PRE-CERCLA SCREENING REPORT
FOR
ELKHORN MINING DISTRICT
JEFFERSON COUNTY, MONTANA

Prepared for
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 8

Prepared by
WESTON SOLUTIONS, INC.
Region 8 Superfund Technical Assessment and Response Team

May 2018

Date Prepared	May 24, 2018
SEMS ID/SSID:	NA/A8R2
TDD No.	0004/1703-11
Document Control No.	W0468.1A.01450
Contract No.	EP-S8-13-01
U.S. EPA Site Assessment Manager	Joseph Chisholm

PRE-CERCLA SCREENING REPORT
FOR
ELKHORN MINING DISTRICT
JEFFERSON COUNTY, MONTANA

Prepared for
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 8

Prepared by
WESTON SOLUTIONS, INC.
Region 8 Superfund Technical Assessment and Response Team

May 2018

Reviewed and Approved by: _____ Date: _____
Joseph Chisholm
EPA Site Assessment Manager

Prepared by: _____ Date: 5/24/2018
Natalie Quiet
WESTON START Senior Project Scientist

Reviewed and Approved by: _____ Date: 5/24/2018
Mark Blanchard, P.G.
WESTON START Project Manager

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

ACRONYMS LIST

µg/L	micrograms per liter
amsl	above mean sea level
ATV	all-terrain vehicle
bgs	below ground surface
BLM	Bureau of Land Management
CDP	census designated place
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
COPC	Contaminants of Potential Concern
CY	cubic yards
DO	dissolved oxygen
ECOS	Environmental Conservation Online System
EPA	U.S. Environmental Protection Agency
ft	feet
FWP	Montana Department of Fish, Wildlife and Parks
GPS	Global Positioning System
GWIC	Ground Water Information Center
IPaC	Information, Planning, and Conservation System
MBMG	Montana Bureau of Mines and Geology
MCL	Maximum Contaminant Level
MDEQ	Montana Department of Environmental Quality
MDSL	Montana Department of State Lands
MSL	Montana State Library
MT	Montana
NRHP	National Register of Historic Places
OLEM	Office of Land and Emergency Management
OSMRE	U.S Office of Surface Mining Reclamation and Enforcement
PCS	Pre-CERCLA Screening
SEMS	Superfund Enterprise Management System
START	Superfund Technical Assessment and Response Team
TDD	Technical Direction Document
TMDL	Total Maximum Daily Load
USFS	U.S. Forest Service
USFWS	U.S. Fish & Wildlife Service
WESTECH	Western Technology and Engineering, Inc.
WESTON	Weston Solutions, Inc.
WRCC	Western Regional Climate Center
XRF	X-ray fluorescence

1.0 INTRODUCTION

This Pre-Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Screening (PCS) for the Elkhorn Mining District, Jefferson County, Montana (MT) (Figure 1) has been prepared to partially satisfy the requirements of Technical Direction Document (TDD) No. 1703-11 issued to Weston Solutions, Inc. (WESTON) under the U.S. Environmental Protection Agency (EPA) Region 8 Superfund Technical Assessment and Response Team (START) Contract No. EP-S8-13-01.

This PCS is being conducted in partnership with Montana Department of Environmental Quality (MDEQ) Abandoned Mine Lands Program, Bureau of Land Management (BLM), United Sates Forest Service (USFS), and U.S. Fish and Wildlife Service (USFWS). This PCS is being conducted at individual abandoned mines located in the Elkhorn Mining District (sites). PCS activities are implemented pursuant to statutory authority granted in CERCLA sections 104 and 105. Regulatory authority is provided under the National Oil and Hazardous Substances Pollution Contingency Plan (CFR 40 Part 300, Subpart E and Appendix A) commonly called the NCP. The PCS activities were conducted pursuant to *Pre-CERCLA Screening Guidance* (Office of Land and Emergency Management (OLEM Directive# 9200.3-107) (EPA, 2016). The information provided in this PCS report is sufficient to determine if these sites pose a threat to public health and the environment, and thus, whether the site is recommended to proceed to additional investigation under CERCLA.

The PCS is the first stage of the investigation and is a compilation of existing information about the sites and surrounding area. The PCS Guidance recommends including a Pre-CERCLA Screening Checklist/Decision Form and a site map. This report includes information obtained from review of historical files and from the site reconnaissance conducted July 24 through July 27, 2017 at the 22 individual mine sites located throughout the Elkhorn Mining District. The Elkhorn basin consists of abandoned mines located on both private and public lands with many potential source areas of waste material located in accessible and highly recreated areas of the Deerlodge National Forest. Elkhorn is a historic mining town that attracts tourists and sightseers. Two historic buildings make up Elkhorn State Park, which is located in the center of Elkhorn. Individual mines that warrant further assessment will be entered into the Superfund Enterprise Management System (SEMS) database as part of the CERCLA Discovery process, which will then proceed to a Preliminary Assessment or potentially other additional actions based on more detailed investigations and observed conditions.

1.1 PROJECT OBJECTIVES

The principal objective of the PCS is to assess the potential threats at individual mine sites throughout the Elkhorn watershed and determine if further investigation under CERCLA is necessary. The PCS is intended to determine if:

- A release of a hazardous substance has occurred at a site or if there is the potential for a release to occur that would pose a threat to human health or the environment;
- The site is eligible for further remedial assessment under CERCLA authority;
- The site needs further attention under Superfund or another cleanup program; and

- The site warrants entry into the federal Superfund program's active sites inventory for further assessment or response.

1.2 PROJECT SCOPE

The assessment includes reviewing readily available information, conducting site reconnaissance (including a description and photo documentation of site features observed and completion of a PCS checklist in the field), limited collection of surface water and soil field screening measurements, initial evaluation of data to determine potential hazards using EPA Hazard Ranking System (HRS) criteria and other human health and environmental standards/benchmarks, and identifying if individual mine sites warrant further investigation.

Readily available information included historical documents such as mine inventories, site investigations, and data collected by the MDEQ, Montana Department of State Lands Abandoned Mine Reclamation Bureau, USFS, and their subcontractors. Mine-specific historical information reviewed is presented in Section 2.3.2 and data summarized in Table 3, with supporting details in the individual mine packets provided in Appendix A.

Desktop information reviewed included Montana Bureau of Mines and Geology (MBMG) Ground Water Information Center (GWIC) for potable groundwater wells in proximity of each mine site (Montana Tech of the University of Montana, 2017). Wetlands were identified by reviewing the USFWS National Wetlands Inventory wetlands mapper (USFWS, 2017c) and federally Threatened and Endangered species using the USFWS Endangered Species database USFWS, 2017; USFWS, 2018). Google Earth aerial imagery was used to assist in confirming waste pile sizes and site features, and measuring distances to relevant targets.

Surface soil x-ray fluorescence (XRF) for metals and water quality screening (including pH, dissolved oxygen, and conductivity) readings were collected from waste material/soil and surface water at each mine site, where present, during the July 2017 site reconnaissance. A PCS checklist documenting the presence/absence of human and environmental targets, accessibility, and conditions at each mine site were completed in the field during the site reconnaissance.

A compilation of the information reviewed and collected during the July 2017 site reconnaissance activities are presented in a matrix in Section 5.2, individual mine PCS reports, and the individual mine Pre-CERCLA Screening Checklist/Decision Forms provided in Appendix A with each mine packet. A comprehensive summary of information found during this initial screening is presented in Table 3.

1.3 DOCUMENT ORGANIZATION

This PCS Report includes background and setting information for the Elkhorn Mining District investigation area as well as PCS screening analysis of 22 individual mine sites located within the district. In order to provide information for both CERCLA Site Assessment and other concerns of interest to the multiple stakeholders, the document is organized as follows:

- Section 1 – Provides the objectives and scope of the assessment
- Section 2 – Provides the site background, description, history and current conditions.

- Section 3 – Identifies potential source materials and contaminants of potential concern (COPCs)
- Section 4 – Provides the district-wide pathway descriptions for the groundwater pathway, the surface water pathway and the soil exposure and air pathways.
- Section 5 – Provides the PCS evaluation criteria and summarizes the analysis of the 22 mine sites.
- Section 6 – References are listed in this section.
- Appendix A – Provides the individual information packets for the 22 mines included in the screening.
- Appendix B – Provides information collected during the July 2017 site reconnaissance activities and includes feature name, feature type, inspection date, feature comments, feature status, feature coordinates, feature photo name, photo description, sample numbers, sample coordinates, sample media, collection method, and field parameter data.

2.0 SITE BACKGROUND

2.1 LOCATION

The Elkhorn Mining District (the District) is situated in the center of Jefferson County in the Elkhorn Mountains with the census designated place (CDP) of Elkhorn lying in the approximate center of the district. Elkhorn lies approximately 8.5 miles northeast from the population center and county seat of Jefferson County, Boulder, Montana. The approximate center of the district is 46.274722 degrees N latitude and 111.946175 degrees W longitude. According to Google Earth, the closest residences are in Elkhorn. According to the 2010 Census, the total population of Elkhorn is 10 and the total population of the town of Boulder is 1,183. The total population of Jefferson County is 11,406. (U.S. Census Bureau, 2010).

The District lies in Sections 2, 3, 11, 15, 22, 23, 27, and 34 in Township 5 North, Range 3 West and Section 34 in Township 6 North, Range 3 West, the east half of Sections 9, 28, and 33 Township 6 North, Range 3 West, and the north half of Section 26 in Township 6 North, Range 3 West (MDEQ, 1998).

2.2 SITE DESCRIPTION

The 22 individual mines inventoried in the Elkhorn Mining District are located within the Elkhorn Creek subwatershed with the exception of Iron mine, which is located at the headwaters of the Muskrat Creek subwatershed (Figure 2). The basin is drained by Elkhorn Creek which flows south to the Boulder River and subsequently to the Jefferson River (MDEQ, 1998). The main tributaries to Elkhorn Creek, which include the mine sites that are the focus of this PCS, are Slaughterhouse Gulch, Greyback Gulch, Seven Up Gulch, Turnley Creek, Queen Gulch, South Fork Queen Gulch, and Tacoma Gulch. The following is a list of the mines inventoried by creek:

Elkhorn Creek – Louise, C&D, Dunstone, James, R. Keene, Luxemburgh, Carmody, and Queen mines, and Elkhorn Creek Tailings.

Slaughterhouse Gulch – Union Elkhorn and NW NW Section 14 22 3535 mines.

Greyback Gulch – Relief, Sourdough, and Golden Curry mines.

Seven up Gulch – Seven Up mine.

Turnley Creek – Trumley Heap Leach.

Queen Gulch –Skyline and Boulaway mines

South Fork Queen Gulch - Bob and Elkhorn Queen mines, and Rex Elkhorn District.

Tacoma Gulch – Tacoma mine.

Muskrat Creek – Iron mine.

Iron mine is located at the headwaters of Muskrat Creek, which flows north for approximately 1 mile before heading west and southwest, and eventually converging with the Boulder River. The basin encompasses approximately 91.7 square miles. The elevation within the basin ranges from approximately 9,400 feet (ft) above mean sea level (amsl) on the mountain peaks to 4,700 ft amsl at the confluence of Elkhorn Creek and Boulder River. Topography ranges from nearly level, grass covered alluvial terraces to steeply sloping, forested and subalpine slopes and ridges.

The properties within and surrounding the District are comprised of a mix of private and USFS managed lands. The majority of residences are located near the center of the District in the Elkhorn townsite. Recreational use in the District includes hunting, fishing, sightseeing, hiking, biking, snowmobiling, four-wheeling and other recreational driving, and cross country skiing. Currently, the District contains numerous abandoned mines with adits, shafts, prospect pits, waste rock and tailings piles, and historic mining structures. According to the Bureau of Land Management's (BLM) Land & Mineral System Reports database, the Golden Curry, Sourdough and Skyline mines are the only sites with active mining claims associated with the sites inventoried in this PCS. The Golden Curry and Sourdough claims are located within Township 6 North, Range 3 West, Section 10 on private lands. There are 4 active lode claims within this section identified as Sourdough Fraction, South Sourdough, South Golden Curry, and South Golden Curry#2. The Skyline mine is associated with the Elkhorn Skyline lode claim, which is located within Township 6 North, Range 2 West, Section 8, and is on USFS-administered land (BLM, 2017; Montana State Library [MSL], 2017).

2.2.1 Climate

There is no meteorological data specific to the Site, but monthly data collected from a meteorological data station (#241008) in Boulder, Montana, just west of Elkhorn mining district is available from July 23, 1880 through June 10, 2016. Average winter temperatures in the Boulder area range from 9.6 °F to 38.5 °F and average summer temperatures range from 42.6 °F to 82.7 °F. The average annual high temperature is 56.8 °F. Average annual precipitation is 10.97 inches. Precipitation is mainly consistent throughout the year with slightly more in May and June. Prevailing winds in the area for the Site are generally south. (Western Regional Climate Center [WRCC], 2017).

2.2.2 Vegetation and Wildlife

Vegetation in the higher elevations is predominantly coniferous forest with Douglas fir, Engelmann spruce, or lodgepole pine in the forested areas. Deciduous forest, primarily cottonwood or aspen, is found along drainages at lower elevations with sedge and willow-dominated wetland areas. Open grasslands and shrub communities occur upland of the drainages at the lower elevations.

The Elkhorns offer unique opportunities for viewing wildlife in their natural habitat. Although often touted for their spectacular elk population, many other animals such as bighorn sheep, mule and white-tailed deer, black bear, moose, and a variety of birds are commonly seen. Some other animals such as badger, wolverine, mountain lions and lynx are more reclusive and seldom seen (USFS, no date). A large bull elk was observed by START near the Elkhorn Creek Tailings site,

and elk, moose, cat, and cow droppings were observed throughout the sites during the July 2017 site reconnaissance activities.

According to the Environmental Assessment conducted by the MDEQ for the Golden Dream Mine Project, a wildlife baseline study of 3,360 acres was conducted in 1995 by Western Technology and Engineering, Inc. (WESTECH) (MDEQ, 2008; WESTECH, 1995). The area surveyed included the areas surrounding the Sourdough, Golden Curry, NW NW Section 12 22 3535, Carmody, and Relief mines, and Elkhorn Creek Tailings (MDEQ, 2008; WESTECH, 1995). According to the report, elk, moose, mule deer, blue grouse and ruffed grouse were recorded on or near the aforementioned mine sites (MDEQ, 2008; WESTECH, 1995). The report stated that these areas were not used by elk for "key summer" or "key winter" range habitat (MDEQ, 2008; WESTECH, 1995).

An update of the area wildlife inventories was performed by WESTECH in June 2006 and included: Fisheries and Species of Concern, Aquatic Biological Resources and Species of Concern, Wildlife Habitats, and Bats and Terrestrial Vertebrate Species of Concern (WESTECH, 2006). The abovementioned mine areas were examined for suitable habitat and presence of bats; however, no evidence of bats or roosts was found and subsequent studies have not observed bats at similar elevations of these mines (MDEQ, 2008; WESTECH, 2006). Potential habitat for the gray wolf, grizzly bear, Townsends Big Ear Bat, Western Toad and the Olive sided Flycatcher exists within 10 miles of the mine areas; however, none of these species were observed in the 1995 or 2006 studies (MDEQ, 2008; WESTECH, 1995; 2006). As of 2006, grizzly bear and gray wolf were likely only to occur as transients in the area; no known sightings of wolves or grizzly bears had been recorded in the area by the Montana Natural Heritage Program (MDEQ, 2008). It is possible that Canadian lynx are present at least as transients in the Elkhorn Mountains but the habitats in and adjacent to the aforementioned mines were not preferred. The probability of lynx use of the mine areas was considered to be low. As of 2006, no threatened or endangered species had been found on or near the aforementioned mine sites (MDEQ, 2008; WESTECH, 2006).

A fisheries and aquatic resources survey was performed by Westech in 1993 and was reevaluated in 2006. The survey indicated that brook trout is the primary fishery with the most fish inhabiting Turnley (57 percent) and Elkhorn creeks (both classified as third order streams). One mottled sculpin was collected in the study area. No fish were collected or observed in certain reaches due to shallow stream depth and low flow. Length frequency distribution data showed that all age classes were present in Elkhorn and Turnley creeks (MDEQ, 2008; WESTECH 1993).

2.2.2.1 Threatened and Endangered Species

A search of the USFWS Environmental Conservation Online System (ECOS) Information, Planning, and Conservation (IPaC) System and the Montana Fish, Wildlife & Parks (FWP) Threatened Species list indicates five different species (one flowering plant, one conifer, and three mammals) are potentially present in the basin and surrounding area (study area) that are considered federally listed threatened or endangered, proposed threatened, or candidate species (USFWS, 2017; 2018; MSP, 2018a). The following species are potentially associated with the study area:

- Ute Ladies'-tresses *(Spiranthes diluvialis)* (Threatened)
- Whitebark Pine (*Pinus albicaulis)* (Candidate)

- Grizzly Bear *(Ursus arctos horribilis)* (Threatened)
- Canada Lynx (*Lynx Canadensis*) (Threatened)
- North American Wolverine (*Gulo gulo luscus)* (Proposed Threatened)

As discussed in Section 2.2.2 above, wildlife and fisheries and aquatic inventories conducted in 1994, 1995 and 2006 indicated the possibility of transient populations of Canada lynx to be present in the Elkhorn Mountains; however, as of 2006, no threatened or endangered species had been found on or near the Sourdough, Golden Curry, NW NW Section 12 22 3535, Carmody, and Relief mines, and Elkhorn Creek Tailings sites (MDEQ, 2008; WESTECH, 2006). According to the Montana Department of Fish, Wildlife and Parks (FWP), the Westslope cutthroat trout is a State designated "Species of Concern" and is known or presumed to be present in Leslie Lake and Muskrat Creek (MSP, 2018a). Previous inventories conducted in 1993 and 2006 did not report observing Westslope cutthroat trout in any of the reaches surveyed. According to the USFWS ECOS and IPaC, none of the aforementioned species have critical habitat within the study area. None of the aforementioned species were specifically surveyed or observed during the site reconnaissance.

2.3 SITE HISTORY

2.3.1 Operational History

The Elkhorn Historic Mining District operated from approximately 1870 to 1951. The period of significance for the district runs from 1879 to 1938 when the district was most productive (MDEQ, 1998). The district was prospected before 1870, but Peter Wys, considered the founder of Elkhorn's riches located a claim in the early l870s. Anton Holter, a prominent Helena banker acquired the claims from Wys and in 1872 organized the Elkhorn Mining Company (MDEQ, 1998). The area first came to prominence when the Holter mine (later known as the Elkhorn and now the Elkhorn Creek Tailings site) began producing silver ore in 1875 (MDEQ, no date). The camp was relatively quiet until 1879 when the first 5-stamp mill was brought in to work the ore from the Holter mine (a.k.a Elkhorn) (MDEQ, 1998). The Elkhorn mine, the most productive mine in the area, produced ore from 1875-1951, reaching a peak of production in the 1890s (MDEQ, 1998). A series of mills evolved at Elkhorn to handle the increasingly complex ores with the first one being built in 1884 (MDEQ, no date; MDEQ, 1998). That same year the Elkhorn townsite was laid out (MDEQ, 1998) (MDEQ, 1998). Approximately twenty lodes and mill sites were located in the Elkhorn district between l880 and 1890 producing silver, gold, lead, zinc and copper with some iron for flux (MDEQ, 1998).

Historically, the Elkhorn Mining District was connected to the Northern Pacific Railway by a spurline from Boulder that was constructed in 1887 (arrived in May of 1890) (MDEQ, no date). After the arrival of the railroad, the Elkhorn and other mines such as the C&D, Elkhorn, Queen, and Dunstone, shipped 20 - 25 carloads of their ore and concentrates each week to East Helena returning about $20,000 (MDEQ, no date). In 1891 the District was producing at a rate of $1 million a year (MDEQ, no date). The population of the town of Elkhorn rose and fell with the demands of the operation of the Elkhorn mine, reaching a peak of 900 in 1890, then gradually dropped down until the 1940s when only a small group remained (MDEQ, 1998). Several smaller mines (Elkhorn Queen, Golden Curry [Sourdough Complex], East Butte mill [Carmody]) were explored and the tailings processed intermittently during periods when the Elkhorn was inactive.

In 1918, tailings production was expanded until nearly all of the district's output came from the processed tailings. In 1919, a reported 4,183 tons of tailings were processed (MDEQ, 1998). From 1917 to 1919, a total of 10,200 tons were shipped (MDEQ, 1998). The last commercial enterprise in the Elkhorn townsite, "Joe-By-Golly" Biasatton's saloon closed its doors in 1938 (MDEQ, 1998). The Holter [Elkhorn] mine produced ore continuously until 1900, but ultimately closed in 1951 (MDEQ, no date). Several subsequent exploration efforts did not result in any production (MDEQ, no date).

2.3.2 Investigations and Regulatory Involvement

Inventories of abandoned mines in the district have been on-going since 1988 with some mines undergoing investigations. Descriptions of features inventoried and investigations conducted, by mine site, are presented in the Table 1 below.

Table 1 – Previous Investigations and Regulatory Involvement

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
Elkhorn Creek			
Louise	Inventory: 6/15/1982, 6/11/1996	U.S Office of Surface Mining Reclamation and Enforcement (OSMRE) and Montana Department of State Lands (MDSL), MDEQ	Site consists of 1 shaft and associated waste rock
	Maintenance Site Inspection: 9/19/1989	MDEQ	Fencing on shaft reported in good condition, not in need of maintenance.
C & D mine	Inventory: 9/14/1988, 6/11/1996	OSMRE and MDSL, MDEQ	Site consists of 4 adits, 5 collapsed/collapsing building, ore mill, ore shoot, and large tailings pile
Dunstone	Inventory: 6/18/1985, 9/13/1988, 9/18/1989, 6/11/1996	OSMRE and MDSL, MDEQ	Site consists of 3 shafts, 1 adit, two structures (ore chute and building over shaft), and waste piles
James R. Keene	Inventory: 6/18/1985, 10/3/1988, 6/11/1996	OSMRE and MDSL, MDEQ	Site consists of 3 shafts and 1 adit.
	Maintenance Site Inspection: 9/19/1989	MDEQ	Fencing on 3 shafts reported in good condition, not in need of maintenance.

