
- Level 1 and bypass adit ground control.
- Bulkhead, valve and instrumentation.
- Level 3 ground control and slab closures.
- Level 1 and 3 portal structures and utilities.

The EPA, CDPHE, DRMS, and CDPHE contractors conduct monitoring consistent with the Site's Interim Monitoring Plan, which was updated in May 2023 to reflect changes as a result of the five-year extension of the interim monitoring period. In addition to monitoring Level 1 bulkhead operations, contractors collect data from multiple monitoring stations to assess water quality and flow rates at and downgradient of the Site. Monitoring stations ELK-08, ELK-05 and ELK-00 in Elk Creek are used to ascertain the effectiveness of the remedy. Other monitoring locations include:

- Level 1 Outfall, located where discharge from Level 1 enters Elk Creek.
- Level 3 Outfall, located in the tunnel flume.
- ELK-11, located upgradient of the Level 1 Outfall.
- Level 1 Mine Discharge at Bypass Adit.
- Opportunistic samples at the discretion of the project team.

Grab samples are to be analyzed for total metals, dissolved metals, alkalinity and calculated hardness during the sampling events, which consist of up to six events per year, weather and site conditions permitting. Figure 2 shows the monitoring locations included in the current interim monitoring program.

Prior to 2023, samples were collected from the previously noted locations by the DRMS, CDPHE contractors, and the U.S. Geological Survey (USGS). Water samples at some locations were collected using MiniSipper instruments (which allow for high-frequency, long-duration sample collection) and grab samples at least twice a year, in June (high-flow stream conditions) and September (low-flow conditions). The grab samples were analyzed for total and total dissolved metals, as well as field and other water quality parameters.<sup>2</sup> Only the grab sample results are evaluated in this FYR since they meet the EPA's requirements for sample volume, sample holding times and preservation. The Data Review section of this FYR report discusses the results presented in annual reports for water years 2019 through 2023.

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<sup>2</sup> The Final Interim Monitoring Plan notes that metals to be reported included (at a minimum) cadmium, calcium, copper, iron, lead, manganese, magnesium, zinc, sulfate and calculated hardness. Water quality parameters include pH, turbidity, specific conductance, resistivity and dissolved oxygen.

### III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the 2020 FYR Report (Table 5) as well as the recommendations from the 2020 FYR Report and the status of those recommendations (Table 6).

**Table 5: Protectiveness Determinations/Statements from the 2020 FYR Report**

OU #	Protectiveness Determination	Protectiveness Statement
OU-1 Sitewide	Will be Protective	The remedy at the Standard Mine Superfund site is expected to be protective of human health and the environment upon completion. In the interim, there are no current direct human or ecological exposures to contaminated soils or mine waste rock above levels of concern. The EPA will determine the need for further remedial action at the Site following completion of the three-to-five-year interim monitoring program for surface water.

**Table 6: Status of Recommendations from the 2020 FYR Report**

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
OU-1 Sitewide	An institutional control implementation and assurance plan has not been prepared for the Site.	Develop an institutional control implementation and assurance plan to document the activities associated with implementing and ensuring the long-term stewardship of institutional controls for the Site.	Ongoing	The EPA is working to draft a plan to document the institutional control activities and long-term stewardship of the institutional controls.	Anticipate finalization in 2025
OU-1 Sitewide	Institutional controls have not been implemented as required by the ROD.	Implement institutional controls consistent with the ROD and the institutional control implementation and assurance plan.	Ongoing	The EPA, the CDPHE and the USFS are working together to determine appropriate mechanisms for implementing institutional controls. The USFS has added the Site to its Land Status Record System. The EPA, in consultation with the CDPHE, will determine which parcels require Environmental Covenants or Notices of Environmental Use Restrictions pursuant to Colorado's Environmental Covenants Statute.	Anticipate in 2026
OU-1 Sitewide	O&M of Levels 5 and 98 is not included in the 2019 O&M Plan.	Coordinate with the USFS to ensure that inspection and maintenance procedures for Levels 5 and 98 are included in an O&M Plan and regularly conducted.	Ongoing	The CDPHE is updating the Site's 2019 O&M Plan to include Levels 5 and 98.	Anticipate finalization in 2025

## IV. FIVE-YEAR REVIEW PROCESS

### **Community Notification, Community Involvement and Site Interviews**

On June 27, 2024, the EPA held a community meeting on the current status of actions at the Site and announced the 2025 FYR. A public notice was made available by a newspaper posting in the *Crested Butte News* on October 24, 2024, and October 31, 2024 (Appendix D). It stated that the FYR was underway and invited the public to submit any comments to the EPA. The results of the review and the FYR Report will be made available at the EPA Superfund Records Center, located at 1595 Wynkoop Street, Denver, Colorado 80202. The EPA will also provide a summary of the FYR Report to the Site's information repository, Crested Butte Old Rock Library, located at 504 Maroon Avenue, Crested Butte, Colorado 81224. The summary document will include relevant links to site documents and the EPA's site profile page at <https://www.epa.gov/superfund/standard-mine>.

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. Appendix E includes the completed interview forms.

Kathleen Knox with the CDPHE has a favorable impression of the phased ROD for the Site. She noted that the extended interim monitoring period will allow them to fully evaluate the effectiveness of Phase 1. She indicated that remedial and maintenance work has been effective in reducing exposures to impacted soils and waste and in reducing metals loading to Elk Creek. Remaining risks associated with the Site, including waste left in place within the repository, have been well documented. She recommended that the EPA conduct an annual public meeting or prepare a fact sheet to keep the community informed about site activities and status through the extended interim monitoring period. She was not aware of any complaints or inquiries about the Site from the community since the implementation of the cleanup. She was not aware of any problems with vandalism or trespassing at the Site.

Mark Mikos with the DRMS is satisfied with the current state of the remediation at the Site. He stated that the Site is returning to native conditions, the repository is stable, and the bulkhead impounding mine water appears to be reaching a stable equilibrium with the native fractures. He noted that the EPA is doing a good job of explaining the Site's risks and the cleanup to the community. To reach a wider audience, he recommended an advertisement on KBUT, the local radio station. He was not aware of any problems with emergency response, vandalism or trespassing at the Site.

Bryan Barrett with the USFS indicated that the project seems to be going well and that the EPA is effectively managing the project. To improve communication among the agencies and site stakeholders, he recommended that a public website be used to convey site-related information. He also recommended that the website include sampling results from pre/post projects, graphs showing bulkhead pressure over time, timelines of previous work and upcoming work, pictures from pre/post projects, accessible Administrative Record documents, and maps showing all site features and where work has been completed. He also noted that general updates via email on a more regular basis would be helpful.

Ashley Bembeneck with the Coal Creek Watershed Coalition (CCWC) indicated that the initial remediation work along Elk Creek and the constructed channel where tailings were removed looks good. Vegetation is growing well and there is increased plant diversity. Maintenance has also been good. Ms. Bembeneck noted that the agencies are doing a good job with monitoring during the long-term bulkhead closure. She also indicated that local stakeholders would like increased participation from the EPA regarding all potential actions in the watershed. One of the key questions being asked is: how does the Site fit into other efforts to protect the watershed as a whole, especially as it relates to the duration of the interim monitoring period and the potential for the Phase 2 action? She indicated that she appreciates the yearly stakeholder meetings and supports continuing this practice done jointly with the CDPHE.

Representatives from the town of Crested Butte – Dara MacDonald (town manager) and Shea Early (director of public works) – appreciate the EPA’s attention to the Site but would like to see clearer outcomes and a plan for the future. They indicated that the EPA performed outreach very well, but the messaging between the CDPHE, the EPA and other agencies needs improvement. This is especially relevant to zinc permitting/regulations for discharges. Arsenic may also be a concern in the future in terms of state regulations. They appreciate annual updates from the EPA. June or August is a good time for the annual update, as the goal is to target the most people. Future updates to the community could include flyers or fact sheets or posting on the town’s website or at the town hall. The town representatives are not aware of any complaints about the Site, but noted there are occasional inquiries from the community. They noted that signage will be posted to help keep people aware of the Site. The town representatives are interested in learning more about the impacts of the Site on the town’s wastewater treatment plant. They would like the EPA to look more in depth into the projects that the CCWC are working on to improve water quality in the area.

Community Member #1 also has a positive impression of the remedial activities at the Site but wished that all metals could have been removed more effectively from Elk Creek. They are happy with the EPA’s communication, especially the improvement made to the system that notifies the town of any event. Annual meetings held at the town hall and online information keeps them well informed of site status.

Community Member #2 indicated that overall, the project looks good. They noted that calculations for the rock cap on one of the repositories near the Site used incorrect numbers for yearly precipitation and may not have taken into account the repository’s location atop a rock glacier. They suggested that the EPA install a “Do not drink the water” sign at the parking area where Elk Creek crosses County Road 12 (or Kebler Pass Road). They noted that there is not much communication from the EPA for many months at a time and suggested that the EPA send a press release to the *Crested Butte News* to keep people informed. They also indicated that it might be possible for the EPA to present information about the Site at a Rocky Mountain Biological Laboratory seminar. The community member also recommended conducting an aquatic macroinvertebrate survey and a plant survey.

### **Data Review**

The Site’s interim monitoring program was implemented in 2018 to determine the effectiveness of the Phase 1 remedy and compliance with surface water applicable or relevant and appropriate requirements (ARARs) (see ROD Sections 10.2.1 and 12.2.5). The ROD originally intended for the interim monitoring program to last up to five years following Phase 1 implementation. In 2022, the EPA documented a five-year extension of the interim monitoring program to allow further time to realize the full water quality benefits from Phase 1 of the remedy, and more specifically, to evaluate water quality while the Level 1 bulkhead is fully closed for an extended period.

This data review evaluates interim monitoring program data for water years 2019 through 2023 (the second through sixth year of the program), as they are the most recent data available for review. The data are presented in annual reports prepared by the CCWC for the CDPHE. The bulkhead at Level 1 was open during water year 2019. The bulkhead was also open in water years 2020, 2021 and 2022, but metered to allow a maximum flow of 20 gpm, which is the discharge limit selected to reflect the maximum treatment rate of a Phase 2 passive system, if one were needed. On June 16, 2023, the bulkhead valve was closed. Data collected in early June 2023 were prior to the bulkhead closure; sampling after that time in water year 2023 represents conditions with the bulkhead fully closed.

Data collected in 2024, under the bulkhead closure scenario, were not yet available for review and inclusion in this FYR Report. Data will continue to be collected through 2027 as part of the interim monitoring program, at which time, the EPA and the CDPHE will evaluate the effect of the bulkhead closure on downgradient water quality and determine the need for further action.

The review focuses on data collected from monitoring stations ELK-08, ELK-05 and ELK-00 as the ROD specifies that these locations be used to monitor the effectiveness of the remedy.<sup>3</sup> In water years 2019 through 2022, data were collected twice per year under high-flow (spring) and low-flow (late summer/early fall) conditions. Figure 2 shows the monitoring locations. Based on the data reviewed for water years 2019 through 2022, the current state surface water standards and the 2011 ROD surface water quality cleanup levels were not met at these locations. Dissolved cadmium and zinc concentrations were the primary issue in the Elk Creek samples.

In water year 2023, the first year of monitoring after the five-year extension to the interim monitoring program, surface water samples from Elk Creek were collected monthly from June to October. The June 2023 samples from Elk Creek were collected prior to closure of the bulkhead on June 16, 2023. The July through October 2023 samples were collected after the bulkhead was fully closed. In general, the data collected during the initial months of the bulkhead closure were similar to results collected in June 2023 and in previous years when the bulkhead was open. Dissolved cadmium and zinc concentrations continued to exceed the current state surface water standards and the 2011 ROD surface water cleanup levels. Like past years, COC concentrations declined as watershed area increased, indicating that there is minimal loading in the Elk Creek Watershed downstream of Standard Mine.

More information on the data reviewed is below.

#### ***Current Water Quality Standards Evaluation***

The Site's Interim Monitoring Plan specifies that surface water data be compared to applicable state water quality standards, which the 2011 ROD indicates are ARARs for the Site. Metals concentration data from each twice-yearly sampling event (2019 to 2022) and monthly sampling event (June to October 2023) were compared to the water quality standards in effect at the time of sampling. Results for cadmium, copper, lead and zinc are compared to acute and chronic aquatic life criteria; iron and manganese are compared to domestic water supply secondary MCLs. Although cadmium, lead and zinc were the only COCs identified in the ROD, copper, iron and manganese are included in the evaluation because these constituents were detected historically in waste rock samples at the Site and data from these constituents may be used during design of a passive treatment system, if necessary.

Tables F-1 through F-12 in Appendix F compare detected concentrations in surface water samples at ELK-08, ELK-05 and ELK-00 to the applicable surface water quality standard for each sampling event (July and September 2019, June and September 2020, June and October 2021, June and September 2022, and June through October 2023). Data from ELK-11 (upgradient of Level-1) are also included for comparison. Table 7 consolidates the information from these tables to show attainment or nonattainment of the standards by sampling location, parameter and sampling event.

As shown in Table 7, all locations in Elk Creek (ELK-11, ELK-08, ELK-05 and ELK-00) consistently exceeded the chronic and acute zinc surface water standards between 2019 and 2023. All locations consistently exceeded the chronic cadmium standard, while most locations also exceeded the acute cadmium standard.

All locations attained the acute lead standard during the 2019 to 2023 sampling events (Table 7). Samples from ELK-11, ELK-08 and ELK-05 typically did not attain the chronic lead standard in samples collected during the spring (high-flow) events (although there are a few exceptions), but samples mostly met the chronic lead standard in the fall (low-flow) events at these locations. ELK-00 met the acute and chronic lead standards during all sampling events except for one in June 2022 and one in July 2023.

Non-COCs copper and manganese also periodically exceeded surface water standards during this FYR period (Table 7). Iron attained its surface water standard at ELK-11, ELK-08, ELK-05 and ELK-00 between 2019 and 2023.

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<sup>3</sup> In 2023, samples were also collected from mine locations and springs to identify changes in water flow or quality that may be attributed to the bulkhead closure. These results are presented in the annual report.

**Table 7: Surface Water Standards Evaluation for ELK-11, ELK-08, ELK-05 and ELK-00, 2019-2023**

Parameter	Chronic/Acute Standard	July 2019	September 2019	June 2020	September 2020	June 2021	October 2021	June 2022	September 2022	June 2023	July 2023	August 2023	September 2023	October 2023	
		Bulkhead Fully Open		Bulkhead Open and Metered at 20 gpm							Bulkhead Fully Closed				
		Segment <sup>a</sup>		COGUUG11											
<b>Monitoring Location ELK-11 (Upgradient)</b>															
Cadmium	Attains Chronic Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Attains Acute Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
Copper	Attains Chronic Standard	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	
	Attains Acute Standard	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Lead	Attains Chronic Standard	No	No	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	Yes	
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Zinc	Attains Chronic Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Attains Acute Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
Iron	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Manganese	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	
<b>Monitoring Location ELK-08</b>															
Cadmium	Attains Chronic Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Attains Acute Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
Copper	Attains Chronic Standard	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	
Lead	Attains Chronic Standard	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	Yes	
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Zinc	Attains Chronic Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Attains Acute Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
Iron	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Manganese	Attains Water Supply Standard	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	
<b>Monitoring Location ELK-05</b>															
Cadmium	Attains Chronic Standards	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Attains Acute Standard	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	Yes	
Copper	Attains Chronic Standards	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	
Lead	Attains Chronic Standards	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Parameter	Chronic/Acute Standard	July 2019	September 2019	June 2020	September 2020	June 2021	October 2021	June 2022	September 2022	June 2023	July 2023	August 2023	September 2023	October 2023	
		Bulkhead Fully Open		Bulkhead Open and Metered at 20 gpm							Bulkhead Fully Closed				
		Segment <sup>a</sup> COGUUG11													
Zinc	Attains Chronic Standards	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Attains Acute Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
Iron	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Manganese	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	
<b>Monitoring Location ELK-00</b>															
Cadmium	Attains Chronic Standards	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Attains Acute Standard	No	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	Yes	
Copper	Attains Chronic Standards	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Lead	Attains Chronic Standards	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Zinc	Attains Chronic Standards	No	No	No	No	No	No	No	No	No	No	No	No	No	
	Attains Acute Standard	No	No	No	No	No	No	No	No	No	No	No	No	No	
Iron	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Manganese	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

*Notes:*

a) Water quality standards for Elk Creek as designated in CCR 1002-35, Stream Segment 11, Upper Gunnison River Basin.

The results in this table are compiled from Table 5 and Table 6 in the Water Year 2019 Annual Report, Table 3 and Table 4 in the Water Year 2020 Annual Report, Table 4 and Table 5 in the Water Year 2021 Annual Report, Table 4 and Table 5 in the Water Year 2022 Annual Report, and Tables 4 to 7 in the Water Year 2023 Annual Report.

Yes = the result attained the standard.

No = the result exceeded the standard.

Individual acute and chronic surface water standards are not presented in this table because they are calculated using paired hardness concentrations. Tables F-1 to F-12 in Appendix F provide the standards calculated for each sampling event.

