Basin Mining Area, Operable Unit 2
Jefferson County, Montana

Draft Final Feasibility Study Report

July 2005

Feasibility Study Report

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Acronyms

ABA	acid base accounting
AD	acid drainage
amsl	above mean sea level
ARARs	applicable or relevant and appropriate requirements
AMD	acid mine drainage
AOC	area of concern
ARD	acid rock drainage
BERA	baseline ecological risk assessment
CDM	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
COCs	contaminants of concern
CTE	central tendency exposure
DC	direct contact
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ERAGS	ecological risk assessment guidance for superfund
FeS_2	pyrite
FS	feasibility study
ft	feet or foot
gpm	gallons per minute
GRA	general response action
GW	groundwater
H_2SO_4	sulfuric acid
HHRA	human health risk assessment
HI	hazard index
HQs	hazard quotients
MDEQ	Montana Department of Environmental Quality
MBMG	Montana Bureau of Mines and Geology
MCLs	maximum contaminant levels
MT	metric tons
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NP/AP	neutral potential/acid potential
NPL	National Priorities List
OU	operable unit
O&M	operations and maintenance
PRAOs	preliminary remedial action objectives
PRGs	preliminary remedial action goals
RAGS	risk assessment guidance for superfund
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	record of decision
RME	reasonable maximum exposure
SERA	screening ecological risk assessment

SW	surface water
SD	stream sediment
TMDL	total maximum daily load
ug/L	micrograms per liter
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
WR	waste rock

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Section 1
Introduction

This feasibility study (FS) report identifies, screens, evaluates, and compares potential remedial alternatives that address mining wastes, contaminated soil, surface water and groundwater within the Basin Mining Area Superfund site operable unit (OU) 2 (Basin Watershed OU2 or OU2) near Basin, Montana. This FS was prepared by CDM Federal Programs Corporation (CDM) for the U.S. Environmental Protection Agency (EPA) Region VIII under EPA Contract No 68-W5-0022, Work Assignment No 945-RICO-081Y. The FS addresses threats to human health and the environment in OU2 under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The Basin Watershed OU2 FS process was completed following the presumptive remedy approach as defined in *Presumptive Remedies: Policy and Procedures* (EPA 1993). This EPA guidance document allows the presumption that the final remedial action alternatives selected for one site would be identical to a similar site with similar types of waste and contamination. The Basin Watershed OU2 and the Upper Tenmile Creek Mining Area Superfund sites are similar sites located on opposite sides of the same mountain range. The two sites have very similar terrain, mining operation history and mining related environmental impacts.

Because Basin Watershed OU2 has contaminant and media concerns almost identical to the Upper Tenmile Creek Mining area, the presumptive remedy guidance allows the results of evaluation of cleanup alternatives from the Upper Tenmile Creek Mining Area FS to be used to streamline the Basin Watershed OU2 FS process. Also, both sites have access to the Luttrell Repository, a local Resource Conservation and Recovery Act (RCRA)-compliant mining waste disposal facility operated by EPA. Therefore, the *Draft Feasibility Study, Upper Tenmile Creek Mining Area Site* (CDM 2001) was used as the template for preparing the presumptive remedy for the Basin Watershed OU2 FS.

1.1 Report Organization

The FS is divided into two volumes. All text, tables, and figures of the FS are presented in Volume I. The appendices to the FS are provided in Volume II. They include Appendix A, the draft applicable or relevant and appropriate requirements (ARARs), Appendix B, the mine site prioritization scoring tables, and Appendix C, the cost estimate tables for retained alternatives.

Volume I of the FS is organized into 20 sections: Section 1 provides the introduction, site background, and risk assessment summary. Section 2 briefly summarizes the ARARs, remedial action objectives, preliminary remediation goals, and general response actions. Sections 3, 4, and 5 present a brief summary of the applicable Upper Tenmile Creek FS results including identifying and screening technologies and process options; developing and screening likely alternatives for effectiveness,

implementability, and cost; and summarizing the potential remedial alternatives retained for detailed analysis. Section 6 provides the criteria and assumptions used for the detailed analysis of alternatives. Section 7 provides a discussion of the site categorization and prioritization scoring process used in evaluating waste rock and tailings alternatives. Section 8 presents an introduction to the evaluation of alternatives using the criteria described in Section 6. Sections 9 through 18 present the evaluation of the retained alternatives per each of the nine subareas in the Cataract Creek and Basin Creek areas of concern (AOC) based on the findings of the Upper Tenmile Creek FS. Section 19 presents a site wide summary of the costs of the alternatives. Section 20 lists references used.

1.2 Site Description

Basin Watershed OU2 covers an area of 77.2 square miles within the Boulder River watershed located in the Beaverhead-Deerlodge National Forest and in the northern portion of Jefferson County, Montana (Figure 1-1). OU2 includes eight miles of the Boulder River (along the southern boundary) and the entire Basin Creek and Cataract Creek watersheds (Figure 1-2). From the Boulder River and Interstate 15, OU2 extends northeast to the drainage divide between the Upper Tenmile Creek watershed and OU2, and northwest to the drainage divide between Little Blackfoot and Ontario watersheds and OU2. Prickly Pear watershed, High Ore Creek watershed, and Red Rock Creek watershed bound OU2 to the northeast, east and west, respectively. OU2 excludes the Town of Basin within the town limits because it is being addressed separately under the Superfund program (i.e., as OU1) (CDM 2000a). Basin Watershed OU2 was proposed for addition to the Superfund National Priorities List (NPL) on July 22, 1999 and listed on October 22, 1999 because of abandoned mine-related problems within OU2 and mining waste in the Town of Basin (OU1) (EPA 1999).

Basin Creek to the west and Cataract Creek to the east transect OU2 in a north-south orientation. Both creeks flow south and discharge to the Boulder River within 1 mile of each other (Figure 1-2). From their headwaters, Basin Creek flows approximately 17 miles to the Boulder River, while Cataract Creek flows approximately 13 miles. About 30 named and unnamed tributaries drain to Basin Creek and about 22 drain to Cataract Creek.

More than 300 abandoned hard rock mines exist within OU2. The Basin Creek Mine and the associated Luttrell Repository exist on the northern OU2 boundary between the Basin Watershed OU2 and Upper Tenmile Creek watershed. This FS does not address either of these areas because the Basin Creek Mine is the subject of separate reclamation requirements under its past operating permit issued and overseen by the Montana Department of Environmental Quality (MDEQ). However, other abandoned mines located on this property, but unrelated to Basin Creek Mine operations have been evaluated. EPA and the U.S. Forest Service (USFS) secured the Luttrell Repository as a joint repository to dispose of mining wastes removed from the area. The repository is operational and currently managed by EPA.

To facilitate evaluation of potential remedial action alternatives, OU2 was divided into three AOCs, the Basin Creek AOC, the Cataract Creek AOC and the Boulder River AOC. To further divide the site, five subareas were selected within the Basin Creek AOC, including (from upstream to downstream) (1) Upper Basin Creek, (2) South Fork Basin Creek, (3) Jack Creek, (4) Middle Basin Creek, and (5) Lower Basin Creek. Four subareas were selected in the Cataract Creek AOC including (from upstream to downstream) (1) Upper Cataract Creek, (2) Middle Cataract Creek, (3) Uncle Sam Gulch, and (4) Lower Cataract Creek. Both Basin Creek and Cataract Creek were further divided into reaches to account for the impact of individual tributaries on each of the creeks.

1.3 Site History

Mining activities in the Basin Watershed OU2 commenced in the late 1800s and continued intermittently into the 1960s. Mining first occurred in the Basin Creek and Cataract Creek watersheds about 1860 as placer operations. The first lode deposits were discovered in the 1870s, with the Eva May, Uncle Sam, Hattie Ferguson, Bullion, and Hope/Katy Mines being significant discoveries. Miners explored veins of quartz, tourmaline, pyrite, galena, tetrahedrite, sphalerite, arsenopyrite, chalcopyrite, and siderite within the Boulder Batholith for gold, silver, and copper. Some mineral processing facilities were located within OU2. The tailings wastes generated by these facilities were deposited in settling ponds often near streams. Smelters were later constructed to treat the complex ores rich in gold, lead, zinc, and copper.

Mining was most active during the 1890s and early twentieth century. Placer mining activity continued during the first half of the twentieth century and again during the depression of the 1930s. Subsurface mining continued until the 1960s when the Crystal Mine (Basin Creek AOC) ended production; however, the majority of minerals were mined prior to 1920. Between 1902 and 1957 the Basin Mining District produced minerals worth an estimated value of $11,700,309 (Montana Bureau of Mines and Geology [MBMG] 1960).

1.4 Mining Related Wastes and Mechanisms

Previous and current investigations have documented the mining-related contamination present in the environment in OU2. Table 1-1 presents the contaminant of concern (COCs) as identified during the RI, through a screening process in the baseline ecological risk assessment (BERA) (CDM 2002a). The sources of COCs in the Basin Watershed OU2 are mining waste (waste rock and tailings), soil, and stream sediments as well as natural mineral sources. Acid mine drainage (AMD), also called acid rock drainage (ARD), formed by exposure of sulfur and iron bearing materials in mine waste to moisture and air is the principal mechanisms for the release of mining-related contaminants.

1.4.1 Mining Wastes

Mining waste within the Basin Watershed OU2 consists of waste rock extracted from the underground mines, and/or waste materials left over from ore extraction through

milling operations or other methods. Waste rock material consists of rocks excavated or removed from the ground during mining operations but not processed for mineral recovery. Composition of this material can vary greatly depending upon specific mine operations and geology. Some waste rock may contain COCs similar to that of background or host rock not associated with the mineralized ore bodies. Other waste rock may be highly mineralized, ore grade materials with high concentrations of COCs. Waste rock can also vary greatly in size from fine grained to cobble or larger size material. Tailings are solid matrix waste products from milling operations. Tailings are uniformly fine-grained material, typically white to yellow in color, located near or along creek banks or within the stream as sediment.

Waste rock and tailings deposits are usually bare or sparsely vegetated due to elevated metals concentrations and low pH and consequently may be susceptible to erosion by wind and surface water. In addition, when subject to precipitation and surface water flow, COCs in these wastes may be leached into surface water, groundwater, sediments and soil.

1.4.2 Acid Mine Drainage/Acid Rock Drainage

AMD/ARD is low pH metal bearing water discharge from either underground mine workings (adits, tunnels, or shafts), or mine waste. When sulfide-bearing materials in underground mine workings or mine waste become exposed to water and oxygen, the sulfide undergoes and oxidation reaction that produces sulfuric acid (H_2SO_4). AMD/ARD occurs when the amount of sulfuric acid generated is greater than the acid neutralizing capacity of the host rock. For detailed information on the AMD/ARD process, the reader is referred to the RI Report (CDM 2005).

1.4.3 Migration and Transport of Site Contaminants

The mobilization of COCs is dependent upon several factors, including: (1) reaction rate, (2) rate of surface and subsurface water flow removing contaminants and allowing the reactions to continue towards completion, (3) erosion of soil-bound contaminants via storm water runoff and soils/sediments carried by such flow, (4) sorption coefficients, and (5) uptake and accumulation.

Contaminated adit discharges and seeps may flow directly into tributaries under normal flow conditions or under storm runoff conditions. Storm events may also transport waste rock materials to drainage channels that convey the material downstream and into Basin Creek, Cataract Creek, and the Boulder River.

Contaminated surface waters also seep into the subsurface in areas, contaminating subsurface soils and groundwater underneath OU2.

1.4.4 Contaminated Stream Sediments

Contaminated stream sediments are typically the result of waste rock and tailings materials deposited in streams through erosional mechanisms. This deposited waste material can contribute to metals loading in streams through leaching. In addition, sediments can become contaminated as a result of metal hydroxides precipitating out.

Contaminated stream sediments can become a source of contaminant releases to surface water when precipitated COCs become remobilized due to dissolution.

1.4.5 Contaminated Surface Water

Surface water quality can be degraded due to releases of COCs from waste rock, tailings, and contaminated sediment. Concentrations of COCs in surface water are highly dependent upon the release mechanisms, stream flow, and water chemistry. Degradation of surface water quality can be more severe during low stream flow conditions if the amount of COCs released to the stream, from an adit for example, remains relatively constant. Erosional impacts from waste rock and tailings during storm events or spring runoff also lead to degradation through COC release.

1.5 Nature and Extent of Contamination Summary

Previous and current investigations have documented the mining-related contamination present in the environment in OU2, as well as the risk to human and ecological health. A subset of the COCs, comprised of arsenic, cadmium, copper, lead, mercury, and zinc were used to describe the nature and extent of the mining-related contamination. These metals/metalloids are common to all the mine sites, and are recognized by EPA as indicators of mining-related contamination (EPA 2000).

In general, Cataract Creek AOC has been impacted the most by historical mining, followed by Basin Creek AOC. Within Cataract Creek and Basin Creek AOCs, Uncle Sam Gulch and Jack Creek subareas, showed the most impact due to historical mining. Although the Boulder River AOC has historical mines impacting site media, it is predominantly impacted at the surface water discharges and sediment transported from the Cataract Creek and Basin Creek AOCs. The following subsections summarize the conditions in each AOC.

1.5.1 Boulder River AOC Nature and Extent

Based on comparison to conservative benchmarks, the surface water and sediment in the Boulder River AOC are adversely impacted by the remnants of historical mining operations, and pose risk to human and environmental receptors.

Surface Water and Sediment

During the 2001 sampling, surface water COCs concentrations exceed ecological benchmarks (dissolved concentrations) throughout the Boulder River AOC. Human health benchmarks (total concentrations) in surface water were only exceeded in High Ore Creek during the 2001 sampling, while both Cataract Creek and High Ore Creek exceeded the human health benchmarks historically. Cataract Creek discharged the largest sulfate and combined COCs loads to Boulder River (CDM 2005).

Water quality samples collected by the USGS along Boulder River since the completion of the RI show that High Ore Creek through 2002 contributed the worst water quality relative to Basin and Cataract Creek, and that Cataract continues to contribute higher COC concentrations than Basin Creek. Both Basin and Cataract Creek did not have COC concentrations exceeding human health benchmarks at the mouth, although both exceeded ecological standards for cadmium, copper, and zinc.

Sediment samples in the Boulder River AOC exceed the ecological benchmarks and exceed the human health benchmarks in High Ore Creek tributary. Contaminated sediments in the Boulder River AOC come from Basin, Cataract, and High Ore Creek tributaries, as well as mine waste materials in close proximity to the river.

Mining Site Wastes

At least 25 mining sites have been identified in proximity to the Boulder River. During the Fall 2001 RI, it was estimated that eight of the 25 sites had been removed by Interstate Highway 15 construction, as there was no visual evidence of mine remnants. Five of the remaining sites (24JF0183, Merry Widow, Montana Central Railroad Ore Bins, 24JF0517 and 24JF0178) were determined to pose little threat to the Boulder River, because of the minimal amount of waste that was present and/or the great distances between the mine and the Boulder River. Since the completion of the 2001 RI two streamside tailings areas; Jib tailings and unnamed tailings area near the former Attwater Mill (i.e., existing golf course), were addressed as part of the Town of Basin record of decision (ROD) (CDM 2005).

Mining Site Seeps and Adits

No historical information was available on adit or seep discharges for mine sites in the Boulder River AOC . The only flowing adit located during the Fall 2001 investigation was the Merry Widow adit. Water quality at the Merry Widow adit was generally acceptable with respect to the COCs, although arsenic was above its human health screening level (CDM2005).

Groundwater

Groundwater data near the Boulder River evaluated included historical data from 13 groundwater wells. The groundwater data showed two exceedences of human health benchmarks. The exceedences were associated with dissolved lead (16.4 ug/L) in well 00BOU1-08-N-GW and total arsenic (9.3 ug/L) in well 00BOU1-10-N-GW, both sampled in June 2000. Both wells are in an area east of the Town of Basin within a small drainage situated along Reach 3 of the Boulder River. In addition, the groundwater media was evaluated throughout the town during the Town of Basin OU1 RI (CDM 2000a), which concluded that groundwater was not a media of concern. Although data from selected areas within the AOC suggest minor, if any, impacts to groundwater, no conclusion can be made regarding the nature and extent of COCs in groundwater and associated impact from mining activities in this AOC (CDM 2005).

1.5.2 Basin Creek AOC Nature and Extent

Based on comparison to conservative benchmarks, the surface water and sediment in the Basin Creek AOC are adversely impacted by the remnants of historical mining operations, and pose risk to human and environmental receptors.

Surface Water and Sediment

Surface water and sediment quality in the Basin Creek AOC are best with respect to human health and aquatic life benchmarks in the Basin Creek headwaters upgradient from the confluence with the Lady Leith Tributary and in South Fork Basin Creek.

Concentrations of COCs and sulfate increased downstream throughout the length of Basin Creek. South Fork Basin Creek had the lowest COCs and sulfate levels among the tributaries sampled in the Basin Creek AOC, while Jack Creek had the highest COCs and sulfate levels (CDM 2005).

Basin Creek, at its mouth discharges dissolved cadmium and dissolved zinc above their respective benchmarks to Boulder River. Sulfate and COCs values at the mouth of Basin Creek were 3, and 2 to 13 times higher, respectively, than sulfate levels in the headwaters at Station S001, indicating impact from ARD/AMD. Jack Creek contributes dissolved cadmium, dissolved copper, and dissolved zinc above benchmark concentrations year round, with the highest concentrations at the mouth of Jack Creek as much as 22 times the benchmarks.

Basin Creek AOC water quality samples collected by the USGS since the completion of the RI show that neither Basin or Jack Creek had COC concentrations exceeding human health benchmarks at the mouth, although Jack Creek subarea did contain the worst water quality relative to both human health further upstream near the Bullion tributary. The 2004 USGS data show that ecological benchmarks for cadmium, copper, and zinc continue to be exceeded at the mouth of Jack Creek.

Contaminated sediments in Basin Creek originate from two primary sources; the former Buckeye-Enterprise mine complex and Jack Creek. The frequency of COCs exceeding sediment screening levels and their concentrations increased downstream in Basin Creek. Below Lady Leith, and below Jack Creek were where Basin Creek sediment had the most COCs at the highest concentrations.

Based on the current benchmarks, surface water and sediment contribute to risk to human and environmental receptors in the Basin Creek AOC, and that Jack Creek subarea poses the worst risk to human and environmental receptors for surface water and sediment.

Mining Site Wastes

At least 100 mining sites have been identified in the Basin Creek AOC. Physical and chemical data are available for 41 of these mine sites. All of the tested mining sites had COC concentrations above ecological and human health benchmarks for soil. Grub Creek Station mine had the lowest COC concentrations, while the former Buckeye, former Enterprise, Dew Drop, former Bullion, and Daily West mines sites had the highest total COC concentrations. Sixteen of the mine sites in Basin Creek AOC had high ARD/AMD potentials. The Dew Drop, Lady Hennessey, RTI Recon: P, Adelaide, former Bullion Smelter, Aurora, and Daily West mine sites are the ones with the highest potential to produce ARD (CDM 2005).

The Buckeye, Enterprise, Bullion, and Bullion Smelter mine sites have been reclaimed by EPA and the USFS during operations between 2001 and 2003. The adits at these mining sites were not addressed during the reclamation. However, based on the current benchmarks, remaining mining site soils pose risk to human and

environmental receptors in the Basin Creek AOC. The Jack Creek subarea poses the worst risk to human and environmental receptors for mine waste (CDM 2005).

Mining Site Seeps and Adits

Adits and seeps at twelve of fourteen mine sites identified with adits or seeps have been sampled, and ten had COCs at concentrations exceeding either human health or ecological benchmarks. The Bullion, Lady Leith, Vindicator, and Josephine mine sites had the highest discharge rates and the highest dissolved COC loads. The same mine sites, along with the Enterprise mine site had the highest total COC loads (CDM 2005).

Groundwater

Groundwater data for the Cataract Creek AOC included historical data from a pond located at the Alsace, shafts located at the California, Corbitt, Eldorado and Plateau, Klondyke and Overland Creek mines, and two wells and one spring located in the vicinity of the Waldy Mine. Additionally, groundwater samples were collected via Micropush sampling methods at the Apollo, Cartwright Cabins 2, Cataract Tails, Eva May, Hattie Furgeson, and Near Boulder Vestal mine sites. A total of 20 samples are available for evaluation of the Cataract AOC.

Sixteen of the 20 groundwater samples exceeded the benchmark for arsenic. Seven of the groundwater samples exceeded the benchmark for lead. Cadmium and zinc exceeded the human health benchmark in two groundwater samples and copper exceed the human health benchmark in one groundwater sample.

No conclusion can be made regarding the nature and extent of the groundwater impact from mining activities throughout this AOC due to the limited available data (CDM 2005).

1.5.3 Cataract Creek AOC Nature and Extent

Based on comparison to conservative benchmarks, the surface water and sediment in the Cataract Creek AOC are adversely impacted by the remnants of historical mining operations, and pose risk to human and environmental receptors.

Surface Water and Sediment

Surface water and sediment quality in the Cataract Creek AOC is best with respect to human health and aquatic life benchmarks within the upper reaches, as well as in Deer Creek and Snowdrift Creek (CDM 2005). COCs and sulfate concentrations increase along the length of the Cataract Creek, with benchmarks first exceeded below the Apollo mine. The worst deterioration occurred downstream of Uncle Sam Gulch.

Among the subareas, COC concentrations in Uncle Sam Gulch subarea exceeded human health benchmarks the most. The COC concentrations in Uncle Sam Gulch subarea were as much as 8 times the human health benchmarks, whereas the COCs in the remaining subareas are generally equal to or less than the human health benchmarks (CDM 2005).

Uncle Sam Gulch and Unnamed Tributary 6 were the biggest sources of contaminated sediment to Cataract Creek, both historically and in 2001. In 2001, the limited sampling demonstrated that ecological benchmarks for arsenic, cadmium, copper, lead, and zinc still exceed benchmarks by up to 254 times.

Based on the current benchmarks, surface water and sediment contribute to risk to human and environmental receptors in the Cataract Creek AOC, and that Uncle Sam Gulch subarea poses the worst risk to human and environmental receptors for surface water and sediment.

Mining Site Wastes

At least 182 mining sites have been identified in the Cataract Creek AOC, and physical and chemical data are available for 67 of these mine sites. The USFS is addressing 6 of these mine sites, namely the Black Bear, Cracker, Grey Lead, Morning Glory Tailings, Phantom, and the Sirius (CDM 2005).

At least 22 mine sites are evaluated as having a high ARD/AMD potential and 22 mine sites are evaluated as having medium ARD/AMD potential. The Mary Anne, Sirius, Sylvan, Apollo, NE SE Section 14, Klondyke, Unnamed 001, Corbitt, North Ada-Piermont, and New Cottage mine sites are evaluated to have the highest ARD/AMD potential. The Crystal Mine was also evaluated to have a high ARD/AMD potential based upon its COC concentrations (CDM 2005). Based on the current benchmarks, mine wastes contribute to risk to human and environmental receptors in the Cataract Creek AOC, and that Uncle Sam subarea poses the worst risk to human and environmental receptors for mine waste.

Mining Site Seeps and Adits

Adit and seep samples were collected from 43 of 46 mine sites identified with adits or seeps, and most had at least one COC at concentrations exceeding human health and/or ecological benchmarks. The Crystal, Cracker, Crescent, Ada, Rocker, Ida M., Sirius, and Eva May mine sites have significant groundwater discharges with elevated COC concentrations.

The Crystal Mine is the most significant mine with respect to discharge and COC concentrations. The Crystal Mine has one discharging adit with a variable discharge measured between 20 and 66 gpm and a one-time pH measurement of 3.4. The adit discharge exceeds both ecological and human health benchmarks for arsenic, cadmium, copper, lead, and zinc. Ecological benchmarks are exceeded by as much as 4,860 times. Human health benchmarks are exceeded by as much as 551 times.

Groundwater

Groundwater data evaluated for the Basin Creek AOC included historical data from

springs, mine shafts, and groundwater wells. Additionally, groundwater samples were collected via Micropush sampling methods at the Apollo, Cartwright Cabins 2, Cataract Tails, Eva May, Hattie Ferguson, and near Boulder Vestal mine sites. A total of 20 groundwater samples are available for evaluation for the Cataract AOC. However, no conclusion can be made regarding the nature and extent of the groundwater impact from mining activities throughout this AOC due to the limited available data (CDM 2005).

1.6 Summary of Risk to Ecological and Human Receptors in OU2

This section summarizes the evaluation of the risks to ecological and human receptors posed by exposure to environmental media (i.e., surface water, sediment, or soil/mining waste) in the Basin Watershed OU2.

1.6.1 Ecological Risk

The exposure scenarios, pathways, and end points for the receptors in Basin Creek OU2 were very similar to neighboring Upper Tenmile Creek. Therefore, the ecological risk assessment (ERA) was streamlined based on the assumptions and risk calculation methods from the Upper Tenmile Creek Mining Area Superfund site baseline ecological risk assessment (BERA) (CDM 2001b), consistent with EPA's ecological risk assessment guidance for superfund (ERAGS) (EPA 1997).

The streamlined ERA indicated that unacceptable risk exist to ecological receptors in OU2 since more COCs in Basin Watershed OU2 are present at higher concentrations than determined to pose ecological risk in Upper Tenmile Creek (CDM 2001b). Also, site specific studies using fish and benthic macroinvertebrates demonstrated detrimental impact from elevated concentrations of metals, resulting in areas of reduced aquatic populations and areas devoid of populations (CDM 2002b).

Data also indicate that insectivorous birds, sensitive terrestrial macrophytes and some forms of soil invertebrates are at risk from metals-contaminated surface soils and other solids media. Finally, data indicate that degraded water quality and habitat are especially pervasive in Bullion Mine tributary, Jack Creek, and Uncle Sam Gulch subareas.

1.6.2 Human Health Risk

Human health risk assessment for the Basin Watershed OU2 was also evaluated based on the presumptive approach using the Upper Tenmile Creek HHRA (CDM 2001c) and the Town of Basin OU1 (CDM 2000b) HHRA assumptions. This presumptive approach was again justified because both watersheds have similar exposure scenarios and complete pathways. HHRA quantification, and development of preliminary remediation goals (PRGs) were performed using Basin Watershed OU2 concentrations only. The approach considers current EPA regulation and guidance and the bounds of technical feasibility.

Based on COC concentration data in Basin Watershed OU2, unacceptable risk in OU2 exists. Risk estimates for other exposure pathways, i.e. inhalation of ambient air and incidental ingestion of surface water are within or below EPA's acceptable range.

Section 2
Remedial Action Goals and Objectives

The goal of the Superfund process is to delineate the nature and extent of contamination at OU2 and develop/select remedies in accordance with CERCLA criteria. These criteria require that remedies be protective of human health and the environment and comply with applicable or relevant and appropriate requirements (ARARs). In addition, a range of cleanup alternatives must be considered and evaluated on seven additional criteria including: long term effectiveness and permanence, reduction of toxicity, mobility, and volume through treatment, short term effectiveness, implementability, cost, state acceptance, and community acceptance.

Preliminary remedial action objectives (PRAOs) and preliminary remediation goals (PRGs) have been developed for OU2. The general cleanup objectives and goals identified in this FS are typical of those used for cleanup actions at abandoned mine sites. They are updated during the RI/FS process as additional site specific information becomes available. The final remedial action objectives and final remediation standards will be identified in the ROD for OU2.

2.1 Applicable or Relevant and Appropriate Requirements

Section 121 of CERCLA requires that the selected remedy comply with ARARs. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) identifies three classifications of ARARs: chemical-specific, action-specific, and location-specific. During the RI/FS, federal and state regulatory statutes, regulations, and rules were evaluated to identify potential ARARs. A summary of potential federal and state ARARs is provided in Appendix A. The following sections summarize the potential chemical-, location-, and action-specific requirements for OU2.

Chemical-Specific ARARs. Chemical-specific ARARs are federal and state health- or risk-based numeric standards that are promulgated for specific site media. The numeric standards are the maximum allowable amount or concentration of a chemical that may be found in or discharged to the ambient environment to protect against unacceptable risks to human health and the environment. Chemical-specific ARARs exist for groundwater and surface water, but do not exist for waste rock, tailings, soils, or sediments.

Location-Specific ARARs. Location-specific ARARs are statutory or regulatory restrictions on the management of hazardous substances or on the conduct of remedial activities because they are in specific locations. Special locations include flood plains, wetlands, historic places, and sensitive ecosystems or habitats.

Action-Specific ARARs. Action-specific ARARs are technology- or activity-based requirements or limitations on remedial actions taken with respect to hazardous

wastes. These requirements are triggered by the particular remedial activities selected.

2.2 Preliminary Remedial Action Objectives

PRAOs for OU2 include the following:

Surface Water

Basin Creek is classified as an A1 stream in the administrative record (ARM 2004) and consequently considered a potential drinking water source by the State of Montana. As such, Basin Creek needs to be maintained suitable for consumptive use after conventional treatment for removal of naturally present impurities, even though the Town of Basin no longer augments its drinking water supply by pumping from Basin Creek. Cataract Creek is not classified for specific water use in the administrative record. However, Montana DEQ's water quality reporting database (Environet) has Cataract creek classified as a B1 stream. Basin and Cataract creeks do not meet the requirements for suitable drinking, culinary and food processing use, and are on DEQs most recent 303(d) list.

Potential end users of Basin Creek, the town of Basin, has a municipal water system comprised of groundwater wells. The town of Basin has no present or future plans to use water from Basin creek to augment its water supply. However, since Basin Creek is classified as an A1 potential drinking water source, and alternative for reaching drinking water standards will be carried through this FS process.

This FS assumes using water from Basin Creek to augment the Town of Basin drinking water source if ever this would become a need in the future. It is assumed that the point of intake would be at the confluence of Basin Creek with Boulder River. Based on this assumption, the surface water PRAOs for the Basin Watershed OU2 are:

- Provide potential drinking water use of surface water at the confluence of Basin Creek and Boulder River.
- Achieve acceptable exposure risks for residents and visitors.
- Achieve acceptable exposure risks to terrestrial and aquatic species.

Groundwater

This FS assumes that the nature and extend of groundwater contamination in Basin Watershed OU2 will not be evaluated. However the groundwater PRAO would protect current and reasonably expected use of groundwater, and prevent or minimize contaminant loadings from groundwater to surface water.

Mine Wastes, Soils, and Sediments

This FS assumes that the nature and extend of mine waste, soils and sediment contamination have been characterized and that the worst areas of risks to human health and environment exist in Jack Creek and Uncle Sam Gulch subareas (CDM

2005). The PRAO for mine waste, soils and sediments in Basin Watershed OU2 are:

- Achieve acceptable exposure risks for residents and visitors.
- Achieve acceptable exposure risks to terrestrial and aquatic species.

2.3 Preliminary Remediation Goals

The PRGs for human and ecological health were developed using exposure assumptions and historical chemical concentrations in OU2. These PRGs are initial guidelines; they do not set remediation levels or determine that cleanup actions to meet these risk-based PRGs are warranted. Final remediation levels will be selected by EPA following review and evaluation of all available data and information, including risks identified in the final risk assessment documents, anticipated effectiveness of potential cleanup alternatives, and other remedy selection criteria, such as public and state preferences. The PRGs for surface water, groundwater, mine wastes, soils, and stream sediments in the Basin Watershed OU2 are discussed below.

Surface Water

PRGs for surface water are based on the State of Montana's water quality standards, which are defined numerically in MDEQ Circular WQB-7 (WQB-7)(MDEQ 2004). The surface water PRGs are intended to provide for the potential use of surface water at the confluence of Basin Creek and the Boulder River as drinking water supply. Under the surface water PRGs, surface water at the confluence of Basin Creek and the Boulder River need to meet acute and chronic aquatic life criteria for all COCs. If both human health drinking water standards and the aquatic life standards exist for the same COC, the more restrictive of the standards is used as the state's surface water quality standard. These PRGs are:

- Attain maximum contaminant levels (MCLs) or state human health standards for all COCs at the confluence of Basin Creek and the Boulder River
- Attain acute and chronic aquatic life criteria for all COCs in surface water
- Attain total maximum daily load (TMDL) water quality criteria for all COCs once those criteria are established in the TMDL process

Table 2-1 identifies the numeric surface water PRGs for the Basin Watershed OU2.

Groundwater

PRGs for groundwater are also based on the MDEQ Circular WQB-7 (MDEQ 2004).

The groundwater PRGs are intended to:

- Protect current and future use of groundwater
- Prevent groundwater from limiting the ability of the streams to attain surface water quality standards by implementing mine waste area source controls.

Table 2-2 identifies the numeric groundwater PRGs for the Basin Watershed OU2.

Mine Wastes and Soils

The PRGs for mine wastes and soils address potential risks to site residents, workers, and recreational visitors from exposure to OU2-related COCs. The PRGs for mine waste, soil, and dust relative to human health represent a range of possible exposure levels due to carcinogenic COCs within EPA's defined acceptable excess cancer risk range of one in 10,000 ($1x10^{-4}$) to one in 1,000,000 ($1x10^{-6}$) (CDM 2000b). The PRGs for mine wastes and soils take into account intakes from all major exposure pathways, and are protective of total exposures through all pathways across OU2. The PRGs for mine wastes and soils are:

- Achieve exposure risks to residents and visitors in the acceptable risk range of 10^{-4} to 10^{-6} or less
- Achieve cleanup levels determined during the BERA to present acceptable risks to terrestrial and aquatic species.

Table 2-3 identifies the numeric mine wastes and soil PRGs the Basin Watershed OU2.

Stream Sediments

The PRGs for stream sediments address potential risks to aquatic life from exposure to OU2-related COCs. The PRGs for sediments are:

- Achieve cleanup levels determined during the BERA to present acceptable risks to aquatic species.
- Prevent sediments from limiting the ability of the streams to attain surface water quality standards.

Table 2-4 identifies the numeric stream sediment PRGs for the COCs at the Basin Watershed OU2.

2.4 General Response Actions

General response actions (GRAs) are broad classes of actions that might be implemented alone, or in combination, to satisfy the cleanup objectives. The GRAs considered likely for remediation in OU2 follow:

- No action leaves sources in their existing condition with no control or cleanup planned. In accordance with the NCP, the no action alternative must be retained for consideration to provide a baseline against which other options can be compared.
- Natural attenuation includes a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or water. Natural attenuation is generally used in conjunction with an active alternative.
- Institutional controls are legal and physical restrictions intended to control or prevent present and future use and access to source areas. This may include such remedies as providing alternative water supplies to prevent the use of contaminated

water sources. Institutional controls are not intended to substitute for engineering aspects of a remedy.

- Containment involves physical measures applied to sources to control the release of contaminants or direct contact or exposure.
- Removal, transport, and disposal involves a complete or partial removal of source material followed by transportation to and disposal at a different location.
- Treatment involves physical, chemical, or biological measures applied to the source materials or contaminated media that reduce toxicity, mobility, and/or volume of the contaminants present.
- Resource utilization involves use or reuse of the source materials as a commercial product which, by the use or reuses, removes the source partially or totally from OU2.