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
Luxemburgh (aka Luxanburgh)	Inventory: 6/6/1985, 9/13/1988, 6/13/1996	OSMRE and MDSL, MDEQ	Site consists of 2 shafts, 1 adit, and associated waste rock piles.
Carmody (East Butte Mill)	Inventory: 10/12/1988, 8/4/1994	MDEQ, OSMRE and MDSL	Site consists 2 open (but fenced) shafts, 2 adits, 3 open pits, various collapsing wooden and metal structures, and waste piles. Volume of tailings estimated to be 15,615 CY; concentrations of silver, arsenic, cadmium, cobalt, copper, iron, mercury, lead, antimony, and zinc were reported above three times background; high concentrations of cyanide were detected Volume of waste rock estimated to be 2,475 CY; concentrations of silver, arsenic, cadmium, copper, iron, mercury, and lead were reported above three times background; high concentrations of cyanide were detected Slaughterhouse Gulch flows through the site. Observed Release was documented for iron, lead, and zinc. No exceedances for Maximum Contaminat Levels (MCLs) but exceedances of chronic aquatic life standards were reported for cadmium, copper, iron, and lead.
	Cultural Resources Inventory and Assessment: 5/28/1998	MDEQ	The site consists of a series of mining excavations ranging from simple prospects, to shafts and adits. Below the excavations is the remains of a cyanide mill complex along with an assay building, a dwelling and two barns and a tailings impoundment. The site was recommended to be eligible for the National Register of Historic Places (NRHP) as a site and as a historic mining landscape.

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
Elkhorn Creek Tailings (King Mill)	Inventory: 8/8/1994	OSMRE and MDSL	Volume of the tailings estimated to be 51,635 CY; concentrations of silver, arsenic, cadmium, copper, mercury, lead, antimony, and zinc were reported above three times background. Elkhorn Creek flows through site. Observed release was documented for lead and zinc. Exceedances were reported for cadmium above MCL and cadmium and zinc above acute and chronic aquatic life standards.
Elkhorn Creek Tailings (King Mill)	Cultural Resources Inventory and Assessment: 5/28/1998	MDEQ Mine Waste Cleanup Bureau	Site consists of King Mill and Elkhorn Creek Tailings. Site features include concrete remains of a tailings processing mill, several large tailings dumps, a flume, a cistern, and two impoundment dams The site was recommended to be eligible for the NRHP as a site and as a historic mining landscape.
	Site Investigation Report: September 2003	USFS	The north half of the site consists of vegetated bottomland underlain by tailings. The south half of the Elkhorn Creek tailings site consists of a pile of non-vegetated tailings. Tailings at the site cover ~6.6 acres. The total volume of tailings is estimated at 46,064 CY; concentrations of lead, antimony, and mercury exceeded respective risk-based clean-up guidelines. Concentrations in leachate of cadmium, copper, lead, and zinc exceeded respective acute aquatic life standards.
Queen (aka Tourmaline Queen)	Inventory: 8/16/1993	OSMRE and MDSL	Volume of waste rock estimated at 80,000 cubic yards (CY); samples indicated elevated metals concentrations. Deposit was explored by 12 adits ranging in length from 25' to 100'. Most recently turned into an open pit. As of 1960, no recorded ore has been produced. There is a large 2 acre pit. No flowing adits are present; no filled shafts and no seeps or springs were found. No

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
			hazardous openings, structures, pits, trenches, slopes or other hazards were noted. Perennial Elkhorn Creek flows north to south 20' east of the site. Approximately 20' between WR-1 and Elkhorn Creek. Surface water was not draining onto or through waste sources. Wetlands are present, and limestone was observed. Fisheries habitat and species classification ranked a 5, as did sport fishery characterization.
Slaughterhouse Gulch			
Union Elkhorn	Inventory: 6/18/1985, 6/11/1996	OSMRE and MDSL, MDEQ	Site consists of 1 building and other broken wooden structures, 1 adit, 2 shafts, and waste rock piles; water observed coming from drainpipe at adit.
	Maintenance Site Inspection: 9/19/1989	MDEQ	Fencing on 2 shafts and door on adit reported in good condition, not in need of maintenance.
NW NW Section 14 22 3535	Cultural Site Record: 9/16/1985	USFS	Site consists of 3 structures plus a collapsed outhouse, adits/portals, pits, and waste rock. The site is located in the eligible Elkhorn District but is not independently eligible for listing. Physical integrity is lacking.
Greyback Gulch			
Sourdough (Sourdough Complex)	Inventory: 10/12/1988, 8/20/1993	OSMRE and MDSL	Site consists of 3 buildings, 7 adits (3 caved, 4 open), 2 open pits, and waste rock piles From 1993: Area is to become an active mine. A mill was constructed further downstream (1/2 mile) on Greyback Creek and

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
			never used. Volume of multiple waste rock piles estimated at 32,450 CY; reported elevated metals concentrations Adit discharge flows through waste rock into Greyback Creek; discharge did not exceed MCLs. One monitoring well on site; analytical data from 1989-1992 did not indicate elevated concentrations of metals (data provided in 1993 inventory report).
Golden Curry (Sourdough Complex)	Cultural Resource Inventory: 10/9/1989	GCM Services, Inc.	The site consists of 7 adits, 3 buildings (none that are over 50 years old), waste rock dumps, remains of a compressor foundation, and remains of an ore chute. The site was mapped, photographed, and recorded prior to resumed mining. No further (cultural) work at the site is recommended.
	Inventory: 8/20/1993	OSMRE and MDSL	Site consists of 3 buildings, 7 adits (3 caved, 4 open), 2 open pits, and waste rock piles From 1993: Area is to become an active mine. A mill was constructed further downstream (1/2 mile) on Greyback Creek and never used. Volume of multiple waste rock piles estimated at 32,450 CY; reported elevated metals concentrations Adit discharge flows through waste rock into Greyback Creek; discharge did not exceed MCLs. One monitoring well on site; analytical data from 1989-1992 did not indicate elevated concentrations of metals (data provided in 1993 inventory report).

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
	Inventory: 6/11/1996	MDEQ	Site currently being mined. Consists of 6 collapsed buildings and numerous adits.
Seven-Up Gulch			
Seven Up	Inventory: 7/20/1988, 1996 (exact date unknown)	OSMRE and MDSL, MDEQ	Site consists of adit and associated waste rock.
Turnley Creek			
Trumley Heap Leach (aka Falcon Heap Leach)	Inventory: 7/1/1994	OSMRE and MDSL	Volume of tailings undetermined. Site previously reclaimed, total depth of reclaimed tailings unknown. Reclamation effort consisted of application of cover soil and revegetation. Tailings were observed at the surface in isolated pockets. Concentrations of silver, arsenic, cadmium, copper, mercury, lead, antimony, and zinc were reported above three times the background. Turnley Creek flows adjacent to the site. No observed releases to Turnley Creek were documented; no MCLs or aquatic life criteria were exceeded. Four monitoring wells are located at the site, downgradient from the reclaimed tailings pond; no MCLs were exceeded in one sample that was collected.
Trumley Heap Leach (aka Falcon Heap Leach)	Site Investigation: 11/8/2004, Report Dated: January 2005	USFS	5 soil test pits and 3 water samples were collected. Analysis of samples indicate that the reclaimed spent ore contains total arsenic concentrations above human health cleanup guidelines used by the State of Montana at abandoned mine sites. Leachable concentrations zinc were also of concern if leachate migrated from the lined former leach pad area.

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
			Manganese concentration exceeded human health guideline in shallow groundwater.
Queen Gulch			
Skyline	Inventory: 7/18/1988, 6/12/1996	OSMRE and MDSL, MDEQ	Site consists of 3 structures, 1 shaft, 2 adits, ore cart tracks, and waste rock. Site actively used by cross-country skiers.
Boulaway	Inventory: 7/18/1988, 6/12/1996	OSMRE and MDSL, MDEQ	Site consists of 3 collapsed buildings, 3 shafts, 1 adit (with unlocked door), and waste rock.
	Cultural Site Record: 5/8/1985	USFS	Site consists of the remains of nine features (estimated as): shed, hoist house, ore bin located over and collapsed into a shaft area, an area where a structure likely once was, remains of a structure, a collapsed adit portal, root cellar or small adit, pile of lumber, some tin cans, and a stove pipe. Trenches located between the site and ridgeline are the result of mineral exploration, probably during the 1950's. There are no mineral surveys, General Land Office plat information, production figures, or references for this property. Structural remains suggest it may date to the 1930's or even as late as the 1950's. The site does not contribute to significance of Elkhorn Historic District.

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
South Fork Queen Gulch			
Bob	Inventory: 9/12/1988, 6/10/1996	OSMRE and MDSL, MDEQ	Site consists of 2 adits and 3 shafts
Elkhorn Queen	Cultural Site Record: 5/7/1985	USFS	Site consists of seven structures and an outhouse. There are also 3 portals, an open pit and a shaft. The site is located adjacent to the Elkhorn Historic District and should probably be included in the District boundary. It is not eligible for NHRP due to lack of setting integrity from early period but should be re-evaluated in the 1990s.
	Inventory: 9/12/1988	OSMRE and MDSL	Site consists of 5 buildings, a loading chute, shaft with headframe, 2 adits, 1 stope, and waste rock pile.
	Site Investigation: 8/16/1993	OSMRE and MDSL	The site consists of 4 buildings, 1 open, headframed shaft, 1 open, timbered adit, and one open stope. Volume of waste rock estimated at 23,000 CY. Elevated concentrations of zinc, iron, arsenic, lead, and cadmium were reported from waste rock samples.
Rex Elkhorn District (aka Elkhorn Rex)	Inventory: 9/12/1988, 6/6/1996	OSMRE and MDSL, MDEQ	Site consists of one building (cabin), 2 adits and 2 shafts.

Mine Site	Inventory/ Investigation Date(s)	Conducted By	Summary
Tacoma Gulch			
Tacoma	Inventory: 7/20/1988, 8/16/1993	OSMRE and MDSL	Site consists of 2 collapsed structures, 8 adits, and associated waste rock. Total volume of multiple waste rock piles estimated at 7,320 CY.
Muskrat Creek			
Iron	Inventory: 8/9/1994	OSMRE and MDSL	Site consists of several collapsing load out structures, several collapsing cabins, a draining adit and associated waste rock. Volume of waste rock was estimated at 8,535 CY; concentrations of cobalt, iron, and copper were present above three times background. One discharging adit is present on the site. No exceedances were reported above MCLs but concentration of copper was reported above acute and chronic aquatic life standards and concentration of mercury above the chronic aquatic life standard. Concentrations of cobalt, copper, iron, and zinc were present above three times background in sediment from adit discharge.

2.4 CURRENT SITE CONDITIONS

2.4.1 Site Reconnaissance

On July 24 through 27, 2017, a reconnaissance of the 22 individual mine sites was conducted by Ms. Natalie Quiet (WESTON-START), Ms. Tana Jones (WESTON-START), Ms. Katie Garcin-Forba (WESTON-START), Mr. Hayden Janssen (WESTON-START), Mr. Joseph Chisholm (EPA Site Assessment Manager), Ms. Allie Archer (EPA), Ms. Robyn Blackburn (USFWS/EPA Liaison), Mr. David Rouse (USFWS), Mr. Joel Chavez (MDEQ), Mr. Scott Graham (MDEQ), Mr. Chris Rye (BLM), and Mr. Sonny Thornborrow (USFS).

Activities conducted during the reconnaissance included:

- A visual inspection of the site and surrounding area;
- Photo-documentation of the site and surrounding area;
- Collection of Global Positioning System (GPS) coordinates of site features observed including, but not limited to, mine openings, structures, waste material, and surface water;
- Collection of in-situ XRF screening readings for select metals (arsenic, copper, lead, and zinc) in soil, waste material, and/or sediment;
- Collection of water quality screening parameters (pH, conductivity, dissolved oxygen [DO]) from surface water at the site and surrounding area.
- Completion of a PCS Report documenting the presence/absence of human and environmental targets, accessibility, and conditions at each mine site.

A figure of the 22 individual mine sites visited is provided in Figure 2. A summary of the 22 individual mine sites visited, associated site features, photographs of site activities, GPS coordinates, and the PCS Reports completed in the field are provided in the individual mine packets in Appendix A and in the Table in Appendix B.

3.0 SOURCES OF CONTAMINATION AND WASTE CHARACTERISTICS

Known and potential sources in the basin include heavy metals contaminated soils, waste rock, tailings, and groundwater discharging from adits as surface water associated with former mining and milling processes. Heavy metals are present in waste materials across several of the mine sites and migration of these offsite into nearby surface water and/or groundwater has been documented for the following mines and are presented by drainage:

Elkhorn Creek - Elkhorn Creek Tailings and Carmody mine

Slaughterhouse Gulch - Union Elkhorn mine

Greyback Gulch - Golden Curry

Turnley Creek – Trumley Heap Leach

Queen Gulch – Skyline mine

Muskrat Creek – Iron mine

Based on the sources identified in previous investigations, historic site uses, historical samples from adit drainages and waste piles, historic and current XRF screening readings, observations, and water quality screening readings collected during the site reconnaissance activities previously described, the associated COPCs in the basin are antimony, arsenic, cadmium, cobalt, copper, iron, lead, mercury, silver, and zinc. COPCs and their associated sources are presented in Table 3 - Elkhorn PCS Mine Site Assessment Matrix in Section 5.2.

4.0 ELKHORN MINING DISTRICT PATHWAY ANALYSIS

The following sections describe the physical conditions, migration pathways, potential targets, and historical releases or potential releases associated with mines in the study area. Four pathways, evaluated based on EPA PCS guidance, are as follows:

- Groundwater migration (drinking water)
- Surface water migration (drinking water, human food chain, sensitive environments)
- Soil exposure (resident population, nearby population, sensitive environments)
- Air migration (population, sensitive environments)

The pathway analysis for the overall study area (Figure 2) is presented below. The results of the pathway analysis for each of the 22 individual mine sites are presented in Table 3 - Elkhorn PCS Mine Site Assessment Matrix in Section 5.0 and described in further detail in the individual mine packets in Appendix A.

4.1 GROUNDWATER MIGRATION PATHWAY

The groundwater migration pathway evaluates: 1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to groundwater; 2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, mobility, and quantity); and 3) the receptors (targets) who actually have been, or potentially could be, impacted by the release. These factors are applied to potable groundwater wells within a 4-mile radius of a potential source. Because the mines all occur in the Elkhorn Mining District, groundwater migration is assessed for the general area, and then in further detail in Appendix A, as applicable for individual mines.

4.1.1 Geologic and Hydrogeologic Setting

The southern Elkhorn Mountains are a thick sequence of sedimentary and layered volcanic rocks which have been folded, faulted and cut by a variety of intrusive rocks. The oldest rocks are mudstones, shale and sandstone in the Belt series of the upper Precambrian. These rocks are covered by a thin layer of Flathead quartzite of the Middle Cambrian. This in turn is covered by marine carbonate rocks, shale and sandstone of the Cambrian, Devonian, Carboniferous, and Permian ages. A thin layer of Upper Jurassic marine sandstone is succeeded by nonmarine Upper Jurassic and Lower Cretaceous sandstone and shale. These rocks are overlain by thick deposits of nonmarine and marine sandstone, mudstone and shale of the Colorado group that grade upward into sandstone and volcanic tuff. In some localities these rocks grade upward into andesitic volcanic rocks of the Late Cretaceous age. Most of the mineral deposits are in either sedimentary rocks or the andesite, or at the contact zone with the quartz monzonite. Gold, silver, lead and copper occur in Paleozoic sediments cut by diorite, gabbro, and quartz monzonite (MDEQ, no date).

Hydrogeologic information for the area indicates that groundwater movement through skarn, sedimentary argillite, and quartz monzonite rocks is primarily through secondary fracture openings, many of which occur along structural and lithologic contact zones. Shallow

groundwater is present in unconsolidated alluvium along the drainage bottoms. Direction of groundwater flow in bedrock generally follows topography (MDEQ, 2008).

4.1.1.1 Groundwater Levels

According to the Montana Bureau of Mines and Geology (MBMG) Ground Water Information Center (GWIC) database, depth to groundwater measured in monitoring wells (not used for drinking water) along Elkhorn Creek, Slaughterhouse Gulch and Greyback Gulch near the town of Elkhorn varies from 16 ft to over 165 ft below ground surface (bgs) (MDEQ, 2008).

4.1.2 Groundwater Targets

Groundwater is used as the primary source of drinking water in the CDP of Elkhorn. According to the 2010 Census, the total population of Elkhorn is 10 and the average number of persons per household in Jefferson County, Montana, is 2.51 (U.S. Census Bureau, 2010). According to a query of the GWIC, there are two test, one fire protection, eight industrial, four irrigation, six stock watering, one research, three others, one unknown, one public supply, and 20 domestic wells within an approximate four-mile radius and within the basin. Of the 20 domestic wells present within a four-mile radius of the mine sites and within the basin, depths ranged from 18 ft bgs to 420 ft bgs and had an average depth of approximately 158 ft bgs. Depth to water ranged from zero ft bgs to 170 ft bgs and had an average depth to water of approximately 42 ft bgs (Montana Tech of the University of Montana, 2017). The public supply well is reportedly is privately owned and 105 ft deep with a depth to water of 12 ft bgs (Montana Tech of the University of Montana, 2017). The well is located in Watertank Gulch approximately 1.75 miles west of the southern-most mine in the basin (Tacoma), approximately 1 mile upgradient of Elkhorn Creek, or outside of the affected drainage (Figure 2). Since water is presumed to follow the general topography, it is unlikely that the water being used is coming from the river or contaminated sources upstream, but rather from the topographic drainage in which the well is located. In addition, a query of the EPA Safe Drinking Water Information System (SDWIS) indicates the town of Boulder receives its municipal drinking water supply from three active wells and one inactive well which are all located within the town of Boulder limits located upgradient and outside of the potentially affected Elkhorn basin (EPA, 2018).

4.2 SURFACE WATER MIGRATION PATHWAY

The surface water migration pathway evaluates: 1) the likelihood that sources at a site actually have released, or potentially could release, by overland flow or by flooding to surface water; 2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, persistence, bioaccumulation, and quantity); and 3) the targets who actually have been, or potentially could be, impacted by the release. These factors are applied to surface water within a 15-mile downstream Target Distance Limit of a potential source. Because the mines all occur in the Elkhorn Mining District, surface water migration is assessed for the general area, and then in further detail in Appendix A, as applicable for individual mines.

4.2.1 Hydrologic Setting

The average annual precipitation in Boulder, MT (located approximately 8.75 miles southwest of Elkhorn, Figure 1) is 10.97 inches. Precipitation is fairly consistent throughout the year with slightly more in May and June. The sites inventoried within the Elkhorn Mining District lie within the Elkhorn Creek subwatershed (hydrologic unit code [HUC] 100200060502). Tributaries to Elkhorn Creek include Slaughterhouse Gulch, Turnley Creek, Queen Gulch, Tacoma Gulch, and Greyback Gulch (Figure 2). Elkhorn Creek flows southward from the Elkhorn Mountains to Boulder River. Elkhorn Creek from its headwaters to Boulder River is approximately 12.18 miles. There are numerous tributaries to the Boulder River with significant eligible wetlands frontage present along the highly braided portion of the river present within 15 downstream miles of Tacoma mine (most downstream mine site in the basin).

The mean annual discharge from 1996 to 2016 recorded from the U.S. Geological Survey (USGS) gauging station (#06033000) located just south of Boulder on the Boulder River, and upstream of the confluence with Elkhorn Creek, is approximately 125 cubic ft per second (cfs) (USGS, 2017a). A USGS gauging station (#06033500), located approximately 6 miles northeast of Boulder on Muskrat Creek (Iron mine is located at the headwaters), indicated an average annual flow of approximately 4 cfs in 1913 (USGS, 2017b) (Figure 2).

4.2.2 Surface Water Targets

Although Elkhorn Creek and Boulder River are state designated for protection of aquatic life and drinking water use classifications, there are no surface water intakes used for potable drinking water within the basin or on Boulder River within 15 miles downstream of the mine sites (MDEQ, 2017; EPA, 2017; Montana Tech of the University of Montana, 2017).

Elkhorn Creek from its headwaters to Wood Gulch (Figure 2; approximately 8 miles), which is about 4 miles downstream of the town of Elkhorn, is listed as impaired under Section 303(d) of the Clean Water Act for aquatic life, cold water fishery, and drinking water uses due to arsenic, cadmium, copper, lead, and zinc concentrations from historic mining activities (acid mine drainage, mine tailings, and dredge/placer mining) (MDEQ, 2017; MDEQ, 2008). The impairment is also caused by sedimentation/siltation, low flow alterations, and alteration in stream-side vegetative covers due to a variety of sources. Total maximum daily loads (TMDLs) for this stream reach were established for arsenic, cadmium, copper, iron, lead, and sediment. The lower reach of Elkhorn Creek from Wood Gulch to the mouth is also listed as impaired for arsenic, cadmium, and lead for similar causes and sources. TMDLs for this reach include arsenic, cadmium, lead, and sediment (MDEQ, 2017).

Muskrat Creek (Iron mine is located at the headwaters) from its headwaters to confluence with Boulder River (Figure 2; approximately 12.83 miles) is listed as impaired for aquatic life and has a TMDL for iron (MDEQ, 2017).

The Boulder River is listed as impaired for aquatic life and drinking water uses due to metals and has TMDLs for arsenic, cadmium, copper, iron, lead, and zinc (Figure 2) (MDEQ, 2017).

Recreational surface water use occurs primarily along Boulder River (e.g., fishing, floating, and camping); however, there is a picnic area present in Elkhorn, the cabin at Skyline mine (located on Queen Gulch, a tributary to Elkhorn Creek) is highly utilized by cross-country skiers and recreationists, and Leslie Lake, downstream of Skyline mine, is a popular spot for fishing (Figure 2).

4.2.2.1 Fisheries

Native fish species potentially present within 15 downstream miles of the most downstream mine site (Tacoma) include: Westslope cutthroat trout, mountain whitefish, mottled sculpin, longnose dace and longnose sucker (MSP, 2018b). Westslope cutthroat trout are a designated "Species of Concern" by FWP) (MSP, 2018a). Introduced species are also present in streams, including: brook, rainbow, brown and Yellowstone cutthroat trout (MSP, 2018b). Recreational fishing occurs throughout the basin but is primarily along Elkhorn Creek and the Boulder River. The fishing season begins the 3rd weekend in May for Elkhorn creeks. Westslope cutthroat are catch and release while Yellowstone cutthroat in Leslie Lake may be kept (USFS, no date). According to the Montana FWP, brook trout are present in Elkhorn Creek and the creek was last stocked in 1937 with Cutthroat Trout (MSP, 2018b). According to survey data collected in 2015 by FWP, species present in the Boulder River at the location surveyed (approximately nine miles west and upstream from the town of Boulder) include Brook Trout, Longnose Sucker, Rainbow Trout, and Rocky Mountain Sculpin (MSP, 2018b). The Boulder River was last stocked in 1973 with Rainbow Trout (MSP, 2018b).