Figure F-1 in Appendix F shows detected concentrations in the most downstream monitoring location (ELK-00) from 2005 to 2022. Detected concentrations in ELK-00 during the interim monitoring period are lower than before and during the initial removal actions at the Site. However, there have not been substantial changes in concentrations since the removal actions were completed. Interim monitoring will continue through 2027, at which time the EPA and the CDPHE will determine if the Phase 2 remedy (water treatment) is needed. Monitoring data collected in 2024 through 2027 will assess conditions while the bulkhead at Level 1 is fully closed.

### **2011 ROD Surface Water Cleanup Standards Evaluation**

Metals concentration data from monitoring stations ELK-08, ELK-05 and ELK-00 in Elk Creek are also compared to the acute and chronic aquatic life surface water cleanup levels selected in the 2011 ROD. Tables 8 and 9 compare the June 2022 and September 2022 dissolved cadmium, lead and zinc concentrations at ELK-08, ELK-05 and ELK-00 as well as ELK-11 (upgradient of Level-1) to the acute and chronic aquatic life surface water cleanup levels selected in the 2011 ROD.<sup>4</sup> The 2022 data are representative of recent sample results collected when the bulkhead was open with a metered flow of 20 gpm. Table 10 compares the October 2023 data for the Elk Creek samples to the 2011 ROD cleanup levels; these samples were collected when the bulkhead was closed.

As shown in Tables 8 through 10, zinc in all Elk Creek samples collected in 2022 and in October 2023 exceeded the acute and chronic aquatic life cleanup levels for zinc from the 2011 ROD. Cadmium in all samples also exceeded the chronic aquatic life cleanup level for cadmium from the 2011 ROD; most samples also exceeded the acute aquatic life cleanup level for cadmium.

Lead concentrations at all sample locations exceeded the chronic aquatic life cleanup level during the June 2022 sampling event but were below the chronic cleanup level in the September 2022 and October 2023 sampling events. Lead attained the acute cleanup level in both 2022 sampling events and the October 2023 sampling event.

Interim monitoring will continue through 2027, at which time the EPA and the CDPHE will determine if the Phase 2 remedial action is needed. Monitoring data collected from 2023 through 2027 will assess conditions while the bulkhead at Level 1 is fully closed.

**Table 8: 2011 ROD Surface Water Cleanup Levels Evaluation of Grab Samples Collected from Elk Creek, June 2022**

Parameter	Monitoring Location	Samples collected on June 16, 2022 <sup>a</sup>			
		ELK-11 (Upgradient)	ELK-08	ELK-05	ELK-00
	Segment	<b>COGUUG11</b>			
Cadmium ( $\mu\text{g/L}$ )	Hardness (mg/L)	21	46	42	43
	Dissolved Cadmium	2.04	3.94	1.87	1.57
	<i>Chronic Aquatic Life Cleanup Level</i>	0.13	0.24	0.22	0.22
	<i>Acute Aquatic Life Cleanup Level</i>	0.44	0.87	0.80	0.82
	Attains Chronic Cleanup Level	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
Lead ( $\mu\text{g/L}$ )	Attains Acute Cleanup Level	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
	Dissolved Lead	1.52	4.15	1.72	1.07
	<i>Chronic Aquatic Life Cleanup Level</i>	0.4	1.1	1.0	1.0
	<i>Acute Aquatic Life Cleanup Level</i>	11	27	25	25
	Attains Chronic Cleanup Level	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
Zinc ( $\mu\text{g/L}$ )	Attains Acute Cleanup Level	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
	Dissolved Zinc	401	652	376	288
	<i>Chronic Aquatic Life Cleanup Level</i>	33	64	59	61
	<i>Acute Aquatic Life Cleanup Level</i>	38	74	68	70

<sup>4</sup> Monitoring of Elk-11 provides information on upgradient water quality but, given its proximity to historical mining activities, is not intended to provide unimpacted background water quality data.

Samples collected on June 16, 2022 <sup>a</sup>						
Parameter	Monitoring Location	ELK-11 (Upgradient)	ELK-08	ELK-05	ELK-00	
	Segment	COGUUG11				
	Attains Chronic Cleanup Level	No	No	No	No	
	Attains Acute Cleanup Level	No	No	No	No	

*Notes:*

a. Data source is Table 4 of the 2022 Annual Report. The bulkhead was open at the time of sampling with a metered flow of 20 gpm.

Numeric cleanup levels were calculated using paired hardness results and the acute and chronic surface water cleanup level equations set in the 2011 ROD. All cleanup levels refer to the dissolved sample fraction.

Yes = the result attained the 2011 ROD cleanup level.  
No = the result exceeded the 2011 ROD cleanup level.

**Table 9: 2011 ROD Surface Water Cleanup Levels Evaluation of Grab Samples Collected from Elk Creek, September 2022**

Samples collected on September 29, 2022 <sup>a</sup>						
Parameter	Monitoring Location	ELK-11	ELK-08	ELK-05	ELK-00	
		(Upgradient)	COGUUG11			
	Hardness (mg/L)	57	91	64	67	
Cadmium ( $\mu\text{g/L}$ )	Dissolved Cadmium	5.79	8.84	1.47	1.18	
	Chronic Aquatic Life Cleanup Level	0.28	0.4	0.3	0.31	
	Acute Aquatic Life Cleanup Level	1.04	1.57	1.16	1.2	
	Attains Chronic Cleanup Level	No	No	No	No	
	Attains Acute Cleanup Level	No	No	No	Yes	
Lead ( $\mu\text{g/L}$ )	Dissolved Lead	0.189	<0.100	<0.100	<0.100	
	Chronic Aquatic Life Cleanup Level	1.4	2.3	1.5	1.6	
	Acute Aquatic Life Cleanup Level	35	58	40	42	
	Attains Chronic Cleanup Level	Yes	Yes	Yes	Yes	
	Attains Acute Cleanup Level	Yes	Yes	Yes	Yes	
Zinc ( $\mu\text{g/L}$ )	Dissolved Zinc	1,370	1,830	293	222	
	Chronic Aquatic Life Cleanup Level	77	115	85	88	
	Acute Aquatic Life Cleanup Level	89	132	98	102	
	Attains Chronic Cleanup Level	No	No	No	No	
	Attains Acute Cleanup Level	No	No	No	No	

*Notes:*

- a. Data source is Table 5 of the 2022 Annual Report. The bulkhead was open at the time of sampling with a metered flow of 20 gpm.

Numeric cleanup levels were calculated using paired hardness results and the acute and chronic surface water cleanup level equations set in the 2011 ROD. All cleanup levels refer to the dissolved sample fraction.

Yes = the result attained the 2011 ROD cleanup level.

No = the result exceeded the 2011 ROD cleanup level.

**Table 10: 2011 ROD Surface Water Cleanup Levels Evaluation of Grab Samples Collected from Elk Creek, October 2023**

Parameter	Monitoring Location	Samples collected on October 9, 2023 <sup>a</sup>			
		ELK-11 (Upgradient)	ELK-08	ELK-05	ELK-00
	Segment	COGUUG11			
	Hardness (mg/L)	64	96	64	66
Cadmium ( $\mu\text{g/L}$ )	Dissolved Cadmium	4.77	4.27	0.76	0.78
	Chronic Aquatic Life Cleanup Level	0.3	0.41	0.3	0.31
	Acute Aquatic Life Cleanup Level	1.16	1.64	1.16	1.19
	Attains Chronic Cleanup Level	No	No	No	No
	Attains Acute Cleanup Level	No	No	Yes	Yes
Lead ( $\mu\text{g/L}$ )	Dissolved Lead	<0.2	0.2	<0.1	<0.1
	Chronic Aquatic Life Cleanup Level	1.5	2.4	1.5	1.6
	Acute Aquatic Life Cleanup Level	40	62	40	41
	Attains Chronic Cleanup Level	Yes	Yes	Yes	Yes
	Attains Acute Cleanup Level	Yes	Yes	Yes	Yes
Zinc ( $\mu\text{g/L}$ )	Dissolved Zinc	1,350	1,150	168	170
	Chronic Aquatic Life Cleanup Level	85	120	85	87
	Acute Aquatic Life Cleanup Level	98	138	98	101
	Attains Chronic Cleanup Level	No	No	No	No
	Attains Acute Cleanup Level	No	No	No	No

*Notes:*

a. Data sources are Tables 4, 5, 6 and 7 of the 2023 Annual Report. The bulkhead was closed at the time of sampling.

Numeric cleanup levels were calculated using paired hardness results and the acute and chronic surface water cleanup level equations set in the 2011 ROD. All cleanup levels refer to the dissolved sample fraction.

**Yes** = the result attained the 2011 ROD cleanup level.  
**No** = the result exceeded the 2011 ROD cleanup level.

### Site Inspection

The site inspection took place on 10/10/2024. Participants from the EPA included RPM Jessica Duggan, CIC Valerie Doornbus and site attorney Matthew Kryman. Other participants included Kathleen Knox from the CDPHE, Mark Mikos, Jeff Graves and Tara Tafi from the DRMS, Brian Barrett from the USFS and Treat Suomi from Skeo (EPA FYR support contractor). The purpose of the inspection was to assess the protectiveness of the remedy.

Site inspection participants began with a safety briefing at the Mt. Emmons Mining Company parking area. From there, the inspection team visited the following site areas: the repository, Levels 5 and 98, the tunnel at Level 3, the Level 1 adit and bulkhead, the Level 1 outfall, seep 8, the USGS gauging station on Elk Creek, and surface water sampling location ELK-00.

The repository was in good condition with no signs of bulging or subsidence. Woody vegetation and trees were observed growing along the toe of the repository; some vegetation was also observed near the top of the repository. The state indicated they would clear the vegetation as part of routine maintenance.

On the walk up to Level 5 and 98, participants briefly stopped at Level 4 and observed the former shaft and DRMS mine closure. Participants also observed Level 98 area where the DRMS will be doing work to adjust a trench constructed during the reclamation work. From Level 98 up to Level 5, participants viewed the area of waste left in place and wetland area near Level 98. Participants observed various areas around Level 5 in need of revegetation. Looking through the DRMS mine closure at the Level 5 adit entrance, participants observed water about six inches deep.

At Level 1, site inspection participants entered the adit and observed the bulkhead and valve mechanism inside. The bulkhead valve was closed at the time of the inspection. The exterior tower for the telemetry system appeared in good condition.

At Level 3, participants entered the adit and observed the sealed floor remedial features that block water from flowing to lower levels of the mine workings. DRMS personnel pointed out the areas where additional maintenance will be performed.

Site inspection participants also observed the reconstructed Elk Creek channel and run-on/runoff and erosion controls near Level 1 as well as an area where the EPA recently mucked out ponds at Level 1. Material removed from the ponds was disposed of at the Site's repository. No issues of concern affecting protectiveness of the remedy were observed during the site inspection.

Following the site inspection, Skeo personnel visited the Site's information repository at Crested Butte Old Rock Library, located at 504 Maroon Avenue, Crested Butte, Colorado 81224. No site records were available. The EPA's RPM followed up with the library via email on October 11, 2024. Based on the library's preference, the EPA plans to provide the library with a summary document after the FYR Report is published. The summary document will include links to the EPA's site documents and websites.

## **V. TECHNICAL ASSESSMENT**

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

**Question A Summary:**

Phase 1 of the remedy – contaminant controls, construction of a concrete flow-through bulkhead at Level 1, waste rock stabilization, adit discharge controls and interim monitoring – has been implemented, as specified in the 2011 ROD. Interim monitoring to evaluate the effectiveness of the source control measures began in 2018 and was anticipated in the ROD to last three to five years. In 2022, the EPA documented a five-year extension of the interim monitoring program in a minor remedy modification. The change to the monitoring program will allow more time to realize the full water quality benefits from Phase 1 of the remedy and, more specifically, to evaluate water quality with the Level 1 bulkhead closed over a longer period. Data will be collected during the extended monitoring period to determine if the source control measures are functioning as intended by the decision documents or if Phase 2 – passive water treatment – will be needed. The EPA expects to determine the need for passive water treatment following the completion of the 10-year interim monitoring program in 2027.

The source control remedy was designed to reduce water flow through mine workings and contaminated soils to reduce metals loading to Elk Creek to lessen water quality impacts and maximize reasonably attainable water uses in Elk Creek. The remedy was also designed to reduce human exposure to dust and ecological impacts from impacted soils and waste rock. Rehabilitation work at Levels 1, 3, 5 and 98 has occurred, which effectively reduces direct human and ecological exposures to contaminated soil and waste rock and better manages adit discharge.

The flow-through bulkhead at Level 1 is operating as designed and allows the EPA to control discharge rates. During most of the FYR period, the bulkhead at Level 1 allowed a maximum flow of 20 gpm (although it was fully open in 2019). Surface water data collected between 2019 and 2022 reported exceedances of the current state acute and chronic surface water standards (ARARs) and the 2011 ROD surface water quality cleanup levels. Consistent with historical results, dissolved cadmium and zinc concentrations were the primary issue in the Elk Creek samples. The bulkhead at Level 1 was fully closed in June 2023 with monthly sampling conducted from July to October 2023. In general, the data collected during the initial months of the bulkhead closure were similar to results collected in previous years when the bulkhead was open. However, the EPA will monitor the long-term effect of this change on downstream water quality through the end of the 10-year interim monitoring program in 2027, at which time, the EPA will determine the need to implement Phase 2 (passive water treatment).

O&M of the completed remedy components including inspections of the site repository, vegetation, Level 1 bulkhead, and Level 1 and Level 3 adit restorations, is occurring as specified in the 2019 O&M Plan. The site repository is inspected regularly and is well maintained, although some woody vegetation was observed growing on the repository during the FYR site inspection. The CDPHE plans to remove the vegetation as part of ongoing maintenance. Inspections and maintenance of surface features at Levels 5 and 98 are occurring, although they were not specified in the 2019 O&M Plan. The CDPHE is updating the O&M Plan to incorporate formal O&M requirements into the plan. The revised plan is expected by December 2025.

Institutional controls in the form of Environmental Covenants or Notices of Environmental Use Restrictions pursuant to Colorado's Environmental Covenants Statute, required by the 2011 ROD, have not yet been implemented at the Site. The EPA, in coordination with the CDPHE and the USFS, is developing an ICIAP that will document the activities associated with implementing and ensuring the long-term stewardship of institutional controls for the Site. In the interim, the USFS has added the USFS-managed areas of the Site, including the waste repository, to its Land Status Record System. This system identifies the remediated areas as being subject to the institutional controls in the 2011 ROD. Any proposed work on USFS-managed land is also subject to the agency's review process.

**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:**

The exposure assumptions and RAOs used at the time of the remedy selection remain valid. The Site is in an unoccupied and remote area of Gunnison National Forest and on private property. There are no current direct human or ecological exposures to contaminated soils or mine waste rock because wastes were transported to the repository and capped, and access to the Site is limited.

The 2011 ROD selected surface water cleanup levels based on Colorado water quality standards for Elk Creek as designated in the 2007 Colorado Code of Regulations (CCR 1002-35), Stream Segment 11, Upper Gunnison River Basin. The water quality standards are ARARs for the Site. The water quality standards are considered protective for aquatic receptors and are a function of water hardness. Colorado most recently amended the water quality standards in December 2023 (CCR 1002-35). Table I-1 in Appendix I compares the 2011 ROD surface water cleanup levels to the December 2023 Colorado water quality standards for site COCs. Table I-1 shows that the current acute and chronic water quality standards are the same as or less stringent for all COCs based on a hypothetical hardness of 100 milligrams per liter (mg/L) as calcium carbonate, with one exception; the chronic value for zinc is slightly more stringent in 2023 versus 2011.<sup>5</sup> The EPA may consider revising the Site's surface water cleanup levels to reflect the most current state water quality standards for surface water.

In addition to the water quality standards, the 2011 ROD states that the MCLs under the Safe Drinking Water Act apply to Stream Segment 11 due to its designation as a drinking water supply. The EPA selected the water quality standards as surface water cleanup levels because the MCLs are less stringent than water quality standards. Table I-2 in Appendix I compares the 2011 ROD surface water cleanup levels to current federal and state MCLs to determine if this remains valid. The 2011 ROD surface water cleanup levels are more stringent than the MCLs, except for the acute surface water cleanup level for lead, when using a default hardness of 100 mg/L as calcium carbonate in the surface water cleanup level equation. The MCL/action level for lead was reduced in 2024 to

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<sup>5</sup> The current water quality standard and 2011 ROD surface water cleanup goals are hardness-based standards. A hypothetical hardness of 100 mg/L calcium carbonate was used to demonstrate the relative difference between the current water quality standards and the 2011 ROD surface water cleanup goals. The resulting numeric values from this assessment should not be construed as the site-specific standards and surface water cleanup values.

10 micrograms per liter ( $\mu\text{g}/\text{L}$ ).<sup>6</sup> However, the surface water cleanup level for lead is below the updated action level and therefore remains valid.

The RAOs defined in the 2011 ROD to reduce human and ecological exposures to impacted soils and waste rock and to reduce metals loading to Elk Creek remain valid. Current and anticipated future land, water and groundwater uses at the Site have not changed since the 2011 ROD in a manner that would affect the RAOs for the remedial action.