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Section 3
Identification and Screening of Remedial Technologies and Process Options

This section presents the results of the identification and screening of technologies and process options that are potentially applicable for use in remediation of OU2. These technologies and process options are subsets of each of the GRAs presented in Section 2.5, applicable to the type of media in OU2 and feasible of implementation.

Using EPA's presumptive remedy guidance for an FS, the results of this screening step would be identical to the results of the Upper Tenmile Creek FS (CDM 2001a). Therefore, the process options and technologies for each GRA and the rationale for retaining them for consideration for use in the Basin Watershed OU2 are presented in Table 3-1.

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Section 4
Development and Screening of Remedial Alternatives

In this section, the technologies and process options retained from Section 3 are integrated to form media-specific remedial alternatives. These alternatives were developed for the waste sources and contaminated media in OU2 which include waste rock and tailings, AMD/ARD, stream sediments, surface water, and groundwater.

Each alternative developed in this section was screened based on three broad criteria: effectiveness, implementability, and cost in accordance with the EPA FS guidance. Alternatives retained under this screening step are then carried through the detailed analysis step of the FS process. Descriptions of these screening criteria are provided below.

Effectiveness. Effectiveness relates to the potential of an alternative to achieve the remedial action objectives considering the chemical and physical characteristics of the source and OU2 conditions. Potential impacts to human health and the environment during the construction and implementation phases, as well as the reliability of the process with respect to OU2 conditions are also considered. For the purposes of this evaluation, three relative levels of effectiveness, low, moderate or high are determined for each alternative.

Implementability. During an evaluation of the implementability of a remedial alternative, the technical and administrative feasibility of constructing, operating, and maintaining the alternative is measured. Technical feasibility takes into account whether or not the remedial alternative is applicable to OU2 and can be properly constructed and operated in OU2. The evaluation considers long-term operation, maintenance, and monitoring of the implemented alternative. Administrative feasibility considers regulatory approval and scheduling restraints, as well as the availability of disposal services, disposal locations, and the necessary construction expertise and equipment. For the purposes of this evaluation, three relative levels of implementability, easy, moderately difficult, or difficult are determined for each alternative.

Cost. The cost evaluation of a remedial alternative provides a comparative cost estimate among alternatives without the need for absolute accuracy. The cost estimates are made using similar sets of assumptions throughout the process. The evaluation is similar to the process used for the final detailed cost analysis but with a lesser degree of refinement and precision. For purposes of this evaluation, three relative levels of cost, low, moderate, or high are determined for each alternative.

Based on the presumptive remedy guidance, the results of the screening of alternatives for the Basin Watershed OU2 would be identical to the results of the *Upper Tenmile Creek Remedial Alternatives Screening Technical Memorandum* (CDM 2000c), the *Upper Tenmile Creek Remedial Alternatives Evaluation Technical Memorandum* (CDM 2000d), and the Upper Tenmile Creek FS (CDM 2001a). This would be true for the relative rating of costs as well. A summary of the applicable alternatives retained for detailed analysis for each waste source category are presented in Table 4-1.

Section 5
Retained Remedial Alternatives

In this section of the FS, the media specific remedial alternatives retained from Section 4 are presented in detail. These retained alternatives are presented for the waste rock and tailings (encompassing all mine waste and soil contamination), acid mine and acid rock drainage, stream sediments, surface water, and groundwater sources of contamination in OU2. Alternatives that were not retained as stand-alone alternatives but which have been combined with retained alternatives are noted in the discussion.

5.1 Waste Rock and Tailings Alternatives

Waste rock and tailings were addressed together in the development and evaluation of remedial alternatives. These alternatives will be evaluated for all mine waste and soil contamination from mine waste. AMD/ARD production from mine waste rock and tailings will also be addressed in these alternatives.

Important factors considered when developing and evaluating waste rock and tailings alternatives for this FS include the following:

- Size and stability of waste material
- Access to waste material
- Runon to waste material
- Leachability of contaminants
- Contaminant concentrations
- Presence of hazardous waste
- Distance and pathways to surface water
- Amount of active erosion

All waste rock and tailings alternatives retained for detailed analysis have been designated waste rock (WR) alternatives.

5.1.1 Alternative WR1 - No Action

Under this alternative, no remedial action would be conducted within OU2. Existing conditions would be allowed to continue in their current state, and no actions would be conducted to remove, isolate, or remediate waste rock or tailings contamination. Consequently, long-term human health and environmental risks associated with the onsite contamination would remain unchanged. Natural attenuation would be expected to reduce contaminant mobility and toxicity over time; however, no monitoring would be required under this alternative to assess changes in conditions in OU2. Therefore, conditions in OU2 are assumed to remain as they currently are

under this alternative. The NCP requires that no action be included among the general response actions evaluated in every FS. The no action response provides a baseline for comparison to the other remedial response actions.

5.1.2 Alternative WR2 - Surface Controls

This alternative would involve (1) consolidating similar waste types into smaller areas; (2) grading and recontouring the waste to reduce slopes and improve land forms, vegetative, and structural stability; (3) reconstructing localized surface water drainages; (4) incorporating amendments into the upper layer of waste to provide acid buffering and enhance vegetation; and (5) revegetating the disturbed areas.

5.1.3 Alternative WR3 - Containment

The alternative of containment in place would involve (1) consolidating similar waste types into smaller areas; (2) grading and recontouring the waste to reduce slopes and improve land forms, vegetative, and structural stability; (3) reconstructing localized surface water drainages; (4) incorporating amendments into the upper layer of waste to provide acid buffering and enhance vegetation; (5) capping the area with the appropriate cover; and (6) revegetating the disturbed area.

An earthen cap and an earthen cap with a geomembrane liner are presently being considered under this alternative. Installation of an earthen cap would involve grading and compacting the waste material surface, placing a compacted layer of fine-grained soil over the waste material surface, and placing a soil cover over the fine-grained soil cap. Depending on the acid-generating characteristics of the waste material, neutralizing amendments may be mixed with the waste material surface before compacting it.

Installation of an earthen cap with a geomembrane liner likely would not include the addition of neutralizing amendments to the waste material surface. Following the grading and compacting of the waste material surface, and depending on whether the waste material surface was fine-grained or rocky, a protective soil layer would be placed over the waste material surface. If necessary, for further protection of the geomembrane liner, a geotextile layer may be placed over the protective soil layer before placement of the geomembrane liner. A drainage layer, such as clean sand or a geonet, could be placed above the geomembrane liner as a drainage layer or hydraulic break, if cover material conditions warranted it. A geotextile layer would typically be placed over the drainage layer, and the final soil cover would be placed over the geotextile.

The type of cap (earthen cap or earthen cap with a geomembrane liner) to be installed over the waste would depend on the following circumstances: (1) the metals concentrations found within the waste areas; (2) the average amount of precipitation that may infiltrate the cap; and (3) regulatory concerns. Engineering details on the type of either cap will be determined during the design phase of this remedial alternative. The higher the toxicity and mobility of the contaminants, the more likely the earthen cap with a liner would be chosen over the earthen cap without a liner. It is assumed in the FS that an earthen cap would be chosen.

The availability of suitable cover soil in proximity to the mine sites is an important aspect of this alternative. Suitable cover soil borrow areas, including land ownership and proximity to access roads are assumed to exist within each subarea.

5.1.4 Alternative WR4 - Excavation and Disposal at Luttrell Repository

This alternative would involve the following activities: (1) excavating the wastes at their source; (2) constructing a holding cell within the Luttrell Repository; (3) hauling and placing the waste into the cell; (4) encapsulating the waste with the appropriate design; and (5) grading, covering, conditioning, and revegetating the excavated area surfaces. A monitoring program, including installation of onsite groundwater monitoring wells with regular sampling has previously been established at the Luttrell Repository.

EPA is currently disposing of mine waste at the Luttrell Repository. The design of the Luttrell Repository is already completed and approved by EPA and expansion of the repository for disposal of additional wastes would follow established design protocols. The Luttrell Repository would substantially reduce the potential for leachate production within the waste. The estimated costs for disposal and operations and maintenance of the Luttrell Repository are based on data developed by EPA.

This alternative would be dependent upon the availability of suitable cover soil for reclaiming excavated waste areas. Suitable cover soil borrow areas, including land ownership and proximity to access roads, are assumed to exist within each subarea.

5.2 Acid Mine and Acid Rock Drainage

AMD/ARD contamination generated by flowing adits within the Basin Watershed OU2 are addressed in the acid drainage (AD) alternatives. Important factors considered when developing and evaluating AD alternatives for this FS include the following:

- Quantity and seasonal variations of AMD/ARD
- Chemical characteristics of AMD/ARD (including pH, Eh, iron, manganese, alkalinity, acidity, and other metals)
- Area available for construction/treatment
- Availability of materials for constructing and maintaining a treatment process
- Regulatory acceptance for variations in discharge effluent quality

5.2.1 Alternative AD1 - No Action

Under this alternative, no remedial action would be conducted within OU2. Existing conditions would be allowed to continue in their current state, and no actions would be conducted to contain, manage, or treat the AMD/ARD. Consequently, long-term human health and environmental risks associated with the onsite and offsite impacts from the continued acid drainage would remain. Some natural attenuation would be

expected to occur over time, but no monitoring to assess improvements would be required.

There would be some associated reduction in mobility and toxicity with natural attenuation; however, there would be no reduction in contaminant volume. OU2 conditions are assumed to remain as they currently are under this alternative. The NCP requires that no action be included among the general response actions evaluated in every FS. The no action response provides a baseline for comparison to the other remedial response actions.

5.2.2 Alternative AD2 - Natural Attenuation

Under the natural attenuation alternative, no controls or long-term measures would be placed on the AMD/ARD in OU2. This alternative is essentially the same as the no action alternative except that monitoring would be included to confirm remediation by natural attenuation. Natural attenuation processes would be expected to be active at the contaminated sites and provide some minor measure of remediation through a variety of physical, chemical, or biological processes. Natural attenuation of AMD/ARD remediation would be expected to include a reduction in metal mobility and toxicity (primarily through immobilization) along with some improvements in water quality through oxidation and dilution. These natural processes would act without human intervention to reduce the toxicity and mobility of some metals in the AMD/ARD. The total mass or volume of metals within the OU2 system would not be reduced unless there was significant leaching of metals and infiltration to the subsurface or loss of certain metals through volatilization over time.

5.2.3 Alternative AD3 - Source Water Controls

This alternative would involve a combination (as appropriate, depending upon site-specific conditions) of surface control measures and mine grouting to reduce or eliminate the volume of contaminated water leaving the mine workings. Although surface water controls and grouting were not retained as stand-alone alternatives, an alternative using a combination of these alternatives was developed for detailed analysis. Evaluation of this alternative is deemed appropriate since it provides a method to reduce or eliminate AMD/ARD without significant long-term maintenance costs. Each of these components is described below:

Surface Water Controls

This alternative would involve implementing one or more surface water control measures to reduce the volume of surface water infiltration and percolation into the underground mine workings or acid-forming waste rock piles. Surface water infiltration is the source of water for most AMD/ARD discharges. By regrading, capping, and covering water pathways to underground mine workings (e.g., open shafts or caved-in stopes), rerouting small drainages, revegetating, and enhancing surface water runoff, the volume of surface water available to enter mine workings could be reduced, thus reducing the volume of AMD/ARD that discharges from the mine or waste materials.

Grouting

This alternative would involve a grouting program that would reduce the volume of AMD/ARD generated by a specific underground mine by isolating uncontaminated surface water and groundwater from the acid-producing rock zones. This alternative would not directly reduce or prevent human and animal access or contact with the AMD/ARD or the areas of concern. This alternative typically would involve the injection of grout through vertical or horizontal boreholes into subsurface fracture systems near mine workings. The grouted fracture systems, in this way, could reduce the volume of water moving in, through, and out of an underground mine.

5.2.4 Alternative AD4 - Biological Treatment

This alternative would involve the diversion of AMD/ARD to a passive biological system for treatment of metal contaminated waters. For purposes of costing in this FS, the passive system evaluated was a constructed wetland system typically consisting of a shallow basin containing a substrate of grassy and woody materials, manure, and limestone. A representative constructed wetland design may be based on a 90 percent removal of zinc, 20-year design life. Anoxic limestone drains, open channel limestone drains, physical oxygenation, and natural oxidation structures can be installed upstream of the wetlands to increase its efficiency. Used substrate is assumed to be periodically disposed of at the Luttrell Repository. Biological treatment will be evaluated on either a subarea or point source basis in each subarea.

5.3 Stream Sediment Alternatives

Important factors considered in developing and evaluating stream sediment (SD) alternatives for this FS include the following:

- Extent of contaminated sediment
- Access to sediment areas
- Sediment toxicity
- Potential for impacting drinking water

5.3.1 Alternative SD1 - No Action

Under this alternative, no remedial action would be conducted within OU2. Existing conditions would be allowed to continue in their current state, and no actions would be conducted to remove, isolate, or remediate contaminated stream sediment. Consequently, long-term human health and environmental risks associated with the onsite contamination would remain unchanged. Natural attenuation would be expected to reduce contaminant mobility and toxicity over time; however, no monitoring for natural attenuation would be required under this alternative to assess changes in site conditions. Therefore, OU2 conditions would be assumed to remain as they currently are under this alternative. The NCP requires that "no action" be included among the general response actions evaluated in every FS. The no action response provides a baseline for comparison to the other remedial response actions.

5.3.2 Alternative SD2 - Natural Attenuation

Under the natural attenuation alternative, no controls or long-term measures would be placed on the contaminated stream sediments within OU2. This alternative is essentially the same as the no action alternative except that monitoring would be included to confirm remediation by natural attenuation. Natural attenuation processes would be expected to be active at the contaminated sites and provide some measure of remediation through a variety of physical, chemical, or biological processes. For contaminated stream sediments, these processes, under favorable conditions, would act without human intervention to reduce the toxicity and mobility of contaminants. The total mass or volume of contaminants would not be reduced; however, the mass located onsite may diminish over time as contaminants are transported off site through erosion and dissolution.

5.3.3 Alternative SD3 - Excavation and Disposal at Luttrell Repository

This option would involve the following: (1) excavating the contaminated stream sediments at the source by either mechanical excavation or hydraulic dredging; (2) dewatering the removed sediments; (3) transporting the waste to the Luttrell Repository; (4) encapsulating the waste with the appropriate design; and (5) reestablishing stream bed sediment using clean sources, as necessary.

EPA is currently disposing of mine waste at the Luttrell Repository. The Luttrell Repository would substantially reduce the potential for leachate production within the waste. The design of the Luttrell Repository is already completed and approved by EPA and expansion of the repository for disposal of wastes would follow established design protocols. The costs for disposal and operations and maintenance of the repository have been developed by EPA. Dewatering of removed sediment likely would be required and could include construction of sediment/evaporation basins at the excavation location.

5.4 Surface Water Alternatives

Important factors considered in developing and evaluating surface water (SW) alternatives for this FS include the following:

- Quantity of seasonal variations in surface water flows, including Basin Creek and Cataract Creek, and the Boulder River
- Quality of the surface water (including pH, Eh, iron, manganese, alkalinity, acidity, and other metals) in Basin Creek and Cataract Creek, the Boulder River, and all drainages into these streams.
- Areas available for construction/treatment

5.4.1 Alternative SW1 - No Action

Under this alternative, no remedial action would be conducted within OU2. Existing conditions would be allowed to continue in their current state, and no actions would

be conducted to contain, manage, or treat contaminated surface water. Consequently, long-term human health and environmental risks associated with the onsite and offsite impacts from the contaminated surface water would remain. Some natural attenuation would be expected to occur over time, but no monitoring to assess changes would be required. There would be some associated reduction in mobility and toxicity with natural attenuation; however, there would be no reduction in contaminant volume. OU2 conditions would be assumed to remain as they currently are under this alternative. The NCP requires that no action be included among the general response actions evaluated in every FS. The no action response provides a baseline for comparison to the other remedial response actions.

5.4.2 Alternative SW2 - Natural Attenuation

Under the natural attenuation alternative, no controls or long-term measures would be placed on contaminated surface water in OU2. This alternative would be essentially the same as the no action alternative, except that monitoring would be included to confirm remediation by natural attenuation. Natural attenuation processes would be expected to be active at the contaminated sites and provide some minor measure of remediation through a variety of physical, chemical, or biological processes. Natural attenuation of contaminated surface water would be expected to include a reduction in metal mobility and toxicity (primarily through immobilization) along with some improvements in water quality though oxidation and dilution. These natural processes would act without human intervention to reduce the toxicity and mobility of some metals in the contaminated surface water. The total mass or volume of metals in OU2 system would be reduced slowly as the metals were transported off site by surface water flow.

5.4.3 Alternative SW3 - Biological Treatment

Under this alternative, surface water would be diverted into either constructed wetlands or biotreatment systems. Since both wetland and biotreatment systems would not require the continuous application of chemicals, they should require less maintenance and be less costly than many active water treatment systems. In addition, up front technologies such as anoxic limestone drains, open channel limestone drains and natural oxidation structures can be installed upstream of both systems to increase efficiency. Constructed wetlands were used as the model for costing this alternative in this FS.

5.4.4 Alternative SW4 - Physical/Chemical Treatment

Under this alternative, a physical/chemical treatment facility utilizing technologies such as neutralization-oxidation-precipitation, reverse osmosis, or ion exchange would be constructed to treat surface water. Final design of the treatment process would require additional investigation into the nature of the metal contamination and other water quality parameters in OU2.

In the Upper Tenmile Creek FS, the estimated cost for implementation of Alternative SW4 was on average 10 times the cost of the next highest treatment alternative for surface water in every Upper Tenmile Creek subarea. Because of its cost relative to the remaining alternatives, it was generally eliminated in the Basin Watershed OU2

FS detailed analysis based on these high costs. However, this alternative will be carried through the detailed alternative analysis step for the Boulder River AOC, since the intake for such treatment would be placed at the confluence Basin Creek and Boulder River . The only potential end users of surface water as a drinking water source in the Basin Watershed OU2 are residents in the Town of Basin in the event that the town decided in the future that it needed to augment its existing water supply.

The additional water required to augment the water supply would be taken as a slip stream of the Boulder River at the confluence with Basin Creek. This would minimize the cost of the facility since it would not require the flexibility to treat the drastically changing seasonal flow rates seen in Basin Creek. Also, evaluating the construction of one plant in the Boulder River AOC would minimize operations and maintenance costs as the Boulder River AOC runs along an existing highway. This would facilitate periodic chemical deliveries needed to support a treatment facility, lower construction costs, and minimize the impact of road construction and maintenance to the water treatment facility. This step was taken to streamline the detailed analysis of alternatives as is outlined in the EPA presumptive remedy guidance. Therefore, Alternative SW4 will only go through the detailed analysis step of the FS process in the Boulder River AOC.

5.5 Groundwater

The levels of COCs in groundwater in OU2 do not pose a threat to either human health or the environment. Therefore, no alternatives are evaluated for groundwater (GW) at this time. Should future sampling events show COC levels that pose risk to human health or the environment, alternatives can be developed for groundwater contamination at that time. Any loading contributed by groundwater seeps to surface water will be addressed in either a waste rock and tailings or AMD/ARD alternative.

Section 6
Criteria and Assumptions Used for the Analysis of Alternatives

The alternatives retained after the screening step presented in Section 4 of this FS undergo a detailed analysis using nine criteria in accordance with the NCP. These criteria are separated into three groups, threshold criteria, secondary balance criteria and final modifying criteria. The first two criteria, overall protection of human health and the environment and compliance with ARARs are threshold criteria that must be satisfied by any remedial action alternative. The next five criteria, long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness, implementability; and cost are secondary balance criteria weighed against the alternatives that satisfy the threshold criteria. The last two criteria, state acceptance and community acceptance are the final modifying criteria that are not evaluated in the FS process, but are considered after receipt of comments on both the FS and proposed plan from both the state and public. Each of the nine criteria are described in detail below.

6.1 Overall Protection of Human Health and the Environment

Each alternative will be assessed to determine whether it can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present in OU2. This protection would be provided by eliminating, reducing, or controlling exposures of contaminants above human health and ecological protection levels. Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.

6.2 Compliance with ARARs

Each alternative will be assessed to determine whether it will attain ARARs under federal and state environmental or facility siting laws. ARARs for OU2 are discussed in Appendix A.

6.3 Long-Term Effectiveness and Permanence

Each alternative will be assessed for the long-term effectiveness and permanence it provides, along with the degree of certainty that the alternative will prove successful. Factors to be considered, as appropriate, include the following:

- Magnitude of residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities. The characteristics of the

residuals are considered to the degree that they remain hazardous, taking into account their toxicity, mobility, or volume and propensity to bioaccumulate.

- Adequacy and reliability of controls, such as containment systems and institutional controls necessary to manage treatment residuals and untreated waste. This factor addresses the uncertainties associated with land disposal for providing long-term protection from residuals, the assessment of the potential need to replace technical components of the alternative, and the potential exposure pathways and risks posed should the remedial action need replacement.

6.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

The degree to which each alternative employs recycling or treatment that reduces toxicity, mobility, or volume will be assessed, including how treatment is used to address the principal threats posed by OU2. Factors to be considered, as appropriate, include the following:

- The treatment or recycling processes the alternatives employ and materials they will treat
- The amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled
- The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment or recycling and the specification of which reductions are occurring
- The degree to which the treatment is irreversible
- The type and quantity of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate such hazardous substances and their constituents
- The degree to which treatment reduces the inherent hazards posed by principal threats in OU2

6.5 Short-Term Effectiveness

The short-term impacts of each alternative will be assessed considering the following:

- Short-term risks that might be posed to the community during implementation of an alternative
- Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures
- Potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation

- Time until protection is achieved

Alternatives having fewer impacts to the community, workers, and the environment during implementation and those using reliable protective measures meet the short-term effectiveness criterion to a greater extent than alternatives with greater impacts. Alternatives requiring a short period of time until protection is achieved are more favorable than those requiring a longer time frame.

6.6 Implementability

The ease or difficulty of implementing each alternative will be assessed by considering the following types of factors, as appropriate:

- Technical feasibility, including technical difficulties and uncertainties associated with the construction and operation of a technology, the reliability of the technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy. Technical feasibility also includes the potential difficulties and adverse impacts associated with road building to access remote sites.

- Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for offsite actions).

- Availability of services and materials, including the availability of adequate offsite treatment, storage and disposal capacity and services; the availability of necessary equipment, specialists, and provisions to ensure any necessary additional resources; the availability of services and materials; and availability of prospective technologies.

6.7 Cost

The types of costs that will be assessed include the following:

- Capital costs, including both direct and indirect costs

- Annual operation and maintenance (O&M) costs

- Net present worth of capital and O&M costs

The present worth of each alternative provides the basis for the cost comparison. The present worth cost represents the amount of money that, if invested in the initial year of the remedial action at an assumed interest rate, would provide the funds necessary to make future payments to cover all costs associated with the remedial action over its planned life.

The present worth analysis will be performed on all remedial alternatives using a 7 percent discount (interest) rate over the period required for the alternative to complete remediation. Inflation and depreciation will not be considered in preparing the present worth costs. Appendix C contains spreadsheets showing each component

of the present worth costs. Assumptions used in preparing these costs are also provided in Appendix C.

6.8 State Acceptance

This assessment will include a determination of which components of the alternatives the state of Montana supports, has reservations about, or opposes. Assessment of issues of concern to the state of Montana will not be completed until comments on the FS are received.

6.9 Community Acceptance

This assessment will include a determination of which components of the alternatives interested persons in the community support, have reservations about, or oppose. This assessment will not be completed until public comments are received on the FS and proposed plan.

Section 7
Analysis of Alternatives for Waste Rock and Tailings for all Subareas

The detailed analysis of alternatives for waste rock and tailings is conducted on a site-wide basis. Mine sites are categorized based on a scoring process and the detailed analysis is performed on categories of mine sites. The scoring and categorization process is discussed in Section 7.1 and a detailed and comparative analysis of remedial alternatives is presented in Section 7.2.

7.1 Mine Site Categorization and Prioritization Process

A process of mine site categorization and prioritization based on a modified abandoned inactive mine scoring system (AIMSS) has been developed to facilitate the evaluation of remedial alternatives for waste rock and tailings. The AIMSS based scoring process utilized was initially developed for the Upper Tenmile Creek Mining Area Site FS (CDM 2001a). This approach was used to facilitate the evaluation of the large number of mine sites within OU2 (345 main and secondary areas). Each mine site is assigned a score based on OU2-wide characteristics and potential impact of the solid media (waste rock or tailings) on human health and the environment. The mine sites are then grouped into five categories based on score. The scoring process is described in Section 7.1.1 and the categorization process in Section 7.1.2.

7.1.1 Mine Site Scoring

A numeric score is assigned to each mine site using information pertaining to existing and potential environmental impact of the solid media present at the site. Each site's score is developed from the evaluation of three general areas: existing and potential direct contact risks, existing or potential impact to surface water quality, and existing or potential impact to groundwater quality. Mine sites have been separated into two groups for scoring purposes, a group of mine sites investigated, for which site-specific environmental data are available and a group of mine sites that were little in size or were inaccessible, with no site-specific data.

For sites that were not visited, default data based on subarea averages, combined with field or map measured distances, were used to calculate a score. Mine sites can then be ranked relative to one another within each group. Because of actual and estimated default data, the scoring methodology is slightly different between the two groups, and, as a result, site scores should not be compared between groups. A description of the methodology used in the scoring process is provided in the subsections below. A summary of site scoring information is presented in Appendix B.

7.1.1.1 Potential Direct Contact Scoring

A portion of a mine site's overall score reflects potential risks from direct contact with site surface soil (mine waste) by human and ecological receptors. The potential direct contact score for a mine site is derived through a comparison of with surface soil COC concentrations to surface soil PRGs (see Section 2.3), with appropriate modification to account for site-specific factors that influence direct contact exposure risks, such as prior reclamation work, distance to the nearest residence, distance to the nearest recreational cabin, ease of access, and the surface area of the waste at the mine site.

The potential direct contact (DC) score is obtained from the following relationship:

Total DC score = (HH COC Score x (Dres + Drec + Droad)) + Eco COC Score) x Mrec x Marea

Where:

HH COC Score = a score obtained by comparing COC concentrations in soil to human health PRGs for soil (arsenic and lead only).

Eco COC Score = a score obtained by comparing COC concentrations in soil to ecological PRGs for soil (arsenic, cadmium, copper, lead, mercury, and zinc).

Dres = a modifier based on the distance to the nearest residence

Drec = a modifier based on the distance to the nearest recreational cabin

Droad = a modifier based on the distance to the nearest primary road

Mrec = a modifier based on the condition or prior reclamation work

Marea = a modifier based on the size of the waste pile area

The COC score for humans (HH COC) is derived by comparing the maximum reported concentrations of arsenic and lead at a mine site to the human health PRGs. If the maximum concentration of a COC is greater than or equal to 50 times the PRG, the COC score is 500 for that COC. If the maximum concentration of a COC is less than the PRG, the COC score is 0 for that COC. Otherwise the COC score is equal to 10 times the ratio of the maximum concentration to the PRG. The total COC score is the sum of the arsenic and lead scores up to a maximum of 500. For sites that site-specific soil chemistry data are available, the maximum COC concentrations obtained from that mine site are used in the scoring. For sites where no site-specific soil chemistry data are available, the average of the maximum COC concentrations for all the mine sites in the subarea (default data) is utilized.

The COC score for ecological receptors (Eco COC) is derived by comparing the maximum reported concentrations of arsenic, cadmium, copper, lead, mercury, and zinc at a mine site to the ecological PRGs. If the maximum concentration of a COC is greater than or equal to 100 times the PRG, the COC score is 100 for that COC. If the maximum concentration of a COC is less than the PRG, the COC score is 0 for that COC. Otherwise, the COC score is equal to the ratio of the maximum concentration to the PRG. The total COC score is the sum of the arsenic, cadmium, copper, lead, mercury, and zinc scores up to a maximum of 100.

The total HH COC score for a mine site is multiplied by the exposure modifiers for distance to the nearest residence (Dres), distance to nearest recreational cabin (Drec), and distance to nearest primary road (Droad). The Dres modifier is 1 if the distance is less than 0.02 mile (100 feet) and 0.3 if the distance is greater than 0.2 mile (1000 ft). The Drec modifier is 0.8 if the distance is less than 0.02 mile and 0.2 if the distance is greater than 0.2 mile. The Droad modifier is 0.8 if the distance is less than 0.02 mile and 0.2 if the distance is greater than 0.2 mile. All modifiers are scaled proportionally for values between limits.

The sum of the HH COC and Eco COC scores is multiplied by modifying factors to account for prior site reclamation and the area of the site wastes (Marea). The prior reclamation modifier (Mrec) reduces the overall score by 99 percent (Mrec = 0.01) if prior reclamation is judged to be successful and in good condition. The Mrec modifier reduces the overall score by 90 percent (Mrec = 0.1) if prior reclamation is judged to be in moderate condition. The score remains unchanged by ths modifier if there has been no reclamation or if the reclamation is in poor condition (Mrec = 1). The area modifier (Marea) is 1.0 if the area of the wastes is one acre or greater, decreasing proportionally to 0.1 if the area is 0.01 acre.

The maximum total direct contact score is 1,400.

7.1.1.2 Potential Surface Water Impact Scoring

A portion of a mine site's overall score is developed to reflect potential risks associated with impacts to surface water from site-related mine waste. The potential impact to surface water score for a mine site is based on site-specific surface water analytical data that may indicate releases of COCs (if available) and the potential offsite release of COCs from the mine site through erosion, leaching, landslide, or other offsite migration.

The potential surface water impact (SW) score is obtained from the following relationship:

Total SW score = SW COC Score + ((COC Release Score x (Merode + Mslide + Marea) x Dstream x Mrec)

Where:

SW COC Score	= a score obtained by comparing COC concentrations in surface water in the nearest stream reach to a site (excluding adit drainage) to the lower of ecological or human health PRGs for (arsenic, cadmium, copper, lead, mercury and zinc).
COC SW Release Score	= a score obtained by comparing COC concentrations in soil to background concentrations for soil (arsenic, cadmium, copper, lead, and zinc).
Merode	= a modifier based on evidence of erosion, leaching, or offsite migration of waste.
Mslide	= a modifier based on potential for landslide or catastrophic release.
Dstream	= a modifier based on the distance to the nearest perennial stream.
Mrec	= a modifier based on the condition of prior reclamation work

Marea = a modifier based on the size of the waste pile area

The COC score for surface water (SW COC) is derived by comparing the maximum reported concentrations of COCs in the surface water of the stream reach closest to the mine site (excluding adit drainage) to the lower of human health or ecological PRGs. If the maximum concentration of a COC is greater than or equal to 50 times the PRG, the COC score is 500 for that COC. If the maximum concentration of a COC is less than the PRG, the COC score is 0 for that COC. Otherwise, the COC score is equal to 10 times the ratio of the maximum concentration to the PRG. The total COC score is the sum of the arsenic, cadmium, copper, lead, mercury, and zinc scores up to a maximum of 500. If no surface water analytical data are available for a mine site, the SW COC score is 0.

The COC release score is calculated differently for mine sites that have site-specific soil chemistry data and those without site-specific data. For mine sites with data, the COC release score is based solely on leachability data. If acid generation potential is high, the COC release score is 1000; if medium, 750 ; and if low, 500. For sites without site-specific data, the COC release score is derived by comparing the subarea soil chemistry default data for arsenic, cadmium, copper, lead, mercury, and zinc to normalized baseline concentrations. If the maximum concentration of a COC is less than or equal to the baseline concentration, the COC release score is 0 for that COC. If the maximum concentration of a COC is greater than or equal to 1000 times the baseline concentration, the COC score is 1000 for that COC. Otherwise, the COC score is equal to the maximum concentration divided by the baseline concentration. The total COC score is the sum of the arsenic, cadmium, copper, lead, mercury, and zinc scores up to a maximum of 1000. The normalized baseline concentration is the COC background concentration divided by a waste release weighting factor. The weighting factors are based on ecological sensitivity to the COCs.

The total COC release score for a mine site is multiplied by modifiers for evidence of erosion, leaching, or offsite migration of waste (Merode); potential for landslide or catastrophic release (Mslide); the distance to the nearest perennial stream (Dstream); the condition of prior reclamation work (Mrec); and the size of the waste pile area (Marea). The Merode modifier is 1 if the potential is high, 0.5 if the potential is moderate, and 0.01 if the potential is low. The Mslide modifier is 0.5 if the potential is high, 0.25 if the potential is moderate, and 0.01 if the potential is low. The Dstream modifier is 1.5 if the distance is less than 50 feet, decreasing to 0.1 at a distance of 500 feet or greater. The prior reclamation modifier (Mrec) reduces the overall score by 99 percent (Mrec = 0.01) if prior reclamation is judged to be successful and in good

condition. The Mrec modifier reduces the overall score by 90 percent (Mrec = 0.1) if prior reclamation is judged to be in moderate condition. The score remains unchanged by ths modifier if there has been no reclamation or if the reclamation is in poor condition (Mrec = 1). The area modifier (Marea) is 1.0 if the area of the waste is one acre or greater, decreasing proportionally to 0.1 if the area is 0.01 acre.

The maximum total surface water impact score is 3,500.

7.1.1.3 Potential Groundwater Impact Scoring

A portion of a mine site's overall score is developed to reflect potential risks associated with impacts to groundwater from mine site wastes. The potential impact to groundwater score for a mine site is based on site-specific groundwater analytical data that may indicate releases of COCs (if available) and the potential offsite release of COCs from mine sites through leaching of waste.

The potential groundwater impact (GW) score is obtained from the following relationship:

Total GW score = (GW COC Score + (HH COC Score x Mleach Marea x Mrec)) x (Dreswell + Drecwell)

Where:

GW COC Score	= a score obtained by comparing COC concentrations in groundwater from a site (excluding adit drainage) to human health PRGs (arsenic, cadmium, and lead).
HH COC Score	= a score obtained by comparing COC concentrations in soil to human health PRGs for soil (arsenic and lead only) - from direct contact section.
Mleach	= a modifier based on leachability and acid generation potential.
Mrec	= a modifier based on the condition of prior reclamation work
Marea	= a modifier based on the size of the waste pile area
Dreswell	= a modifier based on the distance to the

nearest residential well.

Drecwell = a modifier based on the distance to the nearest recreational well.

The COC score for groundwater (GW COC) is derived by comparing the maximum reported concentrations of COCs in groundwater at an individual mine site (excluding adit drainage) to human health PRGs. If the maximum concentration of a COC is greater than or equal to 50 times the PRG, the COC score is 500 for that COC. If the maximum concentration of a COC is less than the PRG, the COC score is 0 for that COC.