4.2.2.2 Sensitive Environments

The USFWS National Wetlands Inventory identified freshwater emergent and freshwater forested/shrub wetlands present along the majority of Greyback Gulch, Turnley Creek, Elkhorn Creek from below the confluence with Turnley Creek downstream to the Boulder River, and in the Boulder River (Figure 2). Freshwater emergent wetlands are scattered along Slaughterhouse Gulch and Elkhorn Creek between the confluence with Slaughterhouse Gulch and Turnley Creek. Scattered sections are also present along Queen Gulch and Muskrat Creek. (USFWS, 2017c)

4.3 SOIL EXPOSURE AND AIR PATHWAYS

For the targets component of the soil and air pathways evaluation, the principal threat is related to populations that are regularly present on or within 200 feet of surficial soil contamination. Nearby populations are also evaluated and include populations that are regularly present within 1-mile of observed contamination. The four populations that receive the most weight are residents, students and daycare attendees, workers, and terrestrial sensitive environments. Terrestrial sensitive environments are areas that are established or protected by State or Federal Law (examples include, but are not limited to, National Parks, threatened or endangered species habitat, wilderness areas, and wildlife refuges). The attractiveness and accessibility of the site for recreational purposes is considered in the soil pathway threat, but it is not weighted as heavily as the other non-transient uses, such as residents and workers.

The principal threat under the air pathway is the threat of airborne releases of hazardous substances. The targets evaluation is primarily concerned with identifying and evaluating the human population, as well as terrestrial and sensitive environments, within 4 miles of the source.

4.3.1 Soil Exposure and Air Pathway Targets

The total population of Elkhorn is 10 (U.S. Census Bureau, 2010). There is one potential resident within 150 ft of the Elkhorn Creek Tailings (King Mill) tailings pile adjacent to the former mill; however, the tailings are not present on their property and based on property records, the property owner lives in Oregon (MSL, 2017). Therefore, it is unknown whether or not there is a permanent resident there. There are also residents in Elkhorn that are within 0.25 miles of the NW NW Section 14 22 3535, Carmody, and Luxemburg mine sites. The closest permanent resident, based on a review of Google Earth aerial imagery, appears to be approximately 800 ft southeast of the waste pile at Carmody mine. There are potentially workers that may come in contact with source waste piles at NW NW Section 14 22 3535, Carmody, and Sourdough/Golden Curry mine sites. These sites are not currently actively mining, but maintenance operations are occurring and offices are present within 200 feet of the Carmody tailings pile. If operations change, there could be the potential for worker exposure to elevated metals in waste materials present on these mine sites. There are no schools or daycares present within 200 ft of a potential source. The estimated population, of full-time residents based on 2010 census data, is listed in the Table 2 below (U.S. Census Bureau, 2016).

Table 2 – Population within Four-Mile Radius

Radius	Population
0 - 0.25	5
0.25 - 0.50	1
0.50 - 1.0	2
1.0 - 2.0	5
2.0 - 3.0	5
3.0 - 4.0	5
Total Population	23

The Elkhorn basin consists of abandoned mines located on both private and public lands with many potential source areas of waste material located in accessible and highly recreated areas of the Deerlodge National Forest. Elkhorn State Park is located in the center of Elkhorn and Elkhorn is a historic mining town that attracts tourists and sightseers. There are several popular hiking and ATV trails throughout the basin, one campground is located in Elkhorn, Leslie Lake and the trail to and the cabin at Skyline mine is highly utilized by recreationists (including cross-country skiers, fishermen, and ATV users). The basin provides multiple recreational activities, including picnicking, sightseeing, camping, hiking trails, cross-country skiing, and ATV use. Although some sites are remote, the potential source areas are not fenced and do not provide adequate restriction to recreationists, trespassers, and wildlife. The primary targets are property owners, workers, recreationists, trespassers, and wildlife. The potential source areas are bound by Slaughterhouse Gulch, Greyback Gulch, Turnley Creek, Elkhorn Creek, Queen Gulch, and Tacoma Gulch canyons and ultimately by the Elkhorn Creek subwatershed and basin boundaries.

4.3.1.1 Sensitive Environments

The USFWS ECOS IPaC species list includes four different species (one flowering plant, one conifer, and two mammals) that may be present in the study area that are considered federal or state listed threatened, endangered, or sensitive species (Section 2.2.2.1); however, none of the species listed have federally designated Critical Habitat within or overlapping the basin boundary or would potentially be impacted by conditions at any of the mine sites (USFWS, 2017; 2018). The species potentially associated with the study area include the Ute Ladies'-tresses, whitebark pine (Candidate), Canada lynx, Grizzly bear, and North American wolverine (USFWS, 2017; 2018). As discussed in Section 2.2.2.1, wildlife surveys were conducted near the areas surrounding the Sourdough, Golden Curry, NW NW Section 12 22 3535, Carmody, and Relief mines, and Elkhorn Creek Tailings (MDEQ, 2008; WESTECH, 1995). As of 2006, no threatened or endangered species had been found on or near the area surrounding these mine sites (MDEQ, 2008; WESTECH, 2006). None of the aforementioned species were surveyed or observed during the site reconnaissance activities.

Freshwater emergent and freshwater forested/shrub wetlands have been identified along the majority of the creeks within the watershed and wetlands have been identified adjacent to potential waste sources at Sourdough Complex, Carmody, Elkhorn Creek Tailings, Trumley Heap Leach, Boulaway, and Queen mine sites (Section 4.2.2.2). These eligible wetlands also occur scattered in a pocket within the 4-mile radius around Iron mine (Figure 2).

5.0 PCS EVALUATION CRITERIA AND SUMMARY BY MINE

This PCS was conducted at individual abandoned mine sites located in the Elkhorn Mining District, Jefferson County, Montana. Pre-CERCLA screening efforts on the 22 mine sites inventoried included determining if these sites may release hazardous substances, pose a threat to public health and the environment, and to identify they warrant further assessment to determine if they should be formally discovered and entered into the Superfund Enterprise Management System (SEMS) database.

In conducting this PCS, readily available information was reviewed and local knowledge and information from the multi-agency team were considered in conducting the site reconnaissance/initial screening assessment at 22 mine sites. This screening assessment included collection of field screening of in situ water quality measurements and soil/waste rock XRF field screening measurements, photo documentation, and preparation of individual mine PCS Reports. In addition, PCS Checklist/Decision forms for each inventoried mine site describing the mine site conditions and identifying potential needs for further investigation were prepared. The information packets created for each mine are included in Appendix A. Table 3 - Elkhorn PCS Mine Site Assessment Matrix at the end of this section summarizes the results of the individual mine screening.

5.1 MINE SITE EVALUATION CRITERIA

5.1.1 Groundwater

In addition to the evaluation criteria described in Section 3.1, the potential for risks to human health and the environment are also assessed by historical comparisons of the detected concentrations to the relevant State of Montana Circular DEQ-7 and EPA MCL groundwater standards. Historical data were compared to available benchmarks at the time and are reported in the respective individual mine packets in Appendix A.

The potential need for further groundwater assessment was identified based on:

- Groundwater wells with historic data indicating impacts to groundwater in exceedance of health-based benchmarks or standards;
- Proximity to significant source volumes of waste material; or
- Information indicating leaching of metals to groundwater is likely to occur.

5.1.2 Surface Water

Mine specific surface water samples were evaluated using the criteria described in Section 3.2. The potential for risks to human health and the environment are also historically assessed by comparing the detected concentrations to the relevant aquatic life water quality standards based on the State of Montana Circular DEQ-7 and EPA MCL (although none of the sampled locations are used for potable water sources) standards. In addition, in order to evaluate the relative exceedances as based on EPA HRS guidance, an Observed Release is documented when there is an exceedance of three times the background concentration or when an analyte is found at a concentration greater than the sample quantitation limit of the background sample if background levels are non-detect.

Historical investigations documenting an Observed Release using the aforementioned criteria and historical comparison to available benchmarks are reported in the individual mine packets in Appendix A.

The potential for further surface water assessment was identified based on:

- Surface water samples collected from waterbodies with historic data indicating impacts to surface water in exceedance of aquatic life benchmarks or standards,
- An historically documented Observed Release,
- Proximity to significant volumes of source material,
- The presence of sensitive environments (wetlands, fishery, or other HRS eligible sensitive environments) within 15 downstream miles of a source, or
- Historical data indicating leaching of metals to surface water.

5.1.3 Soil Exposure and Air

Mine specific historic source waste samples were evaluated using the criteria described in Section 3.3. The potential for risks to human health and the environment were also historically assessed by comparing the detected concentrations to the relevant State of Montana Risk-Based Cleanup Guidelines for Abandoned Mine Sites and MDEQ's Acute Aquatic Life criteria (leachate samples). In addition, these historic samples were evaluated based on an exceedance of three times the background concentration, or if background levels were non-detect, when an analyte was found at a concentration greater than the sample quantitation limit of the background sample. This information was used to document elevated concentrations in waste samples. Historical analytical data and current XRF screening readings estimating the potential for elevated metals concentrations in waste material using the aforementioned criteria and historical comparison to available benchmarks are reported in the individual mine packets in Appendix A.

The potential for further soil assessment was identified based on:

- Soil and waste source samples collected from each mine site with historical data indicating impacts to soil in exceedance of cleanup standards or aquatic based benchmarks (leachate samples),
- Historic analytical data and current supporting XRF screening readings documenting elevated metals concentrations using the three times background criteria,
- Volume of waste material present,
- Particulate size of waste material (gravel vs fines) and potential for offsite migration via overland flow or airborne particulates,
- Observed migration offsite, and
- Presence of human and sensitive environments targets.

5.2 PCS SUMMARY

Of the 22 sites inventoried, 12 warrant further assessment. Of these, four are located on USFS managed lands and four are located within a permitted mining area with the potential for future mining operations. The inventoried mines and assessment factors used to determine whether further actions may be warranted are presented from upstream to downstream by drainage in Table 3 below with details provided in Appendix A.

Table 3 – Elkhorn PCS Mine Site Assessment Matrix

Mine Site	Ownership	Waste Characterization							
		Source Soil					Source Water (Adit Drainage)		
		3x bkg	> 10x bkg	> 100x bkg	Leachability	Cubic Yards	Evidence of discharge	>WQS	Parameter
Elkhorn Creek									
Louise Mine	Private	NA	NA	NA	NA	NA	No	NA	NA
C & D Mine	Private	arsenic, lead, copper, zinc	arsenic, lead, copper	arsenic	NA	15,000; tailings and waste rock mixed	No	NA	NA
Dunstone Mine	Private	copper	NA	NA	NA	192; waste rock	No	NA	NA
James R Keene Mine	Private	NA	NA	NA	NA	NA	No	NA	NA
Luxemburgh Mine	Private	arsenic, copper	arsenic, copper	copper	NA	150; waste rock	No	NA	NA
Carmody Mine (aka East Butte Mill; aka Elkhorn Picnic Area)	Private	lead, arsenic, copper, zinc, silver, cadmium, cobalt, iron, mercury, antimony	arsenic, cadmium, copper, mercury, silver, and zinc	lead, mercury, zinc	NA	18,000; tailings	No	NA	NA
Elkhorn Creek Tailings	Private/USFS	lead, antimony, mercury, arsenic, copper, zinc, cadmium, copper, and silver	NA	NA	cadmium, copper, lead, zinc	57,000; tailings	No	NA	NA
Queen Mine (aka Tourmaline Queen)	Private	arsenic, iron	arsenic	NA	NA	80,000; waste rock	No	NA	NA
Slaughterhouse Gulch									
Union Elkhorn	USFS	arsenic, lead, copper, zinc	arsenic, lead, copper, zinc	lead	NA	75,000; waste rock	Historically observed to drain	Not available	A
NW NW Section 14 22 3535 Mine	Private	arsenic, copper, zinc	copper	NA	NA	7,400; waste rock	No	NA	NA
Greyback Gulch									
Relief Mine	USFS	lead	NA	NA	NA	0.07 acres; waste rock	No	NA	NA
Sourdough Mine	Private	arsenic, copper, lead, zinc	arsenic, copper	NA	NA	7,500; tailings	No	NA	NA
Golden Curry Mine	Private	arsenic, copper, mercury	arsenic, copper	NA	NA	13,900; waste rock/tailings	No	Analytes >3x background in adit sample were cadmium, copper, cobalt, iron, manganese, nickel, zinc	Not reported
Seven-Up Gulch									
Seven Up Mine	USFS	NA	NA	NA	NA	55; waste rock, vegetated	No	NA	NA
Turnley Creek									
Trumley Heap Leach (aka Falcon Heap Leach)	USFS	silver, arsenic, cadmium, copper, mercury, lead,	NA	NA	zinc	2 acres, depth unknown	No	Not available	NA
Queen Gulch									
Skyline Mine	USFS	arsenic, lead, zinc	arsenic, lead, zinc	arsenic	NA	150; waste rock	Yes	Not Available	Slightly low pH
Boulaway Mine	USFS	lead, copper, zinc	lead, copper, zinc	copper, zinc	NA	4,000; waste rock	No	Not Available	NA
South Fork Queen Gulch									
Bob Mine	USFS	lead, arsenic, copper, zinc	lead, arsenic, zinc	NA	NA	10; waste rock	No	NA	NA
Elkhorn Queen Mine	Private	arsenic, lead, copper, and zinc	arsenic, lead, and zinc	lead	NA	23,000; waste rock	No	NA	NA
Rex Elkhorn District	USFS	arsenic, lead, zinc	NA	NA	NA	31; waste rock	No	NA	NA
Tacoma Gulch									
Tacoma Mine	USFS	arsenic, cadmium, mercury, copper, lead, zinc	cadmium, lead, mercury, zinc	lead	NA	7,320; waste rock	No	NA	NA
Muskrat Creek									
Iron Mine	Private	cobalt, copper, iron, zinc	copper and zinc	NA	NA	8,535; waste rock	Yes	copper, mercury in water and cobalt, copper, iron, zinc in sediment	NA

Mine Site	Ownership	Assessment Factors							
		Off-site Migration Potential (release)			Targets/Use				
		Soil	Surface Water		Human				
		Evidence of Erosion	>WQS	Parameter	Drinking Water	>WQS	Residential	Recreational	Terrestrial
Elkhorn Creek									
Louise Mine	Private	No	NA	NA	Approximately 1.3 miles	Not available	None	Low; hiking, ATV	NA
C & D Mine	Private	No	NA	NA	Approximately 1.2 miles	Not available	None	Medium; hiking, ATV	High
Dunstone Mine	Private	No	NA	NA	Approximately 0.5 miles	Not available	within 0.5 miles	High; hiking, ATV	Low
James R Keene Mine	Private	No	NA	NA	Approximately 0.4 miles	Not available	within 0.5 miles	High; hiking, ATV	NA
Luxemburgh Mine	Private	No	NA	NA	Approximately 0.2 miles	Not available	within 0.5 miles	High; hiking, ATV	Low
Carmody Mine (aka East Butte Mill; aka Elkhorn Picnic Area)	Private	Yes	iron, lead, zinc >3x background; cadmium, copper, iron, lead >WQS	NA	Approximately 0.2 miles	Not available	within 0.5 miles	High; hiking, ATV, workers	High
Elkhorn Creek Tailings	Private/USFS	Tailings observed in Elkhorn Creek in wetlands	MCL exceeded for cadmium and acute and chronic aquatic life criteria for cadmium and zinc	None	One well located approximately 900 ft. west and upgradient	Not available	One house located offsite approximately 150 ft west of northern pile - Property owner address in a different town	High; sightseeing, ATV	High
Queen Mine (aka Tourmaline Queen)	Private	No	None exceeded	None	Approximately 2 miles	Not available	None	High; hiking, ATV	High
Slaughterhouse Gulch									
Union Elkhorn	USFS	Yes	Not available	No	Approximately 1 mile	Not available	None	High; hiking, fishing, ATV	High
NW NW Section 14 22 3535 Mine	Private	No	Not available	No	Approximately 230 feet	Not available	within 0.5 miles	Low; hiking, ATV, workers	Medium
Greyback Gulch									
Relief Mine	USFS	No	NA	NA	NA	NA	None	Low; hiking	Low
Sourdough Mine	Private	Yes, migrating into wetland	Exceedances in surface water not reported. Analytes >3x background in sediment samples were arsenic, barium, cobalt, copper, chromium, iron, lead	No	NA	Not Reported	None	Low; hiking, ATV, workers	Medium
Golden Curry Mine	Private	Yes, migrating into wetland and streambed	Exceedances in surface water not reported. Analytes >3x background in sediment samples were arsenic, barium, cobalt, copper, chromium, iron, lead	No	NA	Not Reported	None	Low; hiking, ATV, workers	Medium
Seven-Up Gulch									
Seven Up Mine	USFS	No	NA	NA	NA	NA	None	High; hiking	Low
Turnley Creek									
Trumley Heap Leach (aka Falcon Heap Leach)	USFS	No	None reported	Not reported	NA	Manganese above MCL	None	High; hiking, shooting	High
Queen Gulch									
Skyline Mine	USFS	Yes, migrating into streambed	Not available	Slightly low pH	NA	NA	Recreational use	High; hiking, ATV	Medium
Boulaway Mine	USFS	Potential	Not Available	NA	NA	NA	None	High; camping, hiking	High
South Fork Queen Gulch									
Bob Mine	USFS	No	NA	NA	NA	NA	None	Medium; hiking, ATV	Low
Elkhorn Queen Mine	Private	No	NA	NA	NA	NA	None	High; hiking, ATV	High
Rex Elkhorn District	USFS	No	NA	NA	NA	NA	None	High; hiking, ATV	Low
Tacoma Gulch									
Tacoma Mine	USFS	Unknown	NA	NA	Approximately 2.6 miles	NA	None	Low; hiking, ATV	Low
Muskrat Creek									
Iron Mine	Private	Yes	NA	NA	NA	NA	Recreational use	High; hiking, ATV	Low

Mine Site	Ownership	Targets/Use				Further Evaluation Recommended Checklist Preparer	Recommendation Rationale
		Ecological		Accessibility	Proximity		
		Aquatic	Sensitive	Difficult/ Moderate/ Easy	Remoteness		
Elkhorn Creek							
Louise Mine	Private	NA	NA	Moderate	Upper; Approximately 1 mile	No	No threat of a release or potential impacts to human health or the environment due to a lack of hazardous containing materials and a paucity of targets.
C & D Mine	Private	NA	NA	Moderate	Upper; Approximately 1 mile	Yes	Elevated metals concentrations in tailings. The site is accessible and potentially utilized for recreation; therefore, there is a potential for recreational and airborne exposures.
Dunstone Mine	Private	NA	NA	Easy	Upper; Approximately 0.5 mile	no	Elevated concentrations of copper in only one XRF screening reading of waste rock. However, no migration off-site from the piles was observed and the volume of waste rock is relatively small; therefore, the site poses minimal threat to human health and the environment.
James R Keene Mine	Private	NA	NA	Easy	Upper; approximately 0.4 miles	No	No threat of a release or potential impacts to human health or the environment due to a lack of hazardous containing materials and a paucity of targets.
Luxemburgh Mine	Private	NA	NA	Easy	Upper; Approximately 0.2 miles	No	Elevated metals concentrations in waste rock, proximity of human receptors, and proximity of surface water downgradient. However, no migration offsite from the piles was observed and the volume of waste rock is relatively small; therefore, the site poses minimal threat to human health and the environment.
Carmody Mine (aka East Butte Mill; aka Elkhorn Picnic Area)	Private	On-site	On-site	Easy	Upper; Approximately 0.1 miles	Yes	Elevated metals concentrations in source tailings present adjacent to Elkhorn Creek and outside of permitted mining operations boundaries, close proximity of human receptors, wetlands and fishery present onsite and within 15 downstream miles, and historic exceedances of chronic aquatic life standards in Elkhorn Creek. As a result, the tailings/slickens present outside of the actively permitted mine operations area is recommended for further assessment.
Elkhorn Creek Tailings	Private/ USFS	Elkhorn Creek present onsite	On-site, adjacent and downstream	Easy	Upper; Approximately 0.4 miles	Yes	Elevated metals concentrations in tailings that are entering onsite surface water, close proximity of human receptors, and wetlands and a fishery present onsite and within 15 downstream miles, and historic exceedances of chronic aquatic life standards documented in Elkhorn Creek. The site is accessible and highly utilized for recreation. It is possible that with minor additional sampling an Observed Release to surface water using EPA Hazard Ranking System criteria may be documented.
Queen Mine (aka Tourmaline Queen)	Private	Adjacent	Adjacent	Easy	Lower; Approximately 1.75 miles	No	Elevated metals concentrations in waste rock and sensitive environments (wetlands and a fishery) are present adjacent to the site and within 15 downstream miles. However, the waste rock is largely gravelly cobble, steeply terraced, and no migration off-site from the piles was observed. Historic surface water and sediment samples collected upstream and downstream of the site did not indicate concentrations of metals to be elevated above the upstream sample; therefore, the site poses minimal threat to human health and the environment.
Slaughterhouse Gulch							
Union Elkhorn	USFS	On-site	Approximately 0.35 miles downstream	Moderate	Upper; Approximately 1.0 mile	Yes	Elevated metals concentrations in waste material present adjacent to Slaughterhouse Gulch that was observed in the creek during the July 2017 site reconnaissance, and sensitive environments (wetlands and a fishery) are present within 15 downstream miles of the site.
NW NW Section 14 22 3535 Mine	Private	Adjacent	Approximately 210 feet downstream	Easy	upper; Approximately 700 feet	No	Elevated metals concentrations in waste rock within proximity to surface water, and sensitive environments (wetlands and fishery) are present within 15 downstream miles. However, the volume of material is relatively small, covered by vegetation, no migration off-site of the piles was observed, and the site is within a currently permitted mine complex.
Greyback Gulch							
Relief Mine	USFS	Downstream	Approximately 650 feet to Greyback Creek	Moderate	Upper; Approximately 1.0 mile	No	Elevated metals concentrations in waste rock within proximity of surface water and sensitive environments (wetlands). However, no migration off-site from the piles was observed and the volume of waste rock is relatively small; therefore, the site poses minimal threat to human health and the environment.
Sourdough Mine	Private	Adjacent	On-site	Easy	Upper; Approximately 1 mile	Yes	Elevated metals concentrations in tailings and sediment in Greyback Creek, tailings were observed entering the on-site wetlands during the 2017 site reconnaissance, and a fishery is present within 15 downstream miles. It is possible that with minor additional sampling an Observed Release to surface water using EPA Hazard Ranking System criteria may be documented. However, since the site is within a currently permitted mine complex, the site is not recommended for further assessment at this time.
Golden Curry Mine	Private	On-site	On-site	Easy	Upper; Approximately 1 mile	Yes	Elevated metals concentrations in waste rock/tailings and sediment in Greyback Creek that were observed in the creek during the 2017 site reconnaissance, wetlands are present on the site, and a fishery is present within 15 downstream miles. It is possible that with minor additional sampling an Observed Release to surface water using EPA Hazard Ranking System criteria may be documented. However, since the site is within a currently permitted mine complex, the site is not recommended for further assessment at this time.
Seven-Up Gulch							
Seven Up Mine	USFS	NA	Approximately 0.4 miles	Moderate	Upper; Approximately 1.8 miles	No	No threat of a release or potential impacts to human health or the environment due to a completely vegetated and relatively small waste rock pile.
Turnley Creek							
Trumley Heap Leach (aka Falcon Heap Leach)	USFS	Adjacent	Adjacent	Easy	Upper; Approximately 1.2 miles	Yes	Elevated metals concentrations in tailings with historic arsenic concentrations that were above the MDEQ Risk-Based Cleanup Guidelines for Abandoned Mine Sites, historic exceedance of manganese above the human health guideline in shallow groundwater, wetlands are present adjacent to the site, and a fishery is present within 15 downstream miles of the site. The site is accessible and highly utilized for recreating.
Queen Gulch							
Skyline Mine	USFS	On-site	Approximately 0.3 miles	Difficult	Upper; Approximately 2.8 miles	Yes	Elevated metals concentrations in waste rock and tailings, slightly low pH in the adit drainage, both releasing into the head waters of Queen Creek, and wetlands and a fishery (Leslie Lake) are present within 15 downstream miles of the site. The site is accessible and highly utilized for recreating.
Boulaway Mine	USFS	Adjacent	Onsite	Easy	Upper; Approximately 1.0 mile	Yes	Elevated metals concentrations in waste rock with the potential to impact wetlands that are present onsite and a fishery within 15 downstream miles.
South Fork Queen Gulch							
Bob Mine	USFS	NA	NA	Moderate	Lower; Approximately 2.0 miles	No	Elevated metals concentrations in waste rock. However, no migration off-site from the piles was observed, the volume of waste rock is relatively small, and the site is fairly remote with limited recreational use. As a result, the site poses minimal threat to human health and the environment.
Elkhorn Queen Mine	Private	Downstream	NA	Moderate	Lower; Approximately 2.0 miles	Yes	Elevated metals concentrations in waste rock and tailings, and wetlands and a fishery are present within 15 downstream miles of the site. The site is accessible and highly utilized for recreating.