On January 17, 2024, the EPA's Office of Land and Emergency Management released the "Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities" (2024 Updated Soil Lead Guidance), which updates the residential soil lead regional screening level and removal management level for the CERCLA and Resource Conservation and Recovery Act programs and provides additional guidance for setting residential lead preliminary remediation goals (PRGs) and cleanup levels. The 2024 Updated Soil Lead Guidance recommends that regions use the most current version of the Integrated Exposure Uptake Biokinetic Model with 5 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ) as the 95th percentile target blood lead level and site-specific environmental data (e.g., lead concentrations in various media and bioavailability) to develop PRGs and cleanup levels for residential land use. If an additional source of lead (e.g., lead water service lines, lead-based paint, non-attainment areas where the lead concentrations exceed National Ambient Air Quality Standards) is identified, the 2024 Updated Soil Lead Guidance recommends 3.5  $\mu\text{g}/\text{dL}$  as the 95th percentile target blood lead level. The 2024 Updated Soil Lead Guidance also recommends that the EPA region adjust PRGs and cleanup levels to account for uncertainty, technical limitations (i.e., detection/ quantification limits), and site-specific soil lead background. The 2024 Updated Soil Lead Guidance does not affect the protectiveness of the remedy at Standard Mine. The Site is not a residential lead site and institutional controls are planned to restrict future land use at the Site.

On April 19, 2024, the EPA finalized a rule that designated two per- and polyfluoroalkyl substance (PFAS) chemicals (perfluorooctanoic acid and perfluorooctanesulfonic acid) as CERCLA hazardous substances. The EPA team reviewed available information to assess potential PFAS contamination at the Site. Based on a review of the site history, a flotation mill operated at the Standard Mine site from 1957 to 1960. Flotation mills commonly use surfactants to aid metal recovery from solution. Review of historical patents and information indicates that limited research into use of PFAS as surfactants in ore flotation was conducted in the 1950s, but widespread use was not likely at that time. PFAS may have been used at a different mill facility in the early 1960s for ore processing, but that appears to be the first usage outside of research laboratories. Additional research and on-site use did not appear to occur until later in the 1960s and 1970s, long after the flotation mill at Standard Mine was removed. Thus, based on the site history and preliminary desktop review of the available research, there is no definitive evidence to indicate PFAS contamination at the Standard Mine site.

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

No other information has come to light that could call into question the protectiveness of the remedy. Although an interview raised questions about the protectiveness of drinking surface water, prior risk assessments determined there were no human health risks.

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<sup>6</sup> National Primary Drinking Water Regulations for Lead and Copper: Improvement (LCRI) – Final Rule, dated October 30, 2024, with an effective date of December 30, 2024, available at <https://www.federalregister.gov/documents/2024/10/30/2024-23549/national-primary-drinking-water-regulations-for-lead-and-copper-improvements-lcri>.

## VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations				
<b>OU(s) without Issues/Recommendations Identified by the FYR:</b>				
None.				
<b>Issues and Recommendations Identified by the FYR:</b>				
<b>OU(s):</b> OU-1 Sitewide	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> An ICIAP has not been prepared for the Site.			
	<b>Recommendation:</b> Develop an ICIAP to document the activities associated with implementing and ensuring the long-term stewardship of institutional controls for the Site.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA/State	12/15/2025
<b>OU(s):</b> OU-1 Sitewide	<b>Issue Category: Institutional Controls</b>			
	<b>Issue:</b> Institutional controls have not been implemented as required by the ROD.			
	<b>Recommendation:</b> Implement institutional controls consistent with the ROD and the ICIAP.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA	EPA/State	9/30/2027
<b>OU(s):</b> OU-1 Sitewide	<b>Issue Category: Operations and Maintenance</b>			
	<b>Issue:</b> O&M of Levels 5 and 98 is not included in the 2019 O&M Plan.			
	<b>Recommendation:</b> Update the Site's 2019 O&M Plan to include Levels 5 and 98.			
<b>Affect Current Protectiveness</b>	<b>Affect Future Protectiveness</b>	<b>Party Responsible</b>	<b>Oversight Party</b>	<b>Milestone Date</b>
No	Yes	EPA/State	EPA/State	12/31/2025

### OTHER FINDINGS

One additional recommendation was identified during the FYR. The recommendation does not affect current and/or future protectiveness.

- The Colorado water quality standards, which are the basis of the Site's surface water cleanup levels, have changed since the 2011 ROD was issued. The EPA will consider revising the Site's surface water cleanup levels to reflect the most current state water quality standards for surface water.

## VII. PROTECTIVENESS STATEMENT

Protectiveness Statement	
<i>Operable Unit:</i> OU-1 (Sitewide)	<i>Protectiveness Determination:</i> Short-term Protective
<p><i>Protectiveness Statement:</i></p> <p>The remedy at the Standard Mine Superfund site currently protects human health and the environment because there are no current direct human or ecological exposures to contaminated soils or waste rock above levels of concern. The EPA will determine the need for further remedial action at the Site following the completion of the Site's 10-year interim monitoring program for surface water. For the remedy to be protective over the long term, the following actions need to be taken: 1) develop an ICIAP to document the activities associated with implementing and ensuring the long-term stewardship of institutional controls for the Site, 2) implement institutional controls consistent with the ROD and the ICIAP, and 3) update the Site's 2019 O&amp;M Plan to include Levels 5 and 98.</p>	

## VIII. NEXT REVIEW

The next FYR Report for the Standard Mine Superfund site is required five years from the completion date of this review.

## APPENDIX A – REFERENCE LIST

Bulkhead Closure and Monitoring Plan, Standard Mine Superfund Site, Remedial Action Phase I, Gunnison County, Colorado, Revision 2. Prepared by the CDPHE. May 30, 2023.

Final Interim Monitoring Plan, Standard Mine Superfund Site, Remedial Action Phase I, Gunnison County, Colorado, Revision 1. Prepared by HDR. March 25, 2019.

Final Operation & Maintenance Plan, Standard Mine Superfund Site, Phase I – Source Control. Prepared by HDR. February 4, 2019.

First Five-Year Review Report for Standard Mine Superfund Site, Gunnison, Colorado. Prepared by the EPA Region 8. June 10, 2020.

Interim Monitoring Plan, Standard Mine Superfund Site, Remedial Action Phase I, Gunnison, Colorado, Revision 3. Prepared by the CDPHE. May 19, 2023.

Memorandum, Recommendation to Approve Standard Mine Remedial Action Completion. Prepared by the EPA. September 14, 2017.

Memorandum, Standard Mine Vegetation Annual Inspection (2018). Prepared by AlpineEco. March 14, 2019.

Memorandum to Site File. RE: Minor modification to the 2011 Record of Decision Standard Mine Superfund Site, Crested Butte, Colorado. Prepared by the EPA Region 8. December 9, 2022.

Record of Decision, Standard Mine Superfund Site, Gunnison County, Colorado. Prepared by the EPA. September 30, 2011.

Remedial Investigation Report, Standard Mine, Gunnison County, Colorado. Prepared by URS Operating Services, Inc. May 14, 2010.

Standard Mine Interim Monitoring Program, Water Year 2020 Annual Report. Prepared by Coal Creek Watershed Coalition. October 2022.

Standard Mine Interim Monitoring Program, Water Year 2021 Annual Report. Prepared by Coal Creek Watershed Coalition. August 2024.

Standard Mine Interim Monitoring Program, Water Year 2022 Annual Report. Prepared by Coal Creek Watershed Coalition. August 2024.

Standard Mine Vegetation Monitoring Plan, Gunnison County, Colorado. Prepared by AlpineEco. April 2, 2018.

## APPENDIX B – SITE CHRONOLOGY

**Table B-1: Site Chronology**

Event	Date
Mining operations ceased	1974
The EPA conducted a preliminary assessment and an expanded site investigation	1999
The USFS conducted an EE/CA	2002
The EPA proposed the Site for listing on the NPL	April 2005
The EPA listed the Site on the NPL	September 2005
The EPA began the Site's RI; the EPA issued an Action Memorandum to perform a removal action	June 2006
The EPA performed a removal action, which included surface water drainage improvements	June to October 2006
The EPA issued an Administrative Order for site access	April 2007
The EPA signed a second Action Memorandum for a removal action	July 2007
The EPA performed a removal action, which included the construction of a permanent mine waste repository	July 2007 to September 2008
The EPA issued the BHHRA Report and BERA Report	March 2008
The EPA, the state, the U.S. Department of Interior and the U.S. Department of Agriculture entered into a Consent Decree with Standard Metals	February 2009
The EPA issued the Community Involvement Plan	March 2010
The EPA issued the Site's RI Report, which included addenda to BHHRA and BERA	May 2010
The EPA issued a Settlement Agreement with a potentially responsible party	October 2010
The EPA finalized the combined RI/FS; the EPA signed the Site's ROD	September 2011
The EPA began the remedial design	August 2012
The EPA began Phase 1 of the remedial action	June 2015
The EPA finished the remedial design	October 2016
The EPA finished Phase 1 of the remedial action	March 2018
The interim monitoring program began	January 2018
The EPA issued the Site's first FYR Report	June 2020
The EPA issued a memorandum to the site file to document a minor modification to the Site's 2011 ROD; it documented a five-year extension to the interim monitoring period	December 2022

## APPENDIX C – SITE AREAS

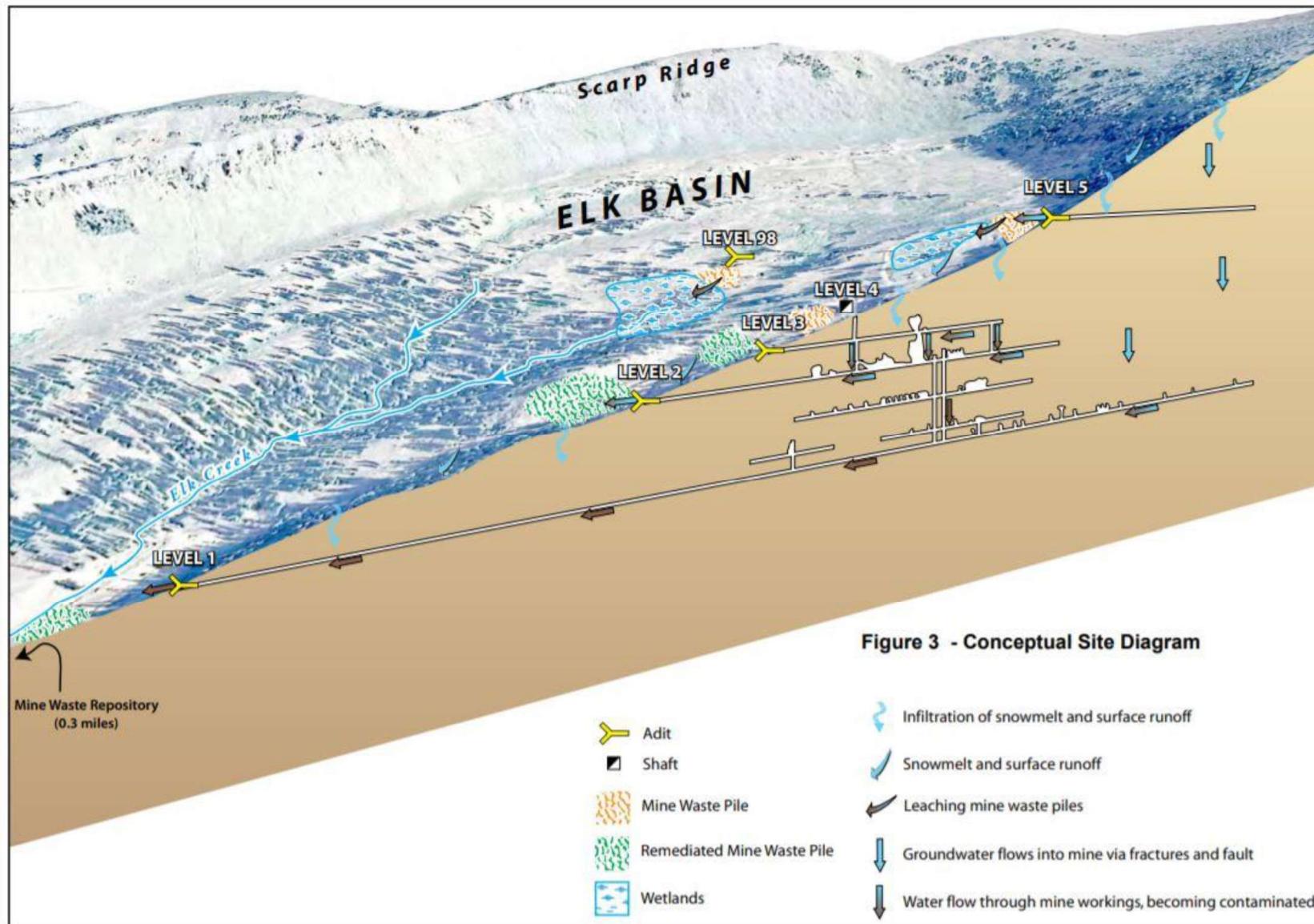
Table C-1 describes the areas disturbed by past mining activities at the Site, as described in the Site's 2011 ROD. Figure 1 of this FYR Report shows the locations of these areas at the Site. Levels 1, 2 and 3 were interconnected through a series of raises and sublevels. Level 4 consisted of two vertical shafts that connected to the Level 3 workings. Levels 5 and 98 were not connected to Levels 1 through 4 or each other.

Figure C-1 is a cross-section of the mine workings. Removal and remedial actions at the Site addressed these areas.

**Table C-1: Disturbed Areas**

Mine Area	Description
Level 1	Contained a discharging adit, revegetated residual soils and waste rock, Elk Creek, 0.5 acre of created wetlands, erosion control ditches and a pilot-scale bioreactor. The Level 1 discharge was considered the primary source of contamination at the Site because it had the highest metal concentrations and highest flow rate relative to the other discharging adits. The pilot-scale bioreactor was removed following the RI.
Level 2	Consisted of a collapsed adit and a small amount of residual soil and waste rock located over bedrock. A small amount of adit discharge water flowed from the collapsed adit over the reclamation area, but the discharge was not channelized or controlled in any manner.
Level 3	Consisted of a non-discharging adit, revegetated residual soil that had been under the excavated waste rock prior to the removal actions, and revegetated waste rock left in place due to the presence of a steep slope between Level 2 and Level 3 that prevented the complete excavation of waste materials due to slope stability concerns.
Level 4	Consisted of two partially collapsed twin-compartment shafts and small waste rock piles.
Level 5	Consisted of a discharging adit and steep pile of waste rock. A blockage is located far within the workings. Water that is discharged from the adit flows over the waste rock, across an old access road, and into a wetland.
Level 98	Consisted of a discharging adit with very low flow and a waste rock pile. Water that is discharged from the adit flows over the southernmost segment of the waste rock pile prior to entering a wetland. A smaller tributary, which combines with other small tributaries from Elk Creek further downstream, flows adjacent to the waste rock pile. Several wetlands are located adjacent to the waste rock pile at this level.

Figure C-1: Mine Cross-section of Mine Workings<sup>7</sup>



<sup>7</sup> Source: The Site's 2011 ROD.

## APPENDIX D – PRESS NOTICE

# EPA PUBLIC NOTICE

## EPA Reviews Cleanup at the Standard Mine Superfund Site

The U.S. Environmental Protection Agency (EPA), in cooperation with the Colorado Department of Public Health and the Environment (CDPHE), is conducting the second five-year review of the Standard Mine Superfund site in Gunnison County, Colorado. The purpose of the five-year review is to ensure that cleanup actions completed to date continue to protect human health and the environment. The five-year review is scheduled to be completed by June 2025.

### We want to hear from you!

Community members are always encouraged to share information that may help EPA make determinations regarding the protectiveness and effectiveness of the remedies at the site. EPA is conducting interviews over the phone, by email, or via online meetings.

#### **For questions or to provide site-related information for the review:**

Valerie Doornbos, EPA Community Involvement Coordinator

Phone: 720-786-7292 Email: [Doornbos.Valerie@epa.gov](mailto:Doornbos.Valerie@epa.gov)

Mailing Address: U.S. EPA Region 8

1595 Wynkoop Street, Denver, CO 80202-1129

Or online at: <https://www.epa.gov/superfund/standard-mine>

## APPENDIX E – INTERVIEW FORMS

STANDARD MINE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
<b>Site Name:</b> Standard Mine	
<b>EPA ID:</b> CO0002378230	
<b>Interviewer name:</b> Valerie Doornbos	<b>Interviewer affiliation:</b> U.S. EPA
<b>Subject name:</b> Kathleen Knox	<b>Subject affiliation:</b> CDPHE
<b>Subject contact information:</b> (303) 692-3544	
<b>Interview date:</b> 10/16/2024	<b>Interview time:</b> Not applicable
<b>Interview location:</b> CDPHE via email	
<b>Interview format (select one):</b> In Person      Phone      Mail <u>Email</u> Other:	
<b>Interview category:</b> Colorado Department of Public Health and Environment	

1. What is your overall impression of the remedial activities at the Site?

I think the Phased ROD has been a good approach for the site. The extended interim monitoring period is ongoing including an extended bulkhead closure, which will allow us to fully evaluate the effectiveness of Phase 1, source control.