Otherwise, the COC score is equal to 10 times the ratio of the maximum concentration to the PRG. The total COC score is the sum of the arsenic, cadmium, and lead scores up to a maximum of 500. If no groundwater analytical data are available for a mine site, the GW COC score is 0.

The COC score for humans (HH COC) is derived by comparing the maximum reported concentrations of arsenic and lead at a mine site to the human health PRGs. This score is calculated as part of the direct contact score (Section 7.1.1.1). The HH COC release score for a mine site is multiplied by modifiers for leachability/acid generation potential (Mleach); the condition of prior reclamation work (Mrec); and the size of the waste pile area (Marea). The Mleach modifier is 1 if the potential is high, 0.5 if the potential is moderate, and 0.01 if the potential is low. The prior reclamation modifier (Mrec) reduces the overall score by 99 percent (Mrec = 0.01) if prior reclamation is judged to be successful and in good condition. The Mrec modifier reduces the overall score by 90 percent (Mrec = 0.1) if prior reclamation is judged to be in moderate condition. The score remains unchanged by ths modifier if there has been no reclamation or if the reclamation is in poor condition (Mrec = 1). The area modifier (Marea) is 1.0 if the area of the waste is one acre or greater, decreasing proportionally to 0.1 if the area is 0.01 acre.

The sum of the GW COC score and the modified HH COC score is then adjusted for exposure potential to obtain the total potential groundwater impact score. The sum is multiplied by modifiers for the distance to the nearest residential well (Dreswell) and the distance to the nearest recreational well (Drecwell). The Dreswell modifier is 1 if the distance is less than 100 feet and 0.3 if the distance is greater than 1000 feet. The Drecwell modifier is 0.8 if the distance is less than 100 feet and 0.2 if the distance is greater than 1000 feet.

The maximum total potential groundwater impact score is 1,800.

7.1.1.4 Overall Mine Site Scores

The overall mine site scores are calculated by adding the scores for potential direct contact, potential surface water impact, and potential groundwater impact. The possible scores for potential direct contact, potential surface water impact, and potential groundwater impact are 1,400; 3,500; and 1,800; respectively, with a total possible score of 6,700.

The overall mine site score provides a measure of the magnitude of the potential problems that may be associated with an individual mine site with a higher score, indicating more potential risk to human health and the environment. However, site scores should only be compared within each scoring group, i.e. the scores in the group scored using mostly site-specific data are not comparable to the scores within the group scored using mostly subarea default data. For the group of sites scored with site-specific data, the score provides a reliable means of evaluating the need for remediation at a particular mine site. For the group of sites scored using mostly subarea default data, the score provides a means for prioritizing additional sampling or remediation evaluation. A summary of mine site scores and assigned prioritization mine categories is presented in Tables 7-1 and 7-2. Scoring calculations are included in Appendix B.

7.1.2 Summary of Mine Site Prioritization Categories

Mine sites have been grouped into the following five categories based on overall mine site-specific scores. The total individual scores also allows mine sites to be ranked relative to one another within a category.

Very Low Priority - Sites with scores less than 100. Lowest priority sites. Very low priority waste rock and tailing sites typically have either previously been successfully reclaimed or are small (generally less than 0.5 acre and less than 100 cubic yards), are not readily accessible, and have a low potential to threaten surface waters.

Low Priority - Sites with scores between 100 and 250. Low priority waste rock and tailing sites pose low to moderate potential risks to human health and the environment, are larger than very low priority sites, are not readily accessible, and have a low potential threat to surface waters. The low priority category includes some mine sites previously reclaimed and some placer sites where COC concentrations are low.

Medium Priority - Sites with scores between 250 and 500. Medium priority waste rock and tailings sites pose moderate potential risks to human health and the environment. Potential risks are primarily related to potential surface water impacts.

Medium-High Priority - Sites with scores between 500 and 750. Medium-high priority waste rock and tailings sites pose moderate to high risks to human health and the environment. While some of the sites have had reclamation activities conducted at them, impacts to surface waters remain high.

High Priority - Sites with scores greater than 750. High priority sites pose high risks to human health and the environment and are anticipated to require remediation.

Summaries of mine site categorization based on prioritization scores are presented in Tables 7-1 and 7-2.

7.2 Analysis of Alternatives for Waste Rock and Tailings

Alternatives for remediating waste rock and tailings are analyzed per mine site prioritization category i.e., (very low to high) in the following sections.

7.2.1 Very Low Priority Mine Sites

Very Low Priority mine sites are the lowest priority group of sites for remedial consideration, as determined through the mine site scoring process (scores below 100). A summary of the detailed analysis of remediation alternatives for Very Low Priority mine sites is presented in Table 7-3. A comparative analysis of Very Low Priority remedial alternatives is summarized in Table 7-4.

Very Low Priority waste rock and tailing sites typically have either previously been successfully reclaimed or are small (generally less than 0.5 acre in size and have less than 100 cubic yards of waste material), are not readily accessible, and do not threaten surface water. Therefore, the no action alternative is compliant with ARARs and effective in both the short- and long-term. The no action alternative is assumed to have minimal cost. The alternative provides no reduction in toxicity, mobility, and volume of contaminants. Unless other site-specific data are produced that show otherwise, this alternative provides a protective remedy for Very Low Priority waste rock and tailings sites.

The surface controls alternative complies with ARARs, is moderately effective in the short-term, and has limited effectiveness in the long-term. Surface controls are more costly than no action and provide slight to moderate reduction in contaminant mobility, but do not reduce toxicity or volume of contaminants. Therefore, this alternative provides a protective remedy for the Very Low Priority waste rock and tailings sites.

Containment in place with an earthen cap or an earthen cap with a geomembrane liner is compliant with ARARs. This alternative is more costly than surface controls,

is moderately effective in both the short- and long-term, and reduces the mobility of contamination. Therefore, this alternative provides a protective remedy for the Very Low Priority waste rock and tailings sites.

The remaining alternative, excavation with disposal in the Luttrell Repository, has similar costs as containment in place, is compliant with ARARs, is effective in both the short- and long-term, and eliminates the toxicity, mobility and volume of contamination in the waste removal area. Therefore, this alternative provides a protective remedy for Very Low Priority waste rock and tailings sites.

7.2.2 Low Priority Mine Sites

Low Priority sites are the second lowest priority group of mine sites for remedial consideration, as determined through the site scoring process (scores of 100 to 250) . A summary of the detailed analysis of remediation alternatives for Low Priority mine sites is presented in Table 7-5. A comparative analysis of Low Priority remedial alternatives is summarized in Table 7-6.

Low Priority waste rock and tailings sites pose low to moderate potential risks to human health and the environment. While these sites typically are larger than Very Low Priority sites and could pose potential direct contact risks to humans and environmental receptors, these sites are not readily accessible and do not pose a significant threat to surface waters. Low Priority includes some sites previously reclaimed and some placer sites where COC concentrations are low. The no action alternative is compliant with ARARs and effective in both the short- and long-term.

The no action alternative is assumed to have minimal cost. The alternative provides no reduction in toxicity, mobility, and volume of contaminants. Unless other site-specific data are produced that would show otherwise, this alternative is expected provide a protective remedy for Low Priority waste rock and tailings sites.

The surface controls alternative complies with ARARs, is moderately effective in the short-term and has limited effectiveness in the long-term. Surface controls are more costly than no action, and provide a slight to moderate reduction in contaminant mobility, but would not be expected to reduce toxicity or volume of contaminants. Therefore, this alternative provides a protective remedy for the Low Priority waste rock and tailings sites.

Containment in place with an earthen cap or an earthen cap with a geomembrane liner is compliant with ARARs. This alternative is more costly than surface controls, is moderately effective in both the short- and long-term, and reduces the mobility of contamination. Therefore, this alternative provides a protective remedy for the Low Priority waste rock and tailings sites.

The remaining alternative, excavation with disposal in the Luttrell Repository, has a cost similar to containment in place, is compliant with ARARs, is highly effective in

both the short- and long-term, and eliminates the toxicity, mobility, and volume of contamination in the waste removal area. Therefore, this alternative provides a protective remedy for Low Priority waste rock and tailings sites.

Many Low Priority mine sites are in remote locations with limited or no vehicular access. Consequently, implementation of the containment or excavation alternatives by conventional construction methods and equipment would create a measurable and visible environmental disturbance. Since the Low Priority mine sites are not likely to pose significant contaminant migration risks to surface water or groundwater, implementing these types of remediation alternatives may result in more adverse environmental impacts than the benefits that will be achieved through remediation.

Based on these circumstances, the no action alternative may be preferable. However, it may be possible to mitigate the adverse impacts and conduct some remediation by using light-weight farm or excavation track equipment and a small labor force. This approach might accomplish an acceptable level of remediation, while creating a much reduced and readily reclaimable construction access.

7.2.3 Medium Priority Mine Sites

Medium Priority sites are the third highest priority group of mine sites for remedial consideration, as determined through the mine site scoring process (scores of 250 to 500). A summary of the detailed analysis of remediation alternatives for Medium Priority mine sites is presented in Table 7-7. A comparative analysis of Medium Priority remedial alternatives is summarized in Table 7-8.

Medium Priority waste rock and tailings sites pose moderate potential risks to human health and the environment. Potential risks are primarily related to surface water impacts. The no action alternative is generally compliant with ARARs, but ineffective in both the short- and long-term. The no action alternative is assumed to have minimal cost. The alternative provides no reduction in toxicity, mobility, and volume of contaminants. Site-specific data are limited for many of these sites, therefore, risks should be confirmed during remedial design. This alternative does not provide a protective remedy for Medium Priority waste rock and tailings sites.

Because potential risks from Medium Priority mine sites are moderate in magnitude and primarily related to surface water impacts, the surface controls alternative can significantly mitigate these impacts. The surface controls alternative complies with ARARs and is effective in both the short- and long-term (except at those sites where adit discharge or other site conditions cause water quality ARARs to be exceeded).

Surface controls are more costly than no action, provide slight to moderate reduction in contaminant mobility, but are expected to reduce toxicity or and volume of

contaminants. Therefore, this alternative provides a protective remedy for the Medium Priority waste rock and tailings sites.

Containment in place with an earthen cap or an earthen cap with a geomembrane liner is compliant with ARARs (except at those few sites where adit discharge would continue to cause ARARs exceedences in surface water). This alternative is more costly than surface controls, is moderately effective in both the short- and long-term, and reduces the mobility of contamination. Therefore, this alternative provides a protective remedy for the Medium Priority waste rock and tailings sites.

The remaining alternative, excavation with disposal in the Luttrell Repository, is similar in cost to surface controls and is compliant with ARARs (except at those few sites where adit discharge would continue to cause ARARs exceedences in surface water). This alternative is highly effective in both the short- and long-term, and eliminates the toxicity, mobility, and volume of contamination in the waste removal area. Therefore, this alternative provides a protective remedy for Medium Priority waste rock and tailings sites.

Some Medium Priority mine sites are in remote locations, with limited or no vehicular access. Consequently, implementation of the containment or excavation alternatives by conventional construction methods and equipment would create a measurable and visible environmental disturbance. However, it may be possible to mitigate the adverse impacts and conduct some remediation by using light-weight farm or excavation track equipment and a small labor force. This approach might accomplish an acceptable level of remediation, while creating a much reduced and readily reclaimable construction access.

7.2.4 Medium-High Priority Mine Sites

Medium-High Priority mine sites are the second highest priority group of mine sites for remedial consideration, as determined through the site scoring process (scores of 500 to 750). A summary of the detailed analysis of remediation alternatives for Medium-High Priority sites is presented in Table 7-9. A comparative analysis of Medium-High Priority remedial alternatives is summarized in Table 7-10.

Medium-High Priority waste rock and tailings sites pose moderate to high risks to human health or the environment. While some of the mine sites have had reclamation activities conducted at them, impacts to surface waters remain high. The no action alternative may be compliant with ARARs (except at sites where adit discharges cause water quality ARARs to be exceeded), but is ineffective in both the short- and long-term and provides no reduction in toxicity, mobility, and volume of contaminants.

The no action alternative is assumed to have minimal cost. This alternative does not

provide a protective remedy for Medium-High Priority waste rock and tailings sites.

The surface controls alternative complies with ARARs, except at those mine sites where adit discharges would continue to cause ARARs exceedences in surface water. Surface controls have limited short- and long-term effectiveness. Surface controls are more costly than no action, provide slight to moderate reduction in contaminant mobility, but will not reduce toxicity and/or volume of contaminants. Therefore, this alternative would not provide a protective remedy for the Medium-High Priority waste rock and tailings sites.

Containment in place with an earthen cap or an earthen cap with a geomembrane liner complies with ARARs (except at those few sites where adit discharge would continue to cause ARARs exceedences in surface water). This alternative is more costly than surface controls, is moderately effective in both the short- and long-term, and reduces the mobility of contamination. Therefore, this alternative provides a protective remedy for the Medium-High Priority waste rock and tailings sites.

The remaining alternative, excavation with disposal in the Luttrell Repository, has cost similar to surface controls and is compliant with ARARs (except at those few sites where adit discharge would continue to cause ARARs exceedences in surface water). This alternative is highly effective in both the short- and long-term, and eliminates the toxicity, mobility, and volume of contamination in the waste removal area. Therefore, this alternative provides a protective remedy for Medium-High Priority waste rock and tailings sites.

7.2.5 High Priority Mine Sites

High Priority sites are the highest priority group of mine sites for remedial consideration, as determined through the site scoring process (scores above 750) . A summary of the detailed analysis of remediation alternatives for High Priority Mine sites is presented in Table 7-11. A comparative analysis of High Priority remedial alternatives is summarized in Table 7-12.

High Priority sites pose high risks to human health and the environment and are anticipated to require remediation. The no action alternative is not compliant with ARARs, is ineffective in both the short- and long-term, and provides no reduction in toxicity, mobility, and volume of contaminants. The no action alternative is assumed to have minimal cost. This alternative does not provide a protective remedy for High Priority waste rock and tailings sites.

The surface controls alternative would comply with ARARs (except at sites with adit discharges). Due to the generally larger size of High Priority mine sites and the larger impacts to surface water associated with these sites, this alternative is considered to be ineffective in both the short- and long-term. Surface controls are more costly than

no action, provide slight to moderate reduction in contaminant mobility, but would not reduce toxicity or volume of contaminants. Therefore, this alternative is not a protective remedy for the High Priority waste rock and tailings sites.

Containment in place with an earthen cap or an earthen cap with a geomembrane liner is compliant with ARARs (except for sites with adit discharges). This alternative is more costly than surface controls, is moderately effective in both the short- and long-term, and reduces the mobility of contamination. Therefore, this alternative provides a protective remedy for the High Priority waste rock and tailings sites.

The remaining alternative, excavation with disposal in the Luttrell Repository, is similar in cost as containment in place, is compliant with ARARs, highly effective in both the short- and long-term, and eliminates the toxicity, mobility, and volume of contamination in the waste removal area. Therefore, this alternative provides a protective remedy for High Priority waste rock and tailings sites.

7.2.6 Comprehensive Summary of Mine Site Scoring Results by Subarea

In addition to the detailed analysis for each category of waste rock and tailings presented above, Table 7-13 presents a comprehensive summary of the scoring results for mine sites in the high, medium-high, and medium priority categories. Only high, medium-high, and medium priority sites are presented since the detailed and comparative analysis showed that the no action alternative is the best solution for the very low and low sites. As indicated by Table 7-13, Jack Creek, Uncle Sam gulch and Middle Cataract Creek house most of the mine sites with the highest risk to human health and the environment, as reflected by the direct contact, surface water and groundwater scores.

Section 8
Introduction to the Evaluation of Alternatives

An evaluation of the remedial alternatives that address threats to human health and the environment within the OU2 is performed by subareas to mirror the characterization approach of the RI. As concluded in the RI, long-term reduction of toxicity in Basin Watershed OU2 begins with the systematic and cost effective implementation of remedial actions in subareas worst impacted by historical mining. Evaluating and comparing the remedial alternatives by subareas allows for the risk management of the remedial action decisions in the ROD.

An evaluation of the remedial alternatives for each of the nine subareas within the Basin Watershed is presented in Sections 9.0 through 18.0 of this FS. The subareas are presented in order of total priority score, as calculated in Section 7. The subarea containing most of the mine sites posing the highest risk to human health and the environment as determined by human health, direct contact, and total scoring values is discussed first. These scoring values for mine sites within the eight remaining subareas determine the order in which the evaluation of alternatives is presented.

The summaries presented in the following sections address AMD/ARD, surface water, and sediment alternatives; alternatives for solid media were previously evaluated in Section 7.

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Section 9
Evaluation of Alternatives for Jack Creek Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment, and surface water for the Jack Creek subarea. Section 9.1 below provides a summary of the results of the RI site characterization for this subarea.

9.1 Summary of Remedial Investigation Results

The Jack Creek subarea consists of the subbasin formed by Jack Creek as it drains into Basin Creek. The terrain and accessibility in this subarea is generally characterized by:

- Fairly broad valley with steep side slopes in the lower portions, however narrower and steeper in the upper portions, minimal flat areas
- Good primary road (Jack Creek Road) with moderate to poor quality secondary roads
- Good access to Jack Creek is in lower portions of subarea, poor in upper portion, with private property access difficulty
- Low gradient creek in the lower portions, while moderate creek gradients in the upper portions

The extent of contamination in the surface water and stream sediment summarized from the RI (CDM 2005) is presented below. The occurrence of AMD/ARD in the Jack Creek subarea is also described below.

9.1.1 Surface Water

Jack Creek had the highest number of COCs at the highest concentrations above human health and ecological benchmarks in surface water, under both non-storm and storm conditions in the Basin Creek AOC. Jack Creek contributes arsenic, cadmium, copper, and zinc above benchmarks year round (CDM 2005).

9.1.2 Stream Sediment

Sediment in Jack Creek had COCs at concentrations that were as much as 60 times greater than the benchmark values, and as much as 6 times the concentrations measured in the Upper Basin Creek subarea. Jack Creek sediments impact Basin

Creek sediments, and pose risk to the environment (CDM 2002a).

9.1.3 AMD/ARD

There are 23 mine sites identified in the Jack Creek subarea, 14 of which are within 500 ft of a stream or drainage. Chemical and physical data are available for ten of these mine sites. Five of these mine sites (Dew Drop, RTI Recon: P, former bullion Smelter, Vindicator, and Morning) have high AMD/ARD production potentials. The former Bullion Mine was reclaimed in 2001/2002 by the USFS and EPA. The former Bullion Smelter was also partially reclaimed by the USFS in 2001.

First Shot/Last Shot has a moderate potential to produce AMD/ARD. The Jack Creek Tailings site was assessed as having a moderate potential to produce AMD/ARD even though the data lack NP, AP, and sulfide information. The similarity of the elevated levels of arsenic, lead, and zinc concentrations to known medium probability mine sites, make it likely that this mine would also have a medium probability of generating acid.

The Vindicator, North Ada, and First Shot/Last Shot mine sites had the highest total zinc concentrations in soils in the subarea, with values ranging from 40 to 600 times the reference zinc concentration at Grub Creek Gulch mine (i.e., lowest concentration in the Basin Creek AOC).

The flowing adits in the Jack Creek subarea at the Vindicator, Bullion, and RTI Recon P mines were sampled with all three having COCs at concentrations exceeding human health and ecological benchmarks. Discharge from these adits ranged from too low to accurately measure to 7 gpm with pH values ranging from 3 to 8.

9.2 Acid Drainage Alternatives

Of the four AD alternatives defined in Section 5 of this FS, only AD1 - No Action, AD2 - Natural Attenuation, and AD3 - Source Controls are applicable for AMD/ARD in the entire Jack Creek subarea. Due to steep terrain throughout the Jack Creek subarea, Alternative AD4 - Biological Treatment is only applicable as a point source remedy and will be evaluated for implementation at each of the 3 mine sites with flowing adits. The cost for this alternative will be the total cost of 3 small biological treatment facilities instead of one central facility. The detailed analysis of AD alternatives for the Jack Creek subarea is summarized in 9-1. A comparative analysis of the AD alternatives is presented in Table 9-2.

9.3 Surface Water Alternatives

Of the four surface water alternatives defined in Section 5 of this FS, only SW1 - No Action, SW2 - Natural Attenuation, and SW3 - Biological Treatment are applicable for surface water in the Jack Creek subarea. As discussed in Section 5 of this FS,

Alternative SW4 - Physical/Chemical Treatment was not evaluated for implementation in this subarea due to its extremely high costs. The detailed analysis of surface water alternatives for the Jack Creek subarea is summarized in Table 9-3. A comparative analysis of the surface water alternatives is presented in Table 9-4.

9.4 Stream Sediment Alternatives

Of the three stream sediment alternatives defined in Section 5 of this FS, only SD1 - No Action, and SD2 - Natural Attenuation are applicable for stream sediment in the Jack Creek subarea. The steep terrain and lack of open space required for construction of a stream diversion in this subarea make SD3 - Excavation and Disposal in the Luttrell Repository cost prohibitive. The detailed analysis of stream sediment alternatives for the Jack Creek subarea is summarized in Table 9-5. A comparative analysis of the stream sediment alternatives is presented in Table 9-6.

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Section 10
Evaluation of Alternatives for the Uncle Sam Gulch Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment, and surface water for the Uncle Sam Gulch subarea. Section 10.1 below provides a summary of the results of the RI site characterization for this subarea.

10.1 Summary of Remedial Investigation Results

The Uncle Sam Gulch subarea is comprised of the subbasin containing Uncle Sam Gulch from its headwaters to its confluence with Cataract Creek. The terrain and accessibility in this subarea is generally characterized by:

- Narrow axial valley with very steep side slopes
- Poor primary road (Uncle Sam Gulch Road)
- Generally good access to the creek
- Steep stream gradient with little flood plain area

Uncle Sam Gulch originates at the top of this subarea and has one unnamed tributary that drains into it. The extent of contamination in surface water, stream sediment, and AMD/ARD is summarized from the RI (CDM 2005) and is presented below.

10.1.1 Surface Water

Uncle Sam Gulch has the highest number of COCs at concentrations above human health and ecological benchmarks in surface water, under both non-storm and storm conditions in Cataract Creek AOC. Concentrations of arsenic, cadmium, copper, lead and zinc were 300 times those seen in the Upper Cataract subarea.

10.1.2 Stream Sediment

Stream sediment in Uncle Sam Gulch mimics the surface water quality. The highest concentrations of COCs in the Cataract Creek AOC occurred in sediment from Uncle Sam Gulch. Arsenic, cadmium, copper, lead, mercury, and zinc exceeded benchmarks by 500 times and were more than 3,500 times greater than sediment sampled in the Upper Cataract Creek subarea.

10.1.3 AMD/ARD

There are 17 mining sites that have been identified in the Uncle Sam Gulch Subarea. Eleven mine sites are located within 500 ft of a stream or drainage. Chemical and physical data are available for six of these mine sites. One mine site was elevated as

having a high AMD/ARD potential. The Crystal lacks NP/AP and percent sulfide data, but the arsenic, lead, and zinc concentrations are similar to mines with a known high probability to generate AMD/ARD. Uncle Sam, Snowbird, Garfield, and the Crystal mines had the five highest total zinc concentrations in this subarea (CDM 2005).

Flowing adits in the Uncle Sam Gulch subarea were observed and sampled at the Crystal, SW NW Section 29, Garfield, Snowbird, and Alpine mines. All 5 adits had COC concentrations that exceeded both human health and ecological benchmarks. The flow from these adits ranged from 0.1 to 60 gpm with pH values ranging from 3 to 8.

10.2 Acid Drainage Alternatives

All four AD alternatives defined in Section 5 of this FS are applicable for AMD/ARD in the Uncle Sam Gulch subarea. However, steep terrain and lack of open space in this subarea make AD4 - Biological Treatment cost prohibitive in portions of the Uncle Sam Gulch subarea. However, this alternative is still viable as a point source remedy, and it will be evaluated for implementation at each flowing adit in the Uncle Sam Gulch subarea. The cost for this alternative will be the total cost of 5 small biological treatment facilities as opposed one central facility. The detailed analysis of AD alternatives for the Uncle Sam Gulch subarea is summarized in Table 10-1. A comparative analysis of the AD alternatives is presented in Table 10-2

10.3 Surface Water Alternatives

Of the four surface water alternatives defined in Section 5 of this FS, only SW1 - No Action and SW2 - Natural Attenuation are applicable for surface water in the Uncle Sam Gulch subarea. The steep terrain, abundance of bedrock, and lack of open space required for stream diversion make implementation of a biological treatment system difficult. This coupled with the additional road work required to support the construction activities that would effect potential land use and could impact sedimentation loading in Cataract Creek make this alternative both non protective and cost prohibitive. Therefore, SW3 - Biological Treatment was not evaluated for this subarea. As discussed in Section 5 of this FS, Alternative SW4 -Physical/Chemical

Treatment was not evaluated for implementation in this subarea due to its extremely high costs. The detailed analysis of surface water alternatives for the Uncle Sam Gulch subarea is summarized in Table 10-3. A comparative analysis of the surface water alternatives is presented in Table 10-4.

10.4 Stream Sediment Alternatives

Of the three stream sediment alternatives defined in Section 5 of this FS, only SD1 - No Action, and SD2 - Natural Attenuation are applicable for stream sediment in the Uncle Sam Gulch subarea. The steep terrain abundance of bedrock, and lack of open space for stream diversion in this subarea make SD3 - Excavation and Disposal in the Luttrell Repository cost prohibitive. The detailed analysis of stream sediment alternatives for the Uncle Sam Gulch subarea is summarized in Table 10-5. A comparative analysis of the stream sediment alternatives is presented in Table 10-6.

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Section 11
Evaluation of Alternatives for the Middle Cataract Creek Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment and surface water for the Middle Cataract Creek subarea. Section 11.1 below provides a summary of the results of the RI site characterization for this subarea.

11.1 Summary of Remedial Investigation Results

The Middle Cataract Creek subarea includes the section of Cataract Creek from its confluence with Rocker Creek at the northern end of the subarea to its confluence with Uncle Sam Gulch at the southern end. The terrain and accessibility in this subarea is generally characterized by:

- Narrow axial valley with steep side slopes, moderate number of flat areas
- Poor primary (Cataract Creek Road) and secondary roads
- Good accessibility to Cataract Creek in the lower portions; however, poor accessibility in the upper portions
- Moderate to steep creek gradients with moderate to minimal flood plains areas

This subarea includes tributaries such as Snowdrift Creek, Rocker Creek, Hoodoo Creek as well as 5 unnamed tributaries. The extent of contamination in surface water, stream sediment, and AMD/ARD is summarized from the RI (CDM 2005) and presented below.

11.1.1 Surface Water

Historical data show COC concentrations above benchmark values that are protective of both human health and the environment throughout the Middle Cataract Creek subarea. However, during the extreme low flow conditions in 2001, the concentrations of COCs in Cataract Creek at the southern end of this subarea decreased in or below their respective benchmark levels.

Of the tributaries in Middle Cataract Creek, Rocker Creek contributed most of the COCs above benchmarks. Unnamed Tributary 6, which drains into Cataract Creek near the southern end of this subarea also contributes concentrations of cadmium,

copper and zinc above benchmarks during both high and low flows (CDM 2005).

11.1.2 Stream Sediment

Sediment COC concentrations in Cataract Creek generally increased in concentrations between the northern and southern end of this subarea, as well as the number of COCs above ecological benchmarks. Sediment from Unnamed Tributary 6 included high levels of mercury, but the inflows from this tributary did not increase mercury levels in Cataract Creek. Historically, the greatest concentrations of zinc in the Cataract Creek AOC occurred in this tributary.

11.1.3 AMD/ARD

There are 91 mine sites identified in the Middle Cataract Creek subarea, with 35 mine sites within 500 ft of a stream or drainage. Chemical and physical data are available for 46 of these mine sites. Eight of these mine sites have high AMD/ARD production potentials, namely the Hattie Ferguson, Lizzie Osborne, Mary Anne, Middle Snowdrift Creek, NE SE Section 14, Sirius, Timberline, and the Unnamed 001. In addition, the Alpine, Bleak Bear, Blue Diamond/Occidental, Cataract Tails, Cracker, Eva May, Gray Lead, Morning Glory, NE SW Section 17, Unnamed 002, and the Vera and Marie mines have a moderate potential to produce AMD/ARD. The Morning Glory, Gray Lead, Hattie Ferguson, Eva May, and Boulder Chief mines had the five highest total zinc concentrations in this subarea, with values ranging from 284 to 1440 times the reference zinc concentration measured at the Vogel mine site.

The following adits in the Middle Cataract subarea have been sampled:

NE SE Section 14
Cracker
Eva May
Cataract
Unnamed 001
Hattie Ferguson
Rocker Extension
Ada
Blue Diamond/Occidental
Apollo
Morning Marie
Rocker
Unnamed 002
NE NW Section 17
Black Bear
Sirius
Middle Snowdrift Creek

Sixteen of these adits had COC concentrations that exceeded human health and ecological benchmarks. The Middle Snowdrift Creek adit did not have any COC exceedences and will not require remediation. Flow from these adits ranged from 0.1 to 10 gpm with pH values ranging from 3 to 8.

11.2 Acid Drainage Alternatives

All four AD alternatives defined in Section 5 of this FS are applicable for AMD/ARD in the Middle Cataract Creek subarea. However, steep terrain and lack of open space in this subarea make AD4 - Biological Treatment cost prohibitive in portions of the Middle Cataract Creek subarea. However, this alternative is still viable as a point source remedy and it will be evaluated for implementation at each flowing adit in the Middle Cataract Creek subarea. The cost for this alternative will be the total cost of 16 small biological treatment facilities as opposed one central facility. The detailed analysis of AD alternatives for the Middle Cataract Creek subarea is summarized in Table 11-1. A comparative analysis of the AD alternatives is presented in Table 11-2.

11.3 Surface Water Alternatives

Of the four surface water alternatives defined in Section 5 of this FS, only SW1 - No Action, SW2 - Natural Attenuation, and SW3 - Biological Treatment are applicable for surface water in the Middle Cataract Creek subarea. As discussed in Section 5 of this FS, Alternative SW4 - Physical/Chemical Treatment was not evaluated for implementation in this subarea due to its extremely high costs. The detailed analysis of surface water alternatives for the Middle Cataract Creek subarea is summarized in Table 11-3. A comparative analysis of the surface water alternatives is presented in Table 11-4.

11.4 Stream Sediment Alternatives

All three of the stream sediment alternatives defined in Section 5 of this FS are applicable for stream sediment in the Middle Cataract Creek subarea. The detailed analysis of stream sediment alternatives for the Middle Cataract Creek subarea is summarized in Table 11-5. A comparative analysis of the stream sediment alternatives is presented in Table 11-6.

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Section 12
Evaluation of Alternatives for the Lower Cataract Creek Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment, and surface water for the Lower Cataract Creek subarea. Section 12.1 below provides a summary of the results of the RI site characterization for this subarea.

12.1 Summary of Remedial Investigation Results

The Lower Cataract Creek subarea consists of the Cataract Creek from its confluence with Uncle Sam Gulch through its mouth at the Boulder River. The terrain and accessibility in this subarea is generally characterized by:

- Narrow axial valley with steep side slopes, and few flat areas
- Good quality primary road (Cataract Creek Road) with moderate to poor secondary roads
- Good access to Cataract Creek in the lower and upper portions of the subarea, poor access through the middle portion of the subarea
- Moderate gradient creeks with little flood plain areas

This subarea includes Big Limber Gulch, Deer Creek, and four unnamed tributaries. The extent of contamination in surface water, stream sediment, and AMD/ARD is summarized from the RI (CDM 2005) and presented below.

12.1.1 Surface Water

In both non storm and storm conditions, COCs in the Lower Cataract Creek subarea exceeded human health and ecological benchmark values. The discharge from Uncle Sam Gulch was the biggest contributor of COC impacting Cataract Creek in this subarea. Concentrations of COCs exceeded benchmarks for arsenic, cadmium, copper, lead, and zinc by up to 300 times during low flow conditions downstream of the mouth of Uncle Sam Gulch.

Downstream of the confluence with Deer Creek tributary concentrations of arsenic, cadmium, copper, lead, and zinc in Cataract Creek increased to levels as much as 1,317 times above benchmark levels. Historically, Big Limber Gulch tributary also contributed levels of arsenic and zinc above benchmark levels. At the southern end of

the subarea, however, concentrations of all COCs decreased, with arsenic and lead below benchmark levels and concentrations of cadmium, copper, and zinc only exceeding benchmarks levels up to 7 times.

12.1.2 Stream Sediment

The highest concentrations of COCs in Cataract Creek occurred in sediment from Uncle Sam Gulch. Arsenic, cadmium, copper, lead, mercury, and zinc exceeded benchmarks by 500 times and were more than 3,500 times greater than headwater concentrations.

Despite these high inputs and contributions from Deer Creek and Big Limber Gulch tributaries, COCs in the sediments in Cataract Creek decreased, however, COC concentrations remained above ecological benchmarks. At the confluence of Boulder River, the concentrations of (arsenic, cadmium, copper, lead, and zinc) ranged from 3 to 475 times the levels in the headwaters and exceeded benchmarks up to 37 times. Stream sediments in the Lower Cataract Creek subarea pose risk to the environment (CDM 2005).

12.1.3 AMD/ARD

There are 75 mine sites identified in the Lower Cataract Creek subarea, with 32 mine sites within 500 ft of a stream or drainage. Of the mine sites with chemical data, Silvan is the only mine site with a high AMD/ARD production potential. Big Medicine, Gold Flake, Manhattan, Phantom, Ruth, Saturday Night, Seattle and Vogel have moderate potentials to produce AMD/ARD. The Boulder Vestal is the only mine site with a low potential to produce AMD/ARD. The Seattle, Saturday Night, Phantom, Sylvan and Boston mine sites had the five highest total zinc concentrations in this subarea, with values ranging from 77 to 150 times the reference zinc concentration at the Vogel mine.

Flowing adits were observed and sampled in the Lower Cataract Creek subarea at the Cartwright Cabins 2, Waldy, Phantom, Vogel, Unnamed 004, Redwing and Sylvan mine sites. The Phantom was the only adit that didn't have COC concentrations exceeding human health and ecologically benchmarks. The remaining 6 mine sites all had COC exceedences. Flow rates from these 6 adits ranged from 0.1 to 2 gpm with pH values ranging from 3 to 8.

12.2 Acid Drainage Alternatives

All four AD alternatives defined in Section 5 of this FS are applicable for AMD/ARD in the Lower Cataract Creek subarea. However, some steep terrain and lack of open space in this subarea make AD4 - Biological Treatment cost prohibitive as an overall alternative for the Lower Cataract Creek subarea. However, this alternative is still viable when evaluated as a point source remedy, and will be evaluated for implementation at each of the 6 flowing adits in the Lower Cataract Creek subarea. The cost for this alternative will be the total cost of 6 small biological treatment facilities as opposed one central facility. The detailed analysis of AD alternatives for the Lower Cataract Creek subarea is summarized in Table 12-1. A comparative analysis of the AD alternatives is presented in Table 12-2.