Mine Site	Ownership	Targets/Use				Further Evaluation Recommended Checklist Preparer	Recommendation Rationale
		Ecological		Accessibility	Proximity		
		Aquatic	Sensitive	Difficult/ Moderate/ Easy	Remoteness		
Rex Elkhorn District	USFS	NA	NA	Moderate	Lower; Approximately 2.0 miles	No	Elevated metals concentrations in waste rock and sensitive environments (wetlands and a fishery) present within 15 downstream miles of the site. The site is accessible and highly utilized for recreating. However, no migration off-site from the piles was observed and the volume of waste rock is relatively small; therefore, the site poses minimal threat to human health and the environment.
Tacoma Gulch							
Tacoma Mine	USFS	Downstream	Approximately 1.0 mile	Easy	Lower; Approximately 2.8 miles	No	Historically elevated metals concentrations in potentially present waste rock, Tacoma Gulch is an intermittent creek, and sensitive environments (wetlands and a fishery) are present within 15 downstream miles of the site. However, the waste piles were not observed during the July 2017 PCS site reconnaissance. It is possible that the piles are covered in vegetation and a release of metals in fines to humans or the environment is unlikely; therefore, the site likely poses minimal threat to human health and the environment.
Muskrat Creek							
Iron Mine	Private	Downstream	Approximately 1.2 miles	Moderate	Upper; Approximately 2.6 miles	Yes	Elevated metals concentrations in waste rock/tailings and adit drainage, wetlands within 15 downstream miles of the site, and historic sampling of the adit discharge indicated the concentration of copper was reported above acute and chronic aquatic life standards and the concentration of mercury was above the chronic aquatic life standards. The site is accessible and highly utilized for recreating.

6.0 REFERENCES

Bureau of Land Management (BLM), 2017. LR200 Public Reports. Reporting Application. Accessed October 2, 2017. 4 pages.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
BLM, 2017	Database	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Montana Department of Environmental Quality (MDEQ), 2017. *Montana Final 2016 Water Quality Integrated Report*. Document number WQPBIMTSTR-011f. January 6, 2017. Available at: http://deq.mt.gov/Water/WQPB/cwaic/reports

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
MDEQ, 2017	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

MDEQ, 2013. *EPA Submittal, Sediment, Nutrients, and Temperature TMDLs and Water Quality Improvement Plans for the Boulder-Elkhorn Planning Area*. Document number M07-TMDL-01bF. August, 2013. Available at: https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=62924

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
MDEQ, 2013	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

MDEQ, 2008. *Environmental Assessment for Elkhorn Goldfields, Inc. Golden Dream Mine Project Operating Permit Application No. 173 Elkhorn, Montana*. April 2008.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
MDEQ, 2008	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

MDEQ, 1998. Cultural Resource Inventory and Assessment for Elkhorn Tailings Piles. Prepared for MDEQ Mine Waste Cleanup Bureau. Prepared by Dale M. Gray GCM Services, Inc. May 1998.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
MDEQ, 1998	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

MDEQ, no date. MDEQ Elkhorn Mining District, Jefferson County, Montana. Http: //deq.mt.gov/Land/abandonedmines/linkdocs/79tech. Accessed May 31, 2017

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
MDEQ, no date	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Montana Tech of the University of Montana, 2017. Groundwater Information Center (GWIC) database. Montana Bureau of Mines and Geology (MBMG). http://data.mbmg.mtech.edu/mapper/mapper.asp. Accessed October 16, 2017.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
Montana Tech of the University of Montana, 2017	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Montana State Library (MSL), 2017. Montana Cadastral. Parcels Database last updated July 19, 2017. Available at: http://svc.mt.gov/msl/mtcadastral/

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
MSL, 2017	Database	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Montana State Parks (MSP), 2018a. *Montana Fish, Wildlife & Parks, Species of Interest*. http://fwp.mt.gov. Accessed March 6, 2018.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
MSP, 2018a	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

MSP, 2018b. *Montana Fish, Wildlife & Parks, Montana Fisheries Information System (MFish).* http://fwp.mt.gov/fishing/mFish/. Accessed March 6, 2018.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
MSP, 2018b	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Munson, Gene, 1989. Montana Cultural Resource Inventory for Golden Curry Mine. October 9, 1989.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
Munson, 1989	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

U.S. Census Bureau, 2016. Tiger/Line Shapefiles database. Accessed October 19, 2017. Available at: https://www.census.gov/geo/maps-data/data/tiger.html

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
U.S. Census Bureau, 2016	Database	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

U.S. Census Bureau, 2010. American Fact Finder. 2010 Population Finder, 2010 Demographic Profile *Elkhorn CDP, Boulder city, and Jefferson County*, Utah. American Fact Finder, www.factfinder2.census.gov. Accessed June 7, 2017.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
U.S. Census Bureau, 2010	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

U.S. Environmental Protection Agency (EPA), 2018. Water System Details for Public Water System MT0000158. Safe Drinking Water Information System. Drinking Water Branch. http://sdwisdww.mt.gov:8080/DWW/JSP/WaterSystemDetail.jsp?tinwsys_is_number=2576&tinwsys_st_code=MT&wsnumber=MT0000158. Accessed March 6, 2018.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
EPA, 2018	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

EPA, 2017. Public Drinking Water Systems from SDWIS Fed & SDWIS State. Region 8. Denver, CO. October 16, 2017.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
EPA, 2017	Database	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

EPA, 2016. *Pre-CERCLA Screening Guidance*. OLEM Directive 9200.3-107. December 19, 2016.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
EPA, 2016	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

U.S. Fish & Wildlife Service (USFWS), 2017. *Environmental Conservation Conversation System (ECOS)*. Accessed October 17, 2017. http://ecos.fws.gov/ecp/.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
USFWS, 2017	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

USFWS, 2018. *Information, Planning, and Conservation System (IPaC)*. Accessed May 8, 2018. http://ecos.fws.gov/ipac/.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
USFWS, 2018	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

USFWS, 2017c. *National Wetlands Inventory, Wetlands*. Updated October 1, 2017. https://www.fws.gov/wetlands/data/mapper.html

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
USFWS, 2017c	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

U.S. Forest Service (USFS), 2005. Falcon Heap Leach Site Investigation, Beaverhead Deerlodge National Forest. Prepared for USDA Forest Service - Northern Region. Prepared by Maxim Technologies. January 2005.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
USFS, 2005	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

USFS, no date. Elkhorn Wildlife Management Unit – Wildlife. Elkhorn Home Page. Available at: https://www.fs.usda.gov/detailfull/helena/home/?cid=stelprdb5371113&width=full. Accessed October 2, 2017.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
USFS, no date	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

U.S. Geological Survey (USGS), 2017a. *National Water Information System, Surface-Water Annual Statistics for the Nation, USGS 6033000 Boulder River near Boulder MT. Annual Statistics.* Accessed October 17, 2017. Available at: https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=06033000

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
USGS, 2017a	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

USGS, 2017b. *National Water Information System, Surface-Water Annual Statistics for the Nation, USGS 6033500 Muskrat Creek near Boulder MT. Annual Statistics.* Accessed October 17, 2017. Available at: https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=06032500

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
USGS, 2017b	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Weed, W.H., 1901. Geology and ore deposits of the Elkhorn mining district, Jefferson County, Montana. USGS 22d Annual Report, pt. 2 p. 399-550. U.S. Government Printing Office, Washington.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
Weed, 1901	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Western Regional Climate Center (WRCC), 2017. Temperature and Precipitation Data for Alta, Utah. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ut0072. Accessed May 31, 2017.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
WRCC, 2017	Website	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Western Technology and Engineering, Inc. (WESTECH), 1993. Elkhorn Project Fisheries Inventory. Helena, Montana. June.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
WESTECH, 1993	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

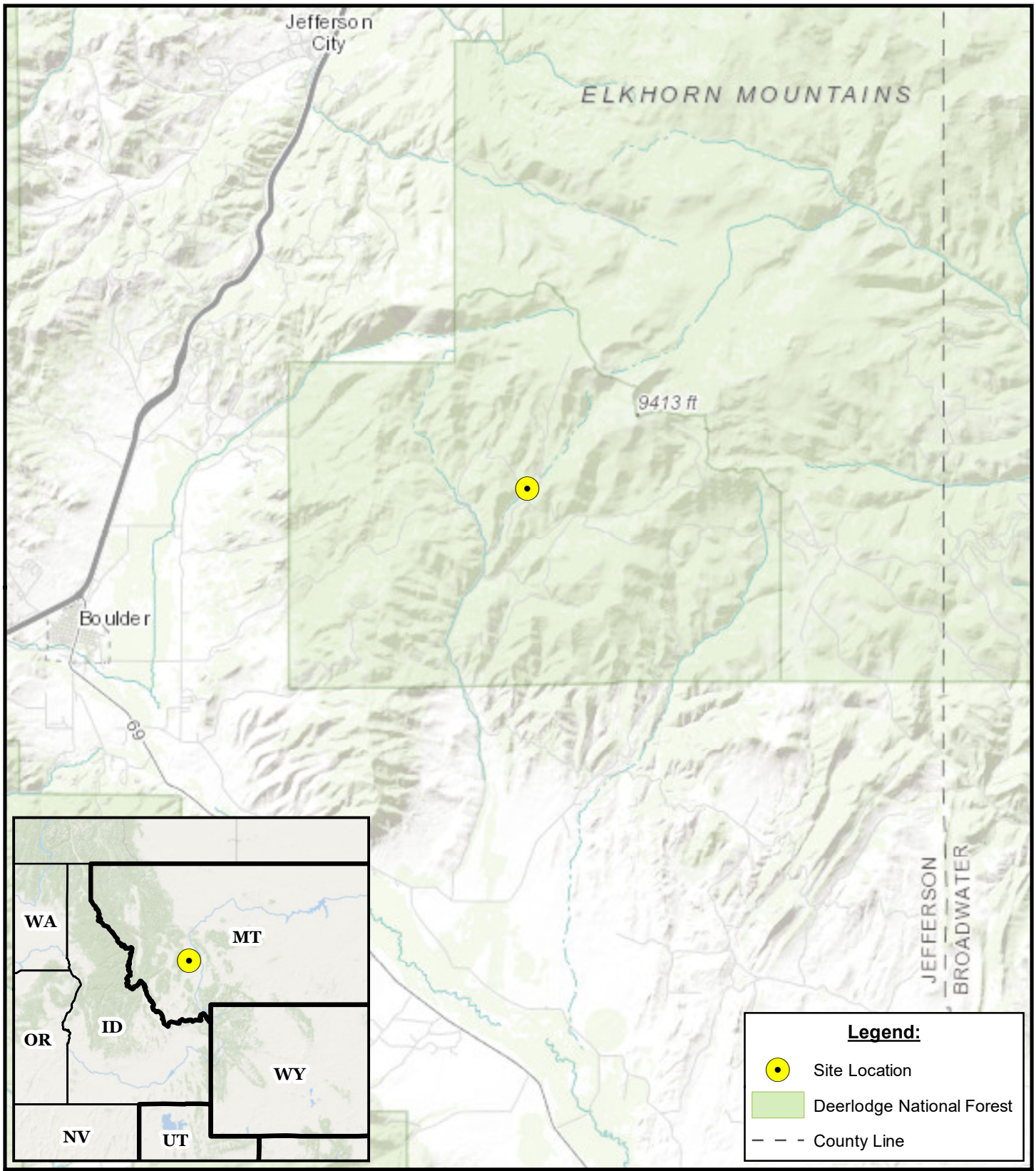
WESTECH, 1995. Wildlife Baseline Study. Helena, Montana. March.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
WESTECH, 1995	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

WESTEH, 2006. Biological Resources Update. Helena, Montana. June.

Citation	Reference Type	Assessment Factor				
		Soundness	Applicability and Utility	Clarity and Completeness	Uncertainty and Variability	Evaluation and Review
WESTECH, 2006	Document	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

FIGURES



Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS 1984

Source:
Background: ESRI USA Topo Maps (2017)

0 2 4 8 Miles

N

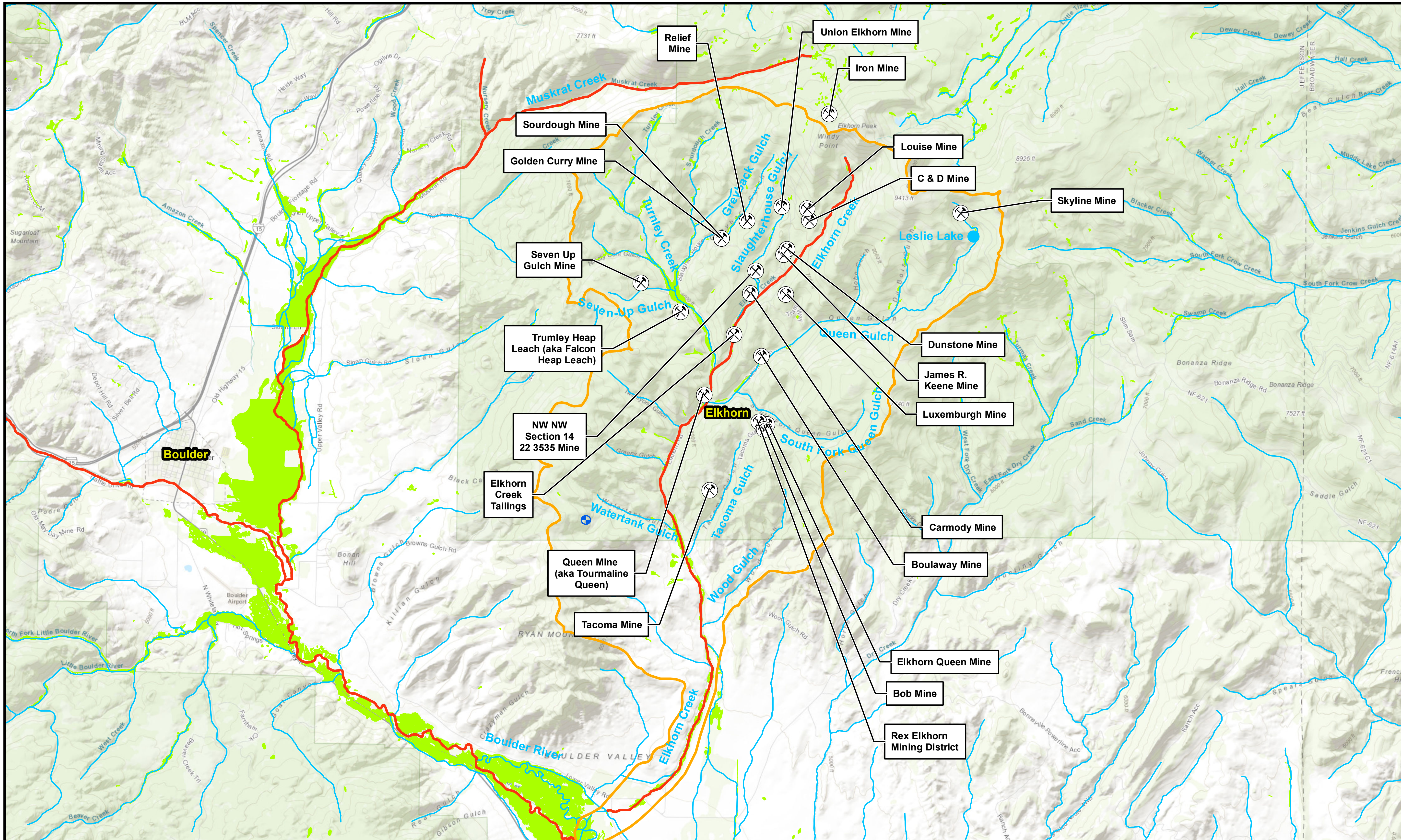
Prepared for:
U.S. EPA - Region 8

Contract: EP-S8-13-01
TO/TDD: 0003/1705-03

Prepared By:
Weston Solutions, Inc.
START IV
Suite 100
1435 Garrison St.
Lakewood, CO

FIGURE 1
INVESTIGATION AREA
LOCATION MAP
ELKHORN MINING DISTRICT
NEAR BOULDER,
JEFFERSON COUNTY MONTANA

Date: 3/20/2018



Coordinate System: NAD 1983 UTM Zone 12N
Projection: Transverse Mercator
Datum: North American 1983
Source:
Mine Sites: Weston GPS (2017)
303(d) Listed Impaired Waters: EPA ATTAINS (2015)
Public Water Supply: GWIC (2017)
Rivers, Site Boundary: USGS NHD (2015)
Waterbodies: Digitized from ESRI Aerial Imagery (2017)
Wetlands: US NWI Wetlands (2017)
Background: ESRI World Topographic Map (2017)

0 0.75 1.5 3 Miles

Legend
- Mine Sites
- Waterbody
- Public Supply Well
- 303(d) Listed Impaired Waters
- Elkhorn Creek Subwatershed Boundary
- Rivers or Streams
- Wetlands

Prepared for:
U.S. EPA - Region 8

Contract: EP-S8-13-01
TO/TDD: 0004/1703-11

Prepared By:
Weston Solutions, Inc.
START IV
Suite 100
1435 Garrison St.
Lakewood, CO