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

I think remedial and maintenance work to date has been effective in reducing exposures to impacted soils and waste and reducing metals loading to Elk Creek. Evaluation of the Phase 1 remedy's ability to meet surface water quality objectives is ongoing.

3. Can you think of anything the EPA could have done during the cleanup to better communicate if there were any risks associated with the Site?

I think remaining risks associated with the Site, including waste left in place within the repository, have been well documented.

4. How do you learn about what's happening at the Site now?

As the state project manager for the Site, I have regular communication and discussion with the EPA about current and planned site activities.

5. Do you feel like the EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

Yes. I think conducting an annual public meeting to share updates about site activities and status is a good way to keep the community informed. I think it would be helpful to continue these annual updates through the extended interim monitoring period via community meeting and/or a fact sheet.

6. What is your assessment of the current performance of the remedy in place at the Site?

The Phase 1 remedy is performing as anticipated at the site. Full assessment of the effectiveness of the Phase 1 remedy and need for Phase 2 will be evaluated at the end of the interim monitoring period.

7. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

I am not aware of any.

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

No.

9. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might the EPA convey site-related information in the future?

Yes, I think the annual public meeting is a good way to keep the community updated during the interim monitoring period.

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

No.

11. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

Yes.

<b>STANDARD MINE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM</b>	
<b>Site Name:</b> Standard Mine	
<b>EPA ID:</b> CO0002378230	
<b>Interviewer name:</b> Valerie Doornbos	<b>Interviewer affiliation:</b> U.S. EPA
<b>Subject name:</b> Mark Mikos	<b>Subject affiliation:</b> DRMS underground project manager
<b>Subject contact information:</b>	
<b>Interview date:</b> 12/9/24	<b>Interview time:</b> Not applicable
<b>Interview location:</b> Not applicable	
<b>Interview format (select one):</b> In Person      Phone      Mail <u>Email</u> Other:	
<b>Interview category:</b>	

1. What is your overall impression of the remedial activities at the Site?

The project is currently successful. Revegetation is going well, erosion is limited where construction activities have taken place, and the bulkhead is functioning properly.

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

I am satisfied with the current state of the remediation at the Site. The Site is returning to native conditions, the repository is stable, and the bulkhead impounding mine water appears to be reaching a stable equilibrium with native fractures.

3. Can you think of anything the EPA could have done during the cleanup to better communicate if there were any risks associated with the Site?

I think the EPA has done a fantastic job of communicating the risks associated with the Site.

4. How do you learn about what's happening at the Site now?

Monthly team meetings with the EPA and CDPHE. VIPER website monitoring the bulkhead pressure gauge.

5. Do you feel like the EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

I do. The last community meeting was a great example of the EPA explaining the risks and cleanup.

6. What is your assessment of the current performance of the remedy in place at the Site?

My assessment of the current performance of the remedy in place at the Site, is that it is functioning properly and the landscape is returning to native conditions.

7. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

I am not.

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

No, I have not heard of any or been involved with any.

9. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might the EPA convey site-related information in the future?

The interested community is well informed. KBUT is the local radio station and is one of three stations that reach the valley, an "ad" would reach many ears to educate the community on site-related information.

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

I do not.

11. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

Yes.

<b>STANDARD MINE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM</b>	
<b>Site Name:</b> Standard Mine	
<b>EPA ID:</b> CO0002378230	
<b>Interviewer name:</b> Valerie Doornbos	<b>Interviewer affiliation:</b> U.S. EPA
<b>Subject name:</b> Bryan Barrett	<b>Subject affiliation:</b> USFS, GMUG environmental engineer
<b>Subject contact information:</b> bryan.barrett2@usda.gov	
<b>Interview date:</b> 11/25/2024	<b>Interview time:</b> Not applicable
<b>Interview location:</b> Not applicable	
<b>Interview format (circle one):</b> In Person      Phone      Mail <input checked="" type="radio"/> Email      Other:	
<b>Interview category:</b> Standard Mine	

1. What is your overall impression of the remedial activities at the Site?

I've only been involved with the project for the past three years, but my general impression is that the EPA has been effectively managing the project. Jess has been informing me when USFS involvement is needed.

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

Project seems to be going well. Excited to see the bulkhead is getting closed and continued work being done to further improve water quality.

4. Can you think of anything the EPA could have done during the cleanup to better communicate if there were any risks associated with the Site?

Website would be helpful (see answer to question 10 below).

More regular email updates would be helpful.

5. How do you learn about what's happening at the Site now?

Email or phone call updates from Jessica Duggan.

6. Do you feel like the EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

More clarity on email updates regarding how the site actions are supporting the overall site goals, stated in a way that is easy to share with stakeholders.

7. What is your assessment of the current performance of the remedy in place at the Site?

Need 2024 sample results to really assess bulkhead performance and whether it has improved water quality. According to the CCWC report (2022), it appears that zinc concentration in Elk Creek has decreased since pre-project (2005), but it's hard to determine for sure with such few data points shown

from pre-project. Data from 2023 appears to show a potential further reduction in zinc loading post-bulkhead closure; 2024 data will hopefully support this.

Also, curious if flow rate and/or loading has increased in the previously mapped seeps and/or if there have been any new seeps that have occurred since the bulkhead has been closed.

8. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

Not that I'm aware of.

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

Not that I'm aware of.

10. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might the EPA convey site-related information in the future?

Public website would improve communication (see below).

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

Regularly updated website to improve communication to public and stakeholders, including summarized and easy to understand (aka easy to share with stakeholders and USFS District staff) sampling results from pre/post projects; graphs showing bulkhead pressure over time; timelines of previous work and upcoming work; pictures from pre/post projects; accessible admin record documents; maps showing all site features and where work has been completed; etc. Also, general updates via email on a more regular basis would be helpful.

From Chad Wellman, GMUG East Zone Engineer:

*"I think it would help if they summarize their findings (water chemistry improvements) and what the results on the ground were as a result of the work performed. I realize the 276 page CCWC report has some of this information, but was wondering if there was a summary to share with the District on what was done and what the improvements were?"*

*"I found the information below in the report. It looks like they have a ways to go to meet Chronic and Acute standards still (unless I am reading this wrong). But it is all likely better than before they started."*

**Table 4.** Standards evaluation of grab samples collected from Elk Creek on June 16, 2022. Locations presented from upstream to downstream. Standards are presented in grey.

Parameter	Monitoring Location	Standards Evaluation For Elk Creek on June 16, 2022			
		ELK-11	ELK-08	ELK-05	ELK-00
	Segment	COGUUG11			
Cadmium (ug/L)	Hardness (mg/L)	21	46	42	43
	Dissolved Cadmium	2.04	3.94	1.87	1.57
	Chronic Aquatic Life Standard	0.22	0.40	0.37	0.38
	Acute Aquatic Life Standard	0.4	0.9	0.8	0.8
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Copper (ug/L)	Dissolved Copper	2.52	6.23	3.01	2.59
	Chronic Aquatic Life Standard	2.4	4.6	4.3	4.4
	Acute Aquatic Life Standard	3.1	6.5	5.9	6.1
	Attains Chronic Standard	No	No	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	1.52	4.15	1.72	1.07
	Chronic Aquatic Life Standard	0.4	1.1	1.0	1.0
	Acute Aquatic Life Standard	11	27	25	25
	Attains Chronic Standard	No	No	No	No
Zinc (ug/L)	Attains Acute Standard	Yes	Yes	Yes	Yes
	Dissolved Zinc	401	652	376	288
	Chronic Aquatic Life Standard	29	60	55	56
	Acute Aquatic Life Standard	39	79	73	74
Iron (ug/L)	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
	Dissolved Iron	<100	<100	<100	<100
Manganese (ug/L)	Domestic Water Supply Standard			300	
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
	Dissolved Manganese	15.3	142	57.1	22.4
	Domestic Water Supply Standard			50	
	Attains Water Supply Standard	Yes	No	No	Yes

Notes:

1. All standards refer to the dissolved sample fraction.
2. Where appropriate standards were calculated using paired hardness results.
3. "Yes" indicates the result attained the standard, "No" indicates the result exceeded the standard. The Colorado Water Quality Control Division evaluates water quality data to determine formal attainment with applicable water quality standards. Official attainment information is provided in WQCC Regulation 93. Results that are less than the MRL (i.e. < X) are considered in attainment of the standard, as long as an appropriate PQL was used.
4. Results in italics are estimated concentrations. In this evaluation, estimated concentrations were compared against the standard. Where impairment is indicated by only estimated results, the segment would not be classified as impaired, instead it would be placed on the monitoring and evaluation list.

12. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

Yes.

<b>STANDARD MINE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM</b>	
<b>Site Name:</b> Standard Mine	
<b>EPA ID:</b> CO0002378230	
<b>Interviewer name:</b> Valerie Doornbos	<b>Interviewer affiliation:</b> U.S. EPA
<b>Subject name:</b> Ashley Bembeneck	<b>Subject affiliation:</b> Coal Creek Watershed Coalition
<b>Interview date:</b> 12/10/24	<b>Interview time:</b> Not applicable
<b>Interview location:</b> Not applicable	
<b>Interview format (select one):</b> <input type="checkbox"/> In Person <input type="checkbox"/> Phone <input type="checkbox"/> Mail <input type="checkbox"/> Email <input type="checkbox"/> Other: <u>Teams meeting</u>	

1. What is your overall impression of the remedial activities at the Site?

The overall impression is good.

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

The remediation work along Elk Creek and the constructed channel where tailings were removed looks good. It's a good example of ecosystem function returning. Vegetation is really starting to take off and there is increased diversity. Maintenance has been good. The agencies are doing a good job with monitoring during the long-term bulkhead closure, especially in relation to the telemetry systems.

3. Can you think of anything the EPA could have done during the cleanup to better communicate if there were any risks associated with the Site?

In 2015, there was a minor incident on site and communication increased following that. We're not in an active cleanup phase so the questions is not fully applicable.

4. How do you learn about what's happening at the Site now?

Contacting project managers directly.

5. Do you feel like the EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

Yes, a reasonably good job. Communicating with the public can be difficult, but it has been good under the circumstances.

6. What is your assessment of the current performance of the remedy in place at the Site?

The bulkhead has worked well so far and I am very curious to see what the longer-term closure indicates for water quality.

7. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

I heard from local stakeholders that there is a general need for increased participation from the EPA regarding all of the potential action in the watershed. One of the key questions being asked is: How does

the Standard Mine Superfund site fit into other efforts to protect the watershed as a whole, especially as it relates to the duration of the interim monitoring period and the potential for Phase 2 removal action.

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

Nothing I'm aware of at this time.

9. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might the EPA convey site-related information in the future?

I appreciate the stakeholder meetings held each year and support continuing this practice done jointly with the CDPHE. Using the newspaper is a good way to communicate public notices: Crested Butte News and Gunnison Country Times.

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

I'm really looking forward to understanding the outcomes of the long-term bulkhead closure. I'm curious to see whether water quality at seeps and springs will change during the course of the closure and what, if anything, might be done in response to changes at the bulkhead. Currently, the interim monitoring plan is heavily geared toward understanding the remedial action on level 1, but I'd like to look into how and whether it is necessary to evaluate level 1 independently from the Site as a whole.

13. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

Yes, CCWC affiliation.

<b>STANDARD MINE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM</b>	
<b>Site Name:</b> Standard Mine	
<b>EPA ID:</b> CO0002378230	
<b>Interviewer name:</b> Valerie Doornbos	<b>Interviewer affiliation:</b> U.S. EPA
<b>Subject name:</b> Community Member #2	<b>Subject affiliation:</b> Community Member
<b>Interview date:</b> 12/9/24	<b>Interview time:</b> 13:20
<b>Interview location:</b> Not applicable	
<b>Interview format:</b> Email	
<b>Interview category:</b> Local Organization	

1. What is your overall impression of the remedial activities at the Site?

Overall great, thanks for all the hard work you've put in. I was upset that the calculations for the rock cap on one of the repositories near the site used wildly incorrect numbers for yearly precipitation. The contractor(?) or EPA engineer used a tiny number like 13 inches of precip a year. We get 300 inches or more of snow in a big snow year, plus it rains in the summer. At that site and elevation they needed to call it 30 inches or more for an accurate calculation of the effects of precipitation on the cap. Furthermore, the repository is directly under a rock glacier. Granted the rock glacier may be melting with climate change, but it seems like there's a chance the rock glacier will scrape away at the edge of the repository in a few hundred years if it doesn't melt first.

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

Overall, it looks good.

3. Can you think of anything the EPA could have done during the cleanup to better communicate if there were any risks associated with the Site?

Possibly put a sign "Do not drink the water" at the parking area next to where Elk Creek crosses County Road 12 (or Kebler Pass Road). Occasionally people camp down by the river and I assume some of them are drinking Coal Creek or Elk Creek water.

4. How do you learn about what's happening at the Site now?

Coal Creek Watershed Coalition sends out good information, occasionally there's an article in the paper and I show up for most of the meetings.

5. Do you feel like EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

Maybe, there's not much communication for many months at a time. Maybe the EPA could send a press release to the Crested Butte News every now and then?

6. What is your assessment of the current performance of the remedy in place at the Site?

I'm a little nervous about the bulkhead valve on Level 1, it seems that could fail after decades. I hope that the state and EPA can keep an eye on that! I love the new Carex and willow-edged pond instead of the old, dangerous tailings pond :-)

7. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

No.

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

Probably some trespassing; people ski, bike and hike all over the place around here. As far as I know, people have just walked or skied through, I haven't heard of any negative activities. I also don't know the rules or whether we're allowed to roam around or not?!

9. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

I like the meetings with data from the previous season's monitoring activities. Probably a press release here and there would help. The Coal Creek Watershed Coalition sends out information and presents data from the Superfund site or from their activities sampling throughout the area. The Rocky Mountain Biological Laboratory has Tuesday night seminars - the EPA may be able to get on the agenda and present data to a more sophisticated audience if you have someone who's willing to run that gauntlet.

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

See my comments above.

I'd like to see an aquatic macroinvertebrate survey of Elk Creek and Coal Creek upstream and downstream of Elk Creek now that the remediation has been in place for a number of years.

Thanks for installing the flume and discharge measuring station on Elk Creek, it's awesome that the USGS has taken control of that site and the data is available on the USGS website. :-)

I'm interested in a plant survey. How is the vegetative cover on the reclaimed areas doing in comparison to undisturbed areas nearby?

11. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

OK.

STANDARD MINE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
<b>Site Name:</b> Standard Mine	
<b>EPA ID:</b> CO0002378230	
<b>Interviewer name:</b> Valerie Doornbos	<b>Interviewer affiliation:</b> U.S. EPA
<b>Subject name:</b> Dara MacDonald & Shea Early	<b>Subject affiliation:</b> Crested Butte Town Manager & Crested Butte Director of Public Works
<b>Subject contact information:</b> Not available	
<b>Interview date:</b> 10/9/2024	<b>Interview time:</b> 16:30
<b>Interview location:</b> Crested Butte Town Hall	
<b>Interview format:</b> In Person	
<b>Interview category:</b> Local Government Official	

1. What is your overall impression of the remedial activities at the Site?

Dara MacDonald: Appreciate EPA's attention but would like to see clearer outcomes.

Shea Earley: Also appreciate EPA's attention but wondered what the interim monitoring report looks like. What will the long-term look like? What is the plan for the future?

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

Dara: Did not have a strong impression.

Shea: Thought it was a good and appropriate job, and that EPA reached out to the correct people.

3. Can you think of anything EPA could have done during the cleanup to better communicate if there were any risks associated with the Site?

Dara: Seconded what Shea said.

Shea: Thought that EPA performed outreach very well. However, messaging between CDPHE and EPA (and other agencies) needs to be better. This especially relates to zinc permitting/regulations in terms of discharges out of the Mine. CDPHE blindly installed their regulations but did not include anything about managing zinc concentrations. The Superfund Site is contributing to the Zinc limit in the water, but CDPHE is regulating based on the wastewater discharge and not taking the Site into account. The goal should be to fix and address this. State regulations need to take a look at the broader future and changing standards. EPA shouldn't let the CDPHE regulate unfiltered, there needs to be a level of coordination and collaboration. What will the treatment process look like five years from now?

Also, Arsenic will probably be a concern in the future in terms of state regulations. Why isn't the EPA currently concerned with this? Could EPA better communicate about lead concerns from vacant properties?

However, both of them mentioned that data sharing and collection helps us to better understand the water quality of surrounding creeks. CCWC should be involved so that there is a holistic monitoring process. There needs to be more discussion about sampling if and when the bulkhead opens.

4. How do you learn about what's happening at the Site now?

Dara: Seconded what Shea said.

Shea: Annual updates, talking with Jess (the RPM), and email updates. June is a good time for the annual update. The goal is to target the most people, so June is good. Early August could be an alternative as well.

5. Do you feel like EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

Dara: Yes, come away from meetings with a good understanding.

Shea: Yes, feel informed leaving meetings.