12.3 Surface Water Alternatives

Of the four surface water alternatives defined in Section 5 of this FS, only SW1 - No Action, SW2 - Natural Attenuation, and SW3 - Biological Treatment are applicable for surface water in the Lower Cataract Creek subarea. As discussed in Section 5 of this FS, Alternative SW4 - Physical/Chemical Treatment was not evaluated for implementation in this subarea due to its extremely high costs. The detailed analysis of surface water alternatives for the Lower Cataract Creek subarea is summarized in Table 12-3. A comparative analysis of the surface water alternatives is presented in Table 12-4.

12.4 Stream Sediment Alternatives

All three of the stream sediment alternatives defined in Section 5 of this FS are applicable for stream sediments in the Lower Cataract Creek subarea. The detailed analysis of stream sediment alternatives for the Lower Cataract Creek subarea is summarized in Table 12-5. A comparative analysis of the stream sediment alternatives is presented in Table 12-6.

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Section 13
Evaluation of Alternatives for Upper Basin Creek Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment, and surface water media for the Upper Basin Creek subarea. Section 13.1 below provides a summary of the results of the RI site characterization for this subarea. The Luttrell Repository located within this subarea.

13.1 Summary of Remedial Investigation Results

The Upper Basin Creek subarea consists of the portion of the Basin Creek AOC upgradient of the confluence with South Fork Basin Creek. The terrain and accessibility in this subarea is generally characterized by:

- Predominantly steep terrain with minimal flat areas
- Good primary road (Basin Creek Road) with moderate to poor quality secondary roads
- Generally good access to Basin Creek in the upper and middle portions of the subarea, poor access in lower portion
- Low to moderate Basin Creek gradient in the upper portions of the subarea, narrow and steep in the lower portions, while tributaries are typically higher gradient

This subarea includes the Lady Leith, Grub Creek, Clear Creek, Joe Bowers Creek, and Weasel Gulch tributaries of Basin Creek. The extent of contamination in the surface water and stream sediment is summarized from the RI (CDM 2005) in the following sections.

13.1.1 Surface Water

Basin Creek's non-storm and storm surface water quality, with respect to human health and aquatic life benchmarks, was best near its headwaters, upgradient from the confluence with the Lady Leith tributary, near its headwaters. The concentrations of the COCs in Basin Creek were higher below Lady Leith tributary to the subarea boundary, with the worst water quality with respect to the benchmarks near the Buckeye and Enterprise mines. Since the RI, remedial efforts by EPA have been completed at these two mines. Of the tributaries sampled in the Upper Basin Creek subarea, all had COC concentrations greater than in the headwaters, with Clear Creek having the highest COC concentrations. The RI report (CDM 2005) presents in detail

how the surface water quality fluctuated within the Upper Basin Creek subarea.

13.1.2 Stream Sediment

Sediments exceeded benchmarks for all COCs (except mercury) throughout most of the creek in the Upper Basin Creek subarea, except near its headwaters. Concentrations of COCs in sediment near the headwaters were similar to those detected in South Fork Basin Creek, a subarea considered to be representative of baseline conditions. The concentration of the COCs were the highest in sediment downgradient and near the Buckeye and Enterprise mines. Sediment quality in Basin Creek in this subarea improved downstream of the Clear Creek confluence, as evidenced by the decrease in concentrations, although all COCs exceeded benchmarks (CDM 2005). Of the tributaries sampled in Upper Basin Creek subarea, the Lady Leith tributary had the highest sediment COC concentrations.

13.1.3 AMD/ARD

There are 51 mine sites identified in the Upper Basin Creek subarea, and 32 of these mine sites are located within 500 feet (ft) of a stream or drainage. Because of access limitations or vein groupings, only 16 of these mine sites were sampled. None of these mine sites had ABA results indicating high AMD/ARD production potentials, however, the Buckeye, Dorothy Snow, Double Shaft, Enterprise, and Adit, Mine, Waste Rock Dump mines had ABA results indicating moderate AMD/ARD potentials (CDM 2005). The Buckeye and Enterprise mines were reclaimed by EPA in 2001/2002.

The flowing adits in the Upper Basin Creek subarea at the Lady Leith, Josephine, Morning Star, Buckeye and Enterprises Mines were sampled with all but the Morning Star having COCs at concentrations exceeding human health and ecological benchmarks. Discharge from these adits ranged from too low to accurately measure to 6 gallons per minute (gpm) with pH values ranging between 3 and 8.

13.2 Acid Drainage Alternatives

Of the four AD alternatives defined in Section 5 of this FS, only AD1 - No Action, AD2 - Natural Attenuation, and AD3 - Source Controls are applicable for AMD/ARD in the entire Upper Basin Creek subarea. Of the mine sites in the Upper Basin Creek subarea containing flowing adits, only the Buckeye Mine is located in terrain with the open area required for implementation of biological treatment. The steep terrain of mine sites like the Lady Leith and Josephine mines make biological treatment cost prohibitive. Therefore, AD4 - Biological Treatment was only evaluated for the Buckeye Mine.. The detailed analysis of AD alternatives for the Upper Basin Creek subarea is summarized in Table 13-1. A comparative analysis of the AD alternatives is presented in Table 13-2.

13.3 Surface Water Alternatives

Of the four surface water alternatives defined in Section 5 of this FS, only SW1 - No Action, and SW2 - Natural Attenuation are applicable for surface water in the Upper Basin Creek subarea. The steep terrain and lack of open space for required for construction make implementation of a biological treatment system difficult. This coupled with the additional road work required to support the construction activities that would effect potential land use and could impact sedimentation loading in Basin Creek make this alternative both non-protective and cost prohibitive. Therefore, SW3 - Biological Treatment was not evaluated for this subarea. As discussed in Section 5 of this FS, Alternative SW4 - Physical Chemical Treatment was not evaluated for implementation in this subarea due to its extremely high costs. The detailed analysis of surface water alternatives for the Upper Basin Creek subarea is summarized in Table 13-3. A comparative analysis of the surface water alternatives is presented in Table 13-4.

13.4 Stream Sediment Alternatives

Of the three stream sediment alternatives defined in Section 5 of this FS, only SD1 - No Action, and SD2 - Natural Attenuation are applicable for stream sediment in the Upper Basin Creek subarea. The steep terrain and lack of open space around Basin Creek required for stream diversion in this subarea make SD3 - Excavation and Disposal in the Luttrell Repository cost prohibitive. The detailed analysis of stream sediment alternatives for the Upper Basin Creek subarea is summarized in Table 13-5. A comparative analysis of the stream sediment alternatives is presented in Table 13-6.

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Section 14
Evaluation of Alternatives for Lower Basin Creek Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment, and surface water for the Lower Basin Creek subarea. Section 14.1 below provides a summary of the results of the RI site characterization for this subarea.

14.1 Summary of Remedial Investigation Results

The Lower Basin Creek subarea extends roughly from the confluence of the Saul Haggerty Gulch and Basin Creek to the mouth of Basin Creek. The terrain and accessibility in this subarea is generally characterized by:

Fairly narrow axial valley with steep side slopes and minimal flat areas

Good primary road (Basin Creek Road) with poor quality secondary roads

Good to moderate access to Basin Creek in the middle and lower portions; however, difficult access in the upper portions

Moderately steep gradient with minimal flood plain in upper portions of subarea

This subarea includes eleven tributaries of Basin Creek including Saul Haggerty, Lilly of the West Gulch, Spring Gulch and seven unnamed tributaries. The extent of contamination in surface water, stream sediment, and AMD/ARD in the Lower Basin Creek subarea is summarized from the RI (CDM 2005) and presented below.

14.1.1 Surface Water

Basin Creek's non-storm water quality in this subarea, with respect to human health and aquatic life benchmarks, improved relative to the water quality in Middle Basin Creek subarea. Although under storm high-flow conditions, the COC concentrations exceeded benchmarks. Of the eleven tributaries in Lower Basin Creek subarea only Saul Haggerty Gulch was sampled historically, and it did not have COCs above benchmarks (CDM 2005).

14.1.2 Stream Sediment

Sediments in Lower Basin Creek subarea had COC concentrations lower than the values detected in Middle Basin Creek subarea, however, the concentrations for all but mercury exceeded benchmarks. Basin Creek at its mouth had COCs concentrations in sediment up to 7 times the benchmarks, compared to COCs concentrations at or below benchmarks in the Upper Basin Creek subarea (CDM 2002b). The highest COC concentrations were detected in the minus 80-mesh size fraction. Sediments in this subarea still pose risk to the environment (CDM 2002a). No sediment samples were collected from the tributaries in Lower Basin Creek subarea.

14.1.3 AMD/ARD

There are 37 mine sites identified in the Lower Basin Creek subarea, with 27 mine sites within 500 ft of a stream or drainage. Five of the 37 mine sites in Lower Basin Creek subarea have high AMD/ARD production potentials, namely the Aurora, Doris, Basin Belle, Adelaide, and the Basin Creek Placer mines. Daily West, 24JF0524, and Columbus mines have moderate potentials to produce AMD/ARD. Nine adits have been identified in this subarea, however, none of these were flowing. Therefore, any AMD/ARD production from these mine sites will be addressed in the waste rock and tailings alternatives. No alternatives for AMD/ARD will be evaluated for the Lower Basin Creek subarea.

14.2 Acid Drainage Alternatives

No AD alternatives were evaluated for the Lower Basin Creek subarea.

14.3 Surface Water Alternatives

Of the four surface water alternatives defined in Section 5 of this FS, only SW1 - No Action, SW2 - Natural Attenuation, and SW3 - Biological Treatment are applicable for surface water in the Lower Basin Creek subarea. As discussed in Section 5 of this FS, Alternative SW4 - Physical/Chemical Treatment was not evaluated for implementation in this subarea due to its extremely high costs. The detailed analysis of surface water alternatives for the Lower Basin Creek subarea is summarized in Table 14-1. A comparative analysis of the surface water alternatives is presented in Table 14-2.

14.4 Stream Sediment Alternatives

All three of the stream sediment alternatives defined in Section 5 of this FS are applicable for stream sediment in the Lower Basin Creek subarea. The detailed analysis of stream sediment alternatives for the Lower Basin Creek subarea is summarized in Table 14-3. A comparative analysis of the stream sediment alternatives is presented in Table 14-4.

Section 15
Evaluation of Alternatives for the Upper Cataract Creek Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment, and surface water for the Upper Cataract Creek subarea. Section 15.1 below provides a summary of the results of the RI site characterization for this subarea.

15.1 Summary of Remedial Investigation Results

The Upper Cataract Creek subarea contains the headwaters of Cataract Creek and stretches to above the confluence of Cataract Creek and Roche Creek. The terrain and accessibility in this subarea is generally characterized by:

Moderate to steep terrain with broad, flat valley floor

Moderate primary roads in the lower portions (Cataract Creek Road); however, poor roads exist in the upper portions, better roads on Upper Tenmile Creek site

Poor access to Cataract Creek in lower portions, moderate access through the middle, upper portions, better accessible through Banner Creek Road (Upper Tenmile Creek)

Low to moderate gradients in the creeks, large flood plain areas in upper portion, narrow valley with little flood plain in lower portion

Cataract Creek within this subarea receives surface water from Unnamed 1 Tributary, Trail Creek, Deep Creek, Overland Creek and Branch Creek. Many of these drainages have near-stream mine sites, as described below. The extent of contamination in surface water, stream sediment, and AMD/ARD is summarized from the RI (CDM 2005) and presented below.

15.1.1 Surface Water

Non-storm and storm surface water quality in Cataract Creek AOC are best with respect to human health and aquatic life benchmarks in the Upper Cataract subarea. The COC concentrations in this subarea are below benchmark values under both low and high-flow conditions, and poses no risk to human health and the environment (CDM 2005). Therefore, no alternatives for surface water were evaluated for the Upper Cataract Creek subarea.

15.1.2 Stream Sediment

Sediments in Upper Cataract Creek subarea had COCs above ecological benchmarks, however, these concentrations were the lowest among the subareas in Cataract Creek AOC. Cataract Creek in Upper Cataract Creek subarea receives inflow from six tributaries, but none of these tributaries were sampled. A detailed interpretation of the sediment concentration changes in Upper Cataract Creek subarea are presented in

the RI report (CDM 2005).

15.1.3 AMD/ARD

There are 26 mine sites identified in the Upper Cataract Creek subarea, with 8 mine sites within 500 ft proximity to a stream or drainage. Of these 26 mines, the Corbitt and the Eldorado and Plateau have high AMD/ARD production potentials, while the North Ada-Piermont has a moderate potential to produce AMD/ARD. The Ida May, North Ada-Piermont, Eldorado and Plateau, Crescent, and Corbitt have total zinc concentrations ranging from 34 to 820 times the reference zinc concentration at the Vogel mine site, the mine site with the lowest COC concentration in the Cataract Creek AOC. AMD/ARD production from waste piles at these 10 mine sites will be addressed in the waste rock and tailings alternatives.

Flowing adits were encountered in the Upper Cataract Creek subarea were identified and sampled at the Lady Ricker, Quartz Creek, Eldorado and Plateau, and Crescent mines, with all but Quartz Creek having COC concentrations exceeding human health and ecological benchmarks.

15.2 Acid Drainage Alternatives

All four AD alternatives defined in Section 5 of this FS are applicable for AMD/ARD in the Upper Cataract Creek subarea. However, logistical concerns make AD4 - Biological Treatment cost prohibitive in selected areas of the Upper Cataract Creek subarea. However, this alternative is viable as a point source remedy, and it will be evaluated for implementation for each flowing adit in the Upper Cataract Creek subarea. The cost of this alternative will be the total cost of 4 small biological treatment facilities as opposed one central facility. The detailed analysis of AD alternatives for the Upper Cataract Creek subarea is summarized in Table 15-1. A comparative analysis of the AD alternatives is presented in Table 15-2.

15.3 Surface Water Alternatives

No surface water alternatives were evaluated for the Upper Cataract Creek subarea.

15.4 Stream Sediment Alternatives

Of the three stream sediment alternatives defined in Section 5 of this FS, only SD1 - No Action, and SD2 - Natural Attenuation are applicable for stream sediment in the Upper Cataract Creek subarea. The steep terrain, poor accessibility, and stream diversion difficulties in this subarea make SD3 - Excavation and Disposal in the Luttrell Repository cost prohibitive. The detailed analysis of stream sediment alternatives for the Upper Cataract Creek subarea is summarized in Table 15-3. A comparative analysis of the stream sediment alternatives is presented in Table 15-4.

Section 16
Evaluation of Alternatives for the Middle Basin Creek Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment, and surface water for the Middle Basin Creek subarea. Section 16.1 provides a summary of the results of the RI site characterization for this subarea.

16.1 Summary of Remedial Investigation Results

The Middle Basin Creek subarea extends from Jack Creek confluence with Basin Creek to just above the point where Saul Haggerty Gulch empties into Basin Creek. The Middle Basin Creek subarea contains the Wood Gulch, Clay Creek, Vacchiou Gulch and three unnamed tributaries that discharge into Basin Creek, but contains relatively few mines. The terrain and accessibility in this subarea is generally characterized by:

- Broad axial valley with steep side slopes
- Good quality primary road (Basin Creek Road)
- Good access to Basin Creek and known mine sites, with limited to no access to tributaries
- Moderate to low gradient creek

The extent of contamination in surface water, stream sediment, and AMD/ARD in the Middle Basin Creek subarea is described below.

16.1.1 Surface Water

Basin Creek's non-storm and storm surface water quality in this subarea, with respect to human health and aquatic life benchmarks, is impacted immediately downgradient of the confluence with Jack Creek. Basin Creek's water quality under non-storm low-flow conditions improves within this subarea. However, under high flow, the COCs remain above benchmarks. None of the tributaries in Middle Basin Creek subarea were sampled (CDM 2005).

16.1.2 Stream Sediment

Sediment in Middle Basin Creek subarea exceeded benchmarks for all COCs (except mercury). Concentrations of COC in the sediment were significantly higher than the levels detected in Upper Basin Creek subarea (CDM 2002b). The highest COC

concentrations were detected in the minus 80-mesh size fraction. No sediment samples were collected from the tributaries in Middle Basin Creek subarea (CDM 2005).

16.1.3 AMD/ARD

AMD/ARD at the mine sites include leachate from waste rock and tailings piles, and adit discharges. AMD/ARD related to waste rock and tailings leachates are addressed through waste rock and tailings alternatives (Section 7). The AMD/ARD contributed by the flowing adits will be addressed through the AD alternatives.

There are 4 mine sites identified in Middle Basin Creek subarea. All 4 of these mine sites are former placer mines and are located within 500 ft of Basin Creek. However, there are no chemical or physical data available for these sites. Further, there are no adits in the Middle Basin Creek subarea. Therefore, AMD/ARD is not a concern in Middle Basin Creek subarea.

16.2 Acid Drainage Alternatives

No AD alternatives were evaluated for the Middle Basin Creek subarea.

16.3 Surface Water Alternatives

Of the four surface water alternatives defined in Section 5 of this FS, only SW1 - No Action, SW2 - Natural Attenuation, and SW3 - Biological Treatment are applicable for surface water in the Middle Creek subarea. As discussed in Section 5 of this FS, Alternative SW4 - Physical/Chemical Treatment was not evaluated for implementation in this subarea due to its extremely high costs. The detailed analysis of surface water alternatives for the Middle Basin Creek subarea is summarized in Table 16-1. A comparative analysis of the surface water alternatives is presented in Table 16-2.

16.4 Stream Sediment Alternatives

All three of the stream sediment alternatives defined in Section 5 of this FS, are applicable for stream sediments in the Middle Basin Creek subarea. The detailed analysis of stream sediment alternatives for the Middle Basin Creek subarea is summarized in Table 16-3. A comparative analysis of the stream sediment alternatives is presented in Table 16-4.

Section 17
Evaluation of Alternatives for the Boulder River Area of Concern

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment and surface water for the Boulder River AOC. Section 17.1 below provides a summary of the results of the RI site characterization for this AOC.

17.1 Summary of Remedial Investigation Results

The Boulder River AOC is bounded by the farthest upstream and downstream sampling stations historically sampled to evaluate the Basin Watershed OU2. The terrain and accessibility in this AOC is generally characterized by:

- Broad river valley
- Good primary and secondary access roads
- Good access to Boulder River from roadways
- Low gradient, wide river, moderate to large flood plain

Three major tributaries empty into the Boulder River, including Basin Creek, Cataract Creek and High Ore Creek. The extent of contamination in surface water, stream sediment, and AMD/ARD in the Boulder River AOC is summarized from the RI report (CDM 2005) and presented below.

17.1.1 Surface Water

Boulder River is the largest among the streams in Basin Watershed OU2. Basin, Cataract, and High Ore Creeks combined account for most of the surface water flow increase in Boulder River with Basin Creek contributing the most flow.

During the Fall 2001 RI sampling, the Boulder River had no concentrations of COCs above benchmark levels upstream of Basin Watershed OU2. However, during high-flow months, arsenic, copper, and lead exceeded benchmarks upstream of Basin Watershed OU2.

Concentrations of COCs were as much as 24 times the concentration seen upstream of the Jib Tailings and about four times the ecological and human health benchmarks, indicating a source of COCs to surface water.(CDM 2005).

Downstream of the confluence with Basin Creek, sulfate concentrations increased but most of the COC concentrations remained relatively unchanged with copper as the only COC exceeding in its benchmark. Historic data show COC concentrations in the

Boulder River between the confluences of Basin Creek and Cataract Creek to be one to three times above the ecological and human health PRGs.

Downstream of the confluence of Cataract Creek with Boulder River, COC concentrations dramatically increased by over 3.5 times the concentrations measured downgradient of the Basin Creek confluence with the Boulder River. Total and dissolved copper concentrations continued to exceed benchmarks downstream of Cataract Creek, while dissolved cadmium and zinc were detected above benchmark levels for the first time. Based on recent and historical data, Cataract Creek has a more significant impact on the Boulder River than Basin Creek. Cataract Creek contributed almost twice the sulfate concentrations measured in Basin Creek. Further, Cataract Creek contributed COC concentrations ranging from one to 16 times the concentrations measured in Basin Creek indicating significantly higher mining-related impacts in Cataract Creek (CDM 2005).

Concentrations of COCs again increased downgradient of the confluence with High Ore Creek. Lead nearly tripled in concentration. These COC concentrations, seen in Fall 2001 sampling, were 2 to 3 times the ecological benchmarks and twice the human health benchmarks. Concentrations in this section of the Boulder River historically approached levels up to five times the human health benchmarks and six times ecological benchmarks (CDM 2005).

17.1.2 Stream Sediment

Sediment COC distribution was similar to surface water COCs with many benchmark level exceedences. The first impacted sediment samples occurred downstream of the Jib Tailings site. The number and concentration of COCs in sediment progressively increased downstream of the confluences of Basin Creek and Cataract Creek with Cataract Creek contributing the second highest amount of contaminated sediment into the Boulder River. The highest COC concentrations were observed downstream of the confluence of High Ore Creek, which contributes the most contaminated sediments to the Boulder River.

17.1.3 AMD/ARD

There were 18 mine sites previously identified within the Boulder River AOC. During the Fall 2001 RI, it was estimated that eight of the 18 sites had been removed by the highway construction, as there was no visual evidence of mine remnants. Five of the remaining sites (24JF0183, Merry Widow, Montana Central Railroad Ore Bins, 24JF0517, and 24JF0178) were determined to pose little threat of mining-related impacts to the Boulder River, because of the minimal amount of waste that was present and/or the large distances between the mine and the Boulder River.

Included in the mine sites are two streamside tailings areas; Jib tailings and unnamed tailings area near the former Attwater Mill (i.e., existing Basin golf course). These two areas were sampled during the Town of Basin RI (CDM 2000c), were identified as sources of COCs to the Boulder River, and are scheduled to be addressed as part of the Town of Basin ROD, (CDM 2001c). Although source removal will be effective in mitigating a long-term source of metals, the extent of removal and associated PRGs may not be sufficient to reduce aquatic risk.

Since there are no flowing adits in the Boulder River area of concern, no AD alternatives were evaluated for the Boulder River.

17.2 AD Alternatives

No AD alternatives were evaluated for the Boulder River AOC.

17.3 Surface Water Alternatives

All four surface water alternatives defined in Section 5 of this FS are applicable for the Boulder River AOC. This area has the road ways, utilities and area suitable for construction of SW4 - Physical/Chemical Treatment which makes it a viable alternative for the Boulder River AOC. In addition, the Boulder River is the only potential source of drinking water in the Basin Watershed OU2 and must be treated to PRGs standards for drinking water. The detailed analysis of surface water alternatives for the Boulder River AOC is summarized in Table 17-1. A comparative analysis of the surface water alternatives is presented in Table 17-2.

17.4 Stream Sediment Alternatives

All three of the stream sediment alternatives defined in Section 5 of this FS, are applicable for stream sediment in the Boulder River AOC. The detailed analysis of stream sediment alternatives for the Boulder River area of concern is summarized in Table 17-3. A comparative analysis of the stream sediment alternatives is presented in Table 17-4.

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Section 18
Evaluation of Alternatives for South Fork Basin Creek Subarea

This section provides the detailed and comparative analysis of remedial alternatives for AMD/ARD, stream sediment, and surface water for the South Fork Basin Creek subarea. Section 18.1 below provides a summary of the results of the RI site characterization for this subarea.

18.1 Summary of Remedial Investigation Results

The South Fork Basin Creek subarea is comprised of the subbasin formed by the south fork of Basin Creek, which drains into Basin Creek. The terrain and accessibility in this subarea is generally characterized by:

- Narrow axial valley with steep side slopes, and minimal flat areas
- Good primary road (Basin Creek Road) with poor quality secondary roads
- Generally good access to creek
- Narrow, low to medium gradient creek

There are no historic or present day mining activities in this subarea. Consequently, the South Fork Basin Creek subarea contains no waste rock, tailings, or adits. While the subarea has one of the two streams contributing the most flow into Basin Creek, the water in South Fork Basin Creek poses no risk to the environment with respect to the COCs. Sediment in South Fork Basin Creek were the least contaminated of the Basin Creek AOC. Selected COCs exceeded benchmarks due to naturally occurring metal bearing host rock (CDM 2005). Sediment in South Fork Basin Creek pose no risk to the environment (CDM 2002a).

18.2 Acid Drainage Alternatives

Since there are no mines adits or contaminated groundwater seeps in the South Fork Basin Creek subarea, no AD alternatives were evaluated for this subarea.

18.3 Surface Water Alternatives

Surface water samples taken from South Fork Basin Creek showed COCs at concentrations below those that pose risk to the environment. The surface water in South Fork Basin Creek subarea will not be used for drinking water, so there is no risk to human health. Therefore, no surface water alternatives were evaluated for this subarea.

18.4 Stream Sediment Alternatives

Samples taken during the RI process show a slight impact to the environment from stream sediment in the South Fork Basin Creek subarea. However, the steep terrain and lack of flat areas throughout the subarea make the stream diversion portion of Alternative SD3 - Excavation and Onsite Disposal at the Luttrell Repository, technically impractical and cost prohibitive to perform Therefore, only Alternative SD1 - No Action and Alternative SD2 - Natural Attenuation were evaluated for this subarea. A detailed analysis of potential remediation alternatives for stream sediment in the South Fork Basin Creek subarea is provided in Table 18-1. The comparative analysis of these alternatives is provided in Table 18-2.

Section 19
Sitewide Summary of Costs

The comparative analysis of remedial actions in Sections 9 through 18 of this FS are presented per subarea. In order to demonstrate the magnitude of the overall Basin Watershed remedial action, a summary of the costs for each alternatives for all subareas is presented in the following tables:

- Table 19-1 Summary of Costs for Waste Rock and Tailings Alternatives for the medium, medium-high, and high priority mine sites within Basin Watershed. The very low and low priority sites are not presented since the detailed and comparative analysis showed that the no action alternative is the best solution for these sites.

- Table 19-2 Summary of Costs for Surface Water Alternatives for the Basin Watershed

- Table 19-3 Summary of Costs for Stream Sediment Alternatives for the Basin Watershed

- Table 19-4 Summary of Costs for AMD/ARD Alternatives for the Basin Watershed

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Section 20
References

ARM 2004. Administrative Rules of Montana 17.30.610 Waters-use Classification Missouri River Drainage Except Yellowstone, Belle Fourche, and Little Missouri River Drainages.

CDM 2000a. Final Feasibility Study Report for Basin Mining Area Superfund Site, Town of Basin OU1, Jefferson County, Montana. December.

____. 2000b. Final Human Health Risk Assessment for the Town of Basin Mining Area Site, Operable Unit 1, Montana. October.

____. 2000c. Draft Technical Memorandum for Remedial Alternatives Screening, Upper Tenmile Creek Mining Area Site, Operable Unit 4, Lewis and Clark County, Montana. April.

____. 2000c. Final Remedial Investigation Report for Basin Mining Area Superfund Site, Town of Basin Operable Unit 1, Jefferson County, Montana. October.

____. 2000d. Draft Technical Memorandum for Remedial Alternatives Evaluation, Upper Tenmile Creek Mining Area Site, Operable Unit 4, Lewis and Clark County, Montana. June.

____. 2001a. Draft Feasibility Study Report, Upper Tenmile Creek Mining Area Superfund Site, Lewis and Clark County, Montana. March.

____. 2001b. Ecological Risk Assessment Report, Upper Tenmile Creek Superfund Site, Lewis and Clark County, Montana. March.

____. 2001c. Record of Decision, Town of Basin Mining Area Operable Unit 1, Jefferson County, Montana. September.

____. 2001c. Final Human Health Risk Assessment, Upper Tenmile Creek, Mining Area Site, Lewis and Clark County, Montana. March. October.

____. 2002a. CDM Federal Programs Corporation. CDM 2002. Draft Ecological Risk Evaluation, Basin Mining Area, Operable Unit 2, Jefferson County, Montana. May.

____. 2002b. Draft Remedial Investigation Report, Basin Mining Area, Operable Unit 2, Jefferson County, Montana. December.

____. 2005. Draft Final Remedial Investigation Addendum Report, Basin Mining Area, Operable Unit 2, Jefferson County, Montana. April.

MBMG 1960. *Bulletin 16, Mines and Mineral Deposits Except Fuels Jefferson County, Montana.* By R.N. Roby, W.C. Ackerman, F.B. Fulkerson, and F.A. Crowley.

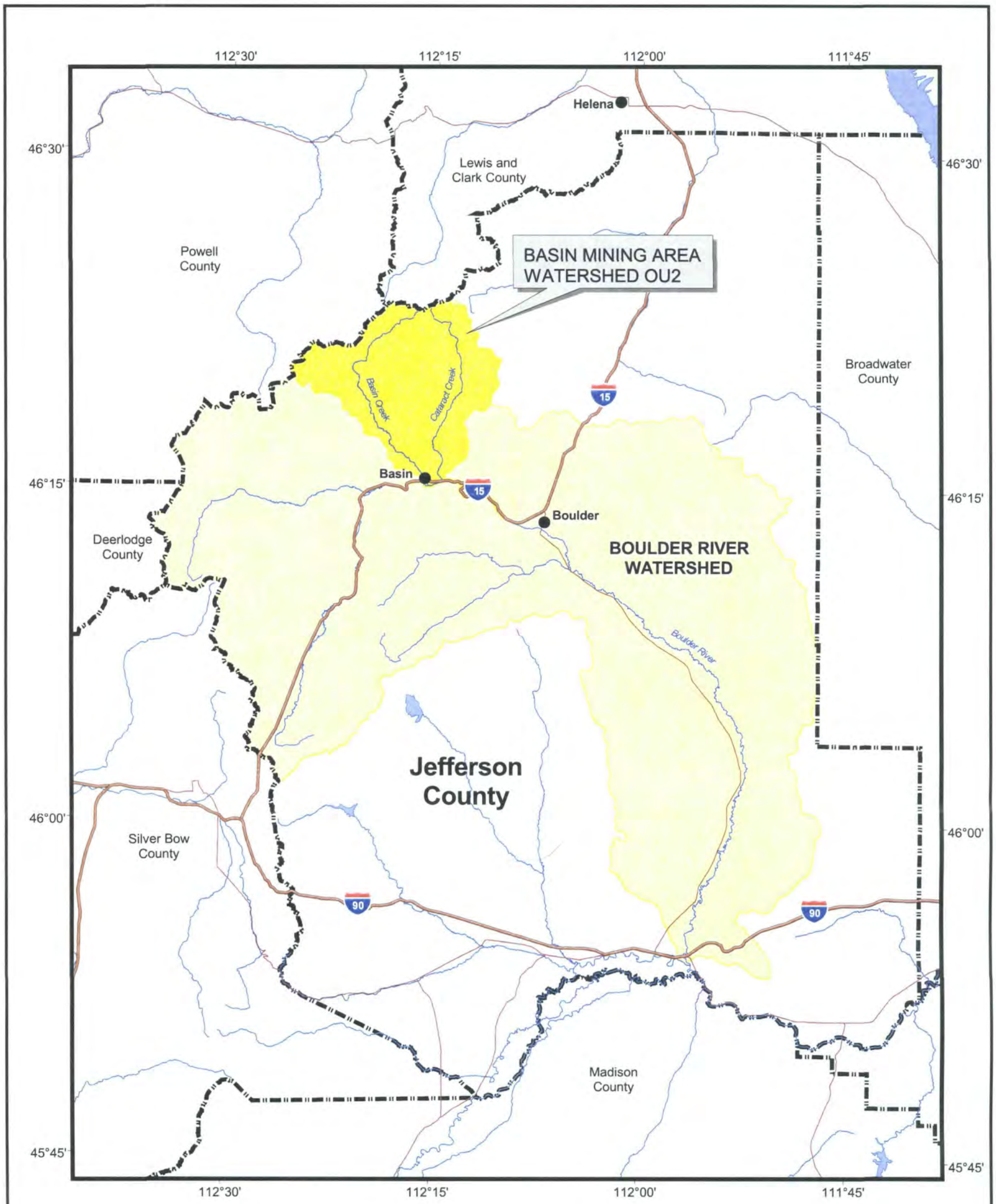
MDEQ 1999. Montana Numeric Water Quality Standards; Circular WQB-7.

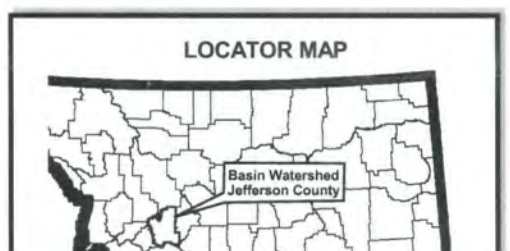
EPA. 1993. Presumptive Remedies: Policy and Procedures. EPA 540-F-93-047. September.

____. 1997. Ecological Risk Assessment Guidance for Superfund (ERAGS): Process for Designing and Conducting Ecological Risk Assessments. Interim Final. EPA-540-R-97-006.