FIGURE 2
INVESTIGATION AREA
VICINITY MAP
ELKHORN MINING DISTRICT
NEAR BOULDER,
JEFFERSON COUNTY, MONTANA

Date: 5/9/2018

APPENDIX A
Mine PCS Reports

APPENDIX B
Feature Summary Table

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
Bob-Feature10	Shaft Caved	7/24/2017	Feature includes a caved shaft approximately 20 ft x 10 ft x 5 ft. What appeared to be waste material was located to the north. A survey stake was located to the east. Tag on nearby tree was D-476	TBD	46.244894	-111.946845	Yes	Bob-Feature10-P1	Caved adit	7/24/2017
Bob-Feature10	Shaft Caved	7/24/2017	Feature includes a caved shaft approximately 20 ft x 10 ft x 5 ft. What appeared to be waste material was located to the north. A survey stake was located to the east. Tag on nearby tree was D-476	TBD	46.244894	-111.946845	Yes	Bob-Feature10-P2	Waste pile	7/24/2017
Bob-Feature7	Shaft Caved	7/24/2017	Shaft, infrastructure 25x30x20	TBD	46.2454	-111.946902	Yes	Bob-Feature7-P1	Shaft	7/24/2017
Bob-Feature7	Prospect pit	7/24/2017	5 ft x 5 ft x 8 ft	TBD	46.244894	-111.947567	Yes	Bob-Feature7-P1	Open adit	7/24/2017
Bob-Feature8	Prospect pit	7/24/2017	Two prospect pits located near fence line and gate. Larger pit is 25ftx 8 ft in depth. Small pit is 2 ft x 4 ft	TBD	46.244839	-111.947904	Yes	Bob-Feature8-P1	Two prospect pits	7/24/2017
Bob-Feature9	Trench	7/24/2017	Trench is 10 ft x 5 ft x 4 ft	TBD	46.244536	-111.947226	Yes	Bob-Feature9-P1	Trench	7/24/2017
Bob-Feature9	Trench	7/24/2017	Trench is 10 ft x 5 ft x 4 ft	TBD	46.244536	-111.947226	Yes	Bob-Feature9-P2	Waste rock pile	7/24/2017
Boulaway-Feature10	Trench	7/24/2017	Trench 100x20x15	TBD	46.261465	-111.9487	Yes	Boulaway-Feature10-P1	Trench	7/24/2017
Boulaway-Feature11	Trench	7/24/2017	Trench 300x15x20	TBD	46.262118	-111.949381	Yes	Boulaway-Feature11-P1	Trench	7/24/2017
Boulaway-Feature12	Prospect pit	7/24/2017	Series of prospect pits and pile Piles average 25x25x25 +/- 3 piles	TBD	46.261803	-111.949226	Yes	Boulaway-Feature12-P1	Pit and pile	7/24/2017
Boulaway-Feature8	Tailings	7/24/2017	Tailings	TBD	46.259931	-111.947777	Yes	Boulaway-Feature8-P1	Tailings	7/24/2017
Boulaway-Feature8	Adit Open	7/24/2017	Opening with timber door around portal. Dry, no evidence of water. 3' x 6' height	TBD	46.260115	-111.947776	Yes	Boulaway-Feature8-P1	Portal door	7/24/2017
Boulaway-Feature9	Shaft Caved	7/24/2017	Closed shaft, fenced 30 round x 20 Filled	TBD	46.260208	-111.948411	Yes	Boulaway-Feature9-P1	Closed shaft	7/24/2017
Boulaway-Feature9	Waste Rock Dump	7/24/2017	Waste rock pile located a few feet from South Fork of Queen Creek. The pile 12 cu yd. 20 x 8 wide x 6 thick	TBD	46.258866	-111.9493	Yes	Boulaway-Feature9-P1	Waste pile with South Fork Queen Creek	7/24/2017
C and D Mine-Feature10	Structure/Building	7/26/2017	Remnants of building	TBD	46.288797	-111.933878	Yes	C and D Mine-Feature10-P1	Remnants of building	7/26/2017
C and D Mine-Feature11	Adit Caved	7/26/2017	Collapsed adit, opening dimensions unknown	TBD	46.288902	-111.934112	Yes	C and D Mine-Feature11-P1	Collapsed adit looking east	7/26/2017
C and D Mine-Feature11	Adit Caved	7/26/2017	Collapsed adit, opening dimensions unknown	TBD	46.288902	-111.934112	Yes	C and D Mine-Feature11-P2	Collapsed adit looking north	7/26/2017
C and D Mine-Feature12	Adit Caved	7/26/2017	Probable adit Entry unknown	TBD	46.288823	-111.934066	Yes	C and D Mine-Feature12-P1	Possible collapsed adit	7/26/2017
C and D Mine-Feature13	Other	7/26/2017	Closed stope, opening 20x5 Closed ~10 ft in Hole at base of stope ~50x50x10	TBD	46.289289	-111.934614	Yes	C and D Mine-Feature13-P1	View of stope entrance facing southwest	7/26/2017
C and D Mine-Feature13	Other	7/26/2017	Closed stope, opening 20x5 Closed ~10 ft in Hole at base of stope ~50x50x10	TBD	46.289289	-111.934614	Yes	C and D Mine-Feature13-P2	Opening of stope facing northeast	7/26/2017
C and D Mine-Feature14	Structure/Building	7/26/2017	Collapsed building (with loading chute?) 20x30 footprint	TBD	46.288744	-111.934221	Yes	C and D Mine-Feature14-P1	Collapsed building	7/26/2017
C and D Mine-Feature15	Other	7/26/2017	Powder shed, did not enter. Seems fully open. Opening 6x10 ~8x10 interior	TBD	46.288823	-111.934366	Yes	C and D Mine-Feature15-P1	Powder shed entry	7/26/2017
C and D Mine-Feature16	Structure/Building	7/26/2017	Collapsed shed 20x10	TBD	46.288732	-111.934343	Yes	C and D Mine-Feature16-P1	Collapsed shed	7/26/2017
C and D Mine-Feature17	Adit Caved	7/26/2017	Collapsed adit 4x4x? Unable to determine interior depth	TBD	46.288793	-111.93459	Yes	C and D Mine-Feature17-P1	Adit opening	7/26/2017
C and D Mine-Feature17	Adit Caved	7/26/2017	Collapsed adit 4x4x? Unable to determine interior depth	TBD	46.288793	-111.93459	Yes	C and D Mine-Feature17-P2	Looking south from adit opening, infrastructure possibly associated with rail reported in historical documents	7/26/2017
C and D Mine-Feature17	Adit Caved	7/26/2017	Collapsed adit 4x4x? Unable to determine interior depth	TBD	46.288793	-111.93459	Yes	C and D Mine-Feature17-P3	From road ~100 ft to adit opening	7/26/2017
C and D Mine-Feature18	Structure/Building	7/26/2017	Ore mill Partially collapsed 60x20 Numerous piles in vicinity	TBD	46.288552	-111.934237	Yes	C and D Mine-Feature18-P1	Ore mill	7/26/2017
C and D Mine-Feature18	Structure/Building	7/26/2017	Ore mill Partially collapsed 60x20 Numerous piles in vicinity	TBD	46.288552	-111.934237	Yes	C and D Mine-Feature18-P2	Pile east of ore mill	7/26/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
Bob-Feature10-Sample1	7/24/2017	12:57	46.244919	-111.94691	Yes	Soil	XRF	NA	NA	NA	84	855	28	315
Bob-Feature10-Sample1	7/24/2017	12:57	46.244919	-111.94691	Yes	Soil	XRF	NA	NA	NA	84	855	28	315
Bob-Feature7-Sample1	7/24/2017	11:27	46.245331	-111.946884	Yes	Soil	XRF	NA	NA	NA	888	1793	93	1074
Bob-Feature9-Sample1	7/24/2017	12:44	46.244531	-111.947109	Yes	Soil	XRF	NA	NA	NA	291	2399	60	552
Bob-Feature9-Sample1	7/24/2017	12:44	46.244531	-111.947109	Yes	Soil	XRF	NA	NA	NA	291	2399	60	552
Boulaway-Feature10-Sample1	7/24/2017	12:58	46.261352	-111.948581	Yes	Soil	XRF	NA	NA	NA	147	295	1442	4715
Boulaway-Feature12-Sample1	7/24/2017	13:18	46.261803	-111.94905	Yes	Soil	XRF	NA	NA	NA	173	76	8471	100000
Boulaway-Feature8-Sample1	7/24/2017	12:25	46.259991	-111.947805	Yes	Soil	XRF	NA	NA	NA	507	348	11100	30300
Boulaway-Feature9-Sample1	7/24/2017	12:36	46.260076	-111.948376	Yes	Soil	XRF	NA	NA	NA	69	257	204	162
Boulaway-Feature9-Sample1	7/24/2017	13:31	46.258842	-111.949289	Yes	Soil	XRF	NA	NA	NA	33	116	262	310
C and D Mine-Feature18-Sample1	7/26/2017	9:54	46.28851	-111.934217	Yes	Soil	XRF	NA	NA	NA	3626	20600	508	545
C and D Mine-Feature18-Sample1	7/26/2017	9:54	46.28851	-111.934217	Yes	Soil	XRF	NA	NA	NA	3626	20600	508	545

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
C and D Mine-Feature19	Structure/Building	7/26/2017	Collapsed building, stone foundation 15x35	TBD	46.288268	-111.934028	Yes	C and D Mine-Feature19-P1	Collapsed structure, Sonny on top of stone foundation	7/26/2017
C and D Mine-Feature19	Structure/Building	7/26/2017	Collapsed building, stone foundation 15x35	TBD	46.288268	-111.934028	Yes	C and D Mine-Feature19-P2	Collapsed structure looking north	7/26/2017
C and D Mine-Feature20	Other	7/26/2017	Bkg XRF	No Action	46.288134	-111.934897	Yes	C and D Mine-Feature20-P1	Bkg XRF	7/26/2017
CARMODY-Feature45	Tailings	7/25/2017	Tailings piles below the buildings on the hill. 100 ft x 100 ft depth unknown	TBD	46.272967	-111.951424	Yes	CARMODY-Feature45-P1	Waste piles. Fine soils	7/25/2017
CARMODY-Feature45	Tailings	7/25/2017	Tailings piles below the buildings on the hill. 100 ft x 100 ft depth unknown	TBD	46.272967	-111.951424	Yes	CARMODY-Feature45-P1	Waste piles. Fine soils	7/25/2017
CARMODY-Feature46	Structure/Building	7/25/2017	Mine type building- 30 ft x 15 ft sided with tin	TBD	46.273519	-111.951381	Yes	CARMODY-Feature46-P1	Large mining structure. Purpose unknown.	7/25/2017
CARMODY-Feature47	Tailings	7/25/2017	Large tailings pile above the unknown mining structure. 75 ft x 30 ft	TBD	46.273665	-111.951543	Yes	CARMODY-Feature47-P1	Tailings pile located above tin mining structure and old road	7/25/2017
CARMODY-Feature48	Structure/Building	7/25/2017	Ore bin structure. 15 ft x 40 ft. Lots of wood debris from other structures below	TBD	46.273418	-111.951571	Yes	CARMODY-Feature48-P1	Ore bin structure	7/25/2017
CARMODY-Feature48	Structure/Building	7/25/2017	Ore bin structure. 15 ft x 40 ft. Lots of wood debris from other structures below	TBD	46.273418	-111.951571	Yes	CARMODY-Feature48-P2	Wood debris from old structures	7/25/2017
CARMODY-Feature49	Structure/Building	7/25/2017	Old mill structure. 50 ft x 40 ft x 50 ft. Collapsing	TBD	46.273254	-111.95176	Yes	CARMODY-Feature49-P1	Structure continues down the hill to the east.	7/25/2017
CARMODY-Feature50	Structure/Building	7/25/2017	Unidentifiable wooden structure. Size unknown, large wood piles.	TBD	46.273145	-111.951647	Yes	CARMODY-Feature50-P1	Large collapsed building	7/25/2017
CARMODY-Feature52	Adit Caved	7/25/2017	Collapsed adit below access road.	TBD	46.272467	-111.952617	Yes	CARMODY-Feature52-P1	Collapsed adit trench	7/25/2017
CARMODY-Feature52	Tailings	7/25/2017	Tailings slicken	TBD	46.272352	-111.952535	Yes	CARMODY-Feature52-P1	Tailings	7/25/2017
CARMODY-Feature53	Prospect pit	7/25/2017	Series of prospect pits to the north of the office buildings. Two pits are both 10 ft x 10 ft x 10 ft	TBD	46.274556	-111.950607	Yes	CARMODY-Feature53-P1	Prospect pits to the north of the office.	7/25/2017
CARMODY-Feature54	Tailings	7/25/2017	Tailings pile located off the side of the reclaimed haul road.	TBD	46.274689	-111.950561	Yes	CARMODY-Feature54-P1	Tailings pile off of the old reclaimed road. Two pipes are located under the material and appear to be used for drainage over the piles.	7/25/2017
CARMODY-Feature55	Structure/Building	7/25/2017	Collapsing structure	TBD	46.274183	-111.949907	Yes	CARMODY-Feature55-P1	Collapsing structure near office buildings	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P1	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P1	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P1	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P1	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P1	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P2	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P2	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P2	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P2	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P2	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P3	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P3	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P3	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P3	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P3	Slicken	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P4	Slicken on southeast side of creek	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P4	Slicken on southeast side of creek	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P4	Slicken on southeast side of creek	7/25/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
C and D Mine-Feature20-Sample1	7/26/2017	10:14	46.28814	-111.934925	Yes	Soil	XRF	NA	NA	NA	1754	4016	212	286
CARMODY-Feature45-Sample1	7/25/2017	10:22	46.272967	-111.951424	Yes	Soil	XRF	NA	NA	NA	-36	223	688	188
CARMODY-Feature45-Sample2	7/25/2017	10:25	46.273305	-111.951251	Yes	Soil	XRF	NA	NA	NA	-26	311	683	237
CARMODY-Feature47-Sample1	7/25/2017	10:39	46.273665	-111.951543	Yes	Soil	XRF	NA	NA	NA	-37	195	353	83
CARMODY-Feature52-Sample1	7/25/2017	11:01	46.272467	-111.952617	Yes	Soil	XRF	NA	NA	NA	-37	1086	498	316
CARMODY-Feature52-Sample1	7/25/2017	11:23	46.272352	-111.952535	Yes	Soil	XRF	NA	NA	NA	96	612	471	905
CARMODY-Feature54-Sample1	7/25/2017	11:35	46.274689	-111.950561	Yes	Soil	XRF	NA	NA	NA	0	1582	886	1104
CARMODY-Feature56-Sample1	7/25/2017	11:54	46.270843	-111.951983	Yes	Soil	XRF	NA	NA	NA	7108	299	854	22615
CARMODY-Feature56-Sample2	7/25/2017	11:58	46.270972	-111.951683	Yes	Soil	XRF	NA	NA	NA	9757	198	884	25334
CARMODY-Feature56-Sample3	7/25/2017	12:17	46.271398	-111.950554	Yes	Soil	XRF	NA	NA	NA	15263	668	1386	32081
CARMODY-Feature56-Sample4	7/25/2017	13:22	46.272645	-111.949568	Yes	Water	YSI	8.23	.167	8.67	NA	NA	NA	NA
CARMODY-Feature56-Sample5	7/25/2017	13:29	46.270862	-111.952099	Yes	Water	YSI	8.3	.090	8.94	NA	NA	NA	NA
CARMODY-Feature56-Sample1	7/25/2017	11:54	46.270843	-111.951983	Yes	Soil	XRF	NA	NA	NA	7108	299	854	22615
CARMODY-Feature56-Sample2	7/25/2017	11:58	46.270972	-111.951683	Yes	Soil	XRF	NA	NA	NA	9757	198	884	25334
CARMODY-Feature56-Sample3	7/25/2017	12:17	46.271398	-111.950554	Yes	Soil	XRF	NA	NA	NA	15263	668	1386	32081
CARMODY-Feature56-Sample4	7/25/2017	13:22	46.272645	-111.949568	Yes	Water	YSI	8.23	.167	8.67	NA	NA	NA	NA
CARMODY-Feature56-Sample5	7/25/2017	13:29	46.270862	-111.952099	Yes	Water	YSI	8.3	.090	8.94	NA	NA	NA	NA
CARMODY-Feature56-Sample1	7/25/2017	11:54	46.270843	-111.951983	Yes	Soil	XRF	NA	NA	NA	7108	299	854	22615
CARMODY-Feature56-Sample2	7/25/2017	11:58	46.270972	-111.951683	Yes	Soil	XRF	NA	NA	NA	9757	198	884	25334
CARMODY-Feature56-Sample3	7/25/2017	12:17	46.271398	-111.950554	Yes	Soil	XRF	NA	NA	NA	15263	668	1386	32081
CARMODY-Feature56-Sample4	7/25/2017	13:22	46.272645	-111.949568	Yes	Water	YSI	8.23	.167	8.67	NA	NA	NA	NA
CARMODY-Feature56-Sample5	7/25/2017	13:29	46.270862	-111.952099	Yes	Water	YSI	8.3	.090	8.94	NA	NA	NA	NA
CARMODY-Feature56-Sample1	7/25/2017	11:54	46.270843	-111.951983	Yes	Soil	XRF	NA	NA	NA	7108	299	854	22615
CARMODY-Feature56-Sample2	7/25/2017	11:58	46.270972	-111.951683	Yes	Soil	XRF	NA	NA	NA	9757	198	884	25334
CARMODY-Feature56-Sample3	7/25/2017	12:17	46.271398	-111.950554	Yes	Soil	XRF	NA	NA	NA	15263	668	1386	32081

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P4	Slicken on southeast side of creek	7/25/2017
CARMODY-Feature56	Tailings	7/25/2017	Cluster of tailings below the Carmody Mine across the road.	TBD	46.271146	-111.951736	Yes	CARMODY-Feature56-P4	Slicken on southeast side of creek	7/25/2017
Dunstone-Feature10	Structure/Building	7/26/2017	Ore bins 20 ft by 10 ft by 20 ft	TBD	46.282369	-111.94081	Yes	Dunstone-Feature10-P1	Ore bins located adjacent to waste rock	7/26/2017
Dunstone-Feature4	Subsidence/Subsidence Area	7/26/2017	6" by 6" very large open subsidence very deep	TBD	46.28211	-111.94135	Yes	Dunstone-Feature4-P1	Subsidence	7/26/2017
Dunstone-Feature4	Subsidence/Subsidence Area	7/26/2017	6" by 6" very large open subsidence very deep	TBD	46.28211	-111.94135	Yes	Dunstone-Feature4-P2	Looking down subsidence	7/26/2017
Dunstone-Feature5	Shaft Open	7/26/2017	Open shaft to at least 5 ft large opening 8 " by 5". Historically had a grate covering the opening but no sign present of grate now.	TBD	46.282165	-111.941308	Yes	Dunstone-Feature5-P1	Open shaft located inside historic building	7/26/2017
Dunstone-Feature5	Shaft Open	7/26/2017	Open shaft to at least 5 ft large opening 8 " by 5". Historically had a grate covering the opening but no sign present of grate now.	TBD	46.282165	-111.941308	Yes	Dunstone-Feature5-P2	Zoomed in open shaft showing collapse at around 5" depth	7/26/2017
Dunstone-Feature6	Structure/Building	7/26/2017	Historic building located on top of open shaft and directly next to subsidence.	TBD	46.282221	-111.941354	Yes	Dunstone-Feature6-P1	Building over-top of shaft with subsidence evident in right foreground of photo.	7/26/2017
Dunstone-Feature7	Shaft Open	7/26/2017	Open shaft and trench but with a wide surface subsidence, 20" by 10" and unknown depth	TBD	46.282415	-111.942565	Yes	Dunstone-Feature7-P1	Looking down open shaft	7/26/2017
Dunstone-Feature7	Shaft Open	7/26/2017	Open shaft and trench but with a wide surface subsidence, 20" by 10" and unknown depth	TBD	46.282415	-111.942565	Yes	Dunstone-Feature7-P2	Standing above shaft looking east down trenching	7/26/2017
Dunstone-Feature7	Shaft Open	7/26/2017	Open shaft and trench but with a wide surface subsidence, 20" by 10" and unknown depth	TBD	46.282415	-111.942565	Yes	Dunstone-Feature7-P3	Looking up trench toward open shaft with wooden debris all along the trench	7/26/2017
Dunstone-Feature7	Shaft Open	7/26/2017	Open shaft and trench but with a wide surface subsidence, 20" by 10" and unknown depth	TBD	46.282415	-111.942565	Yes	Dunstone-Feature7-P4	Looking up trench and I including waste rock piles	7/26/2017
Dunstone-Feature8	Waste Rock Dump	7/26/2017	Waste rock pile at base of historic building covering open shaft. 10" by 5"	TBD	46.282079	-111.94102	Yes	Dunstone-Feature8-P1	Can see historic building located directly behind and on top of waste dump	7/26/2017
Dunstone-Feature9	Waste Rock Dump	7/26/2017	Large waste rock dump adjacent to ore bins and located along route. 40" by 5"	TBD	46.282421	-111.940657	Yes	Dunstone-Feature9-P1	Waste rock dumps	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P1	Creek downstream of mill	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P1	Creek downstream of mill	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P2	Mill building	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P2	Mill building	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P3	Structure uphill from mill	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P3	Structure uphill from mill	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P4	Middle of mill structure looking southeast	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P4	Middle of mill structure looking southeast	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P5	Top of mill looking down onto structure	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P5	Top of mill looking down onto structure	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P6	Southern most point of mill structure from top	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Mine/mineral processing mill	7/26/2017	Downstream of mill	TBD	46.268719	-111.954682	Yes	ELKHORN CREEK TAILINGS-Feature19-P6	Southern most point of mill structure from top	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P1	Significantly large, very fine sandy pile along road.	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P1	Significantly large, very fine sandy pile along road.	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P1	Significantly large, very fine sandy pile along road.	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P1	Significantly large, very fine sandy pile along road.	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P2	Observed Discharge of tailings into creek.	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P2	Observed Discharge of tailings into creek.	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P2	Observed Discharge of tailings into creek.	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P2	Observed Discharge of tailings into creek.	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P3	Observed Discharge of tailings into creek at Location of XRF soil sample	7/26/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
CARMODY-Feature56-Sample4	7/25/2017	13:22	46.272645	-111.949568	Yes	Water	YSI	8.23	.167	8.67	NA	NA	NA	NA
CARMODY-Feature56-Sample5	7/25/2017	13:29	46.270862	-111.952099	Yes	Water	YSI	8.3	.090	8.94	NA	NA	NA	NA
Dunstone-Feature7-Sample1	7/26/2017	9:55	46.282438	-111.942326	Yes	Soil	XRF	NA	NA	NA	15	-18	-24	95
Dunstone-Feature7-Sample1	7/26/2017	9:55	46.282438	-111.942326	Yes	Soil	XRF	NA	NA	NA	15	-18	-24	95
Dunstone-Feature7-Sample1	7/26/2017	9:55	46.282438	-111.942326	Yes	Soil	XRF	NA	NA	NA	15	-18	-24	95
Dunstone-Feature7-Sample1	7/26/2017	9:55	46.282438	-111.942326	Yes	Soil	XRF	NA	NA	NA	15	-18	-24	95
Dunstone-Feature8-Sample1	7/26/2017	10:05	46.282085	-111.941006	Yes	Soil	XRF	NA	NA	NA	26	18	-27	84
Dunstone-Feature9-Sample1	7/26/2017	10:10	46.282424	-111.94076	Yes	Soil	XRF	NA	NA	NA	15	-13	67	56
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	12:01	46.268748	-111.954694	Yes	Water	YSI	7.02	344	10.05	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	12:04	46.268735	-111.95468	Yes	Soil	XRF	NA	NA	NA	4998	462	792	18600
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	12:01	46.268748	-111.954694	Yes	Water	YSI	7.02	344	10.05	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	12:04	46.268735	-111.95468	Yes	Soil	XRF	NA	NA	NA	4998	462	792	18600
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	12:01	46.268748	-111.954694	Yes	Water	YSI	7.02	344	10.05	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	12:04	46.268735	-111.95468	Yes	Soil	XRF	NA	NA	NA	4998	462	792	18600
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	12:01	46.268748	-111.954694	Yes	Water	YSI	7.02	344	10.05	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	12:04	46.268735	-111.95468	Yes	Soil	XRF	NA	NA	NA	4998	462	792	18600
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	12:01	46.268748	-111.954694	Yes	Water	YSI	7.02	344	10.05	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	12:04	46.268735	-111.95468	Yes	Soil	XRF	NA	NA	NA	4998	462	792	18600
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	12:01	46.268748	-111.954694	Yes	Water	YSI	7.02	344	10.05	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	12:04	46.268735	-111.95468	Yes	Soil	XRF	NA	NA	NA	4998	462	792	18600
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	11:12	46.264419	-111.956559	Yes	Soil	XRF	NA	NA	NA	1659	83	181	7819
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	11:20	46.264644	-111.956002	Yes	Soil	XRF	NA	NA	NA	1736	124	140	8067
ELKHORN CREEK TAILINGS-Feature19-Sample3	7/26/2017	11:33	46.263488	-111.956716	Yes	Water	YSI	7.72	0.366	91.0	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample4	7/26/2017	11:48	46.265767	-111.955472	Yes	Water	YSI	8.04	0.343	92.2	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	11:12	46.264419	-111.956559	Yes	Soil	XRF	NA	NA	NA	1659	83	181	7819
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	11:20	46.264644	-111.956002	Yes	Soil	XRF	NA	NA	NA	1736	124	140	8067
ELKHORN CREEK TAILINGS-Feature19-Sample3	7/26/2017	11:33	46.263488	-111.956716	Yes	Water	YSI	7.72	0.366	91.0	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample4	7/26/2017	11:48	46.265767	-111.955472	Yes	Water	YSI	8.04	0.343	92.2	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample1	7/26/2017	11:12	46.264419	-111.956559	Yes	Soil	XRF	NA	NA	NA	1659	83	181	7819