6. What is your assessment of the current performance of the remedy in place at the Site?

Dara: Taking a wait-and-see approach to see what all of this effort has led too.

Shea: Agreed with Dara.

7. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

Dara: Not aware of any complaints. There are occasional inquiries about what is going on at Standard Mine (usually from people who are out of touch/don't follow the site closely).

Shea: Not aware of any complaints. Seconded the occasional inquiries.

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

Dara: Not that they are aware of, but they will continue to discourage summer activity (hiking, ATV-ing, etc.) at the mine property.

Shea: Agreed and mentioned that signage is now going up to help keep people aware of the Site.

9. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

Dara: People are never well-informed, so simple messaging works best. EPA has implemented this and they have seen the improvement. Examples of where EPA might convey site-related information in the future were via flyers/factsheets and on the CB website or town hall.

Shea: Agreed and mentioned that we are dealing with pretty technical stuff, so messaging can be complicated. However, wanted to mention that EPA is doing a great job.

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

Dara: Interested in better understanding the impacts of the Site on the Wastewater Treatment Plant. Any similarities with other mines (like Keystone)?

Shea: Wanted to reiterate the desire for more coordination between CDPHE & EPA for WTP permitting. Strong desire for EPA to look at/possibly include the resources Crested Butte has to offer. The CCWC

has a collective of projects that they are doing to improve water quality-could EPA look at these? CCWC wanted access to the site to do these projects but had some issues with the Forest Service to get access. Another example: Crested Butte offered to pay for NEPA process but never heard anything back.

11. Do you consent to have your name included along with your responses to this questionnaire in the FYR Report?

Dara: Yes

Shea: Yes

STANDARD MINE SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
<b>Site Name:</b> Standard Mine	
<b>EPA ID:</b> CO0002378230	
<b>Interviewer name:</b> Valerie Doornbos	<b>Interviewer affiliation:</b> U.S. EPA
<b>Subject name:</b> Community Member #1	<b>Subject affiliation:</b> Local Resident
<b>Subject contact information:</b> Not available	
<b>Interview date:</b> 10/15/2024	<b>Interview time:</b> Not Applicable
<b>Interview location:</b> Not Applicable	
<b>Interview format:</b> Email	
<b>Interview category:</b> Resident	

1. What is your overall impression of the remedial activities at the Site?

I am overly impressed by almost all of the remediation. Only wish that all the metals could have been removed more effectively from Elk Ck. Still hoping this will improve over time.

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

It was done very professionally, as far as I can see. Hope the bulkhead holds.

3. Can you think of anything EPA could have done during the cleanup to better communicate if there were any risks associated with the Site?

I think communication was really good, especially improving the system by which the Town would be notified of any event.

4. How do you learn about what's happening at the Site now?

Annual meetings at Crested Butte Town Hall.

5. Do you feel like EPA does a good job explaining the difference between whether there are risks to people and whether the cleanup is working well?

Yes

6. What is your assessment of the current performance of the remedy in place at the Site?

Not a scientist, so can't exactly answer this one.

7. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

No

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

Not to my knowledge. I take people on hikes there occasionally to show them the progress of revegetation and explain as best I can.

9. Do you feel the community is well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

I think we're well-informed. Annual update meeting and online info seems adequate for me. Others may want more, but I haven't heard any complaints.

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

Just keep up the good work, and the monitoring.

## APPENDIX F – DATA REVIEW TABLES AND FIGURES

**Table F-1: Standards Evaluation of Grab Samples Collected from Elk Creek, July 2019**

Standards Evaluation For Elk Creek on July 16, 2019					
Parameter	Monitoring Location	COGUUG11			
		Segment	ELK-11	ELK-08	ELK-05
	Hardness (mg/L)	13	37	40	43
Cadmium (ug/L)	Dissolved Cadmium	1.09	2.4	1.31	1.07
	Chronic Aquatic Life Standard	0.15	0.34	0.36	0.38
	Acute Aquatic Life Standard	0.3	0.7	0.8	0.8
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Copper (ug/L)	Dissolved Copper	2.05	5.06	2.96	2.18
	Chronic Aquatic Life Standard	1.6	3.8	4.1	4.4
	Acute Aquatic Life Standard	2.0	5.3	5.7	6.1
	Attains Chronic Standard	No	No	Yes	Yes
	Attains Acute Standard	No	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	2.94	2.98	1.24	0.62
	Chronic Aquatic Life Standard	0.3	0.8	0.9	1.0
	Acute Aquatic Life Standard	7	22	24	25
	Attains Chronic Standard	No	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	220	459	265	216
	Chronic Aquatic Life Standard	19	49	53	56
	Acute Aquatic Life Standard	25	65	70	74
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100
	Domestic Water Supply Standard	300			
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	8.33	63.5	21.3	7.33
	Domestic Water Supply Standard	50			
	Attains Water Supply Standard	Yes	No	Yes	Yes

**Notes:**

1. All standards refer to the dissolved sample fraction.
2. Where appropriate standards were calculated using paired hardness results.
3. "Yes" indicates the result attained the standard, "No" indicates the result exceeded the standard. The Colorado Water Quality Control Division evaluates water quality data to determine formal attainment with applicable water quality standards. Official attainment information is provided in WQCC Regulation 93. Results that are less than the MRL (i.e. < X) are considered in attainment of the standard, as long as an appropriate PQL was used.
4. Results in italics are estimated concentrations. In this evaluation, estimated concentrations were compared against the standard. Where impairment is indicated by only estimated results, the segment would not be classified as impaired, instead it would be placed on the monitoring and evaluation list.

*Source:* Water Year 2019 Annual Report.

**Table F-2: Standards Evaluation of Grab Samples Collected from Elk Creek, September 2019**

Standards Evaluation For Elk Creek on September 18, 2019					
Parameter	Monitoring Location	ELK-11	ELK-08	ELK-05	ELK-00
		Segment	11		
	Hardness (mg/L)	114	114	74	70
Cadmium (ug/L)	Dissolved Cadmium	11.4	6.0	0.87	0.81
	Chronic Aquatic Life Standard	0.79	0.79	0.57	0.55
	Acute Aquatic Life Standard	2.0	2.0	1.4	1.3
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	Yes	Yes
Copper (ug/L)	Dissolved Copper	2.74	1.84	0.51	0.90
	Chronic Aquatic Life Standard	10.0	10.0	6.9	6.6
	Acute Aquatic Life Standard	15.2	15.2	10.1	9.6
	Attains Chronic Standard	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	3.31	<0.10	<0.10	<0.10
	Chronic Aquatic Life Standard	2.9	2.9	1.8	1.7
	Acute Aquatic Life Standard	74	74	46	44
	Attains Chronic Standard	No	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	3060	1200	166	146
	Chronic Aquatic Life Standard	137	137	92	88
	Acute Aquatic Life Standard	180	180	122	116
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100
	Domestic Water Supply Standard			300	
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	9.09	<2.0	<2.0	2.34
	Domestic Water Supply Standard			50	
	Attains Water Supply Standard	Yes	Yes	Yes	Yes

Source: Water Year 2019 Annual Report.

Table F-3: Standards Evaluation of Grab Samples Collected from Elk Creek, June 2020

Parameter	Monitoring Location	Standards Evaluation For Elk Creek on June 18, 2020			
		ELK-11	ELK-08	ELK-05	ELK-00
		Segment	COGUUG11		
Cadmium (ug/L)	Hardness (mg/L)	19	44	44	46
	Dissolved Cadmium	1.6	3.54	1.7	1.22
	Chronic Aquatic Life Standard	0.21	0.39	0.39	0.40
	Acute Aquatic Life Standard	0.4	0.8	0.8	0.9
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Copper (ug/L)	Dissolved Copper	2.52	5.29	3.19	2.04
	Chronic Aquatic Life Standard	2.2	4.4	4.4	4.6
	Acute Aquatic Life Standard	2.8	6.2	6.2	6.5
	Attains Chronic Standard	No	No	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	1.67	2.5	1.07	0.46
	Chronic Aquatic Life Standard	0.4	1.0	1.0	1.1
	Acute Aquatic Life Standard	10	26	26	27
	Attains Chronic Standard	No	No	No	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	348	689	338	264
	Chronic Aquatic Life Standard	27	57	57	60
	Acute Aquatic Life Standard	35	76	76	79
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100
	Domestic Water Supply Standard			300	
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	10.6	77.9	22.6	6.36
	Domestic Water Supply Standard			50	
	Attains Water Supply Standard	Yes	No	Yes	Yes

Notes:

1. All standards refer to the dissolved sample fraction.
2. Where appropriate standards were calculated using paired hardness results.
3. "Yes" indicates the result attained the standard, "No" indicates the result exceeded the standard. The Colorado Water Quality Control Division evaluates water quality data to determine formal attainment with applicable water quality standards. Official attainment information is provided in WQCC Regulation 93. Results that are less than the MRL (i.e. < X) are considered in attainment of the standard, as long as an appropriate PQL was used.
4. Results in italics are estimated concentrations. In this evaluation, estimated concentrations were compared against the standard. Where impairment is indicated by only estimated results, the segment would not be classified as impaired, instead it would be placed on the monitoring and evaluation list.

Source: Water Year 2020 Annual Report.

Table F-4: Standards Evaluation of Grab Samples Collected from Elk Creek, September 2020

Standards Evaluation For Elk Creek on September 29, 2020					
Parameter	Monitoring Location	ELK-11	ELK-08	ELK-05	ELK-00
	Segment	11			
	Hardness (mg/L)	95	124	77	80
Cadmium (ug/L)	Dissolved Cadmium	9.04	6.8	0.89	0.87
	Chronic Aquatic Life Standard	0.69	0.84	0.59	0.61
	Acute Aquatic Life Standard	1.7	2.2	1.4	1.5
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	Yes	Yes
Copper (ug/L)	Dissolved Copper	2.28	1.71	0.54	0.86
	Chronic Aquatic Life Standard	8.6	10.8	7.2	7.4
	Acute Aquatic Life Standard	12.8	16.5	10.5	10.9
	Attains Chronic Standard	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	0.238	<0.100	<0.100	<0.100
	Chronic Aquatic Life Standard	2.4	3.2	1.9	2.0
	Acute Aquatic Life Standard	61	82	49	51
	Attains Chronic Standard	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	2570	1560	194	190
	Chronic Aquatic Life Standard	116	147	96	99
	Acute Aquatic Life Standard	153	195	126	131
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100
	Domestic Water Supply Standard			300	
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	38.3	<2.00	<2.00	<2.00
	Domestic Water Supply Standard			50	
	Attains Water Supply Standard	Yes	Yes	Yes	Yes

Notes:

1. All standards refer to the dissolved sample fraction.
2. Where appropriate standards were calculated using paired hardness results.
3. "Yes" indicates the result attained the standard, "No" indicates the result exceeded the standard. The Colorado Water Quality Control Division evaluates water quality data to determine formal attainment with applicable water quality standards. Official attainment information is provided in WQCC Regulation 93. Results that are less than the MRL (i.e. <X) are considered in attainment of the standard, as long as an appropriate PQL was used.
4. Results in italics are estimated concentrations. In this evaluation, estimated concentrations were compared against the standard. Where impairment is indicated by only estimated results, the segment would not be classified as impaired, instead it would be placed on the monitoring and evaluation list.

Source: Water Year 2020 Annual Report.

Table F-5: Standards Evaluation of Grab Samples Collected from Elk Creek, June 2021

6/17/21					
Parameter	Monitoring Location	ELK-11	ELK-08	ELK-05	ELK-00
		COGUUG11			
	Hardness (mg/L)	22	48	45	47
Cadmium (ug/L)	Dissolved Cadmium	2.17	5.18	2.65	1.71
	6/17: Chronic Aquatic Life Standard	0.23	0.41	0.39	0.41
	6/17: Acute Aquatic Life Standard	0.4	0.9	0.9	0.9
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Copper (ug/L)	Dissolved Copper	3.26	5.5	3.3	2.54
	Chronic Aquatic Life Standard	2.5	4.8	4.5	4.7
	Acute Aquatic Life Standard	3.2	6.7	6.3	6.6
	Attains Chronic Standard	No	No	Yes	Yes
	Attains Acute Standard	No	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	1.35	1.32	0.641	0.29
	Chronic Aquatic Life Standard	0.5	1.1	1.0	1.1
	Acute Aquatic Life Standard	12	29	27	28
	Attains Chronic Standard	No	No	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	436	1030	566	388
	Chronic Aquatic Life Standard	31	62	59	61
	Acute Aquatic Life Standard	40	82	77	81
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100
	Domestic Water Supply Standard	300			
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	14.6	160	50.2	8.99
	Domestic Water Supply Standard	50			
	Attains Water Supply Standard	Yes	No	Yes	Yes

Source: Water Year 2021 Annual Report.

Table F-6: Standards Evaluation of Grab Samples Collected from Elk Creek, October 2021

		Standards Evaluation For Elk Creek on October 1, 2021			
Parameter	Monitoring Location	ELK-11	ELK-08	ELK-05	ELK-00
		Segment	COGUUG11		
Cadmium (ug/L)	Hardness (mg/L)	54	99	79	80
	Dissolved Cadmium	5.48	9.87	2.57	1.19
	Chronic Aquatic Life Standard	0.45	0.71	0.60	0.61
	Acute Aquatic Life Standard	1.0	1.8	1.4	1.5
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	Yes
Copper (ug/L)	Dissolved Copper	3.22	2.5	1.06	1.24
	Chronic Aquatic Life Standard	5.3	8.9	7.3	7.4
	Acute Aquatic Life Standard	7.5	13.3	10.8	10.9
	Attains Chronic Standard	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	0.322	<0.1	<0.1	<0.1
	Chronic Aquatic Life Standard	1.3	2.5	1.9	2.0
	Acute Aquatic Life Standard	33	64	50	51
	Attains Chronic Standard	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	1480	2390	541	245
	Chronic Aquatic Life Standard	69	120	98	99
	Acute Aquatic Life Standard	91	159	129	131
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100
	Domestic Water Supply Standard	300			
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	59.6	21.5	<7.50	<7.50
	Domestic Water Supply Standard	50			
	Attains Water Supply Standard	No	Yes	Yes	Yes

Notes:

1. All standards refer to the dissolved sample fraction.
2. Where appropriate standards were calculated using paired hardness results.
3. "Yes" indicates the result attained the standard, "No" indicates the result exceeded the standard. The Colorado Water Quality Control Division evaluates water quality data to determine formal attainment with applicable water quality standards. Official attainment information is provided in WQCC Regulation 93. Results that are less than the MRL (i.e. < X) are considered in attainment of the standard, as long as an appropriate PQL was used.
4. Results in italics are estimated concentrations. In this evaluation, estimated concentrations were compared against the standard. Where impairment is indicated by only estimated results, the segment would not be classified as impaired, instead it would be placed on the monitoring and evaluation list.

Source: Water Year 2021 Annual Report.

Table F-7: Standards Evaluation of Grab Samples Collected from Elk Creek, June 2022

Standards Evaluation For Elk Creek on June 16, 2022					
Parameter	Monitoring Location	ELK-11	ELK-08	ELK-05	ELK-00
	Segment	COGUUG11			
Cadmium (ug/L)	Hardness (mg/L)	21	46	42	43
	Dissolved Cadmium	2.04	3.94	1.87	1.57
	Chronic Aquatic Life Standard	0.22	0.40	0.37	0.38
	Acute Aquatic Life Standard	0.4	0.9	0.8	0.8
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Copper (ug/L)	Dissolved Copper	2.52	6.23	3.01	2.59
	Chronic Aquatic Life Standard	2.4	4.6	4.3	4.4
	Acute Aquatic Life Standard	3.1	6.5	5.9	6.1
	Attains Chronic Standard	No	No	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	1.52	4.15	1.72	1.07
	Chronic Aquatic Life Standard	0.4	1.1	1.0	1.0
	Acute Aquatic Life Standard	11	27	25	25
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	401	652	376	288
	Chronic Aquatic Life Standard	29	60	55	56
	Acute Aquatic Life Standard	39	79	73	74
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100
	Domestic Water Supply Standard	300			
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	15.3	142	57.1	22.4
	Domestic Water Supply Standard	50			
	Attains Water Supply Standard	Yes	No	No	Yes

Notes:

1. All standards refer to the dissolved sample fraction.
2. Where appropriate standards were calculated using paired hardness results.
3. "Yes" indicates the result attained the standard, "No" indicates the result exceeded the standard. The Colorado Water Quality Control Division evaluates water quality data to determine formal attainment with applicable water quality standards. Official attainment information is provided in WQCC Regulation 93. Results that are less than the MRL (i.e. < X) are considered in attainment of the standard, as long as an appropriate PQL was used.
4. Results in italics are estimated concentrations. In this evaluation, estimated concentrations were compared against the standard. Where impairment is indicated by only estimated results, the segment would not be classified as impaired, instead it would be placed on the monitoring and evaluation list.

Source: Water Year 2022 Annual Report.