____. 1999. Hazard Ranking System. Basin Mining Area. July.

____. 2000. Abandoned Mine Site Characterization and Clean Up Handbook. August.





LEGEND

- City or Town
- River or Creek
- Interstate Highway
- Highway
- Study Area
- Boulder River Watershed
- County Line

N

0 4 8 Miles

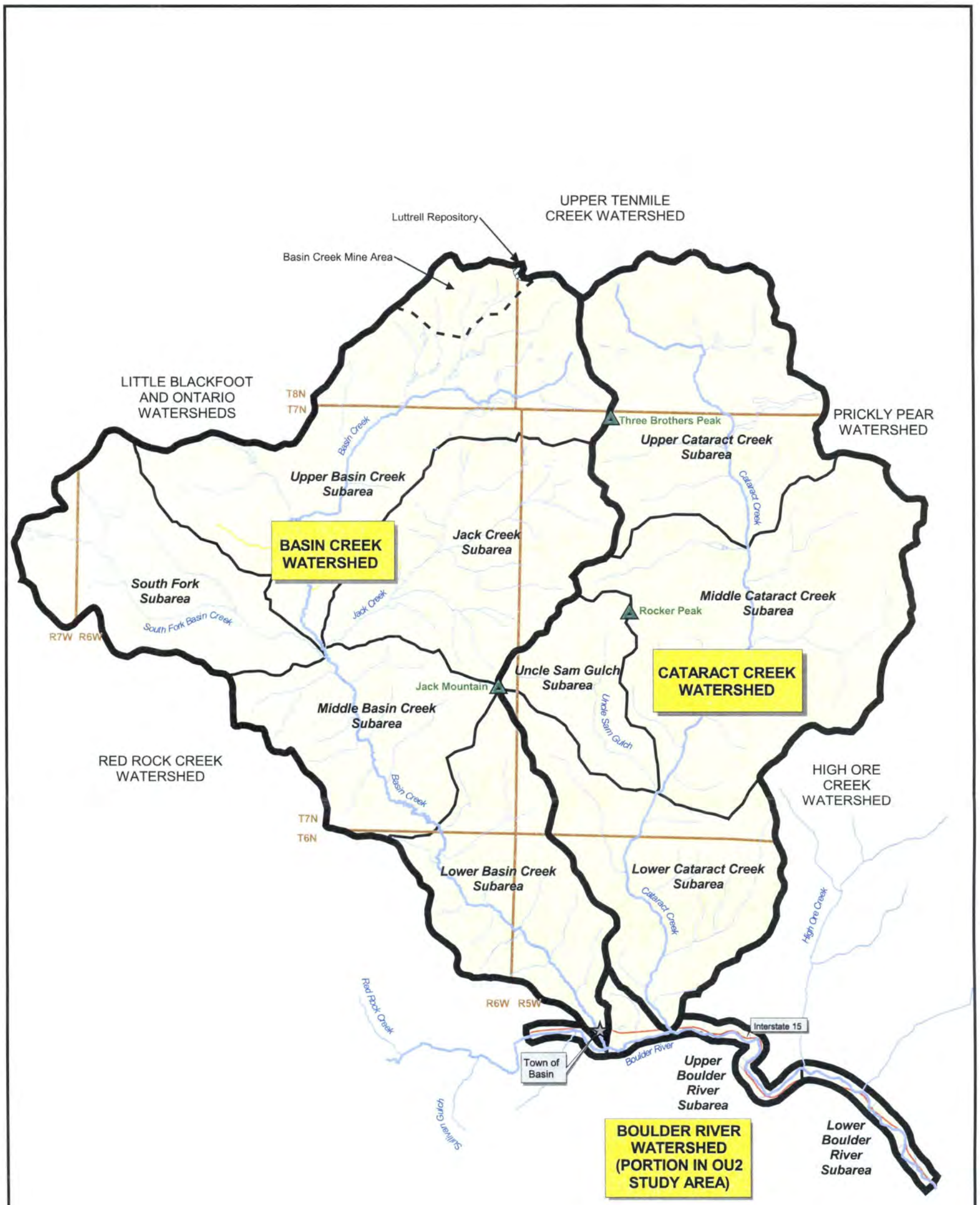
Figure 1-1

SITE LOCATION

BASIN WATERSHED OPERABLE UNIT 2
JEFFERSON COUNTY, MONTANA

CDM

1-24-02 m:\3280-rac8\045-basinwatershed\gis\Draft_FS01.apr SiteLocation_2



LEGEND

- Local Mountain Peak Over 8,000 Feet Above Mean Sea Level
- River or Creek
- Basin Creek Mine Area
- Interstate
- Luttrell Repository
- Study Area
- Watersheds
- Subbasins
- Township and Range Block

Note: Study area is within the Beaverhead-Deerlodge National Forest

N

0 1 2 Miles

Figure 1-2

SITE MAP

BASIN WATERSHED OPERABLE UNIT 2
JEFFERSON COUNTY, MONTANA

CDM

1-24-02 m:\3280-rac8\045-basinwatershed\gis\Draft FS01.apr SiteMap

Table 1-1 Summary of Chemicals of Concern, Basin Watershed OU2

Analytes		Surface Water	Sediment	Soil
Aluminum	Al	X	X	X
Antimony	Sb	X	X	X
Arsenic	As	X	X	X
Barium	Ba	X	X	X
Beryllium	Be	X	X	X
Cadmium	Cd	X	X	X
Chromium	Cr	X	X	X
Cobalt	Co	X	X	X
Copper	Cu	X	X	X
Iron	Fe	X	X	X
Lead	Pb	X	X	X
Manganese	Mn	X	X	X
Mercury	Hg	X	X	X
Nickel	Ni	X	X	X
Selenium	Se		X	X
Silver	Ag	X	X	X
Thallium	Tl	X		X
Vanadium	V	X	X	X
Zinc	Zn	X	X	X
Total		**18**	**18**	**19**

Table 2-1 Surface Water PRGs, Basin Watershed OU2

	Human Health*	Ecological
Analyte	**Surface Water (ug/L)**	**Surface Water (ug/L)**
Aluminum	ND	87
Antimony	6	30
Arsenic	18	150
Barium	2000	ND
Beryllium	4	5.3
Cadmium	5	0.78
Chromium	100	11
Cobalt	ND	23
Copper	5.2	4.1
Cyanide	200	5.2
Iron	300	1000
Lead	3.2	1.16
Manganese	50	120
Mercury	0.05	0.65
Nickel	100	24
Silver	4.1	0.12
Thallium	1.7	40
Vanadium	ND	ND
Zinc	67	42.1

Compiled from the Draft Remedial Investigation Report (CDM 2002a), Tables 4.1-2 and 4.1-3
*Only applicable in Boulder River
ND - No data available on the toxicity of this COC for use in PRG determination
ug/L - Micrograms per liter

Table 2-3 Soil Preliminary Remediation Goals, Basin Watershed OU2

Analyte	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Recreational Soil (mg/kg)	Ecological (mg/kg)	PRG
Aluminum	78000	2000000	no data	50	50
Antimony	31	820	no data	3.5	3.5
Arsenic	120	490	1440	10	10
Barium	5500	140000	no data	165	165
Beryllium	160	4100	no data	1.1	1.1
Cadmium	562	no data	no data	1.6	1.6
Chromium	no data	no data	no data	0.4	0.4
Chromium (III)	120000	3100000	no data	no data	120000
Chromium (VI)	230	6100	no data	no data	230
Cobalt	4700	120000	no data	20	20
Copper	3100	82000	no data	40	40
Cyanide	no data	no data	no data	0.9	0.9
Iron	23000	610000	no data	50	50
Lead	1000	no data	1000	50	50
Manganese	26954	69725	469	100	100
Mercury	337	1050	4165	0.1	0.1
Molybdenum	390	10000	no data	2	2
Nickel	1600	41000	no data	30	30
Selenium	390	10000	no data	0.81	0.81
Silver	390	10000	no data	2	2
Strontium	47000	1200000	no data	no data	47000
Thallium	5.5	140	no data	1	1
Tin	47000	1200000	no data	50	50
Vanadium	550	14000	no data	2	2
Zinc	23000	610000	no data	50	50
pH	no data	no data	no data	<5	<5

Compiled from the Draft Final Remedial Investigation Report Addendum (CDM 2005), Tables 4.1-2 and 4.1-3

No data - No data available on the toxicity of this COC for use in PRG determination

mg/kg - Milligram per Kilogram

Table 2-4 Stream Sediment Preliminary Remediation Goals, Basin Watershed OU2

Analyte	Human Health Sediment (mg/kg)	Ecological (mg/kg)	PRG
Aluminum	no data	no data	no data
Antimony	no data	2	2
Arsenic	3740	5.9	5.9
Barium	no data	200	200
Beryllium	no data	no data	no data
Cadmium	no data	0.596	0.596
Chromium	no data	37.3	37.3
Cobalt	no data	20	20
Copper	no data	18.7	18.7
Cyanide	no data	1	1
Iron	no data	20000	20000
Lead	1000	53	53
Manganese	no data	460	460
Mercury	10825	0.13	0.13
Molybdenum	no data	10	10
Nickel	no data	15.9	15.9
Selenium	no data	4	4
Silver	no data	0.5	0.5
Strontium	no data	no data	no data
Thallium	no data	no data	no data
Tin	no data	no data	no data
Vanadium	no data	no data	no data
Zinc	no data	110	110

Compiled from the Draft Final Remedial Investigation Report Addendum (CDM 2005), Tables 4.1-2 and 4.1-3

No data - No data available on the toxicity of this COC for use in PRG determination

mg/kg - Milligram per Kilogram

Table 3-1 Retained Remedial Technology and Process Options, Basin Watershed OU2 Site

General Response Actions	Remedial Technology	Process Options	Description	Screening Comment
No Action	None	Not Applicable	No action.	Not applicable.
Natural Attenuation	Natural Attenuation	Natural Attenuation	Reduction in toxicity, mobility, or volume through natural processes without human intervention.	May be effective at small, low toxicity sites. Readily implementable.
Institutional Controls	Land Use Controls	Zoning	Implement restrictions to control current and future land use.	Potentially effective in conjunction with other technologies; readily implementable.
		Deed Restrictions	Implement restrictions to control current and future land uses.	Potentially effective in conjunction with other technologies; readily implementable.
		Environmental Control Easement	Can be used to restrict use of site and perform operations and maintenance.	Potentially effective in conjunction with other technologies; readily implementable.
	Access Restrictions	Fencing/Barrier	Install fences around waste areas to limit access.	Effective to prevent direct contact. Retained for use in conjunction with other technologies; readily implementable.
		Controlled Groundwater Area	Temporary or permanent restrictions on groundwater use.	Potentially effective in conjunction with other technologies; readily implementable.
	Community Awareness	Information and Education Programs	Inform the public of site hazards, purpose of remedial actions, and responsibilities in maintenance of remedial actions.	Potentially effective in conjunction with other technologies; readily implementable.
	Water Management Practices	Alternate Sources	Reduce demand on surface water system to allow higher in stream flowrates and increase water quality or to replace contaminated groundwater supplies.	Potentially highly effective. May be used in conjunction with other technologies; moderately implementable.

Table 3-1 Retained Remedial Technology and Process Options, Basin Watershed OU2 Site (continued)

General Response Actions	Remedial Technology	Process Options	Description	Screening Comment
Containment	Surface Water Controls	Runon/Runoff Control Ditches	Limit water flowing to and from source areas and limit contact of surface water with sources.	Potentially effective for around waste areas and to limit infiltration to underground workings.
		Detention/Infiltration Basins	Control surface water runoff and minimize or prevent discharge into stream.	Potentially effective for stormwater control; implementable; used in conjunction with other technologies.
		Stream Channel Diversion/Relocation	New or improved channels to prevent erosion and control releases of contaminants into stream.	Potentially effective where waste removal not feasible in conjunction with other technology.
		Sediment Dams or Traps	Intercept and retain sediments produced from source area.	Potentially effective and implementable at source areas to control storm runoff or within stream channels where sedimentation would occur.
CONTAINMENT (continued)	Source Surface Controls	Consolidation	Wastes are consolidated into a single, smaller area.	Used in conjunction with other process options; readily implementable.
		Grading	Grade waste piles to reduce slopes for managing surface water infiltration, runon/runoff, and erosion; waste materials are left in place.	Used in conjunction with other process options; reduces erosion potential and enhances success of revegetation/ capping; readily implementable.
		Revegetation Erosion Protection	Can be applied directly to wastes or soil cover by adding amendments and seeding. Reduces mobility and direct exposure.	Revegetation of wastes depends upon phytotoxicity. Readily implementable alone or in conjunction with other technology.
		Cover/Cap	Install soil cover or multi-layer cap with soil/vegetation over surface; waste materials are left in place.	Surface infiltration and runoff potential would be reduced, but not prevented; limits direct exposure; readily. implementable

Table 3-1 Retained Remedial Technology and Process Options, Basin Watershed OU2 Site (continued)

General Response Actions	Remedial Technology	Process Options	Description	Screening Comment
	Barriers	Retaining Structures	Constructed to stabilize source material surfaces or slopes against sliding/erosion.	Effective to address special stability or erosion conditions.
		Adit Plugs/Bulkheads	Installed to minimize mine draining discharge volume and to reduce acid generation.	Effectiveness and implementability are very site specific. Requires access to underground workings to install.
		Grouting	Used to minimize water infiltration to mine workings thus reducing AMD discharge. Can also be used in conjunction with mine flooding to control mine exfiltration.	Effectiveness and implementability are very site specific. May require access to underground workings to install.
Removal, Transport, and Disposal	Removal	Mechanical Excavation	Excavate waste in dry or wet using conventional earth-moving equipment.	Effective and readily implementable.
		Hydraulic Dredging	Wastes removed using water-jet cutters and suction pumps. Allows removal of wet material (sediment).	Effective and implementable for gravel and smaller-grained materials, particularly stream sediments. Source of water required.

Table 3-1 Retained Remedial Technology and Process Options, Basin Watershed OU2 Site (continued)

General Response Actions	Remedial Technology	Process Options	Description	Screening Comment
Removal, Transport, and Disposal (continued)	Transport	Truck Hauling	Removed source material is loaded into and hauled by trucks.	Requires haul road; road improvements and size dependent upon type of truck.
		Conveyor	Excavated material is transported using belt conveyor system to disposal site.	Potentially effective in areas near disposal sites or where haul roads are impractical or not undesirable.
	Onsite Disposal	Mine Site Repository	Excavate waste materials and deposit on site in a constructed repository. Repository design could range from simple earthen cap to incorporation of synthetic liners and leachate collection.	Surface infiltration and runoff potential would be greatly reduced; all wastes are consolidated into one location; readily implementable if the site is conducive to repository construction.
		Regional Repository (Luttrell Repository)	Excavate wastes and deposit on site in Luttrell repository.	Implementable and effective for waste rock and tailings. Cost effectiveness depends upon site locations and haul routes.
	Offsite Disposal	Solid Waste Landfill	Excavate and dispose of non-hazardous solid wastes permanently in a non-RCRA facility.	Potentially effective and implementable for non-hazardous materials. Cost-prohibitive as stand-alone alternative. Will be considered in conjunction with other technologies.
		Hazardous Waste Landfill	Excavate and dispose of wastes permanently in a RCRA-permitted facility.	Potentially effective and readily implementable but cost prohibitive as stand-alone alternative. Will be considered in conjunction with other technologies.
Water Treatment	Physical/ Chemical Treatment	Coagulation/ Clarification/ Filtration	Remove suspended heavy metals from water in treatment facility using a three-step treatment process.	Not effective for dissolved heavy metals. Will be considered in conjunction with other technologies. Sludge disposal required.
		Neutralization/ Oxidation/ Precipitation	Remove dissolved heavy metals from water in treatment facility using a three-step treatment process.	Highly effective and implementable but high cost. Sludge disposal required.

Table 3-1 Retained Remedial Technology and Process Options, Basin Watershed OU2 Site (continued)

General Response Actions	Remedial Technology	Process Options	Description	Screening Comment
Water Treatment (continued)	Physical/ Chemical Treatment (continued)	Reverse Osmosis	Remove dissolved heavy metals from water in treatment facility using reverse osmosis.	Highly effective and implementable but high cost. Residual disposal required.
		Adsorption/Ion Exchange	Remove dissolved heavy metals from water in treatment facility using adsorption or ion exchange.	Highly effective and implementable but high cost. Residual disposal required.
	Biological Treatment	Wetlands	Reduce concentrations of suspended solids by physical filtration, adsorption, and precipitation.	Potentially effective; site-specific moderate cost; medium effectiveness.
		Biotreatment Systems	Anaerobic treatment cells that remove metals by raising pH of acidic water and optimize conditions for bacterial production of sulfides; sulfides react with metals to form precipitates.	Potentially effective; site-specific moderate cost; medium to high effectiveness.
Solids Treatment	Physical Treatment	Fixation/ Stabilization	Fixation incorporates hazardous constituents into non-leachable cement or pozzolan solidifying agents. Stabilize waste constituents in place when combined with stabilizing agents such as lime.	Extensive treatability testing required for fixation; costly. Stabilization potentially effective and implementable.
Resource Utilization	Reuse	Recycling	Use of materials for riprap, railroad ballast, or other beneficial use.	Potentially effective and implementable. Reuse not yet identified.

Table 4-1 Alternatives Screening Summary, Basin Watershed OU2 Site

Alternative Description		Effectiveness	Implementability	Cost	Retained For Detailed Analysis
Waste Rock and Tailings					
No Action		Low	Easy	Low	Yes
Institutional Controls		Low to Moderate	Easy (Fencing)	Low	No*
Surface Controls		Low to Moderate	Easy	Low to Moderate	Yes
Containment	Earthen Cap	Moderate	Easy	Moderate	Yes
	Earthen Cap with Liner	Moderate to High	Easy	Moderate	Yes
Excavation and Onsite Disposal	Regional Repository (Luttrell Repository)	High	Easy	Moderate to High	Yes
Excavation and Offsite Disposal	Solid Waste Landfill	High	Moderately Difficult	High	No*
	Hazardous Waste Landfill	High	Easy	High	No*
Acid Mine/Acid Rock Drainage					
No Action		Low	Easy	Low	Yes
Natural Attenuation		Low to Moderate	Easy	Low	Yes
Institutional Controls		Low to Moderate	Easy	Low	No*
Surface Water Controls		Low to Moderate	Easy to Moderately Difficult	Low to Moderate	No*
Grouting		Moderate	Moderately Difficult to Difficult	Moderate to High	No*
Adit Plug/Mine Flooding		Moderate	Moderately Difficult	Moderate to High	No*
Biological Treatment	Constructed Wetlands	Moderate	Moderately Difficult	Moderate	Yes
	Biotreatment Systems	Moderate	Moderately Difficult	Moderate	Yes
Physical/ Chemical Treatment	Coagulation/ Clarification/ Filtration	Low	Moderately Difficult	Moderate to High	No*
	Neutralization/ Oxidation/ Precipitation	High	Moderately Difficult	Moderate to High	Yes
	Reverse Osmosis	High	Moderately Difficult	Moderate to High	Yes
	Ion Exchange	High	Moderately Difficult	Moderate to High	Yes
Stream Sediment					
No Action		Low	Easy	Low	Yes

Table 4-1 Alternatives Screening Summary Basin Watershed OU2 Site (continued)

Natural Attenuation		Low to Moderate	Easy	Low	Yes
Excavation and Onsite Disposal	Mine Site Repository	High	Easy	Moderate	No
	Regional Repository (Luttrell Pit)	High	Easy to Moderately Difficult	Moderate	Yes
Surface Water					
No Action		Low	Easy	Low	Yes
Natural Attenuation		Low to Moderate	Easy	Low	Yes
Surface Controls		Low to Moderate	Easy	Low to Moderate	No*
Biological Treatment		Moderate	Moderately Difficult	Moderate	Yes
Physical/ Chemical Treatment	Coagulation/ Clarification/ Filtration	Low	Moderately Difficult	Moderate to High	No*
	Neutralization/ Oxidation/ Precipitation	High	Moderately Difficult	Moderate to High	Yes
	Reverse Osmosis	High	Moderately Difficult	Moderate to High	Yes
	Ion Exchange	High	Moderately Difficult	Moderate to High	Yes
Groundwater					
No threat to human health and the environment, no alternatives retained.					

Notes:
* Not retained as stand-alone alternative but may be used in conjunction with other alternatives

Table 7-1 Summary of Site Scoring Based on Site-Specific Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
51	APOLLO	MAIN	MIDDLE CATARACT CREEK	326	3077	108	3511	High
83	CRYSTAL	AREA 2	UNCLE SAM GULCH	202	3010	73	3285	High
69	CARTWRIGHT CABINS 2	MAIN	LOWER CATARACT CREEK	130	3000	18	3149	High
91	EVA MAY	MAIN	MIDDLE CATARACT CREEK	486	2327	109	2922	High
43	VINDICATOR	MAIN	JACK CREEK	185	2476	33	2694	High
171	UNNAMED 001	MAIN	MIDDLE CATARACT CREEK	69	2610	8	2688	High
104	HATTIE FERGUSON	UPPER	MIDDLE CATARACT CREEK	268	2027	370	2665	High
20	NORTH ADA - PIERMONT	MAIN	UPPER CATARACT CREEK	230	2304	50	2583	High
70	CATARACT	MAIN	MIDDLE CATARACT CREEK	125	2383	9	2517	High
283	JOSEPHINE	MAIN	UPPER BASIN CREEK	282	1943	286	2511	High
74	CATARACT TAILS	MAIN	MIDDLE CATARACT CREEK	68	2383	29	2479	High
1	ADELAIDE	MAIN	LOWER BASIN CREEK	162	2267	24	2453	High
156	RUTH	MAIN	LOWER CATARACT CREEK	45	2239	0	2284	High
140	NEW COTTAGE	MAIN	LOWER CATARACT CREEK	52	2219	0	2271	High
706	NE NW SECTION 17	MAIN	MIDDLE CATARACT CREEK	88	2116	38	2242	High
254	COLUMBUS	MAIN	LOWER BASIN CREEK	58	2173	0	2231	High
167	SYLVAN	MAIN	LOWER CATARACT CREEK	203	1939	74	2215	High
76	CLIPPER / EDNA	MAIN	MIDDLE CATARACT CREEK	146	1972	18	2136	High
48	ADA	MAIN	MIDDLE CATARACT CREEK	152	1936	19	2107	High
63	BOSTON	MAIN	LOWER CATARACT CREEK	304	1713	73	2090	High
5	AURORA	AREA 2	LOWER BASIN CREEK	430	1504	127	2061	High
261	DORIS	AREA 2	LOWER BASIN CREEK	138	1899	9	2046	High
4	AURORA	MAIN	LOWER BASIN CREEK	380	1504	127	2011	High
102	HATTIE FERGUSON	LOWER	MIDDLE CATARACT CREEK	268	1608	120	1996	High
338	DEW DROP	MAIN	JACK CREEK	745	958	250	1952	High
175	VERA AND MARIE	MAIN	MIDDLE CATARACT CREEK	31	1888	0	1920	High
161	SEATTLE	MAIN	LOWER CATARACT CREEK	181	1688	29	1898	High
116	LIZZIE OSBORNE	MAIN	MIDDLE CATARACT CREEK	84	1739	4	1827	High
61	BLACK BEAR	AREA 2	MIDDLE CATARACT CREEK	308	1350	149	1806	High
277	JESSIE	MAIN	LOWER BASIN CREEK	126	1668	9	1803	High
321	SE NW SECTION 30	MAIN	UPPER BASIN CREEK	65	1688	0	1752	High

Table 7-1 Summary of Site Scoring Based on Site-Specific Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
592	RTI RECON: P	MAIN	JACK CREEK	97	1638	14	1749	High
349	GOLD FLAKE	MAIN	LOWER CATARACT CREEK	26	1642	0	1668	High
125	MARY ANNE	MAIN	MIDDLE CATARACT CREEK	138	1404	17	1559	High
164	SIRIUS	MAIN	MIDDLE CATARACT CREEK	446	938	158	1542	High
144	PHANTOM	MAIN	LOWER CATARACT CREEK	35	1455	2	1492	High
114	KLONDYKE	MAIN	MIDDLE CATARACT CREEK	179	938	306	1423	High
299	MAGDELENA GROUP	MAIN	UPPER BASIN CREEK	3	1375	0	1378	High
78	CRACKER	MAIN	MIDDLE CATARACT CREEK	638	623	116	1377	High
132	MORNING GLORY	TAILINGS	MIDDLE CATARACT CREEK	174	1153	16	1344	High
62	BLUE DIAMOND / OCCIDENTAL	MAIN	MIDDLE CATARACT CREEK	152	1140	12	1305	High
307	MORNING STAR	MAIN	UPPER BASIN CREEK	35	1167	0	1203	High
94	FIRST SHOT / LAST SHOT	MAIN	JACK CREEK	39	1138	0	1177	High
394	ALPINE	MAIN	MIDDLE CATARACT CREEK	82	1077	0	1159	High
127	MIDDLE SNOWDRIFT CREEK	MAIN	MIDDLE CATARACT CREEK	89	1053	0	1143	High
705	LADY RICKER	MAIN	UPPER CATARACT CREEK	16	1125	0	1141	High
347	GARFIELD	MAIN	UNCLE SAM GULCH	20	1116	0	1136	High
142	OVERLAND CREEK	MAIN	UPPER CATARACT CREEK	69	1005	41	1115	High
304	MOLLY SNOW	MAIN	UPPER BASIN CREEK	179	907	15	1101	High
322	SE SE SECTION 35	MAIN	UPPER BASIN CREEK	135	918	12	1065	High
268	GRUB CREEK STATION	MAIN	UPPER BASIN CREEK	6	1047	0	1053	High
93	EVENING STAR	MAIN	UNCLE SAM GULCH	72	958	0	1030	High
381	SNOWBIRD	MAIN	UNCLE SAM GULCH	100	925	0	1025	High
28	PLACER	MAIN	UPPER BASIN CREEK	8	1005	0	1013	High
172	UNNAMED 002	MAIN	MIDDLE CATARACT CREEK	100	902	0	1002	High
133	MORNING MARIE	MAIN	MIDDLE CATARACT CREEK	61	863	0	924	High
82	CRYSTAL	MAIN	UNCLE SAM GULCH	52	776	13	842	High
18	NEPTUNE	MAIN	UPPER BASIN CREEK	134	691	7	832	High
59	BING HAMPTON	MAIN	MIDDLE CATARACT CREEK	2	814	0	816	High
702	TIMBERLINE	MAIN	MIDDLE CATARACT CREEK	150	610	17	777	High
160	SATURDAY NIGHT	MAIN	LOWER CATARACT CREEK	25	707	2	734	Medium-High
157	RUTH	AREA 2	LOWER CATARACT CREEK	11	707	0	718	Medium-High

Table 7-1 Summary of Site Scoring Based on Site-Specific Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
306	MORNING	AREA 2	JACK CREEK	65	624	20	709	Medium-High
169	UNCLE SAM	MAIN	UNCLE SAM GULCH	5	702	0	707	Medium-High
701	SW SE SECTION 4	MAIN	UPPER CATARACT CREEK	50	638	0	688	Medium-High
270	HECTOR	MAIN	LOWER BASIN CREEK	25	624	4	653	Medium-High
339	EDNA	MAIN	MIDDLE CATARACT CREEK	13	638	0	651	Medium-High
611	RTI RECON: R	MAIN	LOWER BASIN CREEK	204	355	37	595	Medium-High
276	JACK CREEK TAILINGS	MAIN	JACK CREEK	23	555	2	579	Medium-High
66	BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	9	560	0	569	Medium-High
165	SPARKING WATER	MAIN	UNCLE SAM GULCH	47	500	13	560	Medium-High
148	RED BIRD	MAIN	MIDDLE CATARACT CREEK	56	500	3	559	Medium-High
44	VINDICATOR	AREA 2	JACK CREEK	34	511	6	551	Medium-High
120	MAMMOTH	MAIN	UNCLE SAM GULCH	37	500	13	550	Medium-High
166	SPARKING WATER	AREA 2	UNCLE SAM GULCH	37	500	13	550	Medium-High
332	BIG MEDICINE	MAIN	LOWER CATARACT CREEK	6	537	0	543	Medium-High
95	FIRST SHOT / LAST SHOT	AREA 2	JACK CREEK	7	516	0	524	Medium-High
315	GARFIELD	EXTENSIO	UNCLE SAM GULCH	20	500	0	520	Medium-High
354	LAPLATE	MAIN	LOWER CATARACT CREEK	20	500	0	520	Medium-High
374	REGALIA	MAIN	LOWER CATARACT CREEK	20	500	0	520	Medium-High
377	SAGINAW	MAIN	LOWER CATARACT CREEK	20	500	0	520	Medium-High
122	MANTLE	MAIN	LOWER CATARACT CREEK	18	500	0	518	Medium-High
617	24JF0241	MAIN	LOWER CATARACT CREEK	11	500	0	511	Medium-High
618	24JF0240	MAIN	LOWER CATARACT CREEK	11	500	0	511	Medium-High
284	JOSEPHINE	MINE 2	UPPER BASIN CREEK	36	463	6	506	Medium-High
110	INDEPENDENCE MINE	MAIN	LOWER CATARACT CREEK	2	500	0	502	Medium-High
251	BULLION MINE	MAIN	JACK CREEK	0	501	0	501	Medium-High
105	SW NW SECTION 29	MAIN	UNCLE SAM GULCH	0	500	0	500	Medium-High
263	DOUBLE SHAFT	MAIN	UPPER BASIN CREEK	13	449	0	462	Medium
305	MORNING	MAIN	JACK CREEK	69	370	20	459	Medium
88	ELDORADO AND PLATEAU	MAIN	UPPER CATARACT CREEK	179	120	147	446	Medium
303	MOCCASON	MAIN	JACK CREEK	72	348	23	442	Medium
60	BLACK BEAR	MAIN	MIDDLE CATARACT CREEK	82	300	45	427	Medium

Table 7-1 Summary of Site Scoring Based on Site-Specific Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
64	BOULDER CHIEF	MAIN	MIDDLE CATARACT CREEK	270	131	12	413	Medium
121	MANHATTAN	MAIN	LOWER CATARACT CREEK	136	270	7	413	Medium
345	FOURTH OF JULY	MAIN	MIDDLE CATARACT CREEK	23	382	0	405	Medium
302	MEYERS GULCH	MAIN	LOWER BASIN CREEK	49	320	3	372	Medium
289	LADY LEITH	MAIN	UPPER BASIN CREEK	53	276	25	355	Medium
77	CORBITT	MAIN	UPPER CATARACT CREEK	153	120	81	354	Medium
252	BULLION SMELTER	MAIN	JACK CREEK	0	349	0	349	Medium
257	DAILY WEST	AREA 2	LOWER BASIN CREEK	139	166	36	341	Medium
271	HECTOR	AREA 2	LOWER BASIN CREEK	23	293	4	320	Medium
67	CALIFORNIA	MAIN	LOWER CATARACT CREEK	304	0	15	319	Medium
296	HECTOR - LOWER	MAIN	LOWER BASIN CREEK	21	293	2	315	Medium
256	DAILY WEST	MAIN	LOWER BASIN CREEK	109	166	36	312	Medium
708	ROCKER WETLAND	MAIN	MIDDLE CATARACT CREEK	18	54	198	270	Medium
260	DORIS	MAIN	LOWER BASIN CREEK	26	224	2	252	Medium
131	MORNING GLORY	MAIN	MIDDLE CATARACT CREEK	23	221	2	245	Low
113	JUMBO	MAIN	MIDDLE CATARACT CREEK	100	137	0	237	Low
616	24JF0524	MAIN	LOWER BASIN CREEK	25	199	0	225	Low
262	DOROTHY SNOW	MAIN	UPPER BASIN CREEK	8	207	0	215	Low
174	UNNAMED 004	MAIN	MIDDLE CATARACT CREEK	77	137	0	215	Low
106	IDA M.	MAIN	MIDDLE CATARACT CREEK	73	131	2	206	Low
65	BOULDER CHIEF	MINE 2	MIDDLE CATARACT CREEK	49	131	2	182	Low
107	IDA M.	AREA 2	MIDDLE CATARACT CREEK	49	131	2	182	Low
79	CRESCENT	MAIN	UPPER CATARACT CREEK	179	0	3	182	Low
96	GRAY LEAD	MAIN	MIDDLE CATARACT CREEK	63	94	16	173	Low
128	MIKE #14	MAIN	MIDDLE CATARACT CREEK	14	148	0	162	Low
6	BASIN BELLE	MAIN	LOWER BASIN CREEK	22	139	1	162	Low
108	IDA MAY	MAIN	UPPER CATARACT CREEK	100	60	0	160	Low
152	ROCKER	MAIN	MIDDLE CATARACT CREEK	100	54	0	154	Low
712	VOGEL	MAIN	LOWER CATARACT CREEK	47	90	0	137	Low
159	SAINT NICK	MAIN	MIDDLE CATARACT CREEK	44	88	1	133	Low
52	BAKAMA	MAIN	MIDDLE CATARACT CREEK	66	60	0	126	Low

Table 7-1 Summary of Site Scoring Based on Site-Specific Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
147	QUARTZ CREEK	MAIN	UPPER CATARACT CREEK	5	118	0	123	Low
150	REDWING	MAIN	LOWER CATARACT CREEK	114	0	1	115	Low
126	MARY ANNE	AREA 2	MIDDLE CATARACT CREEK	23	75	3	101	Low
290	LADY LEITH	AREA 2	UPPER BASIN CREEK	53	22	25	100	Low
49	ALSACE	MAIN	UPPER CATARACT CREEK	0	97	0	97	Very Low
346	FREE SILVER	MAIN	MIDDLE CATARACT CREEK	41	54	1	96	Very Low
287	LADY HENNESSEY	MAIN	UPPER BASIN CREEK	54	22	18	94	Very Low
86	DEER LODGE	MAIN	LOWER CATARACT CREEK	87	0	3	90	Very Low
87	DEER LODGE	AREA 2	LOWER CATARACT CREEK	85	0	3	88	Very Low
288	LADY HENNESSEY	MINE 2	UPPER BASIN CREEK	44	22	18	84	Very Low
703	NE SE SECTION 14	MAIN	MIDDLE CATARACT CREEK	18	65	0	83	Very Low
13	BASIN MILLSITE	MAIN	UPPER BOULDER RIVER	38	37	1	76	Very Low
393	HOLLAND	MAIN	MIDDLE CATARACT CREEK	2	65	0	66	Very Low
129	MINNEAPOLIS	MAIN	LOWER CATARACT CREEK	55	0	3	58	Very Low
89	ELDORADO AND PLATEAU	AREA 2	UPPER CATARACT CREEK	26	22	6	54	Very Low
9	BASIN CREEK PLACER	MAIN	LOWER BASIN CREEK	11	31	0	43	Very Low
2	ADIT, MINE, WASTE ROCK DUMP	MAIN	UPPER BASIN CREEK	5	33	0	38	Very Low
177	WALDY	MAIN	LOWER CATARACT CREEK	36	0	0	37	Very Low
247	BUCKEYE MINE	MAIN	UPPER BASIN CREEK	0	35	0	35	Very Low
248	BUCKEYE MINE	MINE 2	UPPER BASIN CREEK	0	35	0	35	Very Low
250	BUCKEYE MINE	EXTRA AR	UPPER BASIN CREEK	0	35	0	35	Very Low
266	ENTERPRISE MINE	MAIN	UPPER BASIN CREEK	0	35	0	35	Very Low
80	CRESCENT	AREA 2	UPPER CATARACT CREEK	33	0	1	34	Very Low
143	PEN YAN	MAIN	MIDDLE CATARACT CREEK	30	0	0	30	Very Low
109	IDA MAY	AREA 2	UPPER CATARACT CREEK	18	11	0	29	Very Low
58	BILLIE T.	MAIN	MIDDLE CATARACT CREEK	24	0	0	25	Very Low
53	BAKAMA	AREA 2	MIDDLE CATARACT CREEK	12	11	0	23	Very Low
26	PERRY PARKS	MAIN	UPPER BASIN CREEK	18	0	0	18	Very Low
27	PERRY PARKS	AREA 2	UPPER BASIN CREEK	18	0	0	18	Very Low
46	WINTER'S CAMP	MAIN	UPPER BASIN CREEK	6	11	0	17	Very Low
47	WINTER'S CAMP	AREA 2	UPPER BASIN CREEK	6	11	0	17	Very Low