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P3	Observed Discharge of tailings into creek at Location of XRF soil sample	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P3	Observed Discharge of tailings into creek at Location of XRF soil sample	7/26/2017
ELKHORN CREEK TAILINGS-Feature19	Tailings	7/26/2017	Significantly large, very fine sandy pile along road. Unfenced, open access, Numerous ATV tracks and animal tracts	TBD	46.264444	-111.956572	Yes	ELKHORN CREEK TAILINGS-Feature19-P3	Observed Discharge of tailings into creek at Location of XRF soil sample	7/26/2017
ELKHORN CREEK TAILINGS-Feature20	Tailings	7/26/2017	Western most part of pile downgradient of mill	TBD	46.268647	-111.954442	Yes	ELKHORN CREEK TAILINGS-Feature20-P1	Wetland area west of creek downgradient of tailings, tailings deposit in creek bend in background	7/26/2017
ELKHORN CREEK TAILINGS-Feature20	Tailings	7/26/2017	Western most part of pile downgradient of mill	TBD	46.268647	-111.954442	Yes	ELKHORN CREEK TAILINGS-Feature20-P1	Wetland area west of creek downgradient of tailings, tailings deposit in creek bend in background	7/26/2017
ELKHORN CREEK TAILINGS-Feature20	Tailings	7/26/2017	Western most part of pile downgradient of mill	TBD	46.268647	-111.954442	Yes	ELKHORN CREEK TAILINGS-Feature20-P1	Wetland area west of creek downgradient of tailings, tailings deposit in creek bend in background	7/26/2017
ELKHORN CREEK TAILINGS-Feature20	Tailings	7/26/2017	Western most part of pile downgradient of mill	TBD	46.268647	-111.954442	Yes	ELKHORN CREEK TAILINGS-Feature20-P1	Wetland area west of creek downgradient of tailings, tailings deposit in creek bend in background	7/26/2017
ELKHORN CREEK TAILINGS-Feature20	Tailings	7/26/2017	Western most part of pile downgradient of mill	TBD	46.268647	-111.954442	Yes	ELKHORN CREEK TAILINGS-Feature20-P1	Wetland area west of creek downgradient of tailings, tailings deposit in creek bend in background	7/26/2017
ELKHORN CREEK TAILINGS-Feature20	Other	7/26/2017	Vegetated tailings pond with some exposed tailings observed. Tailings are light reddish brown, fine sand.	TBD	46.266127	-111.956171	Yes	ELKHORN CREEK TAILINGS-Feature20-P1	Vegetated tailings pond with some exposed tailings observed. Tailings are light reddish brown, fine sand. 200 yd by 100 yd. by approx. 5-10 ft. Deep	7/26/2017
ELKHORN CREEK TAILINGS-Feature21	Tailings	7/26/2017	Tailings upgradient of mill, bottom of hill below flume, in wetland/creek	TBD	46.270873	-111.951995	Yes	ELKHORN CREEK TAILINGS-Feature21-P1	Tailings upgradient of mill	7/26/2017
ELKHORN CREEK TAILINGS-Feature21	Tailings	7/26/2017	Tailings upgradient of mill, bottom of hill below flume, in wetland/creek	TBD	46.270873	-111.951995	Yes	ELKHORN CREEK TAILINGS-Feature21-P1	Tailings upgradient of mill	7/26/2017
ELKHORN QUEEN-Feature10	Prospect pit	7/24/2017	Cluster of prospect pits. 3 ft x 3 ft x 1 ft pits north and south of large caved adit	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature10-P1	Cluster of prospect pits	7/24/2017
ELKHORN QUEEN-Feature10	Prospect pit	7/24/2017	Cluster of prospect pits. 3 ft x 3 ft x 1 ft pits north and south of large caved adit	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature10-P2	South near survey pin 82n/150 e	7/24/2017
ELKHORN QUEEN-Feature12	Structure/Building	7/24/2017	Mill processing building	TBD	46.246415	-111.94639	Yes	ELKHORN QUEEN-Feature12-P1	Old mill building	7/24/2017
ELKHORN QUEEN-Feature13	Waste Rock Dump	7/24/2017	Waste rock pile closest to mill building	TBD	46.24655	-111.946392	Yes	ELKHORN QUEEN-Feature13-P1	Waste rock pile to the south west of the mill	7/24/2017
ELKHORN QUEEN-Feature14	Structure/Building	7/24/2017	One log cabin and one miner shack. Log cabin is 15 ft x 12 ft Miner shack is 10 ft x 20 ft	TBD	46.246521	-111.945891	Yes	ELKHORN QUEEN-Feature14-P1	Log cabin	7/24/2017
ELKHORN QUEEN-Feature14	Structure/Building	7/24/2017	One log cabin and one miner shack. Log cabin is 15 ft x 12 ft Miner shack is 10 ft x 20 ft	TBD	46.2465	-111.945951	Yes	ELKHORN QUEEN-Feature14-P2	Miners cabin	7/24/2017
ELKHORN QUEEN-Feature15	Structure/Building	7/24/2017	Hoist house	TBD	46.246309	-111.946219	Yes	ELKHORN QUEEN-Feature15-P1	Hoist house	7/24/2017
ELKHORN QUEEN-Feature15	Structure/Building	7/24/2017	Hoist house	TBD	46.246387	-111.946293	Yes	ELKHORN QUEEN-Feature15-P2	Hoist shaft structure. Approximately 80 ft deep	7/24/2017
ELKHORN QUEEN-Feature16	Structure/Building	7/24/2017	Upstairs loft. Possibly operators cabin. Has a hole that's been covered. Approximately 60 ft x 20 ft x 40 ft	TBD	46.246315	-111.946487	Yes	ELKHORN QUEEN-Feature16-P1	Possible operator cabin	7/24/2017
ELKHORN QUEEN-Feature17	Waste Rock Dump	7/24/2017	Waste rock pile furthest to the west of the complex	TBD	46.246525	-111.946592	Yes	ELKHORN QUEEN-Feature17-P1	Furthest west waste rock pile	7/24/2017
ELKHORN QUEEN-Feature17	Waste Rock Dump	7/24/2017	Waste rock pile furthest to the west of the complex	TBD	46.246525	-111.946592	Yes	ELKHORN QUEEN-Feature17-P1	Furthest west waste rock pile	7/24/2017
ELKHORN QUEEN-Feature18	Mine/mineral processing mill	7/24/2017	25 ft x 40 ft - tin material	TBD	46.246415	-111.94639	Yes	ELKHORN QUEEN-Feature18-P1	Ore processing facility	7/24/2017
ELKHORN QUEEN-Feature4	Adit Open	7/24/2017	Old portal leading into south southeast shaft. 5x6 foot hole	TBD	46.246249	-111.946127	Yes	ELKHORN QUEEN-Feature4-P1	Facing SE	7/24/2017
ELKHORN QUEEN-Feature4	Trench	7/24/2017	Trench is 100 ft x 10 ft x 5 ft	TBD	46.247522	-111.947067	Yes	ELKHORN QUEEN-Feature4-P1	Trench 100 ft x 10 FT x 5 ft	7/24/2017
ELKHORN QUEEN-Feature5	Prospect pit	7/24/2017	8 ft x 15 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature5-P1	Prospect pit	7/24/2017
ELKHORN QUEEN-Feature5	Prospect pit	7/24/2017	8 ft x 15 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature5-P2	Prospect pit	7/24/2017
ELKHORN QUEEN-Feature6	Structure/Building	7/24/2017	Hoist house with remnant equipment. 35'x60'	TBD	46.246226	-111.94607	Yes	ELKHORN QUEEN-Feature6-P1	Shaft in Hoist House	7/24/2017
ELKHORN QUEEN-Feature6	Structure/Building	7/24/2017	Hoist house with remnant equipment. 35'x60'	TBD	46.246226	-111.94607	Yes	ELKHORN QUEEN-Feature6-P2	Cable hoist in hoist house	7/24/2017
ELKHORN QUEEN-Feature6	Structure/Building	7/24/2017	Hoist house with remnant equipment. 35'x60'	TBD	46.246226	-111.94607	Yes	ELKHORN QUEEN-Feature6-P3	Concrete hoist mount in Hoist House	7/24/2017
ELKHORN QUEEN-Feature6	Structure/Building	7/24/2017	Hoist house with remnant equipment. 35'x60'	TBD	46.246226	-111.94607	Yes	ELKHORN QUEEN-Feature6-P4	Facing East from outside, portal visible	7/24/2017
ELKHORN QUEEN-Feature6	Structure/Building	7/24/2017	Hoist house with remnant equipment. 35'x60'	TBD	46.246226	-111.94607	Yes	ELKHORN QUEEN-Feature6-P5	Hoist House facing East	7/24/2017
ELKHORN QUEEN-Feature6	Prospect pit	7/24/2017	Prospect pit with some timbers overtop. 7 ft x 3 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature6-P1	Prospect pit	7/24/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
ELKHORN CREEK TAILINGS-Feature19-Sample2	7/26/2017	11:20	46.264644	-111.956002	Yes	Soil	XRF	NA	NA	NA	1736	124	140	8067
ELKHORN CREEK TAILINGS-Feature19-Sample3	7/26/2017	11:33	46.263488	-111.956716	Yes	Water	YSI	7.72	0.366	91.0	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature19-Sample4	7/26/2017	11:48	46.265767	-111.955472	Yes	Water	YSI	8.04	0.343	92.2	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature20-Sample1	7/26/2017	12:10	46.26863	-111.954429	Yes	Soil	XRF	NA	NA	NA	5462	309	486	13700
ELKHORN CREEK TAILINGS-Feature20-Sample2	7/26/2017	12:14	46.268917	-111.954171	Yes	Soil	XRF	NA	NA	NA	5438	283	463	13600
ELKHORN CREEK TAILINGS-Feature20-Sample3	7/26/2017	12:16	46.269163	-111.953781	Yes	Soil	XRF	NA	NA	NA	6573	418	748	16300
ELKHORN CREEK TAILINGS-Feature20-Sample4	7/26/2017	12:20	46.269237	-111.95373	Yes	Soil	XRF	NA	NA	NA	1084	96	322	3000
ELKHORN CREEK TAILINGS-Feature20-Sample5	7/26/2017	12:25	46.269145	-111.95444	Yes	Water	YSI	7.28	346	10.3	NA	NA	NA	NA
ELKHORN CREEK TAILINGS-Feature20-Sample1	7/26/2017	12:06	46.266119	-111.956192	Yes	Soil	XRF	NA	NA	NA	12400	673	1715	46200
ELKHORN CREEK TAILINGS-Feature21-Sample1	7/26/2017	13:03	46.270873	-111.951995	Yes	Soil	XRF	NA	NA	NA	56300	3270	3006	76100
ELKHORN CREEK TAILINGS-Feature21-Sample2	7/26/2017	13:05	46.270899	-111.952022	Yes	Water	YSI	7.53	286	8.22	NA	NA	NA	NA
ELKHORN QUEEN-Feature13-Sample1	7/24/2017	10:44	46.246567	-111.946322	Yes	Soil	XRF	NA	NA	NA	6233	5314	75	9478
ELKHORN QUEEN-Feature17-Sample1	7/24/2017	11:05	46.24653	-111.946598	Yes	Soil	XRF	NA	NA	NA	2813	1716	0	4623
ELKHORN QUEEN-Feature17-Sample2	7/24/2017	11:08	46.246602	-111.946446	Yes	Soil	XRF	NA	NA	NA	5134	8333	108	9605

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
ELKHORN QUEEN-Feature7	Prospect pit	7/24/2017	12 ft x 15 ft with two railroad ties next to it	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature7-P1	Prospect pit	7/24/2017
ELKHORN QUEEN-Feature7	Prospect pit	7/24/2017	12 ft x 15 ft with two railroad ties next to it	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature7-P2	Overburden pile	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P1	Adit	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P1	Adit	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P1	Adit	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P2	Collapsed shoring	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P2	Collapsed shoring	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P2	Collapsed shoring	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P3	Tailings piles	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P3	Tailings piles	7/24/2017
ELKHORN QUEEN-Feature8	Shaft Open	7/24/2017	Large shaft with multiple piles. Shoring materials partially collapsed. 8 ft x 8 ft x 20 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature8-P3	Tailings piles	7/24/2017
ELKHORN QUEEN-Feature9	Adit Caved	7/24/2017	Collapsed adit. Marker is S-39. 15 ft x15 ft x 10 ft	TBD	46.247596	-111.947032	Yes	ELKHORN QUEEN-Feature9-P1	Collapsed adit	7/24/2017
IRON MINE-Feature10	Structure/Building	7/27/2017	Cabin. Still intact. 10 ft x 8 ft. Still had stuff inside the building.	TBD	46.311607	-111.9273	Yes	IRON MINE-Feature10-P1	Exterior of cabin	7/27/2017
IRON MINE-Feature10	Structure/Building	7/27/2017	Cabin. Still intact. 10 ft x 8 ft. Still had stuff inside the building.	TBD	46.311607	-111.9273	Yes	IRON MINE-Feature10-P2	Interior of cabin	7/27/2017
IRON MINE-Feature11	Adit Open	7/27/2017	Open adit. Waste rock dump to the east and stream discharging from the adit. Adit opening is 4 ft x 3 ft x 15 ft. It is caved at the back.	TBD	46.310756	-111.928193	Yes	IRON MINE-Feature11-P1	Waste rock dump	7/27/2017
IRON MINE-Feature11	Adit Open	7/27/2017	Open adit. Waste rock dump to the east and stream discharging from the adit. Adit opening is 4 ft x 3 ft x 15 ft. It is caved at the back.	TBD	46.310756	-111.928193	Yes	IRON MINE-Feature11-P2	Adit discharge	7/27/2017
IRON MINE-Feature11	Adit Open	7/27/2017	Open adit. Waste rock dump to the east and stream discharging from the adit. Adit opening is 4 ft x 3 ft x 15 ft. It is caved at the back.	TBD	46.310756	-111.928193	Yes	IRON MINE-Feature11-P3	Adit opening	7/27/2017
IRON MINE-Feature11	Adit Open	7/27/2017	Open adit. Waste rock dump to the east and stream discharging from the adit. Adit opening is 4 ft x 3 ft x 15 ft. It is caved at the back.	TBD	46.310756	-111.928193	Yes	IRON MINE-Feature11-P4	Open adit	7/27/2017
IRON MINE-Feature12	Structure/Building	7/27/2017	Collapsed cabin. 15 ft x 15 ft. No roof.	TBD	46.311034	-111.928388	Yes	IRON MINE-Feature12-P1	Exterior of cabin	7/27/2017
IRON MINE-Feature12	Structure/Building	7/27/2017	Collapsed cabin. 15 ft x 15 ft. No roof.	TBD	46.311034	-111.928388	Yes	IRON MINE-Feature12-P2	Interior of cabin	7/27/2017
IRON MINE-Feature13	Trench	7/27/2017	Trench, furthest west, below cabin site. 20 ft x 10 ft	TBD	46.311211	-111.928347	Yes	IRON MINE-Feature13-P1	Trench furthest east	7/27/2017
IRON MINE-Feature14	Trench	7/27/2017	Trench located to the west and below the lower cabins. Waste rock pile at the bottom. 15 ft x 20 ft.	TBD	46.311384	-111.928412	Yes	IRON MINE-Feature14-P1	Trench to the west.	7/27/2017
IRON MINE-Feature14	Trench	7/27/2017	Trench located to the west and below the lower cabins. Waste rock pile at the bottom. 15 ft x 20 ft.	TBD	46.311384	-111.928412	Yes	IRON MINE-Feature14-P2	Waste rock dump	7/27/2017
IRON MINE-Feature15	Structure/Building	7/27/2017	Collapsed cabin. 15 ft x 15 ft	TBD	46.311051	-111.928535	Yes	IRON MINE-Feature15-P1	Collapsed cabin furthest west	7/27/2017
IRON MINE-Feature15	Structure/Building	7/27/2017	Collapsed cabin. 15 ft x 15 ft	TBD	46.311051	-111.928535	Yes	IRON MINE-Feature15-P2	Cabin interior	7/27/2017
IRON MINE-Feature2	Structure/Building	7/27/2017	Collapsed structure. Potentially was a shaker a load out structure. 30 ft x 20 ft x 30 ft	TBD	46.310517	-111.929499	Yes	IRON MINE-Feature2-P1	Lower half of structure.	7/27/2017
IRON MINE-Feature2	Structure/Building	7/27/2017	Collapsed structure. Potentially was a shaker a load out structure. 30 ft x 20 ft x 30 ft	TBD	46.310517	-111.929499	Yes	IRON MINE-Feature2-P2	Upper structure of the mine.	7/27/2017
IRON MINE-Feature3	Waste Rock Dump	7/27/2017	Waste rock down that is spread down the hill side. 25 ft x 40 ft depth unknown.	TBD	46.31047	-111.929284	Yes	IRON MINE-Feature3-P1	Waste rock dump down hill east of old structure.	7/27/2017
IRON MINE-Feature4	Structure/Building	7/27/2017	Two collapsed structures. One potentially an ore bin and other structure unknown.	TBD	46.310556	-111.928816	Yes	IRON MINE-Feature4-P1	Old collapsed ore bin	7/27/2017
IRON MINE-Feature4	Structure/Building	7/27/2017	Two collapsed structures. One potentially an ore bin and other structure unknown.	TBD	46.310556	-111.928816	Yes	IRON MINE-Feature4-P2	Structure unidentifiable	7/27/2017
IRON MINE-Feature4	Structure/Building	7/27/2017	Two collapsed structures. One potentially an ore bin and other structure unknown.	TBD	46.310556	-111.928816	Yes	IRON MINE-Feature4-P3	Ore bin	7/27/2017
IRON MINE-Feature5	Structure/Building	7/27/2017	Collapsed ore bin. 40 ft x 40 ft. Waste rock dump below that is 30 ft x 10 ft x 5 ft	TBD	46.310607	-111.928416	Yes	IRON MINE-Feature5-P1	East ore bin	7/27/2017
IRON MINE-Feature5	Structure/Building	7/27/2017	Collapsed ore bin. 40 ft x 40 ft. Waste rock dump below that is 30 ft x 10 ft x 5 ft	TBD	46.310607	-111.928416	Yes	IRON MINE-Feature5-P2	Waste rock below east ore bin	7/27/2017
IRON MINE-Feature6	Structure/Building	7/27/2017	Collapsed structure, possibly a cabin.	TBD	46.310816	-111.92805	Yes	IRON MINE-Feature6-P1	Collapsed cabin below ore bin.	7/27/2017
IRON MINE-Feature7	Structure/Building	7/27/2017	Potentially old shaker house. 40 ft x 25 ft x 30 ft	TBD	46.311009	-111.927849	Yes	IRON MINE-Feature7-P1	Potentially a shaker house.	7/27/2017
IRON MINE-Feature8	Structure/Building	7/27/2017	Collapsed cabin	TBD	46.311193	-111.927659	Yes	IRON MINE-Feature8-P1	Old cabin.	7/27/2017
IRON MINE-Feature9	Structure/Building	7/27/2017	Collapsed cabin to the east. 10 ft x 10 ft	TBD	46.311284	-111.927557	Yes	IRON MINE-Feature9-P1	Collapsed cabin	7/27/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
ELKHORN QUEEN-Feature8-Sample1	7/24/2017	10:14	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	151	219	41	2618
ELKHORN QUEEN-Feature8-Sample2	7/24/2017	10:15	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	546	903	100	4024
ELKHORN QUEEN-Feature8-Sample3	7/24/2017	10:17	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	306	409	39	413
ELKHORN QUEEN-Feature8-Sample1	7/24/2017	10:14	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	151	219	41	2618
ELKHORN QUEEN-Feature8-Sample2	7/24/2017	10:15	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	546	903	100	4024
ELKHORN QUEEN-Feature8-Sample3	7/24/2017	10:17	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	306	409	39	413
ELKHORN QUEEN-Feature8-Sample1	7/24/2017	10:14	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	151	219	41	2618
ELKHORN QUEEN-Feature8-Sample2	7/24/2017	10:15	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	546	903	100	4024
ELKHORN QUEEN-Feature8-Sample3	7/24/2017	10:17	46.247596	-111.947032	Yes	Soil	XRF	NA	NA	NA	306	409	39	413
IRON MINE-Feature11-Sample1	7/27/2017	10:29	46.310915	-111.92829	Yes	Water	YSI	6.90	12.35	9.47	NA	NA	NA	NA
IRON MINE-Feature11-Sample1	7/27/2017	10:29	46.310915	-111.92829	Yes	Water	YSI	6.90	12.35	9.47	NA	NA	NA	NA
IRON MINE-Feature11-Sample1	7/27/2017	10:29	46.310915	-111.92829	Yes	Water	YSI	6.90	12.35	9.47	NA	NA	NA	NA
IRON MINE-Feature11-Sample1	7/27/2017	10:29	46.310915	-111.92829	Yes	Water	YSI	6.90	12.35	9.47	NA	NA	NA	NA
IRON MINE-Feature14-Sample1	7/27/2017	10:46	46.311321	-111.928445	Yes	Soil	XRF	NA	NA	NA	13	62	84	29
IRON MINE-Feature14-Sample1	7/27/2017	10:46	46.311321	-111.928445	Yes	Soil	XRF	NA	NA	NA	13	62	84	29
IRON MINE-Feature3-Sample1	7/27/2017	9:39	46.310473	-111.929285	Yes	Soil	XRF	NA	NA	NA	-16	159	2955	607
IRON MINE-Feature5-Sample1	7/27/2017	9:57	46.310635	-111.928412	Yes	Soil	XRF	NA	NA	NA	-23	119	523	28
IRON MINE-Feature5-Sample1	7/27/2017	9:57	46.310635	-111.928412	Yes	Soil	XRF	NA	NA	NA	-23	119	523	28