Table F-8: Standards Evaluation of Grab Samples Collected from Elk Creek, September 2022

Standards Evaluation For Elk Creek on September 29, 2022					
Parameter	Monitoring Location	ELK-11	ELK-08	ELK-05	ELK-00
	Segment	11			
Cadmium (ug/L)	Hardness (mg/L)	57	91	64	67
	Dissolved Cadmium	5.79	8.84	1.47	1.18
	Chronic Aquatic Life Standard	0.47	0.67	0.51	0.53
	Acute Aquatic Life Standard	1.1	1.6	1.2	1.2
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	Yes
Copper (ug/L)	Dissolved Copper	2.19	1.79	0.58	0.84
	Chronic Aquatic Life Standard	5.5	8.3	6.1	6.4
	Acute Aquatic Life Standard	7.9	12.3	8.8	9.2
	Attains Chronic Standard	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	0.189	<0.100	<0.100	<0.100
	Chronic Aquatic Life Standard	1.4	2.3	1.5	1.6
	Acute Aquatic Life Standard	35	58	40	42
	Attains Chronic Standard	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	1370	1830	293	222
	Chronic Aquatic Life Standard	73	111	81	84
	Acute Aquatic Life Standard	96	147	107	111
	Attains Chronic Standard	No	No	No	No
	Attains Acute Standard	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100
	Domestic Water Supply Standard	300			
	Attains Water Supply Standard	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	63	<7.50	<7.50	<7.50
	Domestic Water Supply Standard	50			
	Attains Water Supply Standard	No	Yes	Yes	Yes

Notes:

1. All standards refer to the dissolved sample fraction.
2. Where appropriate standards were calculated using paired hardness results.
3. "Yes" indicates the result attained the standard, "No" indicates the result exceeded the standard. The Colorado Water Quality Control Division evaluates water quality data to determine formal attainment with applicable water quality standards. Official attainment information is provided in WQCC Regulation 93. Results that are less than the MRL (i.e. < X) are considered in attainment of the standard, as long as an appropriate PQL was used.
4. Results in italics are estimated concentrations. In this evaluation, estimated concentrations were compared against the standard. Where impairment is indicated by only estimated results, the segment would not be classified as impaired, instead it would be placed on the monitoring and evaluation list.

Source: Water Year 2022 Annual Report.

Table F-9: Standards Evaluation at ELK-11 in 2023

ELK-11: Elk Creek upstream of the confluence with the Level 1 Outfall						
Parameter	Monitoring Location	6/2/23	7/5/23	8/4/23	9/6/23	10/9/23
	Segment	COGUUG11				
	Hardness (mg/L)	14	14	39	62	64
Cadmium (ug/L)	Dissolved Cadmium	1.28	1.09	2.73	4.47	4.77
	Chronic Aquatic Life Standard	0.16	0.16	0.35	0.50	0.51
	Acute Aquatic Life Standard	0.3	0.3	0.7	1.1	1.2
	Attains Chronic Standard	No	No	No	No	No
	Attains Acute Standard	No	No	No	No	No
Copper (ug/L)	Dissolved Copper	1.74	1.57	2.23	1.64	1.56
	Chronic Aquatic Life Standard	1.7	1.7	4.0	6.0	6.1
	Acute Aquatic Life Standard	2.1	2.1	5.5	8.6	8.8
	Attains Chronic Standard	No	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	2.40	1.45	0.25	0.17	<0.2
	Chronic Aquatic Life Standard	0.3	0.3	0.9	1.5	1.5
	Acute Aquatic Life Standard	7	7	23	38	40
	Attains Chronic Standard	No	No	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	277	224	647	1040	1350
	Chronic Aquatic Life Standard	20	20	51	78	81
	Acute Aquatic Life Standard	27	27	68	104	107
	Attains Chronic Standard	No	No	No	No	No
	Attains Acute Standard	No	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100	<100
	Domestic Water Supply Standard	300				
	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	14.5	8.26	25.5	32.4	58.3
	Domestic Water Supply Standard	50				
	Attains Water Supply Standard	Yes	Yes	Yes	Yes	No

Table F-10: Standards Evaluation at ELK-08 in 2023

ELK-08: Elk Creek downstream of the Standard Mine and upstream of the Copley Lake tributaries						
Parameter	Monitoring Location	6/2/23	7/5/23	8/4/23	9/6/23	10/9/23
	Segment	COGUUG11				
	Hardness (mg/L)	26	33	66	96	96
Cadmium (ug/L)	Dissolved Cadmium	2.44	1.17	2.35	4.21	4.27
	Chronic Aquatic Life Standard	0.26	0.31	0.53	0.70	0.70
	Acute Aquatic Life Standard	0.5	0.6	1.2	1.7	1.7
	Attains Chronic Standard	No	No	No	No	No
	Attains Acute Standard	No	No	No	No	No
Copper (ug/L)	Dissolved Copper	6.58	2.81	1.62	1.49	1.40
	Chronic Aquatic Life Standard	2.8	3.5	6.3	8.6	8.6
	Acute Aquatic Life Standard	3.8	4.7	9.1	12.9	12.9
	Attains Chronic Standard	No	Yes	Yes	Yes	Yes
	Attains Acute Standard	No	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	2.44	2.98	<0.2	<0.2	0.2
	Chronic Aquatic Life Standard	0.6	0.7	1.6	2.4	2.4
	Acute Aquatic Life Standard	15	19	41	62	62
	Attains Chronic Standard	No	No	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	497	234	528	962	1150
	Chronic Aquatic Life Standard	36	44	83	117	117
	Acute Aquatic Life Standard	47	58	110	154	154
	Attains Chronic Standard	No	No	No	No	No
	Attains Acute Standard	No	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100	<100
	Domestic Water Supply Standard	300				
	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	112	23.3	<7.5	<7.5	<7.5
	Domestic Water Supply Standard	50				
	Attains Water Supply Standard	No	Yes	Yes	Yes	Yes

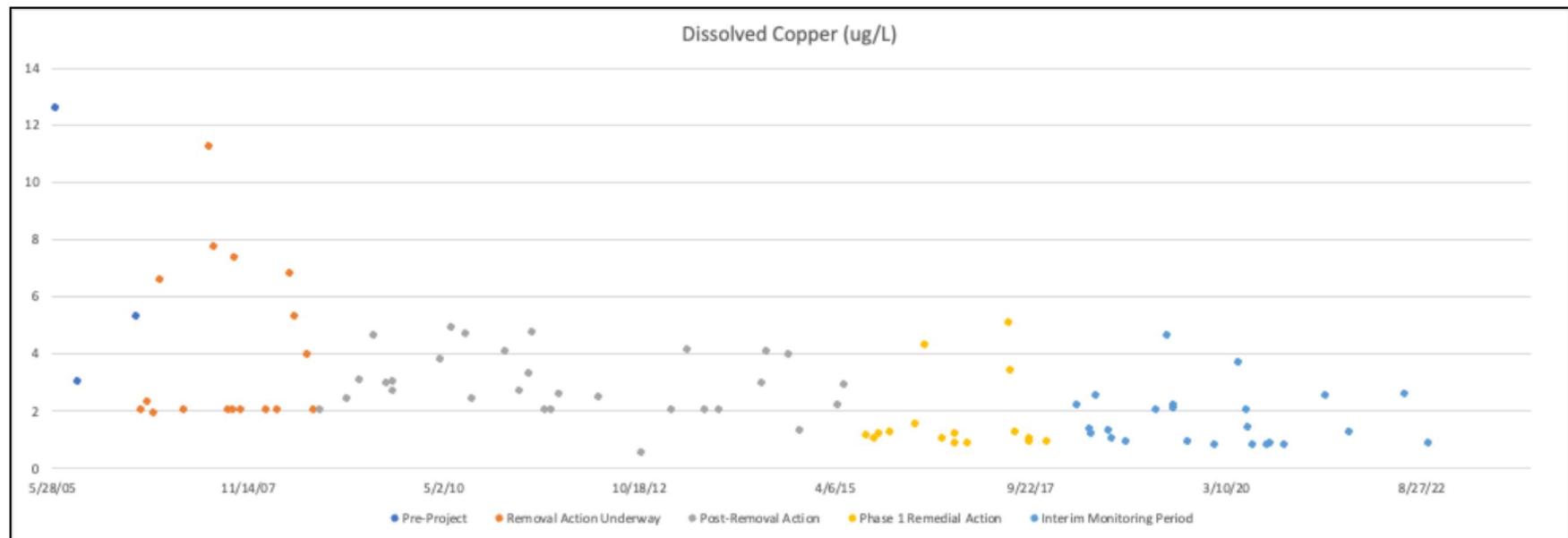
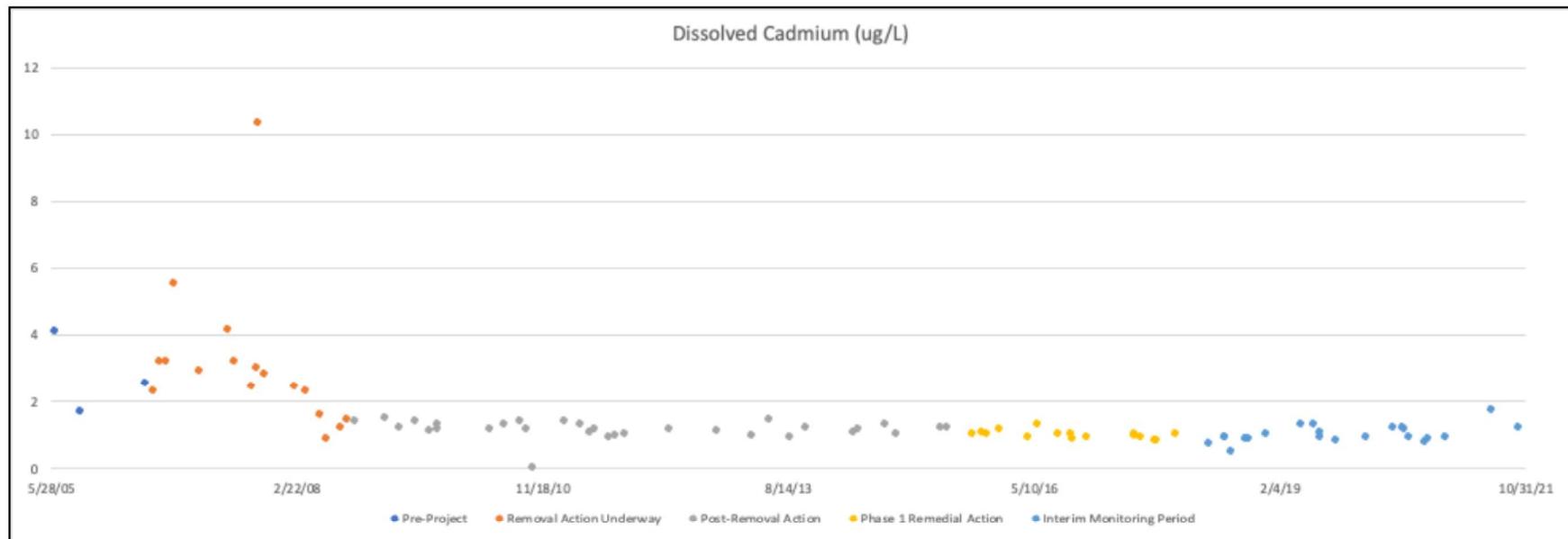
Table F-11: Standards Evaluation at ELK-05 in 2023

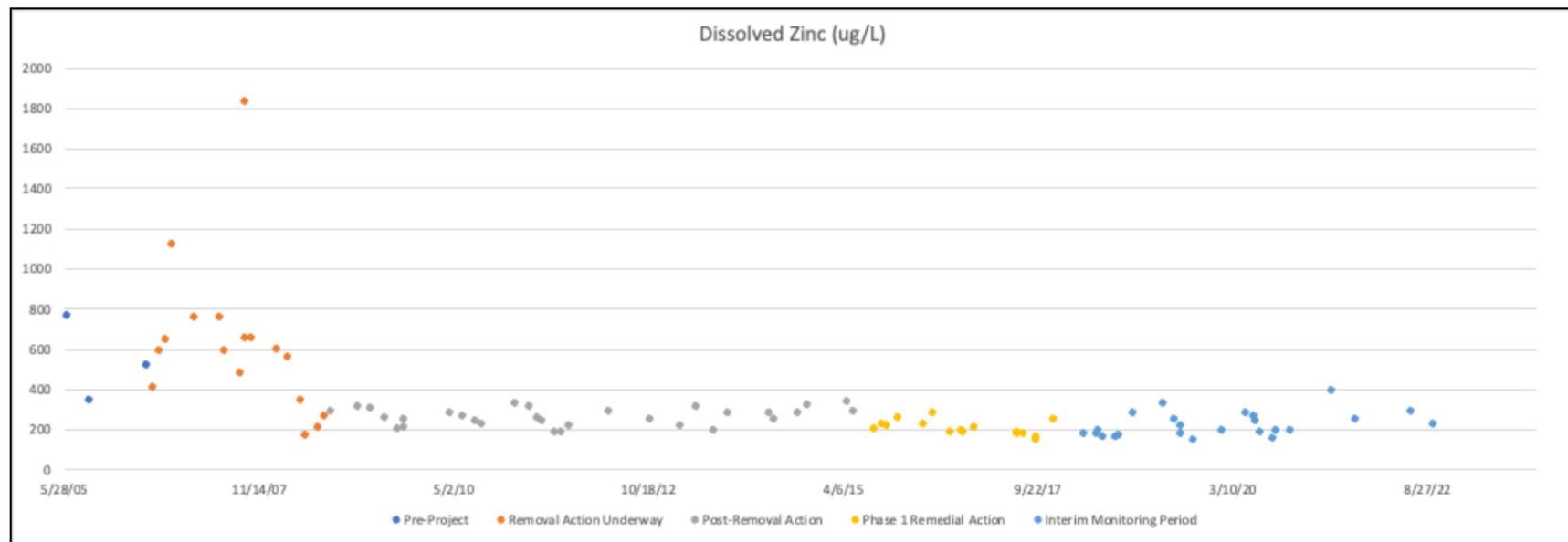
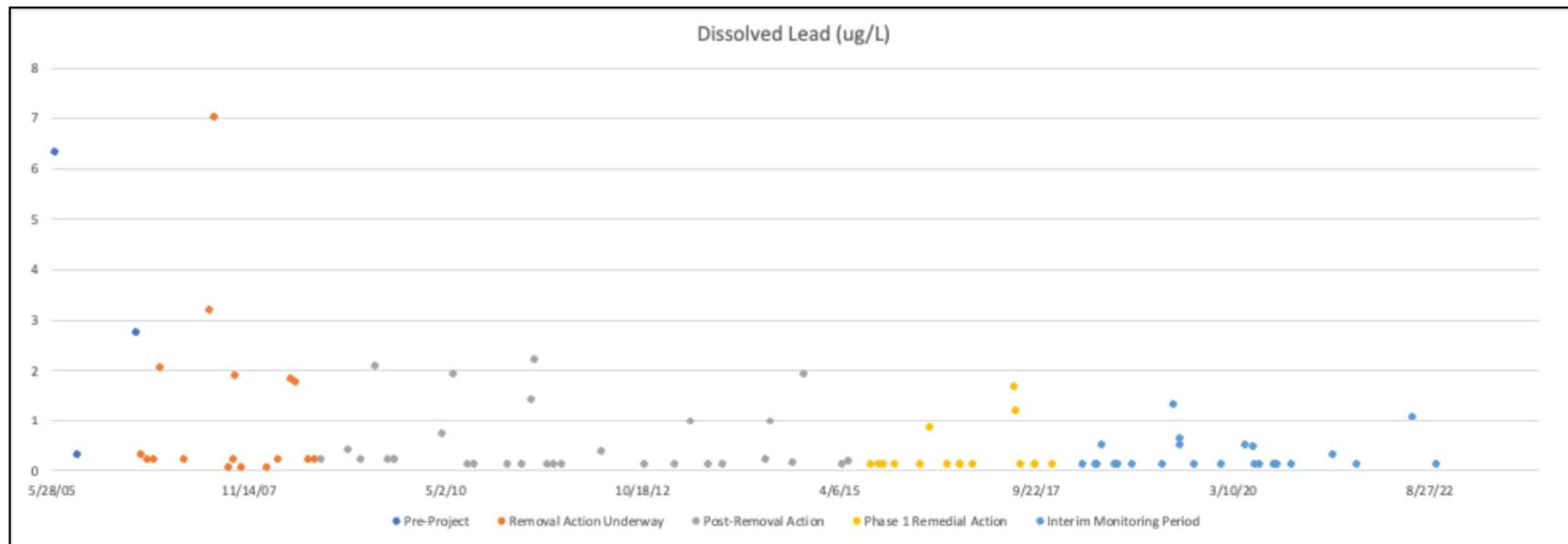
ELK-05: Elk Creek downstream of the confluence with the Copley Lake tributaries						
Parameter	Monitoring Location	6/2/23	7/5/23	8/4/23	9/6/23	10/9/23
	Segment	COGUUG11				
	Hardness (mg/L)	26	34	60	66	64
Cadmium (ug/L)	Dissolved Cadmium	1.39	0.78	0.65	0.68	0.76
	Chronic Aquatic Life Standard	0.26	0.32	0.49	0.53	0.51
	Acute Aquatic Life Standard	0.5	0.7	1.1	1.2	1.2
	Attains Chronic Standard	No	No	No	No	No
	Attains Acute Standard	No	No	Yes	Yes	Yes
Copper (ug/L)	Dissolved Copper	3.96	1.69	0.61	<0.5	<0.5
	Chronic Aquatic Life Standard	2.8	3.6	5.8	6.3	6.1
	Acute Aquatic Life Standard	3.8	4.9	8.3	9.1	8.8
	Attains Chronic Standard	No	Yes	Yes	Yes	Yes
	Attains Acute Standard	No	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	1.51	1.29	<0.10	<0.1	<0.1
	Chronic Aquatic Life Standard	0.6	0.8	1.4	1.6	1.5
	Acute Aquatic Life Standard	15	20	37	41	40
	Attains Chronic Standard	No	No	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	304	156	129	138	168
	Chronic Aquatic Life Standard	36	45	76	83	81
	Acute Aquatic Life Standard	47	60	101	110	107
	Attains Chronic Standard	No	No	No	No	No
	Attains Acute Standard	No	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100	<100
	Domestic Water Supply Standard	300				
	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	51.6	12.5	<7.5	<7.5	<7.5
	Domestic Water Supply Standard	50				
	Attains Water Supply Standard	No	Yes	Yes	Yes	Yes