Table 7-1 Summary of Site Scoring Based on Site-Specific Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
281	JOE BOWER'S MINE	MAIN	UPPER BASIN CREEK	6	11	0	17	Very Low
269	HAWKEYE MINE	MAIN	JACK CREEK	5	0	0	5	Very Low
707	NEAR BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	2	0	0	2	Very Low

Table 7-2 Summary of Site Scoring Based on Subarea Default Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
709	NW SE SECTION 14	MAIN	MIDDLE CATARACT CREEK	108	3000	3	3111	High
68	CARTWRIGHT CABINS	MAIN	LOWER CATARACT CREEK	76	1520	1	1596	High
153	ROCKER EXTENSION	MAIN	MIDDLE CATARACT CREEK	34	1008	0	1043	High
73	CATARACT PLACER	MAIN	LOWER CATARACT CREEK	26	850	0	876	High
123	MANTLE SOUTH	MAIN	LOWER CATARACT CREEK	14	776	0	790	High
292	LOG CABIN AND STONE FIREPLA	MAIN	LOWER CATARACT CREEK	14	776	0	790	High
310	WHITE PINE	MAIN	LOWER CATARACT CREEK	14	776	0	790	High
311	WHITE PINE	AREA 2	LOWER CATARACT CREEK	14	776	0	790	High
608	MORNING GLORY	TAILINGS	LOWER CATARACT CREEK	14	776	0	790	High
312	BASIN GOLD & SILVER	MAIN	UNCLE SAM GULCH	7	776	0	783	High
604	24JF0490	MAIN	UNCLE SAM GULCH	7	776	0	783	High
71	CATERACT FLATS PLACER	MAIN	LOWER CATARACT CREEK	14	642	0	656	Medium-High
98	HANNA	MAIN	MIDDLE CATARACT CREEK	20	635	0	655	Medium-High
130	MINNEAPOLIS	AREA 2	LOWER CATARACT CREEK	15	635	0	650	Medium-High
510	NE BASIN	MAIN	LOWER CATARACT CREEK	14	586	0	600	Medium-High
158	SAINT LAWRENCE	MAIN	UNCLE SAM GULCH	7	522	55	583	Medium-High
35	SW NW SECTION 7	MAIN	JACK CREEK	28	539	4	571	Medium-High
258	DELGATE	MAIN	JACK CREEK	24	539	4	567	Medium-High
594	RTI RECON: O	MAIN	JACK CREEK	24	539	4	567	Medium-High
75	CLIPPER	MAIN	MIDDLE CATARACT CREEK	21	522	0	543	Medium-High
151	ROBIE BURNS	MAIN	MIDDLE CATARACT CREEK	20	522	0	542	Medium-High
173	UNNAMED 003	MAIN	MIDDLE CATARACT CREEK	20	522	0	542	Medium-High
36	UNNAMED FIRE CLAY	MAIN	JACK CREEK	24	511	4	539	Medium-High
602	RTI RECON: E	MAIN	JACK CREEK	24	511	4	539	Medium-High
155	ROSE MINE	AREA 2	LOWER CATARACT CREEK	15	522	0	537	Medium-High
90	ELMER	MAIN	LOWER CATARACT CREEK	15	522	0	537	Medium-High
145	PLACER 2623	MAIN	LOWER CATARACT CREEK	14	522	0	536	Medium-High
149	REDEMPTION	MAIN	LOWER CATARACT CREEK	14	522	0	536	Medium-High
154	ROSE MINE	MAIN	LOWER CATARACT CREEK	14	522	0	536	Medium-High
362	MONTANA	MAIN	LOWER CATARACT CREEK	14	522	0	536	Medium-High
371	PIRATE	MAIN	LOWER CATARACT CREEK	14	522	0	536	Medium-High

Table 7-2 Summary of Site Scoring Based on Subarea Default Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
386	VIOLA	MAIN	LOWER CATARACT CREEK	14	522	0	536	Medium-High
316	GOLDEN ASSETS MINE	MAIN	UNCLE SAM GULCH	7	522	0	528	Medium-High
320	NW SW SECTION 29	MAIN	UNCLE SAM GULCH	7	522	0	528	Medium-High
327	SW SE SECTION 29	MAIN	UNCLE SAM GULCH	7	522	0	528	Medium-High
356	LINCOLN	MAIN	UNCLE SAM GULCH	7	522	0	528	Medium-High
365	NW NE SECTION 32	MAIN	UNCLE SAM GULCH	7	522	0	528	Medium-High
605	24JF0489	MAIN	UNCLE SAM GULCH	7	522	0	528	Medium-High
30	PLACER 2313	MAIN	LOWER CATARACT CREEK	14	501	0	515	Medium-High
317	JACK MTN. IRON	MAIN	JACK CREEK	24	426	4	454	Medium
379	SILVER REEF	MAIN	LOWER CATARACT CREEK	15	388	0	402	Medium
54	BASIN QUARTZ MASS	MAIN	LOWER CATARACT CREEK	14	388	0	402	Medium
351	GOLDEN REEF	MAIN	LOWER CATARACT CREEK	14	388	0	402	Medium
388	HOGBACK	MAIN	LOWER CATARACT CREEK	14	388	0	402	Medium
286	KELLER'S HEMATITE	MAIN	JACK CREEK	26	370	4	399	Medium
17	NE NE SECTION 13	MAIN	JACK CREEK	24	370	4	397	Medium
264	DUMORTIERITE PROSPECT	MAIN	JACK CREEK	24	370	4	397	Medium
275	JACK CREEK RIDGE	AREA 2	JACK CREEK	24	370	4	397	Medium
355	LAST SHOT	MAIN	JACK CREEK	24	370	4	397	Medium
361	MIDNIGHT	MAIN	JACK CREEK	24	370	4	397	Medium
92	EVA MAY	AREA 2	MIDDLE CATARACT CREEK	20	354	1	374	Medium
509	SMELTER CREEK ADIT	MAIN	JACK CREEK	0	348	0	348	Medium
282	JOE METESH LESSEE	MAIN	LOWER BASIN CREEK	32	293	0	325	Medium
253	BUSTER	MAIN	LOWER BASIN CREEK	31	293	0	324	Medium
619	RTI RECON: A	MAIN	LOWER BASIN CREEK	22	293	0	315	Medium
176	VERA AND MARIE	AREA 2	MIDDLE CATARACT CREEK	21	290	1	311	Medium
588	CLEVELAND/DELBERT CLAIMS	MAIN	UPPER BASIN CREEK	12	287	0	299	Medium
117	LIZZIE OSBORNE	AREA 2	MIDDLE CATARACT CREEK	20	276	1	297	Medium
314	CREDEN MINES	MAIN	LOWER BASIN CREEK	32	265	0	297	Medium
146	PROTECTION	MAIN	LOWER CATARACT CREEK	14	276	0	290	Medium
378	SE SE SECTION 21	MAIN	UPPER CATARACT CREEK	7	276	0	283	Medium
710	NE SE SECTION 28	MAIN	UPPER CATARACT CREEK	7	276	0	283	Medium

Table 7-2 Summary of Site Scoring Based on Subarea Default Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
711	NEAR QUARTZ CREEK	MAIN	UPPER CATARACT CREEK	7	276	0	283	Medium
313	CATARACT CREEK PLACER	MAIN	MIDDLE CATARACT CREEK	20	248	0	268	Medium
385	VICTORY	MAIN	LOWER CATARACT CREEK	14	248	0	262	Medium
267	GOLDEN GLOW	MAIN	UPPER BASIN CREEK	12	220	0	232	Low
353	LADY LANE	MAIN	UPPER BASIN CREEK	12	220	0	232	Low
325	SE SW SECTION 32	MAIN	LOWER BASIN CREEK	22	208	0	231	Low
101	HATTIE FERGUSON	MAIN	MIDDLE CATARACT CREEK	21	205	1	227	Low
326	SW SE SECTION 1	MAIN	LOWER BASIN CREEK	25	195	0	220	Low
593	24JF0444	MAIN	MIDDLE CATARACT CREEK	20	189	0	208	Low
249	BUCKEYE MINE (CATARACT)	MAIN	LOWER CATARACT CREEK	82	120	1	203	Low
38	UNNAMED QUARRY	MAIN	UPPER BASIN CREEK	12	174	0	186	Low
29	PLACER DITCH	MAIN	UPPER BASIN CREEK	12	168	0	180	Low
620	BASIN HISTORIC DISTRICT	MAIN	LOWER BASIN CREEK	22	135	0	157	Low
168	TOTTEN MINE	MAIN	MIDDLE CATARACT CREEK	21	135	0	156	Low
359	LULA	MAIN	LOWER BASIN CREEK	27	123	0	151	Low
508	MINNEAPOLIS PLACER & PROSP	MAIN	LOWER CATARACT CREEK	14	135	0	149	Low
606	24JF0683	MAIN	MIDDLE CATARACT CREEK	20	127	0	147	Low
37	UNNAMED PLACER	MAIN	UPPER BASIN CREEK	12	117	0	130	Low
343	FATHER MURPHY	MAIN	LOWER CATARACT CREEK	14	107	0	121	Low
55	BAZZER CLAIM	MAIN	MIDDLE CATARACT CREEK	20	99	0	119	Low
33	SOLAR	MAIN	UPPER BASIN CREEK	12	94	0	106	Low
34	SOLAR	AREA 2	UPPER BASIN CREEK	12	94	0	106	Low
591	24JF0131	MAIN	MIDDLE CATARACT CREEK	20	78	0	98	Very Low
318	NE NW SECTION 16 (51)	MAIN	MIDDLE CATARACT CREEK	20	75	1	96	Very Low
97	GREAT SHIELD	MAIN	MIDDLE CATARACT CREEK	20	75	0	95	Very Low
111	JAMES	MAIN	MIDDLE CATARACT CREEK	20	75	0	95	Very Low
112	JOHN T.	MAIN	MIDDLE CATARACT CREEK	20	75	0	95	Very Low
375	ROCKY POINT	MAIN	MIDDLE CATARACT CREEK	20	75	0	95	Very Low
274	JACK CREEK RIDGE	MAIN	JACK CREEK	24	53	4	81	Very Low
610	24JF0890	MAIN	LOWER BASIN CREEK	25	53	0	78	Very Low
11	BASIN CREEK PLACER 2	MAIN	MIDDLE BASIN CREEK	0	78	0	78	Very Low

Table 7-2 Summary of Site Scoring Based on Subarea Default Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
330	BASIN CREEK PLACER 3	MAIN	MIDDLE BASIN CREEK	0	78	0	78	Very Low
370	PENN PLACER	MAIN	MIDDLE BASIN CREEK	0	78	0	78	Very Low
39	UNNAMED SILVER; LEAD; & ZINC	MAIN	LOWER BASIN CREEK	22	53	0	76	Very Low
308	N462471	MAIN	LOWER BASIN CREEK	22	53	0	76	Very Low
340	ELEPHANT	MAIN	MIDDLE CATARACT CREEK	20	46	0	65	Very Low
259	DIMON	MAIN	LOWER BASIN CREEK	25	38	0	64	Very Low
272	HIGHLAND	MAIN	LOWER BASIN CREEK	22	38	0	61	Very Low
273	HOPE	MAIN	LOWER BASIN CREEK	22	38	0	61	Very Low
360	MAYFLOWER	MAIN	LOWER BASIN CREEK	22	38	0	61	Very Low
511	LAST CHANCE	MAIN	LOWER BASIN CREEK	22	38	0	61	Very Low
607	24JF0696	MAIN	MIDDLE CATARACT CREEK	21	35	0	56	Very Low
124	MARSHALL-CHANGES MINES	MAIN	MIDDLE CATARACT CREEK	21	35	0	56	Very Low
103	SW NW SECTION 28	MAIN	MIDDLE CATARACT CREEK	20	35	0	55	Very Low
134	MOUNTAIN CHIEF	MAIN	MIDDLE CATARACT CREEK	20	35	0	55	Very Low
135	MOUNTAIN CHIEF	AREA 2	MIDDLE CATARACT CREEK	20	35	0	55	Very Low
309	WEST MOUNT THOMPSON	MAIN	MIDDLE CATARACT CREEK	20	35	0	55	Very Low
324	SE SW SECTION 28	MAIN	MIDDLE CATARACT CREEK	20	35	0	55	Very Low
334	CAPTAIN COOK	MAIN	MIDDLE CATARACT CREEK	20	35	0	55	Very Low
603	24JF0833	MAIN	MIDDLE CATARACT CREEK	20	35	0	55	Very Low
609	24JF0676	MAIN	MIDDLE CATARACT CREEK	20	35	0	55	Very Low
25	PEARL	MAIN	UPPER BASIN CREEK	12	38	0	50	Very Low
298	LYONS PROSPECT	MAIN	UPPER BASIN CREEK	12	33	0	45	Very Low
293	LONE STAR	MAIN	LOWER BASIN CREEK	22	22	0	44	Very Low
56	BEE CLAIM	MAIN	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
323	SE SW SECTION 2	MAIN	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
358	BLUEBIRD	LOWER	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
384	BLUEBIRD	MAIN - UPI	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
397	VANDALIA	MAIN	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
589	24JF0247	MAIN	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
590	24JF0142	MAIN	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
599	24JF0132	MAIN	MIDDLE CATARACT CREEK	20	22	0	42	Very Low

Table 7-2 Summary of Site Scoring Based on Subarea Default Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
600	24JF0134	MAIN	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
601	24JF0141	MAIN	MIDDLE CATARACT CREEK	20	22	0	42	Very Low
278	JIB SHAFT	MAIN	UPPER BOULDER RIVER	0	37	0	37	Very Low
279	JIB SHAFT	JIB MILL	UPPER BOULDER RIVER	0	37	0	37	Very Low
280	JIB SHAFT	JIB MILL FI	UPPER BOULDER RIVER	0	37	0	37	Very Low
285	KATIE & KATIE EXTENSION	MAIN	UPPER BOULDER RIVER	0	37	0	37	Very Low
507	BASIN JIBE	MAIN	UPPER BOULDER RIVER	0	37	0	37	Very Low
624	LAST CHANCE	MAIN	UPPER BOULDER RIVER	0	37	0	37	Very Low
85	CUSTER	AREA 2	LOWER CATARACT CREEK	15	22	0	37	Very Low
615	ATLANTIC	MAIN	LOWER CATARACT CREEK	15	22	0	37	Very Low
178	WALDY NORTH	MAIN	LOWER CATARACT CREEK	15	22	0	37	Very Low
170	UNNAMED LEAD & SILVER	MAIN	LOWER CATARACT CREEK	15	22	0	37	Very Low
57	BIG LUMBER GULCH	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
84	CUSTER	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
99	HIAWATHA	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
118	LOUISE	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
136	MT. THOMPSON	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
138	NE NW SECTION 3	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
162	SELF - RISER	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
300	MARGUERITE	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
301	MARGUERITE	AREA 2	LOWER CATARACT CREEK	14	22	0	36	Very Low
352	HUOT	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
357	LIZZIE	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
373	REDEMPTION	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
396	VIRGINIA	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
612	GOLD HILL	MAIN	LOWER CATARACT CREEK	14	22	0	36	Very Low
3	ALMA NO. 2	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
7	BASIN CREEK MINE	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
8	BASIN CREEK MINE	AREA 2	UPPER BASIN CREEK	12	22	0	34	Very Low
19	NEPTUNE CABINS	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
23	OLD BALDY GROUP	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low

Table 7-2 Summary of Site Scoring Based on Subarea Default Data, Basin Watershed OU2

Site Number	Site Name	Subsite Name	Subarea	Direct Contact Total	Surface Water Total	Ground-water Total	TOTAL SCORE	Site Category
32	SE SE SECTION 25	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
255	CRYSTAL GROUP	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
376	RUBY DIGGINGS	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
383	T&B	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
395	BIG CHIEF	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
595	CULLEN CLAIM	MAIN	UPPER BASIN CREEK	12	22	0	34	Very Low
622	CONFIDENCE	MAIN	UPPER BOULDER RIVER	0	33	0	33	Very Low
704	MERRY WIDOW	MAIN	UPPER BOULDER RIVER	0	33	0	33	Very Low
713	ATTWATER MILL	MAIN	UPPER BOULDER RIVER	0	33	0	33	Very Low
10	BASIN CREEK PLACER 1	MAIN	MIDDLE BASIN CREEK	0	31	0	31	Very Low
72	CATARACT MEADOWS CORRAL	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
115	LADY NELL	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
137	NE NE SECTION 28	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
139	NE THREE BROTHERS	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
141	OUSLEY	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
163	SE NE SECTION 28	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
319	NW SW SECTION 27	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
596	24JF0250	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
598	HANSON	MAIN	UPPER CATARACT CREEK	7	22	0	29	Very Low
21	OLD BASIN MILLSITE	MAIN	UPPER BOULDER RIVER	0	0	0	0	Very Low
22	OLD BASIN MILLSITE	AREA 2	UPPER BOULDER RIVER	0	0	0	0	Very Low
294	LOTTA	MAIN	UPPER BOULDER RIVER	0	0	0	0	Very Low
335	CATARACT CITY	MAIN	UPPER BOULDER RIVER	0	0	0	0	Very Low
344	FINN'S CABIN AND SAUNA	MAIN	LOWER BOULDER RIVER	0	0	0	0	Very Low
363	MONTANA CENTRAL RR ORE BI	MAIN	UPPER BOULDER RIVER	0	0	0	0	Very Low
366	OBELISK	MAIN	UPPER BOULDER RIVER	0	0	0	0	Very Low
391	SILICA QUARTZ MINE	MAIN	UPPER BOULDER RIVER	0	0	0	0	Very Low
626	24JF0183	MAIN	UPPER BOULDER RIVER	0	0	0	0	Very Low
714	BASIN STREET TAILINGS	MAIN	UPPER BOULDER RIVER	0	0	0	0	Very Low

Table 7-3 Detailed Analysis of Alternatives Very Low Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	No unacceptable risk under baseline conditions.	Slight reduction in risk, adequate protection.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Environmental Protectiveness	No unacceptable risk under baseline conditions.	Slight reduction in risk, adequate protection.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Compliance with ARARs				
Chemical-Specific	None apply.	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk within acceptable limits.	Residual risk within acceptable limits.	Residual risk within acceptable limits.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	Limited reliability of controls.	Soil cap effective with adequate maintenance.	Waste reliably isolated in engineered repository.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	Lime amendment used to reduce mobility of contaminants.	Lime amendment and soil cap used to reduce mobility of contaminants.	None.
Volume of Contaminated Materials Treated	None.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	None.

Table 7-3 Detailed Analysis of Alternatives Very Low Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Expected Degree of Reduction	None.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Elimination of volume and consequently toxicity in waste removal area. No total elimination of waste however.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.
Environmental Impacts	None, same as baseline conditions.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.
Time Until Removal Action Objectives are Achieved	Objectives currently being met.	Objectives currently met. Construction complete within one field season.	Objectives currently met. Construction complete within one field season.	Objectives currently met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	Difficult to access some remote sites.	Difficult to access some remote sites.	Difficult to access some remote sites.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Additional action possible but could compromise integrity of cap.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	None used.	Services and materials available locally.	Services and materials available locally.	Services and materials available locally.

CDM

Table 7-3 Detailed Analysis of Alternatives Very Low Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Total Present Worth Cost				
Upper Basin Creek Subarea	$44,300	$1,968,900	$2,157,700	$3,129,300
South Fork Creek Subarea	N/A	N/A	N/A	N/A
Jack Creek Subarea	$44,300	$371,800	$339,800	$369,100
Middle Basin Creek Subarea	$44,300	N/A	N/A	N/A
Lower Basin Creek Subarea	$44,300	$946,200	$1,069,900	$964,800
Upper Cataract Creek Subarea	$44,300	$999,200	$1,093,600	$1,036,800
Middle Cataract Creek Subarea	$44,300	$2,251,000	$2,491,900	$2,457,100
Uncle Sam Gulch Subarea	$44,300	$208,300	$208,300	$208,300
Lower Cataract Creek Subarea	$44,300	$1,523,600	$1,683,100	$1,003,400
Boulder River AOC	$44,300	$4,521,600	N/A	N/A
Site-Wide Total	$398,700	$15,288,100	$9,044,300	$9,168,800

N/A - Not Applicable.

Table 7-4 Comparative Analysis of Alternatives Very Low Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	**WR2 Surface Controls**	**WR3 Containment**	**WR4 Excavation and Disposal in Luttrell Repository**
Overall Protection of Human Health and the Environment	Protective of human health and the environment.	Protective of human health and the environment.	Protective of human health and the environment.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Baseline risks within acceptable limits.	Limited effectiveness, exposure pathways are reduced. More effective than Alternative WR1.	More effective than Alternative WR2. Maintenance required.	More effective than Alternative WR3. No waste remains at mine site.
Reduction of Toxicity, Mobility, and Volume	No reduction in toxicity, mobility, or volume.	Limited to moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment.
Short Term Effectiveness	No short term risk to environment and workers from implementation of WR1.	Low to moderate short-term risk to environment and workers.	More short term risks to environment to workers than Alternative WR2.	More short term risks than Alternative WR3. Transport of contaminated material required.
Implementability	Easy to implement.	Moderately difficult to implement due to inaccessibility of remote sites.	More difficult to implement than Alternative WR2. because larger equipment and roads needed to access remote sites.	Difficult to implement. Similar to WR3.
Total Present Worth Cost	Least expensive.	Most expensive.	Less expensive than WR3.	Less expensive than WR2.

Table 7-5 Detailed Analysis of Alternatives Low Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	No unacceptable risk under baseline conditions.	Slight reduction in risk, adequate protection.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Environmental Protectiveness	No unacceptable risk under baseline conditions.	Slight reduction in risk, adequate protection.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Compliance with ARARs				
Chemical-Specific	None apply.	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk within acceptable limits.	Residual risk within acceptable limits.	Residual risk within acceptable limits.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	Limited reliability of controls.	Soil cap effective with adequate maintenance.	Waste reliably isolated in engineered repository.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	Lime amendment used to reduce mobility of contaminants.	Lime amendment and soil cap used to reduce mobility of contaminants.	None.
Volume of Contaminated Materials Treated	None.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	None.

Table 7-5 Detailed Analysis of Alternatives Low Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Expected Degree of Reduction	None.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Elimination of volume and consequently toxicity in waste removal area. No total elimination of waste.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.
Environmental Impacts	None, same as baseline conditions.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.
Time Until Removal Action Objectives are Achieved	Objectives currently being met.	Objectives currently met. Construction complete within one field season.	Objectives currently met. Construction complete within one field season.	Objectives currently met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	Difficult to access some remote sites.	Difficult to access some remote sites.	Difficult to access some remote sites.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Additional action possible but could compromise cap integrity.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible.

Table 7-5 Detailed Analysis of Alternatives Low Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Availability of Services and Materials	None used.	Services and materials available locally.	Services and materials available locally.	Services and materials available locally.
Total Present Worth Cost				
Upper Basin Creek Subarea	$44,300	$873,700	$932,300	$677,700
South Fork Creek Subarea	N/A	N/A	N/A	N/A
Jack Creek Subarea	$44,300	$208,300	$208,300	$208,300
Middle Basin Creek Subarea	$44,300	N/A	N/A	N/A
Lower Basin Creek Subarea	$44,300	$602,400	$651,300	$660,900
Upper Cataract Creek Subarea	$44,300	$1,378,300	$1,785,200	$1,006,300
Middle Cataract Creek Subarea	$44,300	$2,984,200	$3,518,000	$3,752,000
Uncle Sam Gulch Subarea	$44,300	$208,300	$208,300	$208,300
Lower Cataract Creek Subarea	$44,300	$1,117,200	$1,390,600	$942,700
Boulder River AOC	$44,300	$208,300	N/A	N/A
Site Wide Total	$398,700	$7,652,700	$8,694,000	$4,079,400

N/A - Not Applicable.

Table 7-6 Comparative Analysis of Alternatives Low Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Overall protection of Human Health and the Environment	Protective of human health and the environment.	Protective of human health and the environment.	Protective of human health and the environment.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Baseline risks within acceptable limits.	Limited effectiveness, exposure pathways are reduced. More effective than Alternative WR1.	More effective than Alternative WR2. Maintenance required.	More effective than Alternative WR3. No waste remains at mine site.
Reduction of Toxicity, Mobility, and Volume	No reduction in toxicity, mobility, or volume.	Limited to moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment.
Short Term Effectiveness	No short term risk to environment and workers from implementation of WR1.	Low to moderate short-term risk to environment and workers.	More short term risks to environment to workers than Alternative WR2.	More short term risks than Alternative WR3. Transport of contaminated material required.
Implementability	Easy to implement.	Moderately difficult to implement due to inaccessibility of remote sites.	More difficult to implement than Alternative WR2 because larger equipment and roads needed to access remote sites.	Difficult to implement. Similar to WR3.
Total Present Worth Cost	Least expensive.	Less expensive than WR3, more expensive than WR4.	Most expensive.	Less expensive than WR2, and WR3

Table 7-7 Detailed Analysis of Alternatives Medium Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Slight reduction in risk, adequate protection likely.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Slight reduction in risk, adequate protection likely.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Compliance with ARARs				
Chemical-Specific	None apply.	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk likely within acceptable limits.	Residual risk within acceptable limits.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	Limited reliability of controls.	Soil cap effective with adequate maintenance.	Waste reliably isolated in engineered repository.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	Lime amendment used to reduce mobility of contaminants.	Lime amendment and soil cap used to reduce mobility of contaminants.	None.
Volume of Contaminated Materials Treated	None.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	None.
Expected Degree of Reduction	None.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Elimination of volume and consequently toxicity in waste removal area. No total elimination of waste.

Table 7-7 Detailed Analysis of Alternatives Medium Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.
Environmental Impacts	Same as baseline conditions.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives may be met. Construction complete within one field season.	Objectives met. Construction complete within one field season.	Objectives met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	Difficult to access some remote sites.	Difficult to access some remote sites.	Difficult to access some remote sites.
Ease of Implementing More Action if Necessary	Does not inhibit additional action	Does not inhibit additional action	Additional action possible but could compromise integrity of cap.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	None used.	Services and materials available locally.	Services and materials available locally.	Services and materials available locally.
Total Present Worth Cost				
Upper Basin Creek Subarea	$44,300	$810,400	$953,600	$693,000

Table 7-7 Detailed Analysis of Alternatives Medium Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
South Fork Creek Subarea	N/A	N/A	N/A	N/A
Jack Creek Subarea	$44,300	$975,200	$1,391,000	$1,191,300
Middle Basin Creek Subarea	$44,300	N/A	N/A	N/A
Lower Basin Creek Subarea	$44,300	$882,700	$973,900	$927,300
Upper Cataract Creek Subarea	$44,300	$1,107,000	$1,386,900	$822,600
Middle Cataract Creek Subarea	$44,300	$2,435,100	$3,060,100	$2,196,100
Uncle Sam Gulch Subarea	$44,300	$280,300	$280,300	$280,300
Lower Cataract Creek Subarea	$44,300	$983,800	$1,153,000	$822,400
Boulder River AOC	$44,300	$208,300	N/A	N/A
Site Wide Total	$398,700	$7,682,800	$13,470,900	$6,933,000

N/A - Not Applicable.

Table 7-8 Comparative Analysis of Alternatives Medium Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	**WR2 Surface Controls**	**WR3 Containment**	**WR4 Excavation and Disposal in Luttrell Repository**
Overall protection of Human Health and the Environment	Not protective of human health and the environment.	Likely protective of human health and the environment.	Protective of human health and the environment.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective.	Limited to moderate effectiveness, exposure pathways are reduced. More effective than Alternative WR1.	More effective than Alternative WR2. Maintenance required.	More effective than Alternative WR3. No waste remains at mine site.
Reduction of Toxicity, Mobility, and Volume	No reduction in toxicity, mobility, or volume.	Limited to moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment.
Short Term Effectiveness	No increase in short term risk to environment and workers from implementation of WR1.	Low to moderate short-term risk to environment and workers.	More short term risks to environment to workers than Alternative WR2.	More short term risks than Alternative WR3. Transport of contaminated material required.
Implementability	No implementation required.	Moderately difficult to implement due to inaccessibility of remote sites.	More difficult to implement than Alternative WR2 because larger equipment and roads needed to access remote sites.	Difficult to implement. Similar to WR3.
Total Present Worth Cost	Least expensive.	Less expensive than WR3.	Most expensive.	Less expensive than WR3, more expensive than WR2..

Table 7-9 Detailed Analysis of Alternatives Medium-High Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Slight reduction in risk, adequate protection not expected.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Slight reduction in risk, adequate protection not expected.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Compliance with ARARs				
Chemical-Specific	None apply.	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk likely above acceptable limits.	Residual risk within acceptable limits.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	Limited reliability of controls.	Soil cap effective with adequate maintenance.	Waste reliably isolated in engineered repository.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	Lime amendment used to reduce mobility of contaminants.	Lime amendment and soil cap used to reduce mobility of contaminants.	None.
Volume of Contaminated Materials Treated	None.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	None.

Table 7-9 Detailed Analysis of Alternatives Medium-High Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	**WR2 Surface Controls**	**WR3 Containment**	**WR4 Excavation and Disposal in Luttrell Repository**
Expected Degree of Reduction	None.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Elimination of volume and consequently toxicity in waste removal area. No total elimination of waste.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.
Environmental Impacts	Same as baseline conditions.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives may not be met. Construction complete within one field season.	Objectives met. Construction complete within one field season.	Objectives met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	Difficult to access some remote sites.	Difficult to access some remote sites.	Difficult to access some remote sites.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Additional action possible but could compromise integrity of cap.	Difficult to take additional action on waste in repository.

Table 7-9 Detailed Analysis of Alternatives Medium-High Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	None used.	Services and materials available locally.	Services and materials available locally.	Services and materials available locally.
Total Present Worth Cost				
Upper Basin Creek Subarea	$44,300	$313,700	$320,200	$346,700
South Fork Creek Subarea	N/A	N/A	N/A	N/A
Jack Creek Subarea	$44,300	$919,700	$756,400	$2,971,700
Middle Basin Creek Subarea	$44,300	N/A	N/A	N/A
Lower Basin Creek Subarea	$44,300	$579,000	$650,600	$569,400
Upper Cataract Creek Subarea	$44,300	$533,400	$631,100	$441,900
Middle Cataract Creek Subarea	$44,300	$792,400	$890,000	$765,300
Uncle Sam Gulch Subarea	$44,300	$1,412,100	$1,672,400	$1,336,200
Lower Cataract Creek Subarea	$44,300	$1,700,200	$1,918,300	$1,358,900
Boulder River AOC	$44,300	$208,300	N/A	N/A
Site Wide Total	$398,700	$6,458,800	$6,839,000	$7,790,100

N/A - Not Applicable.

Table 7-10 Comparative Analysis of Alternatives Medium-High Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	**WR2 Surface Controls**	**WR3 Containment**	**WR4 Excavation and Disposal in Luttrell Repository**
Overall protection of Human Health and the Environment	Not protective of human health and the environment.	Not expected to be protective of human health and the environment.	Protective of human health and the environment.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective.	Limited to moderate effectiveness, exposure pathways are reduced. More effective than Alternative WR1.	More effective than Alternative WR2. Maintenance required.	More effective than Alternative WR3. No waste remains at mine site.
Reduction of Toxicity, Mobility, and Volume	No reduction in toxicity, mobility, or volume.	Limited to moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment.
Short Term Effectiveness	No increase in short term risk to environment and workers from implementation of WR1.	Low to moderate short-term risk to environment and workers.	More short term risks to environment to workers than Alternative WR2.	More short term risks than Alternative WR3. Transport of contaminated material required.
Implementability	No implementation required.	Moderately difficult to implement due to inaccessibility of remote sites.	More difficult to implement than Alternative WR2 because larger equipment and roads needed to access remote sites.	Difficult to implement. Similar to WR3.
Total Present Worth Cost	Least expensive.	More expensive than WR1.	More expensive than WR2, less expensive than WR4	Most expensive.

Table 7-11 Detailed Analysis of Alternatives High Priority Waste, Basin Watershed OU2

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Slight reduction in risk, adequate protection not expected.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Slight reduction in risk, adequate protection not expected.	Moderate to high reduction in risk, adequate protection.	High reduction in risk, adequate protection.
Compliance with ARARs				
Chemical-Specific	None apply.	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk likely above acceptable limits.	Residual risk within acceptable limits.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	Limited reliability of controls.	Soil cap effective with adequate maintenance.	Waste reliably isolated in engineered repository.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	Lime amendment used to reduce mobility of contaminants.	Lime amendment and soil cap used to reduce mobility of contaminants.	None.
Volume of Contaminated Materials Treated	None.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	Only surface wastes treated. Therefore, low percentage of waste volume treated.	None.

Table 7-11 Detailed Analysis of Alternatives High Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
Expected Degree of Reduction	None.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume through treatment.	Elimination of volume and consequently toxicity in waste removal area. No total elimination of waste.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.	Need to mitigate noise, traffic and fugitive air emissions during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.	Sufficient if safety procedures followed. Workers must wear appropriate PPE.
Environmental Impacts	Same as baseline conditions.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.	Significant road construction required to access remote sites.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives may not be met. Construction complete within one field season.	Objectives met. Construction complete within one field season.	Objectives met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	Difficult to access some remote sites.	Difficult to access some remote sites.	Difficult to access some remote sites.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Additional action possible but could compromise integrity of cap.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	None used.	Services and materials available locally.	Services and materials available locally.	Services and materials available locally.

Table 7-11 Detailed Analysis of Alternatives High Priority Waste, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	WR1 No Action	WR2 Surface Controls	WR3 Containment	WR4 Excavation and Disposal in Luttrell Repository
	Total Present Worth Cost			
Upper Basin Creek Subarea	$44,300	$5,651,300	$7,734,400	$3,992,200
South Fork Creek Subarea	N/A	N/A	N/A	N/A
Jack Creek Subarea	$44,300	$3,694,100	$4,746,800	$3,432,900
Middle Basin Creek Subarea	$44,300	N/A	N/A	N/A
Lower Basin Creek Subarea	$44,300	$4,552,200	$6,223,500	$3,911,900
Upper Cataract Creek Subarea	$44,300	$1,865,500	$2,464,400	$1,108,700
Middle Cataract Creek Subarea	$44,300	$14,247,400	$19,194,900	$15,969,400
Uncle Sam Gulch Subarea	$15,600	$4,877,700	$6,264,300	$16,275,600
Lower Cataract Creek Subarea	$44,300	$3,959,500	$5,212,600	$2,948,600
Boulder River AOC	$44,300	$208,300	N/A	N/A
Site Wide Total	$398,700	$39,056,000	$51,840,900	$47,639,300

N/A - Not Applicable.