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
James R Keene-Feature1	Shaft Caved	7/26/2017	Closed shaft 20x20x25 Whole area fenced, fence in good shape Hoist within fence	TBD	46.280945	-111.942377	Yes	James R Keene-Feature1-P1	Shaft, hoist in background	7/26/2017
James R Keene-Feature2	Shaft Open	7/26/2017	Completely open shaft, no fencing 15x25x30 opening ~3x2	TBD	46.280571	-111.942367	Yes	James R Keene-Feature2-P1	Portal	7/26/2017
James R Keene-Feature3	Structure/Building	7/26/2017	Keene townsite below mine	No Action	46.280694	-111.942505	Yes	James R Keene-Feature3-P1	Townsite	7/26/2017
James R Keene-Feature4	Shaft Open	7/26/2017	Open shaft or decline adit, completely open, no fencing 20x30x30 Opening 2x4, unknown depth	TBD	46.280856	-111.943101	Yes	James R Keene-Feature4-P1	Open shaft/decline adit	7/26/2017
James R Keene-Feature5	Prospect pit	7/26/2017	Fairly deep prospect pit 30x20x25	TBD	46.281269	-111.943409	Yes	James R Keene-Feature5-P1	Pit	7/26/2017
James R Keene-Feature6	Shaft Open	7/26/2017	Deep, open shaft Fully fenced 10x10x40	TBD	46.281339	-111.942043	Yes	James R Keene-Feature6-P1	Down shaft	7/26/2017
Louise-Feature7	Shaft Caved	7/26/2017	Partially collapsed shaft, open to ~45 feet Total dimensions =20x30x45	TBD	46.290844	-111.935581	Yes	Louise-Feature7-P1	Fenced partially collapsed shaft	7/26/2017
Luxemburgh-Feature1	Adit Caved	7/26/2017	Collapsed adit 15" by 15" by 2" located directly off road	TBD	46.272458	-111.939751	Yes	Luxemburgh-Feature1-P1	View from above looking at collapsed adit	7/26/2017
Luxemburgh-Feature2	Trench	7/26/2017	Trench but possibly collapsed adit. Covered with small woody debris. Approx 20" by 8 " by 1"	TBD	46.272728	-111.940216	Yes	Luxemburgh-Feature2-P1	Trench	7/26/2017
Luxemburgh-Feature3	Subsidence/Subsidence Area	7/26/2017	Large subsidence located to east of shaft. 10" by 10" and approx 80" deep.	TBD	46.273093	-111.94033	Yes	Luxemburgh-Feature3-P1	Subsidence	7/26/2017
Luxemburgh-Feature4	Shaft Caved	7/26/2017	Caved shaft. Surface opening 6" by 6" and approx 5" deep before collapse at shaft opening.	TBD	46.273143	-111.94039	Yes	Luxemburgh-Feature4-P1	Shaft collapsed with large subsidence in background.	7/26/2017
Luxemburgh-Feature5	Trench	7/26/2017	Deep trench possibly collapsed adit. Waste rock pile - 5" x 5" x 4"	TBD	46.272877	-111.940238	Yes	Luxemburgh-Feature5-P1	Looking up deep trench	7/26/2017
Luxemburgh-Feature5	Trench	7/26/2017	Deep trench possibly collapsed adit. Waste rock pile - 5" x 5" x 4"	TBD	46.272877	-111.940238	Yes	Luxemburgh-Feature5-P2	Waste rock dump at base of trench	7/26/2017
Luxemburgh-Feature5	Trench	7/26/2017	Deep trench possibly collapsed adit. Waste rock pile - 5" x 5" x 4"	TBD	46.272877	-111.940238	Yes	Luxemburgh-Feature5-P3	Looking down into trench	7/26/2017
Luxemburgh-Feature6	Shaft Caved	7/26/2017	Collapsed shaft small opening on top of ridge 3" x 3" and 3" approx deep	TBD	46.273573	-111.940487	Yes	Luxemburgh-Feature6-P1	Caved shaft at top of ridge	7/26/2017
Luxemburgh-Feature7	Subsidence/Subsidence Area	7/26/2017	Subsidence 10" by 10" and approx 8" deep	TBD	46.272943	-111.941054	Yes	Luxemburgh-Feature7-P1	Subsidence with shaft and wooden debris in background.	7/26/2017
Luxemburgh-Feature8	Shaft Open	7/26/2017	30" by 15" and 20" deep located up on ridge with woody debris and subsidence close by	TBD	46.273063	-111.940992	Yes	Luxemburgh-Feature8-P1	Open shaft with Hayden throwing rocks to test depth.	7/26/2017
Luxemburgh-Feature9	Adit Open	7/26/2017	Open adit. 20" back into ridge, 5" wide and unknown depth into adit but deep and visible wood structures in opening. Small waste dump at end of adit.	TBD	46.273335	-111.941028	Yes	Luxemburgh-Feature9-P1	Open adit over top of ridge from road	7/26/2017
NW NW Section 14 22 3535-Feature1	Adit Caved	7/25/2017	Collapsed adit above mine buildings. Remnant cable spool and timbers outside collapsed portal hole	TBD	46.27711	-111.949842	Yes	NW NW Section 14 22 3535-Feature1-P1	Remnant mine debris at collapsed adit	7/25/2017
NW NW Section 14 22 3535-Feature1	Adit Caved	7/25/2017	Collapsed adit above mine buildings. Remnant cable spool and timbers outside collapsed portal hole	TBD	46.27711	-111.949842	Yes	NW NW Section 14 22 3535-Feature1-P2	Facing collapsed adit	7/25/2017
NW NW Section 14 22 3535-Feature2	Other	7/25/2017	Large Exploratory pit north of collapsed adit. 50 yards x 20 yards x 60 feet deep	TBD	46.27762	-111.94994	Yes	NW NW Section 14 22 3535-Feature2-P1	Exploratory pit north of collapsed adit	7/25/2017
NW NW Section 14 22 3535-Feature3	Other	7/25/2017	Upstream of influence of mine site, east side of main road. Just below barb wire fence.	TBD	46.277531	-111.951177	Yes	NW NW Section 14 22 3535-Feature3-P1	Upstream SW sample location, looking upstream	7/25/2017
NW NW Section 14 22 3535-Feature4	Tailings	7/25/2017	Tailings pile south of former mill. Reddish brown soils mixed areas of fine light grey soil. Several connected lobes 100'x100'x20'	TBD	46.276449	-111.949955	Yes	NW NW Section 14 22 3535-Feature4-P1	General mill site area north of tailings piles.	7/25/2017
NW NW Section 14 22 3535-Feature4	Tailings	7/25/2017	Tailings pile south of former mill. Reddish brown soils mixed areas of fine light grey soil. Several connected lobes 100'x100'x20'	TBD	46.276449	-111.949955	Yes	NW NW Section 14 22 3535-Feature4-P1	General mill site area north of tailings piles.	7/25/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
Luxemburgh-Feature5-Sample1	7/26/2017	11:15	46.27276	-111.940061	Yes	Soil	XRF	NA	NA	NA	-55	1453	2991	170
Luxemburgh-Feature5-Sample1	7/26/2017	11:15	46.27276	-111.940061	Yes	Soil	XRF	NA	NA	NA	-55	1453	2991	170
Luxemburgh-Feature5-Sample1	7/26/2017	11:15	46.27276	-111.940061	Yes	Soil	XRF	NA	NA	NA	-55	1453	2991	170
NW NW Section 14 22 3535-Feature1-Sample1	7/25/2017	11:56	46.277142	-111.949859	Yes	Soil	XRF	NA	NA	NA	262	309	878	1131
NW NW Section 14 22 3535-Feature1-Sample1	7/25/2017	11:56	46.277142	-111.949859	Yes	Soil	XRF	NA	NA	NA	262	309	878	1131
NW NW Section 14 22 3535-Feature3-Sample1	7/25/2017	12:29	46.277535	-111.951166	Yes	Water	YSI	7.86	0.143	82.9	NA	NA	NA	NA
NW NW Section 14 22 3535-Feature4-Sample1	7/25/2017	12:45	46.276468	-111.94994	Yes	Soil	XRF	NA	NA	NA	28	1354	575	243
NW NW Section 14 22 3535-Feature4-Sample2	7/25/2017	12:56	46.275913	-111.950191	Yes	Water	YSI	8.08	0.144	82.8	NA	NA	NA	NA

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
NW NW Section 14 22 3535-Feature5	Other	7/25/2017	Background soil location on west side of Creek	TBD	46.275878	-111.950446	Yes	NW NW Section 14 22 3535-Feature5-P1	Background XRF soil sample	7/25/2017
QUEEN-Feature1	Adit Open	7/26/2017	Open adit 2' by 1.5' and unknown depth	TBD	46.252111	-111.964259	Yes	QUEEN-Feature1-P1	Open adit	7/26/2017
QUEEN-Feature1	Other	7/26/2017	Downstream of waste piles at turn off of Elkhorn Rd to mine. west side of road, upstream of culvert.	TBD	46.250447	-111.965339	Yes	QUEEN-Feature1-P1	Elkhorn Creek at Elkhorn road culvert at mine turnoff	7/26/2017
QUEEN-Feature1	Other	7/26/2017	Downstream of waste piles at turn off of Elkhorn Rd to mine. west side of road, upstream of culvert.	TBD	46.250447	-111.965339	Yes	QUEEN-Feature1-P1	Elkhorn Creek at Elkhorn road culvert at mine turnoff	7/26/2017
QUEEN-Feature2	Waste Rock Dump	7/26/2017	2 acres of waste rock pile	TBD	46.251877	-111.965102	Yes	QUEEN-Feature2-P1	Waste rock dumps lining the upper-most portion of disturbed area	7/26/2017
QUEEN-Feature2	Waste Rock Dump	7/26/2017	2 acres of waste rock pile	TBD	46.251877	-111.965102	Yes	QUEEN-Feature2-P1	Waste rock dumps lining the upper-most portion of disturbed area	7/26/2017
QUEEN-Feature2	Waste Rock Dump	7/26/2017	2 acres of waste rock pile	TBD	46.251877	-111.965102	Yes	QUEEN-Feature2-P1	Waste rock dumps lining the upper-most portion of disturbed area	7/26/2017
QUEEN-Feature2	Waste Rock Dump	7/26/2017	2 acres of waste rock pile	TBD	46.251877	-111.965102	Yes	QUEEN-Feature2-P2	Bottom of waste rock	7/26/2017
QUEEN-Feature2	Waste Rock Dump	7/26/2017	2 acres of waste rock pile	TBD	46.251877	-111.965102	Yes	QUEEN-Feature2-P2	Bottom of waste rock	7/26/2017
QUEEN-Feature2	Waste Rock Dump	7/26/2017	2 acres of waste rock pile	TBD	46.251877	-111.965102	Yes	QUEEN-Feature2-P2	Bottom of waste rock	7/26/2017
Relief Mine-Feature11	Shaft Open	7/25/2017	Shaft is a decline shaft. Wooden ore bin present at site. Potentially from the 1880s based on materials used to build it. At least 80 to 90 feet deep. 10 ft x 8 ft in diameter. Waste rock dump located directly below	TBD	46.288146	-111.95279	Yes	Relief Mine-Feature11-P1	Decline shaft	7/25/2017
Relief Mine-Feature11	Shaft Open	7/25/2017	Shaft is a decline shaft. Wooden ore bin present at site. Potentially from the 1880s based on materials used to build it. At least 80 to 90 feet deep. 10 ft x 8 ft in diameter. Waste rock dump located directly below	TBD	46.288146	-111.95279	Yes	Relief Mine-Feature11-P2	Shaft opening	7/25/2017
Relief Mine-Feature11	Shaft Open	7/25/2017	Shaft is a decline shaft. Wooden ore bin present at site. Potentially from the 1880s based on materials used to build it. At least 80 to 90 feet deep. 10 ft x 8 ft in diameter. Waste rock dump located directly below	TBD	46.288146	-111.95279	Yes	Relief Mine-Feature11-P3	Shaft timbering	7/25/2017
Relief Mine-Feature11	Shaft Open	7/25/2017	Shaft is a decline shaft. Wooden ore bin present at site. Potentially from the 1880s based on materials used to build it. At least 80 to 90 feet deep. 10 ft x 8 ft in diameter. Waste rock dump located directly below	TBD	46.288146	-111.95279	Yes	Relief Mine-Feature11-P4	Old ore bin.	7/25/2017
Relief Mine-Feature11	Shaft Open	7/25/2017	Shaft is a decline shaft. Wooden ore bin present at site. Potentially from the 1880s based on materials used to build it. At least 80 to 90 feet deep. 10 ft x 8 ft in diameter. Waste rock dump located directly below	TBD	46.288146	-111.95279	Yes	Relief Mine-Feature11-P5	Waste rock dump	7/25/2017
Relief Mine-Feature12	Shaft Open	7/25/2017	Shaft is partially collapsed. Opening is 8 ft x 5 ft x 4 ft. Small rock pile below the shaft	TBD	46.288285	-111.9525	Yes	Relief Mine-Feature12-P1	Collapsed shaft	7/25/2017
Rex Elkhorn Dist-Feature1	Adit Caved	7/24/2017		TBD	46.246629	-111.948635	Yes	Rex Elkhorn Dist-Feature1-P1	Collapsed adit	7/24/2017
Rex Elkhorn Dist-Feature10	Structure/Building	7/24/2017	Cabin 25x25	TBD	46.246661	-111.948582	Yes	Rex Elkhorn Dist-Feature10-P1	Cabin	7/24/2017
Rex Elkhorn Dist-Feature11	Shaft Caved	7/24/2017	Collapsed shaft 10x6x5	TBD	46.246566	-111.948071	Yes	Rex Elkhorn Dist-Feature11-P1	Collapsed shaft	7/24/2017
Rex Elkhorn Dist-Feature12	Trench	7/24/2017	Long trench, possibly collapsed adit at headwall 150x10x5 (at start) Shallows to >1 for most distance Bottom of trench (2nd photo of feature) 20x10x5	TBD	46.246769	-111.948065	Yes	Rex Elkhorn Dist-Feature12-P1	Headwall of trench	7/24/2017
Rex Elkhorn Dist-Feature12	Trench	7/24/2017	Long trench, possibly collapsed adit at headwall 150x10x5 (at start) Shallows to >1 for most distance Bottom of trench (2nd photo of feature) 20x10x5	TBD	46.246769	-111.948065	Yes	Rex Elkhorn Dist-Feature12-P2	Bottom of trench	7/24/2017
Rex Elkhorn Dist-Feature2	Shaft Caved	7/24/2017	15x15x20	TBD	46.24634	-111.948642	Yes	Rex Elkhorn Dist-Feature2-P1	Shaft	7/24/2017
Rex Elkhorn Dist-Feature3	Trench	7/24/2017	Trench 30x8x3	TBD	46.245588	-111.949418	Yes	Rex Elkhorn Dist-Feature3-P1	Trench with Joel	7/24/2017
Rex Elkhorn Dist-Feature4	Trench	7/24/2017	50x8x3	TBD	46.245573	-111.949596	Yes	Rex Elkhorn Dist-Feature4-P1	Trench	7/24/2017
Rex Elkhorn Dist-Feature5	Shaft Open	7/24/2017	Partially collapsed 3x3 depth unknown NHA97473	TBD	46.245416	-111.94776	Yes	Rex Elkhorn Dist-Feature5-P1	Partially collapsed shaft	7/24/2017
Rex Elkhorn Dist-Feature6	Shaft Open	7/24/2017	5x5x12 shaft 12x1x15 pile	TBD	46.245554	-111.947915	Yes	Rex Elkhorn Dist-Feature6-P1	Shaft	7/24/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
NW NW Section 14 22 3535-Feature5-Sample1	7/25/2017	13:07	46.275885	-111.950463	Yes	Soil	XRF	NA	NA	NA	217	41	69	542
QUEEN-Feature1-Sample1	7/26/2017	13:14	46.252111	-111.964259	Yes	Soil	XRF	NA	NA	NA	46	491	-60	149
QUEEN-Feature1-Sample1	7/26/2017	13:24	46.250452	-111.965357	Yes	Water	YSI	8.22	0.152	92.8	NA	NA	NA	NA
QUEEN-Feature1-Sample2	7/26/2017	13:34	46.254331	-111.963041	Yes	Water	YSI	8.22	0.148	93.0	NA	NA	NA	NA
QUEEN-Feature2-Sample1	7/26/2017	13:32	46.251877	-111.965102	Yes	Soil	XRF	NA	NA	NA	43	666	-23	75
QUEEN-Feature2-Sample2	7/26/2017	13:36	46.252445	-111.964445	Yes	Soil	XRF	NA	NA	NA	90	571	-41	-41
QUEEN-Feature2-Sample3	7/26/2017	13:48	46.251818	-111.96429	Yes	Soil	XRF	NA	NA	NA	40	996	-28	0
QUEEN-Feature2-Sample1	7/26/2017	13:32	46.251877	-111.965102	Yes	Soil	XRF	NA	NA	NA	43	666	-23	75
QUEEN-Feature2-Sample2	7/26/2017	13:36	46.252445	-111.964445	Yes	Soil	XRF	NA	NA	NA	90	571	-41	-41
QUEEN-Feature2-Sample3	7/26/2017	13:48	46.251818	-111.96429	Yes	Soil	XRF	NA	NA	NA	40	996	-28	0
Relief Mine-Feature11-Sample1	7/25/2017	8:41	46.288195	-111.952768	Yes	Soil	XRF	NA	NA	NA	230	52	27	176
Relief Mine-Feature11-Sample1	7/25/2017	8:41	46.288195	-111.952768	Yes	Soil	XRF	NA	NA	NA	230	52	27	176
Relief Mine-Feature11-Sample1	7/25/2017	8:41	46.288195	-111.952768	Yes	Soil	XRF	NA	NA	NA	230	52	27	176
Relief Mine-Feature11-Sample1	7/25/2017	8:41	46.288195	-111.952768	Yes	Soil	XRF	NA	NA	NA	230	52	27	176
Relief Mine-Feature11-Sample1	7/25/2017	8:41	46.288195	-111.952768	Yes	Soil	XRF	NA	NA	NA	230	52	27	176
Rex Elkhorn Dist-Feature1-Sample1	7/24/2017	8:33	46.246353	-111.948738	Yes	Soil	XRF	NA	NA	NA	102	535	59	122
Rex Elkhorn Dist-Feature6-Sample1	7/24/2017	9:06	46.245584	-111.947829	Yes	Soil	XRF	NA	NA	NA	177	58	24	350

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
Rex Elkhorn Dist-Feature7	Adit Caved	7/24/2017	Collapsed adit 20x3x4 NHA97474	TBD	46.245779	-111.947894	Yes	Rex Elkhorn Dist-Feature7-P1	Collapsed adit	7/24/2017
Rex Elkhorn Dist-Feature8	Shaft Caved	7/24/2017	Probably collapsed shaft 4x6x2	TBD	46.245747	-111.947942	Yes	Rex Elkhorn Dist-Feature8-P1	Probable collapsed/filled in shaft	7/24/2017
Rex Elkhorn Dist-Feature9	Trench	7/24/2017	25x8x5 Trench (or possible collapsed adit) Pile beneath - vegetated	TBD	46.246501	-111.948736	Yes	Rex Elkhorn Dist-Feature9-P1	Trench (or possibly collapsed adit)	7/24/2017
Seven Up Gulch-Feature1	Adit Open	7/25/2017	Open adit without anything blocking the entryway. Trench comes out about 50 ft. Adit opening is about 2 ft x 2 ft - depth unknown. Waste rock pile at the end of the trench measuring 25 ft x 15 ft x 4 ft.	TBD	46.275077	-111.984362	Yes	Seven Up Gulch-Feature1-P1	Adit opening	7/25/2017
Seven Up Gulch-Feature1	Adit Open	7/25/2017	Open adit without anything blocking the entryway. Trench comes out about 50 ft. Adit opening is about 2 ft x 2 ft - depth unknown. Waste rock pile at the end of the trench measuring 25 ft x 15 ft x 4 ft.	TBD	46.275077	-111.984362	Yes	Seven Up Gulch-Feature1-P2	Waste material pile	7/25/2017
Skyline-Feature19	Adit Caved	7/25/2017	Cluster of five adits leading into the mountainside to the north.	No Action	46.291275	-111.888231	Yes	Skyline-Feature19-P1	Pile	7/25/2017
Skyline-Feature19	Adit Caved	7/25/2017	Cluster of five adits leading into the mountainside to the north.	No Action	46.291275	-111.888231	Yes	Skyline-Feature19-P2	Road leading into closed adit.	7/25/2017
Skyline-Feature20	Waste Rock Dump	7/25/2017	Waste rock pile above water seep that serves as headwaters to creek. 35'x15'x? depth.	TBD	46.290542	-111.888984	Yes	Skyline-Feature20-P1	Waste rock pile.	7/25/2017
Skyline-Feature20	Waste Rock Dump	7/25/2017	Waste rock pile above water seep that serves as headwaters to creek. 35'x15'x? depth.	TBD	46.290542	-111.888984	Yes	Skyline-Feature20-P2	Seep below pile.	7/25/2017
Skyline-Feature21	Shaft Caved	7/25/2017	Caved shaft below the road.	TBD	46.290396	-111.888849	Yes	Skyline-Feature21-P1	Caved shaft remnants.	7/25/2017
Skyline-Feature22	Structure/Building	7/25/2017	50'x20'. Roof intact.	Cabin	46.290508	-111.889761	Yes	Skyline-Feature22-P1	Cabin	7/25/2017
Skyline-Feature22	Structure/Building	7/25/2017	50'x20'. Roof intact.	Cabin	46.290508	-111.889761	Yes	Skyline-Feature22-P2	Cabin	7/25/2017
Skyline-Feature22	Structure/Building	7/25/2017	50'x20'. Roof intact.	Cabin	46.290508	-111.889761	Yes	Skyline-Feature22-P3	Northeast cabin view	7/25/2017
Skyline-Feature22	Structure/Building	7/25/2017	50'x20'. Roof intact.	Cabin	46.290508	-111.889761	Yes	Skyline-Feature22-P4	Cabin	7/25/2017
Skyline-Feature22	Structure/Building	7/25/2017	50'x20'. Roof intact.	Cabin	46.290508	-111.889761	Yes	Skyline-Feature22-P5	Catchment for spring.	7/25/2017
Skyline-Feature22	Structure/Building	7/25/2017	50'x20'. Roof intact.	Cabin	46.290508	-111.889761	Yes	Skyline-Feature22-P6	Doorway	7/25/2017
Skyline-Feature22	Structure/Building	7/25/2017	50'x20'. Roof intact.	Cabin	46.290508	-111.889761	Yes	Skyline-Feature22-P7	Spring routed beneath cabin.	7/25/2017
Skyline-Feature22	Structure/Building	7/25/2017	50'x20'. Roof intact.	Cabin	46.290508	-111.889761	Yes	Skyline-Feature22-P8	Inside cabin.	7/25/2017
Skyline-Feature23	Structure/Building	7/25/2017	Outhouse.	No Action	46.29025	-111.889925	Yes	Skyline-Feature23-P1	Outhouse	7/25/2017
Skyline-Feature23	Structure/Building	7/25/2017	Outhouse.	No Action	46.29025	-111.889925	Yes	Skyline-Feature23-P2	Outhouse	7/25/2017
Skyline-Feature24	Adit Caved	7/25/2017	Railroad tracks next to collapsed structure leading from collapsed adit.	TBD	46.290123	-111.889355	Yes	Skyline-Feature24-P1	Tracks leading out.	7/25/2017
Skyline-Feature24	Adit Caved	7/25/2017	Railroad tracks next to collapsed structure leading from collapsed adit.	TBD	46.290123	-111.889355	Yes	Skyline-Feature24-P2	Tracks leading to edge of waste pile.	7/25/2017
Skyline-Feature24	Adit Caved	7/25/2017	Railroad tracks next to collapsed structure leading from collapsed adit.	TBD	46.290123	-111.889355	Yes	Skyline-Feature24-P3	Waste rock pile leading from closed adit.	7/25/2017
Skyline-Feature25	Structure/Building	7/25/2017	Wood shack	No Action	46.290331	-111.890031	Yes	Skyline-Feature25-P1	Wood shack	7/25/2017
Skyline-Feature25	Structure/Building	7/25/2017	Wood shack	No Action	46.290331	-111.890031	Yes	Skyline-Feature25-P2	Wood shack	7/25/2017
Skyline-Feature26	Adit Open	7/25/2017	Open adit. 5'x4'x depth unknown. Partially collapsed five feet inside. Tunnel continues for unknown distance.	TBD	46.289755	-111.889369	Yes	Skyline-Feature26-P1	Adit entrance	7/25/2017
Skyline-Feature26	Adit Open	7/25/2017	Open adit. 5'x4'x depth unknown. Partially collapsed five feet inside. Tunnel continues for unknown distance.	TBD	46.289755	-111.889369	Yes	Skyline-Feature26-P1	Adit entrance	7/25/2017
Skyline-Feature26	Adit Open	7/25/2017	Open adit. 5'x4'x depth unknown. Partially collapsed five feet inside. Tunnel continues for unknown distance.	TBD	46.289755	-111.889369	Yes	Skyline-Feature26-P1	Adit entrance	7/25/2017
Skyline-Feature26	Adit Open	7/25/2017	Open adit. 5'x4'x depth unknown. Partially collapsed five feet inside. Tunnel continues for unknown distance.	TBD	46.289755	-111.889369	Yes	Skyline-Feature26-P1	Adit entrance	7/25/2017
Skyline-Feature26	Adit Open	7/25/2017	Open adit. 5'x4'x depth unknown. Partially collapsed five feet inside. Tunnel continues for unknown distance.	TBD	46.289755	-111.889369	Yes	Skyline-Feature26-P2	Open adit	7/25/2017
Skyline-Feature26	Adit Open	7/25/2017	Open adit. 5'x4'x depth unknown. Partially collapsed five feet inside. Tunnel continues for unknown distance.	TBD	46.289755	-111.889369	Yes	Skyline-Feature26-P2	Open adit	7/25/2017
Skyline-Feature26	Adit Open	7/25/2017	Open adit. 5'x4'x depth unknown. Partially collapsed five feet inside. Tunnel continues for unknown distance.	TBD	46.289755	-111.889369	Yes	Skyline-Feature26-P2	Open adit	7/25/2017