Table F-12: Standards Evaluation at ELK-00 in 2023

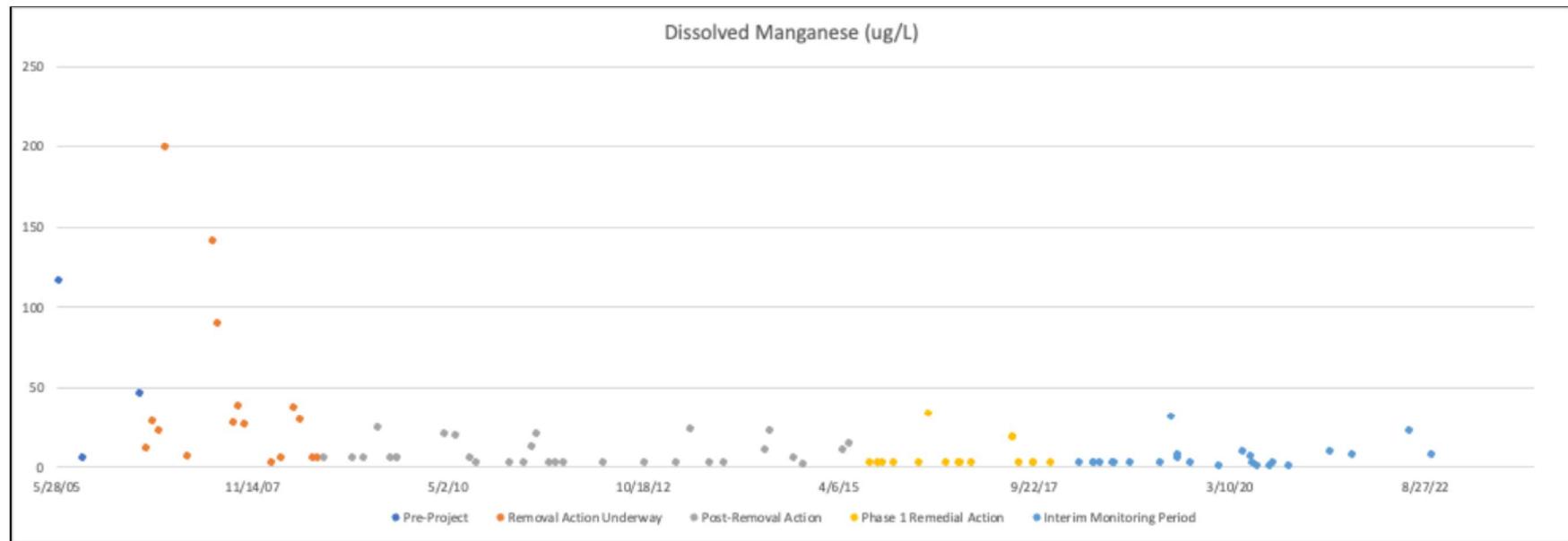
ELK-00: Elk Creek upstream of the confluence with Coal Creek						
Parameter	Monitoring Location	6/2/23	7/5/23	8/4/23	9/6/23	10/9/23
	Segment	COGUUG11				
	Hardness (mg/L)	28	36	61	67	66
Cadmium (ug/L)	Dissolved Cadmium	1.13	0.75	0.77	0.85	0.78
	Chronic Aquatic Life Standard	0.28	0.33	0.50	0.53	0.53
	Acute Aquatic Life Standard	0.5	0.7	1.1	1.2	1.2
	Attains Chronic Standard	No	No	No	No	No
	Attains Acute Standard	No	No	Yes	Yes	Yes
Copper (ug/L)	Dissolved Copper	3.47	1.56	0.84	0.60	0.78
	Chronic Aquatic Life Standard	3.0	3.7	5.9	6.4	6.3
	Acute Aquatic Life Standard	4.1	5.1	8.4	9.2	9.1
	Attains Chronic Standard	No	Yes	Yes	Yes	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes
Lead (ug/L)	Dissolved Lead	0.94	0.71	<0.1	<0.1	<0.1
	Chronic Aquatic Life Standard	0.6	0.8	1.5	1.6	1.6
	Acute Aquatic Life Standard	16	21	38	42	41
	Attains Chronic Standard	No	Yes	No	No	Yes
	Attains Acute Standard	Yes	Yes	Yes	Yes	Yes
Zinc (ug/L)	Dissolved Zinc	240	152	156	184	170
	Chronic Aquatic Life Standard	38	48	77	84	83
	Acute Aquatic Life Standard	50	63	102	111	110
	Attains Chronic Standard	No	No	No	No	No
	Attains Acute Standard	No	No	No	No	No
Iron (ug/L)	Dissolved Iron	<100	<100	<100	<100	<100
	Domestic Water Supply Standard	300				
	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes
Manganese (ug/L)	Dissolved Manganese	23.1	<7.5	<7.5	<7.5	<7.5
	Domestic Water Supply Standard	50				
	Attains Water Supply Standard	Yes	Yes	Yes	Yes	Yes

**Figure F-1: COC Concentrations at ELK-00 from 2005 to 2022**





A chart was not prepared for dissolved iron, because concentrations were less than the MDL in 86 of 91 samples.



Source: Water Year 2022 Annual Report.

## APPENDIX G – SITE INSPECTION PHOTOS



Waste repository



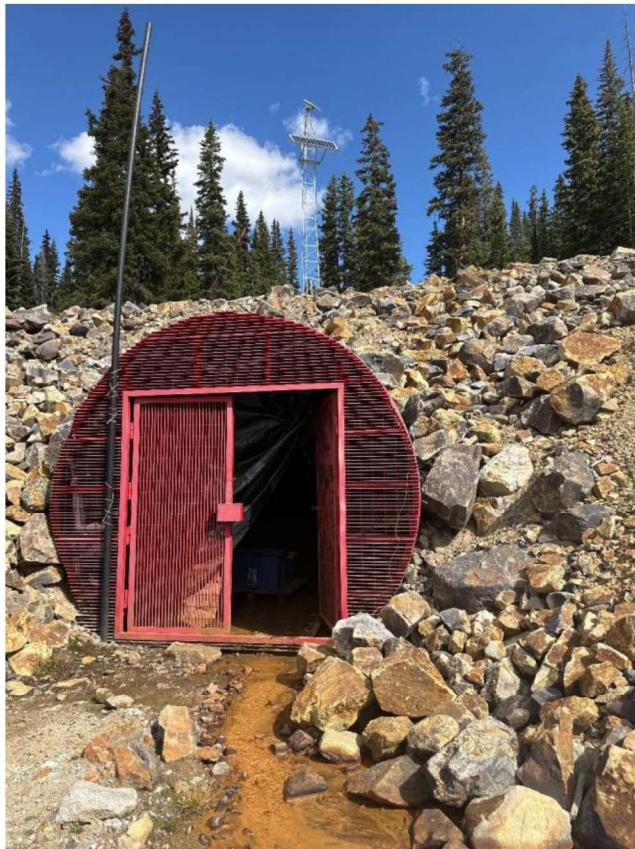
Tree growth on the repository cap



Tree growth on the repository cap



Steep area from the top of the repository



Level 1 entry with telemetry system tower in the background



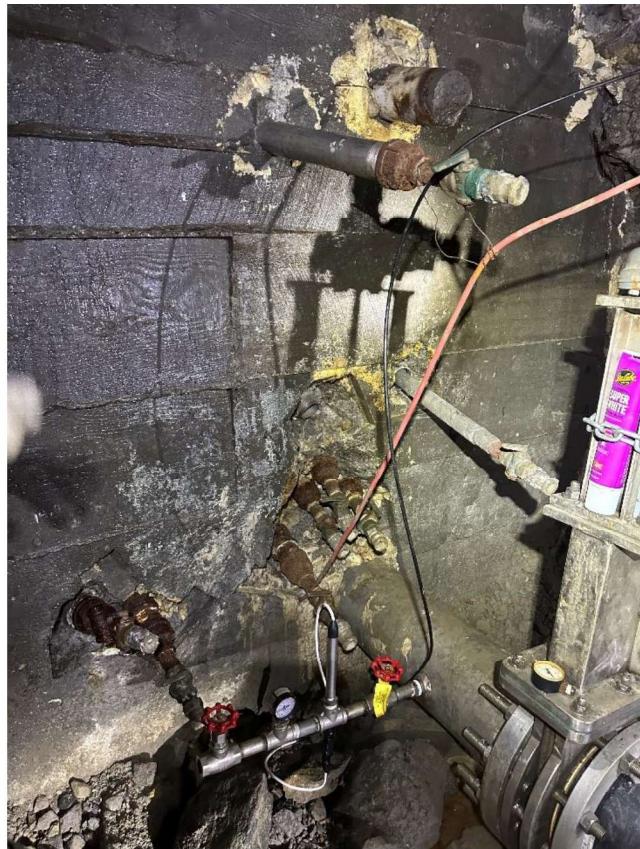
Level 1 new and old openings



Level 1 telemetry system tower



Level 1 bulkhead and flume



Level 1 bulkhead



Level 1 flume, near the bulkhead



Pond outside Level 1



Wetlands near Level 1



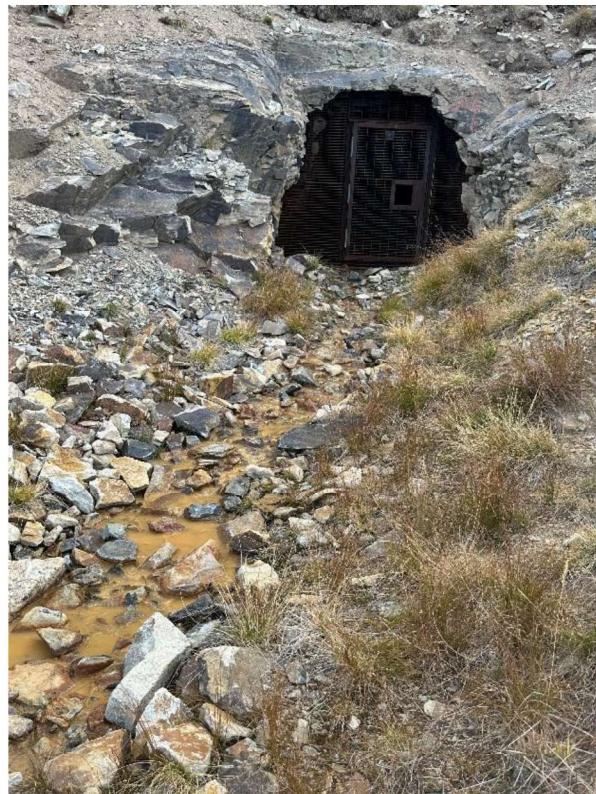
Wetlands near Level 1



ELK-00 sample location on Elk Creek



USGS gauging station near ELK-00



Level 5 adit



Standing water at Level 5 adit



Drainage from Level 5 adit



Level 98



Level 98 surface work

## APPENDIX H – SITE INSPECTION CHECKLIST

<b>FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST</b>			
<b>I. SITE INFORMATION</b>			
<b>Site Name:</b> Standard Mine	<b>Date of Inspection:</b> <u>10/10/2024</u>		
<b>Location and Region:</b> Gunnison National Forest, Colorado, Region 8	<b>EPA ID:</b> <u>CO0002378230</u>		
<b>Agency, Office or Company Leading the Five-Year Review:</b> The EPA	<b>Weather/Temperature:</b> <u>Sunny and 60 degrees Fahrenheit</u>		
<b>Remedy Includes:</b> (check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; padding-right: 20px;"> <input checked="" type="checkbox"/> Landfill cover/containment  <input checked="" type="checkbox"/> Access controls  <input checked="" type="checkbox"/> Institutional controls  <input type="checkbox"/> Groundwater pump and treatment  <input type="checkbox"/> Surface water collection and treatment  <input checked="" type="checkbox"/> Other: Mine source controls: Phase 1 - Level 3 contaminant controls, bulkhead closure in Level 1, waste rock stabilization and adit discharge controls at Levels 5 and 98; Phase 2 (if necessary) passive water treatment.                 </td> <td style="width: 50%; padding-left: 20px;"> <input type="checkbox"/> Monitored natural attenuation  <input type="checkbox"/> Groundwater containment  <input type="checkbox"/> Vertical barrier walls                 </td> </tr> </table>		<input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other: Mine source controls: Phase 1 - Level 3 contaminant controls, bulkhead closure in Level 1, waste rock stabilization and adit discharge controls at Levels 5 and 98; Phase 2 (if necessary) passive water treatment.	<input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls
<input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other: Mine source controls: Phase 1 - Level 3 contaminant controls, bulkhead closure in Level 1, waste rock stabilization and adit discharge controls at Levels 5 and 98; Phase 2 (if necessary) passive water treatment.	<input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls		
The ROD also requires monitoring of the following site features: <ul style="list-style-type: none"> <li>• Mine waste repository and areas impacted by repository construction.</li> <li>• Revegetated/stabilized/armored residual soils and waste rock at Levels 1, 2, 3, 5 and 98.</li> <li>• Reconstructed Elk Creek channel and run-on/runoff and erosion controls.</li> <li>• Level 3 contaminant controls.</li> <li>• Flow-through bulkhead in Level 1.</li> <li>• Institutional controls.</li> <li>• Passive water treatment system, if implemented.</li> </ul>			
<b>Attachments:</b>	<input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached		
<b>II. INTERVIEWS</b> (check all that apply)			
1. <b>O&amp;M Site Manager</b> _____ Name _____ Title _____ Date _____ Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone: _____ Problems, suggestions <input type="checkbox"/> Report attached: _____			
2. <b>O&amp;M Staff</b> _____ Name _____ Title _____ Date _____ Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone: _____ Problems/suggestions <input type="checkbox"/> Report attached: _____			
3. <b>Local Regulatory Authorities and Response Agencies</b> (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 <u>CDPHE</u> Contact <u>Kathleen Knox</u> Project Manager <u>10/16/2024</u> Name _____ Title _____ Date _____ Problems/suggestions <input type="checkbox"/> Report attached: <u>Interview form included in Appendix E.</u>			
Agency <u>USFS</u> Contact <u>Bryan Barrett</u> GMUG Env. Engineer <u>11/25/2024</u> Name _____ Title _____ Date _____ Problems/suggestions <input type="checkbox"/> Report attached: <u>Interview form included in Appendix E.</u>			

Agency	DRMS		
Contact	Mark Mikos	Project Manager	12/09/2024
Name	Title		
Problems/suggestions <input type="checkbox"/> Report attached: <u>Interview form included in Appendix E.</u>			
4. <b>Other Interviews</b> (optional) <input checked="" type="checkbox"/> Report attached: <u>Interview forms included Appendix E</u>			
Representative from the Coal Creek Watershed Coalition and a community member.			
<b>III. ON-SITE DOCUMENTS AND RECORDS VERIFIED</b> (check all that apply)			
1. <b>O&amp;M Documents</b>			
<input checked="" type="checkbox"/> O&M manual <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A			
<input checked="" type="checkbox"/> As-built drawings <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A			
<input checked="" type="checkbox"/> Maintenance logs <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A			
Remarks: _____			
2. <b>Site-Specific Health and Safety Plan</b>			
<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Up to date <input type="checkbox"/> N/A			
<input type="checkbox"/> Contingency plan/emergency response plan <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
Remarks: _____			
3. <b>O&amp;M and OSHA Training Records</b>			
<input checked="" type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input type="checkbox"/> N/A			
Remarks: _____			
4. <b>Permits and Service Agreements</b>			
<input type="checkbox"/> Air discharge permit <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
<input type="checkbox"/> Effluent discharge <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
<input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
<input type="checkbox"/> Other permits: _____ <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
Remarks: _____			
5. <b>Gas Generation Records</b>			
<input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
Remarks: _____			
6. <b>Settlement Monument Records</b>			
<input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
Remarks: _____			
7. <b>Groundwater Monitoring Records</b>			
<input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
Remarks: _____			
8. <b>Leachate Extraction Records</b>			
<input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
Remarks: _____			
9. <b>Discharge Compliance Records</b>			
<input type="checkbox"/> Air <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			
<input type="checkbox"/> Water (effluent) <input type="checkbox"/> Readily available <input type="checkbox"/> Up to date <input checked="" type="checkbox"/> N/A			