Table 7-12 Comparative Analysis of Alternatives High Priority Waste, Basin Watershed OU2

EVALUATION CRITERIA	ALTERNATIVE			
	WR1 No Action	**WR2 Surface Controls**	**WR3 Containment**	**WR4 Excavation and Disposal in Luttrell Repository**
Overall protection of Human Health and the Environment	Not protective of human health and the environment.	Not expected to be protective of human health and the environment.	Protective of human health and the environment.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs...	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective.	Limited to moderate effectiveness, exposure pathways are reduced. More effective than Alternative WR1.	More effective than Alternative WR2. Maintenance required.	More effective than Alternative WR3. No waste remains at mine site.
Reduction of Toxicity, Mobility, and Volume	No reduction in toxicity, mobility, or volume.	Limited to moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Moderate reduction in mobility. No reduction in toxicity or volume of waste through treatment.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment.
Short Term Effectiveness	No increase in short term risk to environment and workers from implementation of WR1.	Low to moderate short-term risk to environment and workers.	More short term risks to environment to workers than Alternative WR2.	More short term risks than Alternative WR3. Transport of contaminated material required.
Implementability	No implementation required.	Moderately difficult to implement due to inaccessibility of remote sites.	More difficult to implement than Alternative WR2 because larger equipment and roads needed to access remote sites.	Difficult to implement. Similar to WR3.
Total Present Worth Cost	Least expensive.	More expensive than WR1.	Most expensive.	Less expensive than WR3, more expensive than WR2

Table 9-1 Detailed Analysis of Alternatives AMD/ARD Jack Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Not protective of human health in the short term, may be protective long term.	Protection of human health is uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective long term.	Protection of environment uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Compliance with ARARs				
Chemical-Specific	Water quality exceedences unchanged.	Water quality exceedences unchanged in short term, compliance with ARARs uncertain in long term.	Compliance with ARARs is uncertain.	Potentially compliant with ARARs (dependent on seasonal variation).
Location-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be moderate to acceptable in long term.	Risk reduced as volume of adit drainage is reduced. Residual risk in remaining drainage may be above acceptable limits.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Reliability of controls is uncertain.	Treatment effectiveness is weather dependent.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	None.	None.	Biological treatment process (oxidation, precipitation, etc).

Table 9-1 Detailed Analysis of Alternatives AMD/ARD Jack Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Volume of Contaminated Materials Treated	None.	None.	None.	All adit drainage volume treated.
Expected Degree of Reduction	No reduction in toxicity, mobility, or volume of waste.	Reduction in toxicity, mobility, or volume of waste will occur over time.	Moderate reduction in mobility. No reduction in toxicity or volume of waste.	Moderate reduction in toxicity and mobility. No reduction in volume through treatment.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.
Environmental Impacts	Unchanged.	Minimal decrees in impacts over time.	Moderate road construction required to reach remote sites.	Moderate road construction required to reach remote sites.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives not met in short term, may be met in long term.	Objectives may not be met. Construction complete within one field season.	Objectives may not be met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	No construction and only long term monitoring.	Ability to construct dependent on thorough understanding of mine workings and hydrogeology.	Requires adequate area for treatment. Difficult for remote sites. Must be constructed at individual adit sites.

Table 9-1 Detailed Analysis of Alternatives AMD/ARD Jack Creek Subarea, Basin Watershed OU2(continued)

Evaluation Criteria	Alternative			
	AD1 No Action	**AD2 Natural Attenuation**	**AD3 Source Controls**	**AD4 Biological Treatment**
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	None used.	Services and materials available locally.	Service and materials available either locally or regionally.	Service and materials available locally. May require sludge disposal.
Total Present Worth Cost				
Total Cost	$221,500	$341,800	$85,434,500	$3,252,800

Table 9-2 Comparative Analysis of Alternatives AMD/ARD Jack Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness uncertain.	Protectiveness uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Low to moderate. Long term effectiveness is uncertain.	More effective than AD3. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Limited to moderate reduction in toxicity and mobility. No reduction in volume.	Moderate reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of AD1.	No short term risk to environment and workers from implementation of AD2.	Moderate short term risk to environment and workers. Moderate road construction to reach remote sites is required.	More short term environmental impacts during construction than AD3.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.	Difficult to implement, but less difficult than AD3.
Total Present Worth Cost	Less than AD2.	Less than AD4.	Most expensive.	Less than AD3.

Table 9-3 Detailed Analysis of Alternatives Surface Water Jack Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Not protective of human health in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Compliance with ARARs			
Chemical-Specific	Water quality exceedences remain unchanged.	Water quality exceedences remain unchanged in short term. Compliance with ARARs long term is uncertain.	Potentially compliant with ARARs, Dependent on seasonal variations.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Treatment effectiveness may be weather dependent.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	Biological treatment process such as oxidation, precipitation and sulfate reduction.
Volume of Contaminated Materials Treated	None.	None.	All surface water above standards is treated.

Table 9-3 Detailed Analysis of Alternatives Surface Water Jack Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Moderate reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	High protection if safety procedures are followed. Workers must wear appropriate PPE.
Environmental Impacts	Minimal.	Minimal.	Moderate disturbance to install infrastructure.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives may not be met throughout year. Construction complete within one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Requires adequate area for treatment components. Must be constructed at individual point source.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	Not required.	Available locally.	Services and material available locally. Requires infrequent substrate replacement and disposal.
Total Present Worth Cost			
Total Cost	$221,500	$303,800	$119,447,700

Table 9-4 Comparative Analysis of Alternatives Surface Water Jack Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness of environment is uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Moderate long term effectiveness. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SW1.	No short term risk to environment and workers from implementation of SW2.	Moderate short term impacts during construction.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.
Total Present Worth Cost	Less than SW2.	Less than SW3.	Most expensive.

Table 9-5 Detailed Analysis of Alternatives Stream Sediments Jack Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall Protection of Human Health and the Environment		
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.
Compliance with ARARs		
Chemical-Specific	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence		
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.
Reduction of Toxicity, Mobility, and Volume		
Treatment Process Used and Materials Treated	None.	None.
Volume of Contaminated Materials Treated	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.
Short Term Effectiveness		
Protection of Community During Remedial Action	Not applicable.	Not applicable.

Table 9-5 Detailed Analysis of Alternatives Stream Sediments Jack Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.
Environmental Impacts	Minimal.	Minimal.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.
Implementability		
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.
Ease of Implementing More Action if Necessary	Not applicable.	Not applicable.
Administrative Feasibility	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.
Total Present Worth Cost		
Total Cost	$221,500	$371,700

Table 9-6 Comparative Analysis of Alternatives Stream Sediments Jack Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.
Implementability	Easy to implement.	Easy to implement.
Total Present Worth Cost	Less than SD2.	Most expensive.

Table 10-1 Detailed Analysis of Alternatives AMD/ARD Uncle Sam Gulch Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Not protective of human health in the short term, may be protective long term.	Protection of human health is uncertain.	Supplemental treatment should be evaluated in design phase.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective long term.	Protection of environment uncertain.	Moderate to high reduction in risks at the Buckeye Adit. Supplemental treatment should be evaluated in design phase.
Compliance with ARARs				
Chemical-Specific	Water quality exceedences unchanged.	Water quality exceedences unchanged in short term, compliance with ARARs uncertain in long term.	Compliance with ARARs is uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Location-Specific	None apply.	None apply.	Compliant with ARARs.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Action-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be moderate to acceptable in long term.	Risk reduced as volume of adit drainage is reduced. Residual risk in remaining drainage may be above acceptable limits.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Reliability of controls is uncertain.	Treatment effectiveness is weather dependent.

Table 10-1 Detailed Analysis of Alternatives AMD/ARD Uncle Sam Gulch Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	**AD2 Natural Attenuation**	**AD3 Source Controls**	**AD4 Biological Treatment**
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	None.	None.	Biological treatment process. (oxidation, precipitation, etc).
Volume of Contaminated Materials Treated	None.	None.	None.	All adit drainage volume treated.
Expected Degree of Reduction	No reduction in toxicity, mobility, or volume of waste.	Reduction in toxicity, mobility, or volume of waste will occur over time.	Moderate reduction in mobility. No reduction in toxicity or volume of waste.	Moderate reduction in toxicity and mobility. No reduction in volume through treatment.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.
Environmental Impacts	Unchanged.	Minimal decrees in impacts overtime.	Moderate road construction required to reach remote sites.	Moderate road construction required to reach remote sites.

Table 10-1 Detailed Analysis of Alternatives AMD/ARD Uncle Sam Gulch Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	**AD2 Natural Attenuation**	**AD3 Source Controls**	**AD4 Biological Treatment**
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives not met in short term, may be met in long term.	Objectives may not be met. Construction complete within one field season.	Objectives may not be met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	No construction and only long term monitoring.	Construction may be difficult due to steep areas within subarea.	Requires adequate area for treatment. Difficult for remote sites. Must be constructed at individual adit sites.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	None used.	Services and materials available locally.	Service and materials available either locally or regionally.	Service and materials available locally. May require sludge disposal.
Total Present Worth Cost				
Total Cost	$221,500	$298,600	$320,122,300	$5,117,600

Table 10-2 Comparative Analysis of Alternatives AMD/ARD Uncle Sam Gulch Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness uncertain.	Protectiveness uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Low to moderate long term effectiveness uncertain.	More effective than AD3. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Limited to moderate reduction in toxicity and mobility. No reduction in volume.	Moderate reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of AD1.	No short term risk to environment and workers from implementation of AD2.	Moderate short term risk to environment and workers. Moderate road construction to reach remote sites is required.	More short term environmental impacts during construction than AD3.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.	Difficult to implement, less difficult that AD3 however.
Total Present Worth Cost	Less than AD2.	Less than AD3.	Most expensive.	Less than AD3, more than AD2.

Table 10-3 Detailed Analysis of Alternatives Surface Water Uncle Sam Gulch Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SW1 No Action	SW2 Natural Attenuation
Overall Protection of Human Health and the Environment		
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.
Compliance with ARARs		
Chemical-Specific	Water quality exceedences remain unchanged.	Water quality exceedences remain unchanged in short term. Compliance with ARARs long term is uncertain.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence		
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.
Reduction of Toxicity, Mobility, and Volume		
Treatment Process Used and Materials Treated	None.	None.
Volume of Contaminated Materials Treated	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.

Table 10-3 Detailed Analysis of Alternatives Surface Water Uncle Sam Gulch Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative	
	SW1 No Action	SW2 Natural Attenuation
Short Term Effectiveness		
Protection of Community During Remedial Action	Not applicable.	Not applicable.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.
Environmental Impacts	Minimal.	Minimal.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.
Implementability		
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.
Ease of Implementing More Action if Necessary	Not applicable.	Not applicable.
Administrative Feasibility	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.
Total Present Worth Cost		
Total Cost	$221,500	$303,800

Table 10-4 Comparative Analysis of Alternatives Surface Water Uncle Sam Gulch Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SW1 No Action	SW2 Natural Attenuation
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs in uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SW1.	No short term risk to environment and workers from implementation of SW2.
Implementability	Easy to implement.	Easy to implement.
Total Present Worth Cost	Less than SW2.	Most expensive.

Table 10-5 Detailed Analysis of Alternatives Stream Sediment Uncle Sam Gulch Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall Protection of Human Health and the Environment		
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.
Compliance with ARARs		
Chemical-Specific	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence		
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.
Reduction of Toxicity, Mobility, and Volume		
Treatment Process Used and Materials Treated	None.	None.
Volume of Contaminated Materials Treated	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.

Table 10-5 Detailed Analysis of Alternatives Stream Sediment Uncle Sam Gulch Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Short Term Effectiveness		
Protection of Community During Remedial Action	Not applicable.	Not applicable.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.
Environmental Impacts	Minimal.	Minimal.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.
Implementability		
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.
Ease of Implementing More Action if Necessary	Not applicable.	Not applicable.
Administrative Feasibility	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.
Total Present Worth Cost		
Total Cost	$221,500	$371,700

Table 10-6 Comparative Analysis of Alternatives Stream Sediments Uncle Sam Gulch Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.
Compliance with ARARs	Compliant with ARARs.	Compliance with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.
Implementability	Easy to implement.	Easy to implement.
Total Present Worth Cost	Less than SD2.	Most expensive.

Table 11-1 Detailed Analysis of Alternatives AMD/ARD Middle Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Not protective of human health in the short term, may be protective long term.	Protection of human health is uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective long term.	Protection of environment is uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Compliance with ARARs				
Chemical-Specific	Water quality exceedences unchanged.	Water quality exceedences unchanged in short term, compliance with ARARs uncertain in long term.	Compliance with ARARs is uncertain.	Potentially compliant with ARARs (dependent on seasonal variation).
Location-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Reliability of controls is uncertain.	Treatment effectiveness is weather dependent.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	None.	None.	Biological treatment process (oxidation, precipitation, etc).
Volume of Contaminated Materials Treated	None.	None.	None.	All adit drainage volume treated.
Expected Degree of Reduction	No reduction in toxicity, mobility, or volume of waste.	Reduction in toxicity, mobility, or volume of waste will occur over time.	Moderate reduction in mobility. No reduction in toxicity or volume of waste.	Moderate reduction in toxicity and mobility. No reduction in volume through treatment.

Table 11-1 Detailed Analysis of Alternatives AMD/ARD Middle Cataract Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy
Environmental Impacts	Unchanged.	Minimal decrease in impacts over time.	Moderate road construction required to reach remote sites.	Moderate road construction required to reach remote sites.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives not met in short term, may be met in long term.	Objectives may not be met. Construction complete within one field season.	Objectives may not be met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	No construction and only long term monitoring.	Ability to construct dependent on thorough understanding of mine workings and hydrogeology.	Requires adequate area for treatment. Difficult for remote sites. Must be constructed at individual adit sites.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	None used.	Services and materials available locally.	Service and materials available either locally or regionally.	Service and materials available locally. May require sludge disposal.
Total Present Worth Cost				
Total Cost	$221,500	$600,800	$142,585,900	$5,690,100

Table 11-2 Comparative Analysis of Alternatives AMD/ARD Middle Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness uncertain.	Protectiveness uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Low to moderate. Long term effectiveness is uncertain.	More effective than AD3. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Limited to moderate reduction in toxicity and mobility. No reduction in volume.	Moderate reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of AD1.	No short term risk to environment and workers from implementation of AD2.	Moderate short term risk to environment and workers. Moderate road construction to reach remote sites is required.	More short term environmental impacts during construction than AD3.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.	Difficult to implement, but less difficult than AD3.
Total Present Worth Cost	Less than AD2.	Less than AD4.	Most expensive.	Less than AD3.

Table 11-3 Detailed Analysis of Alternatives Surface Water Middle Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Not protective of human health in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Compliance with ARARs			
Chemical-Specific	Water quality exceedences remain unchanged.	Water quality exceedences remain unchanged in short term. Compliance with ARARs long term is uncertain.	Potentially compliant with ARARs, Dependent on seasonal variations.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Treatment effectiveness may be weather dependent.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	Biological treatment process such as oxidation, precipitation and sulfate reduction.
Volume of Contaminated Materials Treated	None.	None.	All surface water above standards is treated.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Moderate reduction in toxicity and mobility. No reduction in volume.

Table 11-3 Detailed Analysis of Alternatives Surface Water Middle Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	High protection if safety procedures are followed. Workers must wear appropriate PPE.
Environmental Impacts	Minimal.	Minimal.	Moderate disturbance to install infrastructure.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives may not be met throughout year. Construction complete within one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Requires adequate area for treatment components. Must be constructed at individual point source.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	Not required.	Available locally.	Services and material available locally. Requires infrequent substrate replacement and disposal.
Total Present Worth Cost			
Total Cost	$221,500	$303,800	$119,366,100

Table 11-4 Comparative Analysis of Alternatives Surface Water Middle Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	**SW2 Natural Attenuation**	**SW3 Biological Treatment**
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness of environment is uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Moderate long term effectiveness. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SW1.	No short term risk to environment and workers from implementation of SW2.	Moderate short term impacts during construction.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.
Total Present Worth Cost	Less than SW2.	Less than SW3.	Most expensive.

Table 11-5 Detailed Analysis of Alternatives Stream Sediments Middle Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.	High reduction in risk. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	High reduction in risk. Adequate protection.
Compliance with ARARs			
Chemical-Specific	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Wastes isolated in reliable, engineered repository.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	None.
Volume of Contaminated Materials Treated	None.	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction of toxicity or volume through treatment.

Table 11-5 Detailed Analysis of Alternatives Stream Sediments Middle Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Fugitive air emissions monitoring required during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Safety procedures developed for construction will protect workers. Proper PPE must be worn.
Environmental Impacts	Minimal.	Minimal.	Temporary disruption of stream corridor.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives met and construction complete in one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Stream diversion required for sediment removal. May not be applicable throughout the length of Cataract Creek in the Middle Cataract Creek subarea.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.	Available locally.
Total Present Worth Cost			
Total Cost	$221,500	$371,700	$2,943,500

Table 11-6 Comparative Analysis of Alternatives Stream Sediment Middle Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	**SD2 Natural Attenuation**	**SD3 Excavation and Disposal in Luttrell Repository**
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	More effective than SD2. No sediments remain in stream.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.	More short term risk than alternative SD2. Transportation of contaminated material required.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement. May only be possible in sections of Cataract Creek due to terrain of subarea.
Total Present Worth Cost	Less than SD2.	Less than SD3.	Most expensive.

Table 12-1 Detailed Analysis of Alternatives AMD/ARD Lower Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Not protective of human health in the short term, may be protective long term.	Protection of human health is uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective long term.	Protection of environment is uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Compliance with ARARs				
Chemical-Specific	Water quality exceedences unchanged.	Water quality exceedences unchanged in short term, compliance with ARARs uncertain in long term.	Compliance with ARARs is uncertain.	Potentially compliant with ARARs (dependent on seasonal variation).
Location-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be moderate to acceptable in long term.	Risk reduced as volume of adit drainage is reduced. Residual risk in remaining drainage may be above acceptable limits.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Reliability of controls is uncertain.	Treatment effectiveness is weather dependent.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	None.	None.	Biological treatment process (oxidation, precipitation, etc).

Table 12-1 Detailed Analysis of Alternatives AMD/ARD Lower Cataract Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Volume of Contaminated Materials Treated	None.	None.	None.	All adit drainage volume treated.
Expected Degree of Reduction	No reduction in toxicity, mobility, or volume of waste.	Reduction in toxicity, mobility, or volume of waste will occur over time.	Moderate reduction in mobility. No reduction in toxicity or volume of waste.	Moderate reduction in toxicity and mobility. No reduction in volume through treatment.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Not applicable	Minimal impacts from fugitive air emissions, noise, and increased traffic.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.
Environmental Impacts	Unchanged.	Minimal decrees in impacts over time.	Moderate road construction required to reach remote sites.	Moderate road construction required to reach remote sites.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives not met in short term, may be met in long term.	Objectives may not be met. Construction complete within one field season.	Objectives may not be met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	No construction and only long term monitoring.	Ability to construct dependent on thorough understanding of mine workings and hydrogeology.	Requires adequate area for treatment. Difficult for remote sites. Must be constructed at individual adit sites.

Table 12-1 Detailed Analysis of Alternatives AMD/ARD Lower Cataract Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	None used.	Services and materials available locally.	Service and materials available either locally or regionally.	Service and materials available locally. May require sludge disposal.
Total Present Worth Cost				
Total Cost	$221,500	$367,600	$20,174,300	$2,559,400

Table 12-2 Comparative Analysis of Alternatives AMD/ARD Lower Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	**AD2 Natural Attenuation**	**AD3 Source Controls**	**AD4 Biological Treatment**
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness uncertain.	Protectiveness uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Low to moderate. Long term effectiveness is uncertain.	More effective than AD3. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Limited to moderate reduction in toxicity and mobility. No reduction in volume.	Moderate reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of AD1.	No short term risk to environment and workers from implementation of AD2.	Moderate short term risk to environment and workers. Moderate road construction to reach remote sites is required.	More short term environmental impacts during construction than AD3.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.	Difficult to implement, but less difficult that AD3.
Total Present Worth Cost	Less than AD2.	Less than AD4.	Most expensive.	Less than AD3.

Table 12-3 Detailed Analysis of Alternatives Surface Water Lower Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Not protective of human health in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Compliance with ARARs			
Chemical-Specific	Water quality exceedences remain unchanged.	Water quality exceedences remain unchanged in short term. Compliance with ARARs long term is uncertain.	Potentially compliant with ARARs, Dependent on seasonal variations.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Treatment effectiveness may be weather dependent.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	Biological treatment process such as oxidation, precipitation and sulfate reduction.
Volume of Contaminated Materials Treated	None.	None.	All surface water above standards is treated.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Moderate reduction in toxicity and mobility. No reduction in volume.

Table 12-3 Detailed Analysis of Alternatives Surface Water Lower Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	High protection if safety procedures are followed. Workers must wear appropriate PPE.
Environmental Impacts	Minimal.	Minimal.	Moderate disturbance to install infrastructure.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives may not be met throughout year. Construction complete within one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Requires adequate area for treatment components. Must be constructed at individual point source.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	Not required.	Available locally.	Services and material available locally. Requires infrequent substrate replacement and disposal.
Total Present Worth Cost			
Total Cost	$221,500	$303,800	$236,968,000

Table 12-4 Comparative Analysis of Alternatives Surface Water Lower Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness of environment is uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Moderate long term effectiveness. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SW1.	No short term risk to environment and workers from implementation of SW2.	Moderate short term impacts during construction.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.
Total Present Worth Cost	Less than SW2.	Less than SW3.	Most expensive.

Table 12-5 Detailed Analysis of Alternatives Stream Sediments Lower Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.	High reduction in risk. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	High reduction in risk. Adequate protection
Compliance with ARARs			
Chemical-Specific	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Wastes isolated in reliable, engineered repository.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	None.
Volume of Contaminated Materials Treated	None.	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction of toxicity or volume through treatment.

Table 12-5 Detailed Analysis of Alternatives Stream Sediments Lower Cataract Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Fugitive air emissions monitoring required during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Safety procedures developed for construction will protect workers. Proper PPE must be worn.
Environmental Impacts	Minimal.	Minimal.	Temporary disruption of stream corridor.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives met and construction complete in one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Stream diversion required for sediment removal. May not be applicable throughout the length of Cataract Creek in the Lower Cataract Creek subarea.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.	Available locally.
Total Present Worth Cost			
Total Cost	$221,500	$371,700	$6,625,200

Table 12-6 Comparative Analysis of Alternatives Stream Sediment Lower Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	**SD2 Natural Attenuation**	**SD3 Excavation and Disposal in Luttrell Repository**
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	More effective than SD2. No sediments remain in stream.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.	More short term risk than alternative SD2. Transportation of contaminated material required.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement. May only be possible in sections of Cataract Creek due to terrain of subarea.
Total Present Worth Cost	Less than SD2.	Less than SD3.	Most expensive.

Table 13-1 Detailed Analysis of Alternatives AMD/ARD Upper Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Not protective of human health in the short term, may be protective long term.	Protection of human health is uncertain.	Moderate to high reduction in risks at the Buckeye adit. Supplemental treatment should be evaluated in design phase.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective long term.	Protection of environment uncertain.	Moderate to high reduction in risks at the Buckeye adit. Supplemental treatment should be evaluated in design phase.
Compliance with ARARs				
Chemical-Specific	Water quality exceedences unchanged.	Water quality exceedences unchanged in short term, compliance with ARARs uncertain in long term.	Compliance with ARARs is uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Location-Specific	None apply.	None apply.	Compliant with ARARs.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Action-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be moderate to acceptable in long term.	Risk reduced as volume of adit drainage is reduced. Residual risk in remaining drainage may be above acceptable limits.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Reliability of controls is uncertain.	Treatment effectiveness is weather dependent.

Table 13-1 Detailed Analysis of Alternatives AMD/ARD Upper Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	None.	None.	Biological treatment process (oxidation, precipitation, etc).
Volume of Contaminated Materials Treated	None.	None.	None.	All adit drainage volume treated.
Expected Degree of Reduction	No reduction in toxicity, mobility, or volume of waste.	Reduction in toxicity, mobility, or volume of waste will occur over time.	Moderate reduction in mobility. No reduction in toxicity or volume of waste.	Moderate reduction in toxicity and mobility. No reduction in volume through treatment.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.
Environmental Impacts	Unchanged.	Minimal decrease in impacts over time.	Moderate road construction required to reach remote sites.	Moderate road construction required to reach remote sites.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives not met in short term, may be met in long term.	Objectives may not be met. Construction complete within one field season.	Objectives may not be met. Construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation involved.	No construction and only long term monitoring.	Ability to construct dependent on thorough understanding of mine workings and hydrogeology.	Requires adequate area for treatment. Difficult for remote sites. Must be constructed at individual adit sites.

Table 13-1 Detailed Analysis of Alternatives AMD/ARD Upper Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	None used.	Services and materials available locally.	Service and materials available either locally or regionally.	Service and materials available locally. May require sludge disposal.
Total Present Worth Cost				
Total Cost	$221,500	$340,000	$58,992,900	$2,686,400

Table 13-2 Comparative Analysis of Alternatives AMD/ARD Upper Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness uncertain.	Protectiveness uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Low to moderate. Long term effectiveness uncertain.	More effective than AD3. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Limited to moderate reduction in toxicity and mobility. No reduction in volume.	Moderate reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of AD1.	No short term risk to environment and workers from implementation of AD2.	Moderate short term risk to environment and workers. Moderate road construction to reach remote sites is required.	More short term environmental impacts during construction than AD3.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.	Difficult to implement, but less difficult that AD3.
Total Present Worth Cost	Less than AD2.	Less than AD4.	Most expensive.	Less than AD3.

Table 13-3 Detailed Analysis of Alternatives Surface Water Upper Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SW1 No Action	SW2 Natural Attenuation
Overall Protection of Human Health and the Environment		
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.
Compliance with ARARS		
Chemical-Specific	Water quality exceedences remain unchanged.	Water quality exceedences remain unchanged in short term. Compliance with ARARs long term is uncertain.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence		
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.
Reduction of Toxicity, Mobility, and Volume		
Treatment Process Used and Materials Treated	None.	None.
Volume of Contaminated Materials Treated	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.
Short Term Effectiveness		
Protection of Community During Remedial Action	Not applicable.	Not applicable.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.

Table 13-3 Detailed Analysis of Alternatives Surface Water Upper Basin Creek Subarea, Basin Watershed OU (continued)

Evaluation Criteria	Alternative	
	SW1 No Action	SW2 Natural Attenuation
Environmental Impacts	Minimal.	Minimal.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.
Implementability		
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.
Ease of Implementing More Action if Necessary	Not applicable.	Not applicable.
Administrative Feasibility	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.
Total Present Worth Cost		
Total Cost	$221,500	$371,700

Table 13-4 Comparative Analysis of Alternatives Surface Water Upper Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SW1 No Action	SW2 Natural Attenuation
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SW1.	No short term risk to environment and workers from implementation of SW2.
Implementability	Easy to implement.	Easy to implement.
Total Present Worth Cost	Less than SW2.	Most expensive.

Table 13-5 Detailed Analysis of Alternatives Stream Sediments Upper Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall Protection of Human Health and the Environment		
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.
Compliance with ARARs		
Chemical-Specific	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence		
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.
Reduction of Toxicity, Mobility, and Volume		
Treatment Process Used and Materials Treated	None.	None.
Volume of Contaminated Materials Treated	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.
Short Term Effectiveness		
Protection of Community During Remedial Action	Not applicable.	Not applicable.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.

Table 13-5 Detailed Analysis of Alternatives Stream Sediments Upper Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Environmental Impacts	Minimal.	Minimal.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.
Implementability		
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.
Ease of Implementing More Action if Necessary	Not applicable.	Not applicable.
Administrative Feasibility	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.
Total Present Worth Cost		
Total Cost	$221,500	$371,700

Table 13-6 Comparative Analysis of Alternatives Stream Sediments Upper Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.
Compliance with ARARs	Compliant with ARARs.	Compliance with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.
Implementability	Easy to implement.	Easy to implement.
Total Present Worth Cost	Less than SD2.	Most expensive.

Table 14-1 Detailed Analysis of Alternatives Surface Water Lower Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Not protective of human health in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Compliance with ARARs			
Chemical-Specific	Water quality exceedences remain unchanged.	Water quality exceedences remain unchanged in short term. Compliance with ARARs long term is uncertain.	Potentially compliant with ARARs. Dependent on seasonal variations.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Treatment effectiveness may be weather dependent.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	Biological treatment process such as oxidation, precipitation and sulfate reduction.
Volume of Contaminated Materials Treated	None.	None.	All surface water above standards is treated.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Moderate reduction in toxicity and mobility. No reduction in volume.

Table 14-1 Detailed Analysis of Alternatives Surface Water Lower Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	High protection if safety procedures are followed. Workers must wear appropriate PPE.
Environmental Impacts	Minimal.	Minimal.	Moderate disturbance to install infrastructure.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives may not be met throughout year. Construction complete within one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Requires adequate area for treatment components. Must be constructed at individual point source.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	Not required.	Available locally.	Services and material available locally. Requires infrequent substrate replacement and disposal.
Total Present Worth Cost			
Total Cost	$221,500	$303,800	$354,567,900

Table 14-2 Comparative Analysis of Alternatives Surface Water Lower Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness of environment is uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Moderate long term effectiveness. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SW1.	No short term risk to environment and workers from implementation of SW2.	Moderate short term impacts during construction.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.
Total Present Worth Cost	Less than SW2.	More expensive than SW1.	Order of magnitude more expensive.

Table 14-3 Detailed Analysis of Alternatives Stream Sediment Lower Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.	High reduction in risk. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	High reduction in risk. Adequate protection.
Compliance with ARARs			
Chemical-Specific	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Wastes isolated in reliable, engineered repository.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	None.
Volume of Contaminated Materials Treated	None.	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction of toxicity or volume through treatment.

Table 14-3 Detailed Analysis of Alternatives Stream Sediment Lower Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Fugitive air emissions monitoring required during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Safety procedures developed for construction will protect workers. Proper PPE must be worn.
Environmental Impacts	Minimal.	Minimal.	Temporary disruption of stream corridor.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives met and construction complete in one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Stream diversion required for sediment removal. May not be applicable throughout the length of Basin Creek in the Lower Basin Creek subarea.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.	Available locally.
Total Present Worth Cost			
Total Cost	$221,500	$271,700	$3,927,100

Table 14-4 Comparative Analysis of Alternatives Stream Sediment Lower Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in Luttrell Repository
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	More effective than SD2. No impacted sediments remain in stream.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.	More short term risk than alternative SD2. Transportation of contaminated material required.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement. May only be possible in sections of Basin Creek due to terrain of subarea.
Total Present Worth Cost	Least expensive.	More expensive than SD1.	Much more expensive than SD2.

Table 15-1 Detailed Analysis of Alternatives AMD/ARD Upper Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions not protective.	Not protective of human health in the short term, may be protective long term.	Protection of human health is uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective long term.	Protection of environment uncertain.	Moderate to high reduction in risks. Supplemental treatment should be evaluated in design phase.
Compliance with ARARs				
Chemical-Specific	Water quality exceedences unchanged.	Water quality exceedences unchanged in short term, compliance with ARARs uncertain in long term.	Compliance with ARARs is uncertain.	Potentially compliant with ARARs (dependent on seasonal variation).
Location-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	None apply.	None apply.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be moderate to acceptable in long term.	Risk reduced as volume of adit drainage is reduced. Residual risk in remaining drainage may be above acceptable limits.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Reliability of controls is uncertain.	Treatment effectiveness is weather dependent.

Table 15-1 Detailed Analysis of Alternatives AMD/ARD Upper Cataract Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	None.	None.	Biological treatment process (oxidation, precipitation, etc).
Volume of Contaminated Materials Treated	None.	None.	None.	All adit drainage volume treated.
Expected Degree of Reduction	No reduction in toxicity, mobility, or volume of waste.	Reduction in toxicity, mobility, or volume of waste will occur over time.	Moderate reduction in mobility. No reduction in toxicity or volume of waste.	Moderate reduction in toxicity and mobility. No reduction in volume through treatment.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.	Sufficient if safety procedures are followed. Appropriate PPE must be worn while implementing remedy.
Environmental Impacts	Unchanged.	Minimal decrease in impacts overtime.	Moderate road construction required to reach remote sites.	Moderate road construction required to reach remote sites.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Objectives not met in short term, may be met in long term.	Objectives may not be met. Construction complete within one field season.	Objectives may not be met. Construction complete within one field season

Table 15-1 Detailed Analysis of Alternatives AMD/ARD Upper Cataract Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Implementability				
Ability to Construct and Operate	No construction or operation involved.	No construction and only long term monitoring.	Ability to construct dependent on thorough understanding of mine workings and hydrogeology.	Requires adequate area for treatment. Difficult for remote sites. Must be constructed at individual adit sites.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action
Administrative Feasibility	Feasible.	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	None used.	Services and materials available locally.	Service and materials available either locally or regionally.	Service and materials available locally. May require sludge disposal.
Total Present Worth Cost				
Total Cost	$221,500	$326,200	$8,695,000	$2,376,400

Table 15-2 Comparative Analysis of Alternatives AMD/ARD Upper Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative			
	AD1 No Action	AD2 Natural Attenuation	AD3 Source Controls	AD4 Biological Treatment
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness uncertain.	Protectiveness uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs in uncertain.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Low to moderate. Long term effectiveness uncertain.	More effective than AD3. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Limited to moderate reduction in toxicity and mobility. No reduction in volume.	Moderate reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of AD1.	No short term risk to environment and workers from implementation of AD2.	Moderate short term risk to environment and workers. Moderate road construction to reach remote sites is required.	More short term environmental impacts during construction than AD3.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.	Difficult to implement, but less difficult that AD3.
Total Present Worth Cost	Least expensive.	More expensive than AD1.	Most expensive	Less expensive than AD3, more expensive than AD2

Table 15-3 Detailed Analysis of Alternatives Stream Sediment Upper Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall Protection of Human Health and the Environment		
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.
Compliance with ARARS		
Chemical-Specific	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence		
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.
Reduction of Toxicity, Mobility, and Volume		
Treatment Process Used and Materials Treated	None.	None.
Volume of Contaminated Materials Treated	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.
Short Term Effectiveness		
Protection of Community During Remedial Action	Not applicable.	Not applicable.

Table 15-3 Detailed Analysis of Alternatives Stream Sediment Upper Cataract Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.
Environmental Impacts	Minimal.	Minimal.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.
Implementability		
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.
Ease of Implementing More Action if Necessary	Not applicable.	Not applicable.
Administrative Feasibility	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.
Total Present Worth Cost		
Total Cost	$221,500	$371,700

Table 15-4 Comparative Analysis of Alternatives Stream Sediment Upper Cataract Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.
Implementability	Easy to implement.	Easy to implement.
Total Present Worth Cost	Less than SD2.	Most expensive.