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
Rex Elkhorn Dist-Feature7-Sample1	7/24/2017	9:19	46.245817	-111.947882	Yes	Soil	XRF	NA	NA	NA	265	177	54	693
Skyline-Feature20-Sample1	7/25/2017	10:54	46.290575	-111.889011	Yes	Soil	XRF	NA	NA	NA	188	5011	1	24
Skyline-Feature20-Sample1	7/25/2017	10:54	46.290575	-111.889011	Yes	Soil	XRF	NA	NA	NA	188	5011	1	24
Skyline-Feature22-Sample1	7/25/2017	11:12	46.290309	-111.889698	Yes	Water	YSI	6.79	0.016	87.5	NA	NA	NA	NA
Skyline-Feature22-Sample1	7/25/2017	11:12	46.290309	-111.889698	Yes	Water	YSI	6.79	0.016	87.5	NA	NA	NA	NA
Skyline-Feature22-Sample1	7/25/2017	11:12	46.290309	-111.889698	Yes	Water	YSI	6.79	0.016	87.5	NA	NA	NA	NA
Skyline-Feature22-Sample1	7/25/2017	11:12	46.290309	-111.889698	Yes	Water	YSI	6.79	0.016	87.5	NA	NA	NA	NA
Skyline-Feature22-Sample1	7/25/2017	11:12	46.290309	-111.889698	Yes	Water	YSI	6.79	0.016	87.5	NA	NA	NA	NA
Skyline-Feature22-Sample1	7/25/2017	11:12	46.290309	-111.889698	Yes	Water	YSI	6.79	0.016	87.5	NA	NA	NA	NA
Skyline-Feature22-Sample1	7/25/2017	11:12	46.290309	-111.889698	Yes	Water	YSI	6.79	0.016	87.5	NA	NA	NA	NA
Skyline-Feature22-Sample1	7/25/2017	11:12	46.290309	-111.889698	Yes	Water	YSI	6.79	0.016	87.5	NA	NA	NA	NA
Skyline-Feature24-Sample1	7/25/2017	11:22	46.290145	-111.889161	Yes	Soil	XRF	NA	NA	NA	1259	5777	.000001	537
Skyline-Feature24-Sample1	7/25/2017	11:22	46.290145	-111.889161	Yes	Soil	XRF	NA	NA	NA	1259	5777	.000001	537
Skyline-Feature24-Sample1	7/25/2017	11:22	46.290145	-111.889161	Yes	Soil	XRF	NA	NA	NA	1259	5777	.000001	537
Skyline-Feature26-Sample1	7/25/2017	11:37	46.289926	-111.889442	Yes	Soil	XRF	NA	NA	NA	2577	2858	199	696
Skyline-Feature26-Sample2	7/25/2017	11:41	46.289556	-111.889144	Yes	Water	YSI	6.65	0.021	97.1	NA	NA	NA	NA
Skyline-Feature26-Sample3	7/25/2017	11:46	46.289768	-111.889585	Yes	Water	YSI	7.37	0.021	115	NA	NA	NA	NA
Skyline-Feature26-Sample4	7/25/2017	12:00	46.289755	-111.889369	Yes	Water	YSI	6.69	0.23	95.8	NA	NA	NA	NA
Skyline-Feature26-Sample1	7/25/2017	11:37	46.289926	-111.889442	Yes	Soil	XRF	NA	NA	NA	2577	2858	199	696
Skyline-Feature26-Sample2	7/25/2017	11:41	46.289556	-111.889144	Yes	Water	YSI	6.65	0.021	97.1	NA	NA	NA	NA
Skyline-Feature26-Sample3	7/25/2017	11:46	46.289768	-111.889585	Yes	Water	YSI	7.37	0.021	115	NA	NA	NA	NA

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
Skyline-Feature26	Adit Open	7/25/2017	Open adit. 5'x4'x depth unknown. Partially collapsed five feet inside. Tunnel continues for unknown distance.	TBD	46.289755	-111.889369	Yes	Skyline-Feature26-P2	Open adit	7/25/2017
Skyline-Feature27	Structure/Building	7/25/2017	Collapsed cabin.	No Action	46.28848	-111.888631	Yes	Skyline-Feature27-P1	Collapsed cabin.	7/25/2017
SOURDOUGH-Feature32	Other	7/24/2017	Greyback Creek Reference/Upstream of tailings piles (south side of creek) and downslope of old cabin (on north side of creek)	TBD	46.28504	-111.959609	Yes	SOURDOUGH-Feature32-P1	Greyback Creek upstream reference	7/25/2017
SOURDOUGH-Feature33	Tailings	7/25/2017	Waste pile adjacent and in Greyback Creek on south side of stream, just above a collapsed adit (not draining). There are numerous test pits within the wide spread tailings.	TBD	46.285129	-111.961112	Yes	SOURDOUGH-Feature33-P1	Tailings next to Greyback creek	7/25/2017
SOURDOUGH-Feature33	Tailings	7/25/2017	Waste pile adjacent and in Greyback Creek on south side of stream, just above a collapsed adit (not draining). There are numerous test pits within the wide spread tailings.	TBD	46.285129	-111.961112	Yes	SOURDOUGH-Feature33-P1	Tailings next to Greyback creek	7/25/2017
SOURDOUGH-Feature34	Other	7/25/2017	SW sample in Greyback Creek adjacent to tailings pile and collapsed adit (not draining)	TBD	46.285215	-111.961145	Yes	SOURDOUGH-Feature34-P1	SW sample in Greyback Creek adjacent to tailings pile and collapsed adit (not draining)	7/25/2017
SOURDOUGH-Feature35	Other	7/25/2017	Background XRF upgradient of tailings pile that were at Greyback creek	TBD	46.284814	-111.961621	Yes	SOURDOUGH-Feature35-P1	Background XRF above tailings that are near Greyback Creek	7/25/2017
SOURDOUGH-Feature36	Tailings	7/25/2017	Expansive and steep tailings pile below road. Orange stained tailings with drainage into adjacent low-lying wetland. Orange precip noted in drainage through wetlands. Approx 100 yards to creek. I	TBD	46.284529	-111.960527	Yes	SOURDOUGH-Feature36-P1	Lower side or Expansive and steep tailings pile below road.	7/25/2017
SOURDOUGH-Feature36	Tailings	7/25/2017	Expansive and steep tailings pile below road. Orange stained tailings with drainage into adjacent low-lying wetland. Orange precip noted in drainage through wetlands. Approx 100 yards to creek.	TBD	46.284529	-111.960527	Yes	SOURDOUGH-Feature36-P1	Lower side or Expansive and steep tailings pile below road.	7/25/2017
SOURDOUGH-Feature36	Tailings	7/25/2017	Expansive and steep tailings pile below road. Orange stained tailings with drainage into adjacent low-lying wetland. Orange precip noted in drainage through wetlands. Approx 100 yards to creek.	TBD	46.284529	-111.960527	Yes	SOURDOUGH-Feature36-P1	Lower side or Expansive and steep tailings pile below road.	7/25/2017
SOURDOUGH-Feature37	Other	7/25/2017	6 or 7" monitoring well downgradient of tailings piles near (20') Greyback Creek	TBD	46.284944	-111.959316	Yes	SOURDOUGH-Feature37-P1	Well cap information	7/25/2017
SOURDOUGH-Feature37	Other	7/25/2017	6 or 7" monitoring well downgradient of tailings piles near (20') Greyback Creek	TBD	46.284944	-111.959316	Yes	SOURDOUGH-Feature37-P2	Monitoring well (stick up approx 18") with Sourdough mine waste in background.	7/25/2017
TACOMA-Feature26	Adit Open	7/26/2017	Open adit SW 3ft by 1 ft opening	TBD	46.232471	-111.963604	Yes	TACOMA-Feature26-P1	Open adit	7/26/2017
TACOMA-Feature27	Adit Open	7/26/2017	Open adit, SW 1 foot by 1" and depth unknown	TBD	46.23249	-111.963605	Yes	TACOMA-Feature27-P1	Open adit	7/26/2017
TACOMA-Feature27	Adit Open	7/26/2017	Open adit, SW 1 foot by 1" and depth unknown	TBD	46.23249	-111.963605	Yes	TACOMA-Feature27-P2	Photo shows proximity of the two open adits, depth unknown	7/26/2017
TACOMA-Feature28	Adit Open	7/26/2017	Open adit SW 4" x 4" with a depth at least 10"	TBD	46.232769	-111.963658	Yes	TACOMA-Feature28-P1	SW open adit	7/26/2017
TACOMA-Feature29	Prospect pit	7/26/2017	Cluster of 3 pits, 10" by 10" approx depth 3"	TBD	46.232735	-111.963732	Yes	TACOMA-Feature29-P1	First 2 pits from above	7/26/2017
TACOMA-Feature29	Prospect pit	7/26/2017	Cluster of 3 pits, 10" by 10" approx depth 3"	TBD	46.232735	-111.963732	Yes	TACOMA-Feature29-P2	3rd pit in cluster	7/26/2017
TACOMA-Feature30	Trench	7/26/2017	20" by 10" unsure if there was an adit opening because of complete coverage by fallen rock and no evidence of waste rock or dump associated with the trench	TBD	46.232988	-111.963572	Yes	TACOMA-Feature30-P1	10" by 20" trench	7/26/2017
TACOMA-Feature31	Adit Open	7/26/2017	2" by 2" open adit unknown depth	TBD	46.233207	-111.963601	Yes	TACOMA-Feature31-P1	2" by 2" unknown depth open adit	7/26/2017
TACOMA-Feature32	Prospect pit	7/26/2017	30" by 15" trench	TBD	46.233237	-111.963261	Yes	TACOMA-Feature32-P1	30" by 15" trench	7/26/2017
TACOMA-Feature33	Adit Open	7/26/2017	3" by 3" open adit unknown depth	TBD	46.233061	-111.962578	Yes	TACOMA-Feature33-P1	3" by 3" unknown depth open adit	7/26/2017
TACOMA-Feature34	Adit Open	7/26/2017	2" by 1" unknown depth open adit	TBD	46.233108	-111.962549	Yes	TACOMA-Feature34-P1	Open adit unknown depth	7/26/2017
TACOMA-Feature34	Adit Open	7/26/2017	2" by 1" unknown depth open adit	TBD	46.233108	-111.962549	Yes	TACOMA-Feature34-P2	2 open adits very close proximity	7/26/2017
TRUMLEY HEAP LEACH-Feature1	Reclaimed Area	7/25/2017	Open field partially vegetated with grasses and bare ground intermixed with apparent iron-stained waste- rock	TBD	46.269744	-111.972037	Yes	TRUMLEY HEAP LEACH-Feature1-P1	Soil XRF random sample in reclaimed area	7/25/2017
TRUMLEY HEAP LEACH-Feature1	Reclaimed Area	7/25/2017	Open field partially vegetated with grasses and bare ground intermixed with apparent iron-stained waste- rock	TBD	46.269744	-111.972037	Yes	TRUMLEY HEAP LEACH-Feature1-P1	Soil XRF random sample in reclaimed area	7/25/2017
TRUMLEY HEAP LEACH-Feature1	Reclaimed Area	7/25/2017	Open field partially vegetated with grasses and bare ground intermixed with apparent iron-stained waste- rock	TBD	46.269744	-111.972037	Yes	TRUMLEY HEAP LEACH-Feature1-P1	Soil XRF random sample in reclaimed area	7/25/2017
TRUMLEY HEAP LEACH-Feature1	Reclaimed Area	7/25/2017	Open field partially vegetated with grasses and bare ground intermixed with apparent iron-stained waste- rock	TBD	46.269744	-111.972037	Yes	TRUMLEY HEAP LEACH-Feature1-P1	Soil XRF random sample in reclaimed area	7/25/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
Skyline-Feature26-Sample4	7/25/2017	12:00	46.289755	-111.889369	Yes	Water	YSI	6.69	0.23	95.8	NA	NA	NA	NA
SOURDOUGH-Feature32-Sample1	7/25/2017	9:08	46.28504	-111.959609	Yes	Water	YSI	7.20	0.097	81.9	NA	NA	NA	NA
SOURDOUGH-Feature33-Sample1	7/25/2017	9:28	46.285139	-111.961123	Yes	Soil	XRF	NA	NA	NA	24	193	1052	174
SOURDOUGH-Feature33-Sample2	7/25/2017	9:56	46.285088	-111.962164	Yes	Water	YSI	7.81	0.107	81.9	NA	NA	NA	NA
SOURDOUGH-Feature34-Sample1	7/25/2017	9:40	46.285222	-111.961147	Yes	Water	YSI	7.67	0.101	81.7	NA	NA	NA	NA
SOURDOUGH-Feature35-Sample1	7/25/2017	10:09	46.284797	-111.961653	Yes	Soil	XRF	NA	NA	NA	25	18	66	85
SOURDOUGH-Feature36-Sample1	7/25/2017	10:28	46.284529	-111.960527	Yes	Soil	XRF	NA	NA	NA	53	535	576	33
SOURDOUGH-Feature36-Sample2	7/25/2017	10:31	46.284457	-111.960441	Yes	Soil	XRF	NA	NA	NA	148	1392	3615	760
SOURDOUGH-Feature36-Sample3	7/25/2017	10:59	46.284112	-111.960119	Yes	Soil	XRF	NA	NA	NA	41	229	810	353
TRUMLEY HEAP LEACH-Feature1-Sample1	7/25/2017	14:17	46.269748	-111.972032	Yes	Soil	XRF	NA	NA	NA	346	635	60	1029
TRUMLEY HEAP LEACH-Feature1-Sample2	7/25/2017	14:20	46.269639	-111.972221	Yes	Soil	XRF	NA	NA	NA	293	1226	75	1002
TRUMLEY HEAP LEACH-Feature1-Sample3	7/25/2017	14:23	46.269435	-111.972557	Yes	Soil	XRF	NA	NA	NA	266	750	47	403
TRUMLEY HEAP LEACH-Feature1-Sample4	7/25/2017	14:28	46.26929	-111.972529	Yes	Soil	XRF	NA	NA	NA	63	14	31	204

Feature Name	Feature Type	Inspection Date	Feature Comments	Feature Status	Feature Lat	Feature Long	Lat/long Verified	Photo Name	PhotoDesc	PhotoDate
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P1	Waste rock pile	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P1	Waste rock pile	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P1	Waste rock pile	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P1	Waste rock pile	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P1	Waste rock pile	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P2	Waste rock pile above creek	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P2	Waste rock pile above creek	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P2	Waste rock pile above creek	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P2	Waste rock pile above creek	7/26/2017
Union Elkhorn-Feature11	Waste Rock Dump	7/26/2017	Large waste rock pile near adit. Pile has several benches including lower one immediately adjacent to creek. Approximately 300'x150'x30' depth.	TBD	46.291198	-111.94269	Yes	Union Elkhorn-Feature11-P2	Waste rock pile above creek	7/26/2017
Union Elkhorn-Feature12	Adit Open	7/26/2017	Open Adit 3x5' depth inside unknown. Pipe leading out of adit not draining.	TBD	46.291435	-111.942852	Yes	Union Elkhorn-Feature12-P1	Adit opening	7/26/2017
Union Elkhorn-Feature12	Adit Open	7/26/2017	Open Adit 3x5' depth inside unknown. Pipe leading out of adit not draining.	TBD	46.291435	-111.942852	Yes	Union Elkhorn-Feature12-P2	Brick and iron framed adit entry.	7/26/2017
Union Elkhorn-Feature13	Shaft Open	7/26/2017	Fenced off. 40'deep x 15-25' x 15-25'.	TBD	46.2916	-111.943383	Yes	Union Elkhorn-Feature13-P1	At fence line.	7/26/2017
Union Elkhorn-Feature13	Shaft Open	7/26/2017	Fenced off. 40'deep x 15-25' x 15-25'.	TBD	46.2916	-111.943383	Yes	Union Elkhorn-Feature13-P2	Fence line.	7/26/2017
Union Elkhorn-Feature13	Shaft Open	7/26/2017	Fenced off. 40'deep x 15-25' x 15-25'.	TBD	46.2916	-111.943383	Yes	Union Elkhorn-Feature13-P3	Wench remnants.	7/26/2017
Union Elkhorn-Feature14	Waste Rock Dump	7/26/2017	Tie xrf reading from open shaft to this feature. 150'x150'x30' deep.	TBD	46.29157	-111.943359	Yes	Union Elkhorn-Feature14-P1	Xrf	7/26/2017
Union Elkhorn-Feature14	Waste Rock Dump	7/26/2017	Tie xrf reading from open shaft to this feature. 150'x150'x30' deep.	TBD	46.29157	-111.943359	Yes	Union Elkhorn-Feature14-P1	Xrf	7/26/2017
Union Elkhorn-Feature14	Waste Rock Dump	7/26/2017	Tie xrf reading from open shaft to this feature. 150'x150'x30' deep.	TBD	46.29157	-111.943359	Yes	Union Elkhorn-Feature14-P2	Waste pile.	7/26/2017
Union Elkhorn-Feature14	Waste Rock Dump	7/26/2017	Tie xrf reading from open shaft to this feature. 150'x150'x30' deep.	TBD	46.29157	-111.943359	Yes	Union Elkhorn-Feature14-P2	Waste pile.	7/26/2017
Union Elkhorn-Feature15	Shaft Open	7/26/2017	Fenced shaft. 20'x 20' x 40 deep	TBD	46.292066	-111.944182	Yes	Union Elkhorn-Feature15-P1	Shaft taken from outside fence	7/26/2017

Feature Summary Table
Elkhorn Mining District Pre-CERCLA Screening

Sample Number	Sample Date	Sample Time	Latitude	Longitude	Lat/long Verified2	Sample Media	Collection Method	YSI_pH	YSI_EC	YSI_DO	XRF_Pb	XRF_As	XRF_Cu	XRF_Zn
Union Elkhorn-Feature11-Sample1	7/26/2017	8:45	46.291123	-111.942506	Yes	Soil	XRF	NA	NA	NA	8239	952	1112	2214
Union Elkhorn-Feature11-Sample2	7/26/2017	8:53	46.290653	-111.942698	Yes	Water	YSI	7.55	0.105	93.0	NA	NA	NA	NA
Union Elkhorn-Feature11-Sample3	7/26/2017	9:07	46.291189	-111.942687	Yes	Soil	XRF	NA	NA	NA	7724	394	274	8259
Union Elkhorn-Feature11-Sample4	7/26/2017	9:13	46.291546	-111.942264	Yes	Water	YSI	7.27	0.110	93.1	NA	NA	NA	NA
Union Elkhorn-Feature11-Sample5	7/26/2017	10:13	46.290579	-111.943317	Yes	Soil	XRF	NA	NA	NA	81	41	21	151
Union Elkhorn-Feature14-Sample1	7/26/2017	9:47	46.291568	-111.943425	Yes	Soil	XRF	NA	NA	NA	3840	631	374	6264
Union Elkhorn-Feature14-Sample2	7/26/2017	9:50	46.291578	-111.943377	Yes	Soil	XRF	NA	NA	NA	3624	548	565	10700
Union Elkhorn-Feature14-Sample1	7/26/2017	9:47	46.291568	-111.943425	Yes	Soil	XRF	NA	NA	NA	3840	631	374	6264
Union Elkhorn-Feature14-Sample2	7/26/2017	9:50	46.291578	-111.943377	Yes	Soil	XRF	NA	NA	NA	3624	548	565	10700