Remarks: _____			
10. <b>Daily Access/Security Logs</b>		<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date
Remarks: <u>Vehicular entry via MEMCO must sign in</u>			
<b>IV. O&amp;M COSTS</b>			
1. <b>O&amp;M Organization</b>			
<input type="checkbox"/> State in-house		<input checked="" type="checkbox"/> Contractor for state	
<input type="checkbox"/> PRP in-house		<input type="checkbox"/> Contractor for PRP	
<input type="checkbox"/> Federal facility in-house		<input type="checkbox"/> Contractor for Federal facility	
<input type="checkbox"/> _____			
2. <b>O&amp;M Cost Records</b>			
<input type="checkbox"/> Readily available		<input type="checkbox"/> Up to date	
<input type="checkbox"/> Funding mechanism/agreement in place		<input checked="" type="checkbox"/> Unavailable	
Original O&M cost estimate: _____ <input type="checkbox"/> Breakdown attached			
Total annual cost by year for review period if available			
From: _____ Date	To: _____ Date	_____	<input type="checkbox"/> Breakdown attached
From: _____ Date	To: _____ Date	_____	<input checked="" type="checkbox"/> Breakdown attached
From: _____ Date	To: _____ Date	_____	<input type="checkbox"/> Breakdown attached
From: _____ Date	To: _____ Date	_____	<input type="checkbox"/> Breakdown attached
From: _____ Date	To: _____ Date	_____	<input type="checkbox"/> Breakdown attached
From: _____ Date	To: _____ Date	_____	<input type="checkbox"/> Breakdown attached
3. <b>Unanticipated or Unusually High O&amp;M Costs during Review Period</b>			
Describe costs and reasons: _____			
<b>V. ACCESS AND INSTITUTIONAL CONTROLS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>A. Fencing</b>			
1. <b>Fencing Damaged</b>		<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Gates secured
Remarks: _____			
<b>B. Other Access Restrictions</b>			
1. <b>Signs and Other Security Measures</b>		<input type="checkbox"/> Location shown on site map	
Remarks: <u>Locked adit portal gates and the access road has locked gates preventing access to the area.</u>			
<b>C. Institutional Controls</b>			

<b>1. Implementation and Enforcement</b>			
Site conditions imply ICs not properly implemented		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A*	
Site conditions imply ICs not being fully enforced		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A*	
Type of monitoring (e.g., self-reporting, drive by): _____			
Frequency: _____			
Responsible party/agency: _____			
Contact _____		_____	_____
Name		Title	Date
Reporting is up to date		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A*	
Reports are verified by the lead agency		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A*	
Specific requirements in deed or decision documents have been met*		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Violations have been reported		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A*	
Other problems or suggestions: <input type="checkbox"/> Report attached			
<u>*ICs have not yet been implemented</u>			
<b>2. Adequacy</b> <input type="checkbox"/> ICs are adequate <input checked="" type="checkbox"/> ICs are inadequate <input checked="" type="checkbox"/> N/A*			
Remarks: <u>*ICs have not yet been implemented</u>			
<b>D. General</b>			
<b>1. Vandalism/Trespassing</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident			
Remarks: _____			
<b>2. Land Use Changes On-Site</b> <input type="checkbox"/> N/A			
Remarks: <u>None</u>			
<b>3. Land Use Changes Off-Site</b> <input type="checkbox"/> N/A			
Remarks: <u>None</u>			
<b>VI. GENERAL SITE CONDITIONS</b>			
<b>A. Roads</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
<b>1. Roads Damaged</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A			
Remarks: _____			
<b>B. Other Site Conditions</b>			
Remarks: _____			
<b>VII. LANDFILL COVERS</b> <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
Waste Rock Repository			
<b>A. Landfill Surface</b>			
<b>1. Settlement</b> (low spots) <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Settlement not evident			
Area extent: _____		Depth: _____	
Remarks: _____			
<b>2. Cracks</b> <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident			
Lengths: _____		Widths: _____	
		Depths: _____	

Remarks: _____			
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident
Area extent: _____		Depth: _____	
Remarks: _____			
4.	<b>Holes</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Holes not evident
Area extent: _____		Depth: _____	
Remarks: _____			
5.	<b>Vegetative Cover</b>	<input type="checkbox"/> Grass	<input type="checkbox"/> Cover properly established
<input type="checkbox"/> No signs of stress		<input checked="" type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram)	
Remarks: <u>Riprap cover with small trees starting to grow along the toe and further in on the repository. The state intends to remove them.</u>			
6.	<b>Alternative Cover</b> (e.g., armored rock, concrete)	<input type="checkbox"/> N/A	
Remarks: <u>Appeared in good condition.</u>			
7.	<b>Bulges</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Bulges not evident
Area extent: _____		Height: _____	
Remarks: _____			
8.	<b>Wet Areas/Water Damage</b>	<input checked="" type="checkbox"/> Wet areas/water damage not evident	
<input type="checkbox"/> Wet areas		<input type="checkbox"/> Location shown on site map	Area extent: _____
<input type="checkbox"/> Ponding		<input type="checkbox"/> Location shown on site map	Area extent: _____
<input type="checkbox"/> Seeps		<input type="checkbox"/> Location shown on site map	Area extent: _____
<input type="checkbox"/> Soft subgrade		<input type="checkbox"/> Location shown on site map	Area extent: _____
Remarks: _____			
9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
<input checked="" type="checkbox"/> No evidence of slope instability		Area extent: _____	
Remarks: _____			
<b>B. Benches</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> 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.)			
<b>C. Letdown Channels</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> 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.	<b>Settlement</b> (Low spots)	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of settlement
Area extent: _____		Depth: _____	
Remarks: _____			
2.	<b>Material Degradation</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of degradation

Material type: _____		Area extent: _____	
Remarks: _____			
3. <b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of erosion	
Area extent: _____	Depth: _____		
Remarks: _____			
4. <b>Undercutting</b>	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> No evidence of undercutting	
Area extent: _____	Depth: _____		
Remarks: _____			
5. <b>Obstructions</b>	Type: _____	<input checked="" type="checkbox"/> No obstructions	
<input type="checkbox"/> Location shown on site map	Area extent: _____		
Size: _____			
Remarks: _____			
6. <b>Excessive Vegetative Growth</b>	Type: _____		
<input type="checkbox"/> No evidence of excessive growth			
<input checked="" type="checkbox"/> Vegetation in channels does not obstruct flow			
<input type="checkbox"/> Location shown on site map	Area extent: _____		
Remarks: _____			
<b>D. Cover Penetrations</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
<b>E. Gas Collection and Treatment</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
<b>F. Cover Drainage Layer</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1. <b>Outlet Pipes Inspected</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
Remarks: _____			
2. <b>Outlet Rock Inspected</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
Remarks: _____			
<b>G. Detention/Sedimentation Ponds</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	
1. <b>Siltation</b>	Area extent: _____	Depth: _____	<input type="checkbox"/> N/A
<input type="checkbox"/> Siltation not evident			
Remarks: _____			
2. <b>Erosion</b>	Area extent: _____	Depth: _____	
<input type="checkbox"/> Erosion not evident			
Remarks: _____			
3. <b>Outlet Works</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
Remarks: _____			
4. <b>Dam</b>	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A	
Remarks: _____			
<b>H. Retaining Walls</b>	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A	

<b>I. Perimeter Ditches/Off-Site Discharge</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1. <b>Siltation</b>		<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Siltation not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2. <b>Vegetative Growth</b>		<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
<input type="checkbox"/> Vegetation does not impede flow			
Area extent: _____		Type: _____	
Remarks: _____			
3. <b>Erosion</b>		<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
Area extent: _____		Depth: _____	
Remarks: _____			
4. <b>Discharge Structure</b>		<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks: _____			
<b>VIII. VERTICAL BARRIER WALLS</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. <b>Settlement</b>		<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2. <b>Performance Monitoring</b>		Type of monitoring: _____	
<input type="checkbox"/> Performance not monitored			
Frequency: _____		<input type="checkbox"/> Evidence of breaching	
Head differential: _____			
Remarks: _____			
<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
Passive water treatment is Phase 2 of the remedial action and has not yet been implemented.			
<b>X. OTHER REMEDIES</b>			
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.			
<p><u>Level 1: The Level 1 portal closure appeared undisturbed. The Level 1 bypass adit portal gate was secured upon arrival. The Level 1 adit was in good condition with no issues of concern noted. Site inspection participants entered the adit and observed the bulkhead closure. The exterior tower for the telemetry system appeared in good condition.</u></p> <p><u>Levels 3, 5, and 98: No issues of concern were noted at the exterior areas of Level 3, Level 5 and Level 98. Surface work at Level 3 and Level 5 was complete at the time of the inspection.</u></p>			
<b>XI. OVERALL OBSERVATIONS</b>			
<b>A. Implementation of the Remedy</b> <p>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).</p> <p><u>The source control remedy is designed to reduce water flow through mine workings and contaminated soils to reduce metals loading to Elk Creek, to lessen water quality impacts and maximize reasonably attainable water uses in Elk Creek. The remedy is also designed to reduce human exposure to dust and</u></p>			

<p><u>ecological impacts from impacted soils and waste rock. Rehabilitation of the Level 1, 3 and 5 adits and level 98 occurred. The bulkhead at Level 1 was closed and is operating as designed. Sampling of surface water is ongoing as part of the interim monitoring program, which began in 2018 and was extended through 2027. The effectiveness of the source control remedy will be evaluated using interim monitoring data over time but is expected to reduce contaminant loading to Elk Creek.</u></p>
<b>B. Adequacy of O&amp;M</b>
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. <u>O&amp;M activities are adequate at this time.</u>
<b>C. Early Indicators of Potential Remedy Problems</b>
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. <u>None at this time.</u>
<b>D. Opportunities for Optimization</b>
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>None at this time.</u>

**Site inspection participants:**

Jessica Duggan (EPA)  
 Valerie Doornbus (EPA)  
 Matthew Kryman (EPA)  
 Kathleen Knox (CDPHE)  
 Jeff Graves (DRMS)  
 Mark Mikos (DRMS)  
 Tara Tafi (DRMS)  
 Bryan Barrett (USFS)  
 Treat Suomi (Skeo)

## APPENDIX I – DETAILED ARARS REVIEW TABLES

**Table I-1: Comparison of 2011 ROD Surface Water Cleanup Levels to Current State Water Quality Standards for Site COCs**

COC		2011 ROD Surface Water Cleanup Level <sup>a</sup>		Current State Standard <sup>b</sup>		Change?
		Equation	Example value based on hypothetical 100 mg/L hardness <sup>c</sup>	Equation	Example value based on hypothetical 100 mg/L hardness <sup>c</sup>	
Cadmium	Acute	$(1.136672 - [\ln(\text{hardness}) * 0.041838]) * e^{(0.9151[\ln(\text{hardness})] - 3.6236)}$	1.70	$(1.136672 - [\ln(\text{hardness}) * 0.041838]) * e^{(0.9789[\ln(\text{hardness})] - 3.866)}$	1.8	ROD value < current standard
	Chronic	$(1.10162 - [\ln(\text{hardness}) * 0.041838]) * e^{(0.7998[\ln(\text{hardness})] - 4.4451)}$	0.42	$(1.10162 - [\ln(\text{hardness}) * 0.041838]) * e^{(0.7977[\ln(\text{hardness})] - 3.909)}$	0.72	ROD value < current standard
Lead	Acute	$(1.46203 - [\ln(\text{hardness}) * 0.145712]) * e^{(1.273[\ln(\text{hardness})] - 1.46)}$	65	$(1.46203 - [\ln(\text{hardness}) * 0.145712]) * e^{(1.273[\ln(\text{hardness})] - 1.46)}$	65	No change
	Chronic	$(1.46203 - [\ln(\text{hardness}) * 0.145712]) * e^{(1.273[\ln(\text{hardness})] - 4.705)}$	2.5	$(1.46203 - [\ln(\text{hardness}) * 0.145712]) * e^{(1.273[\ln(\text{hardness})] - 4.705)}$	2.5	No change
Zinc	Acute	$0.978 * e^{(0.8525[\ln(\text{hardness})] + 1.0617)}$	143	$0.978 * e^{(0.9094[\ln(\text{hardness})] + 0.9095)}$	160	ROD value < current standard
	Chronic	$0.986 * e^{(0.8525[\ln(\text{hardness})] + 0.9109)}$	124	$0.986 * e^{(0.9094[\ln(\text{hardness})] + 0.6235)}$	121	ROD value > current standard

*Notes:*

- Surface water cleanup levels defined in Table 18 of the 2011 ROD as “COC Concentrations Expected to Provide Adequate Protection of Ecological Receptors.”
- State surface water quality standards, effective December 31, 2023, available at <https://www.coloradosos.gov/CCR/GenerateRulePdf.do?ruleVersionId=10835&fileName=5%20CCR%201002-31>, pdf pages 58 and 59, and specific to Upper Gunnison River Basin Stream Segment 11 (COGUUG11) in Regulation No. 35 – Classifications and Numeric Standards for Gunnison and Lower Delores River Basin, available at <https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=11271&fileName=5%20CCR%201002-35>, pdf page 160 (accessed 11/5/2024).
- The current state water quality standards and the 2011 ROD surface water cleanup levels are hardness-based standards. A hypothetical hardness of 100 mg/L calcium carbonate was used to demonstrate the relative difference between the current standards and the 2011 ROD surface water cleanup levels. The resulting numeric values from this assessment should not be construed as the site-specific standards and surface water cleanup values but as example values.

All standards reported in micrograms per liter (µg/L)  
ln = natural log

**Table I-2: Comparison of 2011 ROD Surface Water Cleanup Levels to Current Drinking Water Standards for Site COCs**

COC		2011 ROD Surface Water Cleanup Level <sup>a</sup>		Current Drinking Water Standards		Change?
		Equation	Example value based on hypothetical 100 mg/L hardness <sup>b</sup>	State Standard <sup>c</sup>	Federal Standard <sup>d</sup>	
Cadmium	Acute	$(1.136672 - [\ln(\text{hardness}) * 0.041838]) * e^{(0.9151[\ln(\text{hardness})] - 3.6236)}$	1.7	5	5	ROD value < current state/federal standard
	Chronic	$(1.10162 - [\ln(\text{hardness}) * 0.041838]) * e^{(0.7998[\ln(\text{hardness})] - 4.4451)}$	0.42			ROD value < current state/federal standard
Lead	Acute	$(1.46203 - [\ln(\text{hardness}) * 0.145712]) * e^{(1.273[\ln(\text{hardness})] - 1.46)}$	65	10/15 <sup>e</sup>	10 <sup>f</sup>	ROD value > current state/federal standard
	Chronic	$(1.46203 - [\ln(\text{hardness}) * 0.145712]) * e^{(1.273[\ln(\text{hardness})] - 4.705)}$	2.5			ROD value < current state/federal standard
Zinc	Acute	$0.978 * e^{(0.8525[\ln(\text{hardness})] + 1.0617)}$	143	5,000 <sup>g</sup>	5,000 <sup>h</sup>	ROD value < current state/federal standard
	Chronic	$0.986 * e^{(0.8525[\ln(\text{hardness})] + 0.9109)}$	124			ROD value < current state/federal standard

*Notes:*

- Surface water cleanup levels defined in Table 18 of the 2011 ROD as “COC Concentrations Expected to Provide Adequate Protection of Ecological Receptors.”
- The 2011 ROD surface water cleanup levels are hardness-based standards. A hypothetical hardness of 100 mg/L calcium carbonate was used to demonstrate the relative difference between the 2011 ROD surface water cleanup levels and current drinking water standards. The resulting numeric values from this assessment should not be construed as the site-specific surface water cleanup values, but as example values.
- State drinking water standards, 5 CCR 1002-11, available at <https://www.coloradosos.gov/CCR/GenerateRulePdf.do?ruleVersionId=11290&fileName=5%20CCR%201002-11>, pdf pages 197 and 369 (accessed 11/4/2024).
- National primary drinking water standards available at <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>, (accessed 11/4/2024). National secondary drinking water standards available at <https://www.epa.gov/sdwa/secondary-drinking-water-standards-guidance-nuisance-chemicals> (accessed 11/4/2024).
- The state has established a lead trigger level of 10 µg/L and action level of 15 µg/L.
- National Primary Drinking Water Regulations for Lead and Copper: Improvements, dated October 30, 2024, with an effective date of December 30, 2024: <https://www.federalregister.gov/documents/2024/10/30/2024-23549/national-primary-drinking-water-regulations-for-lead-and-copper-improvements-lcri>.
- Zinc value is a secondary MCL.
- Zinc value is a secondary MCL; National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. The EPA recommends secondary standards to water systems but does not require systems to comply.

Cleanup levels and standards reported in µg/L.

ln = natural log