Table 16-1 Detailed Analysis of Alternatives Surface Water Middle Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Not protective of human health in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.
Compliance with ARARs			
Chemical-Specific	Water quality exceedences remain unchanged.	Water quality exceedences remain unchanged in short term. Compliance with ARARs long term is uncertain.	Potentially compliant with ARARs. Dependent on seasonal variations.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk may be reduced to within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Treatment effectiveness may be weather dependent.

Table 16-1 Detailed Analysis of Alternatives Surface Water Middle Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	Biological treatment process such as oxidation, precipitation and sulfate reduction.
Volume of Contaminated Materials Treated	None.	None.	All surface water above standards is treated.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Moderate reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	High protection if safety procedures are followed. Workers must wear appropriate PPE.
Environmental Impacts	Minimal.	Minimal.	Moderate disturbance to install infrastructure.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives may not be met throughout year. Construction complete within one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Requires adequate area for treatment components. Must be constructed at individual point source.

Table 16-1 Detailed Analysis of Alternatives Surface Water Middle Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative		
	SW1 No Action	**SW2 Natural Attenuation**	**SW3 Biological Treatment**
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.
Administrative Feasibility	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	Not required.	Available locally.	Services and material available locally. Requires infrequent substrate replacement and disposal.
Total Present Worth Cost			
Total Cost	$221,500	$303,800	$236,966,000

Table 16-2 Comparative Analysis of Alternatives Surface Water Middle Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness of environment is uncertain.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Moderate long term effectiveness. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Reduction in toxicity and mobility. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SW1.	No short term risk to environment and workers from implementation of SW2.	Moderate short term impacts during construction.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.
Total Present Worth Cost	Less than SW2.	Less than SW3.	Most expensive.

Table 16-3 Detailed Analysis of Alternatives Stream Sediment Middle Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.	High reduction in risk. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	High reduction in risk. Adequate protection.
Compliance with ARARs			
Chemical-Specific	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Wastes isolated in reliable, engineered repository.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	None.
Volume of Contaminated Materials Treated	None.	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction of toxicity or volume through treatment.
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Fugitive air emissions monitoring required during construction.

Table 16-3 Detailed Analysis of Alternatives Stream Sediment Middle Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Safety procedures developed for construction will protect workers. Proper PPE must be worn.
Environmental Impacts	Minimal.	Minimal.	Temporary disruption of stream corridor.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives met and construction complete in one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Stream diversion required for sediment removal. May not be applicable throughout the length of Basin Creek in the Middle Basin Creek subarea.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.	Available locally.
Total Present Worth Cost			
Total Cost	$221,500	$369,700	$3,937,900

Table 16-4 Comparative Analysis of Alternatives Stream Sediment Middle Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in Luttrell Repository
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	More effective than SD2. No impacted sediments remain in stream.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.	More short term risk than alternative SD2. Transportation of contaminated material required.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement. May only be possible in sections of Basin Creek due to terrain of subarea.
Total Present Worth Cost	Less than SD2.	Less than SD3.	Most expensive

Table 17-1 Detailed Analysis of Alternatives Surface Water Boulder River AOC, Basin Watershed OU2

Evaluation Criteria	Alternative			
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment	SW4 Physical/Chemical Treatment
Overall Protection of Human Health and the Environment				
Public Health, Safety and Welfare	Baseline conditions are not protective.	Not protective of human health in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.	High reduction in risks. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	Moderate to high reduction in risks. Adequate protection.	High reduction in risks. Adequate protection.
Compliance with ARARs				
Chemical-Specific	Water quality exceedences remain unchanged.	Water quality exceedences remain unchanged in short term. Compliance with ARARs long term is uncertain.	Potentially compliant with ARARs, Dependent on seasonal variations.	Compliance with ARARs expected.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.	Residual risk may be reduced to within acceptable limits.	Residual risk expected to be within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Treatment effectiveness may be weather dependent.	Treatment effective with adequate maintenance.
Reduction of Toxicity, Mobility, and Volume				
Treatment Process Used and Materials Treated	None.	None.	Biological treatment process such as oxidation, precipitation and sulfate reduction.	Likely to include filtration and reverse osmosis.
Volume of Contaminated Materials Treated	None.	None.	All surface water above standards is treated.	All surface water above standards will be treated.

Table 17-1 Detailed Analysis of Alternatives Surface Water Boulder River AOC, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment	SW4 Physical/Chemical Treatment
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Moderate reduction in toxicity and mobility. No reduction in volume.	Moderate to high reduction in toxicity and mobility. No reduction in volume through treatment.
Short Term Effectiveness				
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Minimal impacts from fugitive air emissions, noise, and increased traffic.	Minimal impacts from fugitive air emissions, noise, increased traffic.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	High protection if safety procedures are followed. Workers must wear appropriate PPE.	High protection if safety procedures are followed. Workers must wear appropriate PPE.
Environmental Impacts	Minimal.	Minimal.	Moderate disturbance to install infrastructure.	Moderate disturbance to install infrastructure.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives may not be met throughout year. Construction complete within one field season.	Objectives met and construction complete within one field season.
Implementability				
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Requires adequate area for treatment components. Must be constructed at individual point source.	Requires adequate area for treatment system components.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.	Does not inhibit additional action.

Table 17-1 Detailed Analysis of Alternatives Surface Water Boulder River AOC, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative			
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment	SW4 Physical/Chemical Treatment
Administrative Feasibility	Feasible.	Feasible.	Feasible. Some land ownership and long term O&M concerns.	Feasible. Some land ownership and long term O&M concerns.
Availability of Services and Materials	Not required.	Available locally.	Services and material available locally. Requires infrequent substrate replacement and disposal.	Services and materials available either locally or regionally. Requires sludge disposal.
Total Present Worth Cost				
Total Cost	$221,500	$333,800	$1,102,152,900	$14,809,500

Table 17-2 Comparative Analysis of Alternatives Surface Water Boulder River Area of Concern, Basin Watershed OU2

Evaluation Criteria	Alternative			
	SW1 No Action	SW2 Natural Attenuation	SW3 Biological Treatment	SW4 Physical/Chemical Treatment
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protectiveness of environment is uncertain.	Protective. More protective than SW3.
Compliance with ARARs	Not compliant with ARARs.	Compliance with ARARs is uncertain.	Compliance with ARARs is uncertain.	Compliant with ARARS.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	Moderate long term effectiveness. Maintenance required.	More effective than SW3. Maintenance required.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Reduction in toxicity and mobility. No reduction in volume.	More reduction in mobility and toxicity than SW3. No reduction in volume.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SW1.	No short term risk to environment and workers from implementation of SW2.	Moderate short term impacts during construction.	Similar short term effectiveness to SW3.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement.	Difficult to implement, similar to SW3
Total Present Worth Cost	Less than SW2.	Less than SW4.	Most expensive.	Less than SW3

Table 17-3 Detailed Analysis of Alternatives Stream Sediments Boulder River Area of Concern, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Overall Protection of Human Health and the Environment			
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.	High reduction in risk. Adequate protection.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.	High reduction in risk. Adequate protection.
Compliance with ARARs			
Chemical-Specific	None apply.	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence			
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk moderate to acceptable levels in long term.	Residual risk within acceptable limits.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.	Wastes isolated in reliable, engineered repository.
Reduction of Toxicity, Mobility, and Volume			
Treatment Process Used and Materials Treated	None.	None.	None.
Volume of Contaminated Materials Treated	None.	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction of toxicity or volume through treatment.

Table 17-3 Detailed Analysis of Alternatives Stream Sediments Boulder River Area of Concern, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in the Luttrell Repository
Short Term Effectiveness			
Protection of Community During Remedial Action	Not applicable.	Not applicable.	Fugitive air emissions monitoring required during construction.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.	Safety procedures developed for construction will protect workers. Proper PPE must be worn.
Environmental Impacts	Minimal.	Minimal.	Temporary disruption of stream corridor.
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.	Objectives met and construction complete in one field season.
Implementability			
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.	Stream diversion required for sediment removal. May not be applicable throughout the length of Boulder River AOC.
Ease of Implementing More Action if Necessary	Does not inhibit additional action.	Does not inhibit additional action.	Difficult to take additional action on waste in repository.
Administrative Feasibility	Feasible.	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.	Available locally.
Total Present Worth Cost			
Total Cost	$221,500	$401,700	$26,670,500

Table 17-4 Comparative Analysis of Alternatives Stream Sediments Boulder River Area of Concern, Basin Watershed OU2

Evaluation Criteria	Alternative		
	SD1 No Action	SD2 Natural Attenuation	SD3 Excavation and Disposal in Luttrell Repository
Overall protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term, may be protective in long term.	Protective of human health and the environment.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Not effective in short term, may be effective in long term.	More effective than SD2. No sediments remain in stream.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Limited reduction in toxicity. No reduction in mobility or volume.	Elimination of volume in waste removal area. No reduction in toxicity or volume through treatment
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.	More short term risk than alternative SD2. Transportation of contaminated material required.
Implementability	Easy to implement.	Easy to implement.	Difficult to implement. May only be possible in sections of Boulder River due to terrain of subarea.
Total Present Worth Cost	Less than SD2.	Less than SD3.	Most expensive

Table 18-1 Detailed Analysis of Alternatives Stream Sediment South Fork Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	Alternative SD1 No Action	Alternative SD2 Natural Attenuation
Overall Protection of Human Health and the Environment		
Public Health, Safety and Welfare	Baseline conditions are protective.	Baseline conditions are protective.
Environmental Protectiveness	Baseline conditions not protective.	Not protective of the environment in the short term, may be protective in long term.
Compliance with ARARs		
Chemical-Specific	None apply.	None apply.
Location-Specific	Compliant with ARARs.	Compliant with ARARs.
Action-Specific	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence		
Magnitude of Residual Risk	Residual risk above acceptable limits.	Residual risk above acceptable limits in short term. Risk may be at moderate to acceptable levels in long term.
Adequacy and Reliability of Controls	No additional controls.	No additional controls.
Reduction of Toxicity, Mobility, and Volume		
Treatment Process Used and Materials Treated	None.	None.
Volume of Contaminated Materials Treated	None.	None.
Expected Degree of Reduction	No reduction in toxicity, mobility or volume.	Reduction in toxicity may occur over time. No reduction in mobility or volume.
Short Term Effectiveness		
Protection of Community During Remedial Action	Not applicable.	Not applicable.
Protection of Onsite Workers During Removal Action	Not applicable.	Not applicable.
Environmental Impacts	Minimal.	Minimal.

Table 18-1 Detailed Analysis of Alternatives Stream Sediment South Fork Basin Creek Subarea, Basin Watershed OU2 (continued)

Evaluation Criteria	Alternative	
	Alternative SD1 No Action	**Alternative SD2 Natural Attenuation**
Time Until Removal Action Objectives are Achieved	Objectives not met.	Time must be determined through periodic sampling.
Implementability		
Ability to Construct and Operate	No construction or operation.	No construction, operations consist of long term monitoring.
Ease of Implementing More Action if Necessary	Not applicable.	Not applicable.
Administrative Feasibility	Feasible.	Feasible.
Availability of Services and Materials	Not required.	Available locally.
Total Present Worth Cost		
Total Cost	$221,500	$369,700

Table 18-2 Comparative Analysis of Alternatives Stream Sediment South Fork Basin Creek Subarea, Basin Watershed OU2

Evaluation Criteria	Alternative	
	SD1 No Action	SD2 Natural Attenuation
Overall Protection of Human Health and the Environment	Not protective of environment. No risk to human health.	Not protective of environment in short term. May prove effective in the long term.
Compliance with ARARs	Compliant with ARARs.	Compliant with ARARs.
Long Term Effectiveness and Permanence	Not effective, risk to environment not mitigated by remedy.	Limited effectiveness, reduction in toxicity may occur over time.
Reduction of Toxicity, Mobility, and Volume	No reduction of toxicity, mobility, or volume.	Some reduction of toxicity may occur over time.
Short Term Effectiveness	No short term risk to environment and workers from implementation of SD1.	No short term risk to environment and workers from implementation of SD2.
Implementability	Easy to implement.	Easy to implement.
Total Present Worth Cost	Less than SD2.	Most expensive.

Table 19-1 Summary of Costs for Waste Rock and Tailings Alternatives, Basin Watershed OU2

Subarea	Site Score*	Total Subarea Cost by Alternative			
		WR1	WR2	WR3	WR4
Jack Creek	H	$ 44,300	$ 3,694,100	$ 4,746,800	$ 3,432,900
	MH, H	$ 88,600	$ 4,613,800	$ 5,503,200	$ 6,404,600
	M, MH, H	$ 132,900	$ 5,589,000	$ 6,894,200	$ 7,595,900
Uncle Sam Gulch	H	$ 44,300	$ 4,877,700	$ 6,264,300	$ 16,275,600
	MH, H	$ 88,600	$ 6,289,800	$ 7,936,700	$ 17,611,800
	M, MH, H	$ 132,900	$ 6,498,100	$ 8,145,000	$ 17,820,100
Middle Cataract Creek	H	$ 44,300	$ 14,247,400	$ 19,194,900	$ 15,969,400
	MH, H	$ 88,600	$ 15,039,800	$ 20,084,900	$ 16,734,700
	M, MH, H	$ 132,900	$ 17,474,900	$ 23,145,000	$ 18,930,800
Lower Cataract Creek	H	$ 44,300	$ 3,959,500	$ 5,212,600	$ 2,948,600
	MH, H	$ 88,600	$ 5,659,700	$ 7,130,900	$ 4,307,500
	M, MH, H	$ 132,900	$ 6,643,500	$ 8,283,900	$ 5,129,900
Upper Basin Creek	H	$ 44,300	$ 5,651,300	$ 7,734,400	$ 3,992,200
	MH, H	$ 88,600	$ 5,965,000	$ 8,054,600	$ 4,338,900
	M, MH, H	$ 132,900	$ 6,775,400	$ 9,008,200	$ 5,031,900
Lower Basin Creek	H	$ 44,300	$ 4,552,200	$ 6,223,500	$ 3,911,900
	MH, H	$ 88,600	$ 5,131,200	$ 6,874,100	$ 4,481,300
	M, MH, H	$ 132,900	$ 6,013,900	$ 7,848,000	$ 5,408,600
Upper Cataract Creek	H	$ 44,300	$ 1,743,900	$ 2,280,900	$ 1,041,000
	MH, H	$ 88,600	$ 2,276,200	$ 2,910,800	$ 1,472,200
	M, MH, H	$ 132,900	$ 3,905,700	$ 5,041,600	$ 2,501,300
Middle Basin Creek	H	$ 44,300	na	na	na
	MH, H	$ 88,600			
	M, MH, H	$ 132,900			
Boulder River	H	$ 44,300	$ 208,300	na	na
	MH, H	$ 88,600	$ 416,600		
	M, MH, H	$ 132,900	$ 624,900		
South Fork	H	na	na	na	na
	MH, H				
	M, MH, H				

Notes -

* Cost is summed for multiple scores.

H - High score; MH - Medium-high score; M - Medium score

Table 19-1 Summary of Costs for Waste Rock and Tailings Alternatives, Basin Watershed OU2

Subarea	Site Score*	Total Subarea Cost by Alternative

na - not available; not calculated for this subarea

Table 19-2 Summary of Costs for Surface Water Alternatives, Basin Watershed OU2

Subarea	Total Subarea Cost* by Alternative			
	SW1	SW2	SW3	SW4
Jack Creek	$ 221,500	$ 303,800	$ 119,447,700	na
Uncle Sam Gulch	$ 221,500	$ 303,800	na	na
Middle Cataract Creek	$ 221,500	$ 303,800	$ 119,366,100	na
Lower Cataract Creek	$ 221,500	$ 303,800	$ 236,968,000	na
Upper Basin Creek	$ 221,500	$ 303,800	na	na
Lower Basin Creek	$ 221,500	$ 303,800	$ 354,567,900	na
Upper Cataract Creek	$ 221,500	$ 303,800	na	na
Middle Basin Creek	$ 221,500	$ 303,800	$ 236,966,000	na
Boulder River	$ 221,500	$ 333,800	$ 1,102,152,900	$ 14,809,500
South Fork	na	na	na	na

Notes -

* Cost is based on sites with high scores.

Table 19-3 Summary of Costs for Stream Sediment Alternatives, Basin Watershed OU2

Subarea	Total Subarea Cost* by Alternative		
	SD1	SD2	SD3
Jack Creek	$ 221,500	$ 371,700	na
Uncle Sam Gulch	$ 221,500	$ 371,700	na
Middle Cataract Creek	$ 221,500	$ 371,700	$ 2,943,500
Lower Cataract Creek	$ 221,500	$ 371,700	$ 6,625,200
Upper Basin Creek	$ 221,500	$ 371,700	na
Lower Basin Creek	$ 221,500	$ 371,700	$ 3,927,100
Upper Cataract Creek	$ 221,500	$ 371,700	na
Middle Basin Creek	$ 221,500	$ 369,700	$ 3,937,900
Boulder River	$ 221,500	$ 401,700	$ 26,670,500
South Fork	$ 221,500	$ 369,700	na

Notes -

* Cost is based on sites with high scores.

Table 19-4 Summary of Costs for AMD/ARD Alternatives, Basin Watershed OU2

Subarea	Total Subarea Cost* by Alternative					
	AD1	AD2	AD3	AD4	AD4B	AD5
Jack Creek	$ 221,500	$ 341,800	$ 85,343,500	$ 3,252,800	$ 7,682,100	$ 3,552,900
Uncle Sam Gulch	$ 221,500	$ 298,600	$ 320,122,300	$ 5,117,600	na	$ 3,476,000
Middle Cataract Creek	$ 221,500	$ 600,800	$ 142,585,900	$ 5,690,100	$ 15,418,000	$ 6,470,600
Lower Cataract Creek	$ 221,500	$ 367,600	$ 20,174,000	$ 2,559,400	$ 3,069,700	$ 3,021,900
Upper Basin Creek	$ 221,500	$ 340,000	$ 58,992,900	$ 2,686,400	na	na
Lower Basin Creek	na	na	na	na	na	na
Upper Cataract Creek	$ 221,500	$ 326,200	$ 8,695,000	$ 2,376,400	na	$ 2,410,600
Middle Basin Creek	na	na	na	na	na	na
Boulder River	na	na	na	na	na	na
South Fork	na	na	na	na	na	na

Notes -

* Cost is based on sites with high scores.

Appendix A
is not Resubmitted

Appendix B
Mine Site Priority Scoring

POTENTIAL DIRECT CONTACT SCORE

[ ] Denotes Variables

Human COC Score

If maximum COC concentration <= PRG then COC score = 0
If maximum COC concentration >= [50] x PRG then COC score = [500]
Otherwise COC score = [10] x (maximum concentration/PRG)

PRG (recreational)

Arsenic	1440	mg/kg
Lead	1000	mg/kg

Total HH COC Score = Sum of COC scores up to a maximum of 500

Ecological COC Score

If maximum COC concentration <= PRG then COC score = 0
If maximum COC concentration >= [100] x PRG then COC score = [100]
Otherwise COC score = [1] x (maximum concentration/PRG)

PRG

Arsenic	10	mg/kg
Cadmium	1.6	mg/kg
Copper	40	mg/kg
Lead	50	mg/kg
Mercury	0.1	mg/kg
Zinc	50	mg/kg

Total Eco COC Score = Sum of COC scores up to a maximum of 100

Exposure Potential Modifiers

Prior Reclamation:

Reclamation in "good" condition = modifier	0.01
Reclamation in "moderate" condition = modifier	0.1
No ("none") reclamation or "poor" condition = modifier	1

Distance to Nearest Residence (mi)

<=	0.02	then modifier	1
between		then modifier	proportional
>=	0.2	then modifier	0.3

Distance to Nearest Recreation Cabin (mi)

<=	0.02	then modifier	0.8
between		then modifier	proportional
>=	0.2	then modifier	0.2

Access (Distance to Primary Road) (mi) (also reflects development potential)

<=	0.02	then modifier	0.8
between		then modifier	proportional
>=	0.5	then modifier	0.2

Waste Pile Area (acres)

<=	0.01	then modifier	0.1
between		then modifier	proportional
>=	1	then modifier	1

Waste Pile Area (acres) - if no site-specific soil chemistry data available

<=	0.01	then modifier	0.1
between		then modifier	proportional
>=	1	then modifier	1

Summary of Direct Contact Scoring

Total Potential Direct Contact Score = ((HH COC Score x (sum of res., rec, access modifiers up to a maximum of 2.6)) + Eco COC Score) x reclamation modifier x area modifier

Maximum Score = 1400
Maximum Score = 2800 if no site-specific soil chemistry data available

POTENTIAL SURFACE WATER IMPACT SCORE

Surface Water Impact Score

Surface Water COC Score

If surface water not sampled then COC score = 0
If maximum COC concentration <= PRG then COC score = 0
If maximum COC concentration >= 50 x PRG then COC score = 500
Otherwise COC score = 10 x (maximum concentration/PRG)

PRG (Lower of Eco or HH)

Arsenic	10 ug/l
Cadmium	0.15 ug/l
Copper	4.1 ug/l
Lead	1.16 ug/l
Mercury	0.05 ug/l
Zinc	42.1 ug/l

Total Surface Water Impact Score = Sum of Surface Water COC Scores to a maximum of 500

Solid Waste/Leachate Release Score

COC Release Score (if site-specific soil chemistry data available)

Leachability/acid generation potential

High	then COC release score =	1000
Medium	then COC release score =	750
Low	then COC release score =	500
Unknown	then COC release score =	0

COC Release Score (if no site-specific soil chemistry data available, subarea default data used)

If maximum soil COC concentration <= Baseline (BL) then COC score = 0
If maximum soil COC concentration >= 1000 x (BL/WF), COC score = 1000
Otherwise COC score = 1 x (maximum concentration/(BL/WF)

Waste Release Weighting Factors (WF)

Arsenic	20
Cadmium	200
Copper	15
Lead	10
Zinc	1

Total COC Release Score = Sum of COC Release Scores up to a maximum of 1000

Exposure Potential Modifiers

Evidence of erosion, leaching, or off-site migration of waste:

High	then modifier	1
Medium	then modifier	0.5
Low	then modifier	0.01

Potential for landslide or catastrophic release:

High	then modifier	0.5
Medium	then modifier	0.25
Low	then modifier	0.01

Distance to Perennial Stream (ft):

<=	50	then modifier	1.5
between		then modifier	proportional
>=	500	then modifier	0.1

Distance to Perennial Stream (ft) if no site-specific soil chemistry data available:

<=	50	then modifier	1.5
between		*then modifier*	*proportional*
>=	500	then modifier	0.1

Waste Pile Area (modifier from direct contact section)

Prior Reclamation (modifier from direct contact section)

Total Solid Waste/Leachate Release Score = COC Release Score x (sum of erosion, landslide, and distance to stream modifiers) x area modifier x rec modifier
Maximum score = 3000
Maximum score = 7000 if no site-specific chemistry data available

Summary of Surface Water Impact Scoring:

Total SW Score =Total Surface Water COC Score + Total Solid waste/leachate score
Maximum score = 3500
Maximum score = 4500 if no site-specific chemistry data available

POTENTIAL GROUND WATER IMPACT SCORE

Ground Water COC Score

If ground water not sampled then COC score = 0
If maximum COC concentration <= PRG then COC score = 0
If maximum COC concentration >= 50 x PRG then COC score = 500
Otherwise COC score = 10 x (maximum concentration/PRG)

PRG

Arsenic	10	ug/l
Cadmium	5	ug/l
Lead	15	ug/l

Total Ground Water COC Score = Sum of COC Scores up to a maximum of 500

Leachate Release Scores

COC Score = Total HH COC Score (from direct contact section)

COC Release Modifiers
Leachability/acid generation potential

High	then modifier	1
Medium	then modifier	0.5
Low	then modifier	0.1

Waste Pile Area (modifier from direct contact section)

Prior Reclamation (modifier from direct contact section)
Waste Pile Soil Concentrations for remediated waste piles
Soil concentrations for remediated waste piles will be as follows:
Grub Creek Mine Site values will be used for remediated waste piles in the Basin Creek AOC
Buckeye, Bullion, Bullion Smelter, Smelter Creek Adit, and Enterprise have remediated waste piles
Vogel Mine Site values will be used for remediated waste piles in the Cataract Creek AOC

Total leachate release score = COC score x leachability modifier x size modifier x reclamation modifier
Maximum score = 500
Maximum score = 1000 if no site-specific chemistry data available

Exposure Potential Modifiers

Distance to Nearest Residential Well:

<=	100	then modifier	1
between		then modifier	proportional
>=	1000	then modifier	0.3

Distance to Nearest Recreational Well:

<=	100	then modifier	0.8
between		then modifier	proportional
>=	1000	then modifier	0.2

Summary of Ground Water Impact Scoring:

Total GW Score = (Total GW COC Score + Total leachate release score) x (sum of res. and rec. modifiers up to a maximum of 1.8)
Maximum score = 1800
Maximum score = 2700 if no site-specific chemistry data available

TOTAL SITE SCORE

Direct Contact Score	1400
Surface Water Impact Score	3500
Ground Water Impact Score	1800
TOTAL	6700

If No Site-Specific Soil Chemistry Data Available:

Direct Contact Score	2800
Surface Water Impact Score	8000
Ground Water Impact Score	2700
TOTAL	13500

Site Number	Site Name	Subsite Name	Subarea	Site-Specific Soil Chem. Data	Waste Area (acres)	Waste Area (modifier)	Distance to Primary Road (mi)	Distance to Primary Road (modifier)	Distance to Perennial Stream (feet)	Distance to Perennial Stream (modifier)	Distance to Nearest Residence (mi)	Distance to Nearest Residence (modifier)	Distance to Recreation Cabin (mi)	Distance to Recreation Cabin (modifier)	Distance to Residential Well (feet)	Distance to Residential Well (modifier)	Distance to Recreation Well (feet)	Distance to Recreation Well (modifier)	Prior Reclamation	Prior Reclamation (modifier)	Leachability/Acid generation potential (score)	Leachability/Acid generation potential (modifier)	Potential For Landslide (score)	Potential For Landslide (modifier)	Evidence of erosion, leaching or off-site releases (score)
1	ADELAIDE	MAIN	LOWER BASIN CREEK	x	1.00	1.00	0.010	0.80	20	1.50	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
2	ADIT, MINE, WASTE ROCK I	MAIN	UPPER BASIN CREEK	x	0.50	0.55	0.110	0.69	550	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
3	ALMA NO. 2	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	750	0.10	4.3	0.30	4.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
4	AURORA	MAIN	LOWER BASIN CREEK	x	5.00	1.00	0.177	0.60	300	0.72	0.8	0.30	0.8	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
5	AURORA	AREA 2	LOWER BASIN CREEK	x	5.00	1.00	0.000	0.80	300	0.72	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
6	BASIN BELLE	MAIN	LOWER BASIN CREEK	x	0.10	0.18	0.071	0.74	250	0.88	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
7	BASIN CREEK MINE	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	1850	0.10	4.7	0.30	4.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
8	BASIN CREEK MINE	AREA 2	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	1850	0.10	4.7	0.30	4.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
9	BASIN CREEK PLACER	MAIN	LOWER BASIN CREEK	x	1.00	1.00	0.500	0.20	50	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
10	BASIN CREEK PLACER 1	MAIN	MIDDLE BASIN CREEK		0.10	0.18	0.500	0.20	150	1.19	1.7	0.30	1.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
11	BASIN CREEK PLACER 2	MAIN	MIDDLE BASIN CREEK		0.10	0.18	0.014	0.80	100	1.34	0.7	0.30	0.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
13	BASIN MILLSITE	MAIN	UPPER BOULDER RIVER	x	0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
17	NE NE SECTION 13	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	1250	0.10	1.7	0.30	1.7	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
18	NEPTUNE	MAIN	UPPER BASIN CREEK	x	2.00	1.00	0.116	0.68	400	0.41	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	medium
19	NEPTUNE CABINS	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	900	0.10	4.3	0.30	4.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
20	NORTH ADA - PIERMONT	MAIN	UPPER CATARACT CREEK	x	8.00	1.00	0.001	0.80	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
21	OLD BASIN MILLSITE	MAIN	UPPER BOULDER RIVER		20.00	1.00	0.000	0.80	50	1.50	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	high
22	OLD BASIN MILLSITE	AREA 2	UPPER BOULDER RIVER		0.10	0.18	0.000	0.80	50	1.50	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
23	OLD BALDY GROUP	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	2000	0.10	5.0	0.30	5.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
25	PEARL	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	1100	0.10	2.9	0.30	2.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
26	PERRY PARKS	MAIN	UPPER BASIN CREEK	x	0.10	0.18	0.325	0.42	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
27	PERRY PARKS	AREA 2	UPPER BASIN CREEK	x	0.10	0.18	0.342	0.40	0	1.50	3.5	0.30	3.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
28	PLACER	MAIN	UPPER BASIN CREEK	x	10.00	1.00	0.500	0.20	20	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	medium
29	PLACER DITCH	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	300	0.72	3.6	0.30	3.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
30	PLACER 2313	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	300	0.72	0.8	0.30	0.8	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
32	SE SE SECTION 25	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	750	0.10	4.2	0.30	4.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
33	SOLAR	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	400	0.41	3.0	0.30	3.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
34	SOLAR	AREA 2	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	400	0.41	3.0	0.30	3.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
35	SW NW SECTION 7	MAIN	JACK CREEK		0.10	0.18	0.061	0.75	200	1.03	2.3	0.30	2.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
36	UNNAMED FIRE CLAY	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	250	0.88	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
37	UNNAMED PLACER	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	350	0.57	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
38	UNNAMED QUARRY	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	250	0.88	0.1	0.77	0.1	0.60	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
39	UNNAMED SILVER; LEAD; &	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	1700	0.10	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
41	UPPER DITCH	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	450	0.26	4.7	0.30	4.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
42	VENUS	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	50	1.50	4.6	0.30	4.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
43	VINDICATOR	MAIN	JACK CREEK	x	12.00	1.00	0.033	0.78	250	0.88	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	high
44	VINDICATOR	AREA 2	JACK CREEK	x	0.10	0.18	0.033	0.78	250	0.88	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
46	WINTER'S CAMP	MAIN	UPPER BASIN CREEK	x	0.10	0.18	0.500	0.20	100	1.34	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
47	WINTER'S CAMP	AREA 2	UPPER BASIN CREEK	x	0.10	0.18	0.500	0.20	100	1.34	0.2	0.34	0.2	0.23	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
48	ADA	MAIN	MIDDLE CATARACT CREEK	x	2.00	1.00	1.991	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	high
49	ALSACE	MAIN	UPPER CATARACT CREEK	x	0.25	0.32	0.231	0.54	3500	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	medium
50	AMERICAN EAGLE	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	8.2	0.30	8.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
51	APOLLO	MAIN	MIDDLE CATARACT CREEK	x	2.00	1.00	0.065	0.74	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	high	0.50	high
52	BAKAMA	MAIN	MIDDLE CATARACT CREEK	x	2.00	1.00	0.500	0.20	1200	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
53	BAKAMA	AREA 2	MIDDLE CATARACT CREEK	x	0.10	0.18	0.500	0.20	1200	0.10	6.2	0.30	6.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
54	BASIN QUARTZ MASS	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	500	0.10	0.8	0.30	0.8	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
55	BAZZER CLAIM	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	3700	0.10	4.2	0.30	4.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
56	BEE CLAIM	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	1800	0.10	6.0	0.30	6.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
57	BIG LUMBER GULCH	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	600	0.10	1.2	0.30	1.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
58	BILLIE T	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.500	0.20	1400	0.10	5.0	0.30	5.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
59	BING HAMPTON	MAIN	MIDDLE CATARACT CREEK	x	8.00	1.00	0.037	0.78	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
60	BLACK BEAR	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.770	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
61	BLACK BEAR	AREA 2	MIDDLE CATARACT CREEK	x	3.00	1.00	0.768	0.20	900	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
62	BLUE DIAMOND / OCCIDEN	MAIN	MIDDLE CATARACT CREEK	x	3.50	1.00	0.209	0.56	10	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
63	BOSTON	MAIN	LOWER CATARACT CREEK	x	3.00	1.00	0.629	0.20	200	1.03	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	high
64	BOULDER CHIEF	MAIN	MIDDLE CATARACT CREEK	x	8.00	1.00	1.880	0.20	1100	0.10	1.5	0.30	1.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	medium
65	BOULDER CHIEF	MINE 2	MIDDLE CATARACT CREEK	x	0.10	0.18	1.880	0.20	1900	0.10	3.0	0.30	3.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
66	BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	x	1.00	1.00	0.225	0.54	1000	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
67	CALIFORNIA	MAIN	LOWER CATARACT CREEK	x	1.00	1.00	0.500	0.20	250	0.88	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	high	0.50	medium
68	CARTWRIGHT CABINS	MAIN	LOWER CATARACT CREEK		1.00	1.00	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
69	CARTWRIGHT CABINS 2	MAIN	LOWER CATARACT CREEK	x	1.00	1.00	0.402	0.32	50	1.50	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	high	1.0	high	0.50	high
70	CATARACT	MAIN	MIDDLE CATARACT CREEK	x	5.00	1.00	0.500	0.20	50	1.50	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	high
71	CATERACT FLATS PLACER	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
72	CATARACT MEADOWS COI	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	1050	0.10	6.9	0.30	6.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
73	CATARACT PLACER	MAIN	LOWER CATARACT CREEK		0.25	0.32	0.062	0.75	50	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
74	CATARACT TAILS	MAIN	MIDDLE CATARACT CREEK	x	5.00	1.00	0.500	0.20	0	1.50	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	high
75	CLIPPER	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.052	0.76	550	0.10	3.2	0.30	3.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
76	CLIPPER / EDNA	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	0.033	0.78	300	0.72	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
77	CORBITT	MAIN	UPPER CATARACT CREEK	x	3.00	1.00	0.433	0.28	2600	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
78	CRACKER	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	0.077	0.73	600	0.10	0.1	0.88	0.1	0.70	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	medium
79	CRESCENT	MAIN	UPPER CATARACT CREEK	x	4.00	1.00	0.077	0.73	4100	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	medium	0.25	high
80	CRESCENT	AREA 2	UPPER CATARACT CREEK	x	0.10	0.18	0.038	0.78	4000	0.10	8.5	0.30	8.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
82	CRYSTAL	MAIN	UNCLE SAM GULCH	x	0.10	0.18	0.038	0.78	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
83	CRYSTAL	AREA 2	UNCLE SAM GULCH	x	15.00	1.00	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	high
84	CUSTER	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1400	0.10	1.5	0.30	1.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
85	CUSTER	AREA 2	LOWER CATARACT CREEK		0.10	0.18	0.000	0.80	1100	0.10	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
86	DEER LODGE	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.000	0.80	600	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
87	DEER LODGE	AREA 2	LOWER CATARACT CREEK	x	0.10	0.18	0.048	0.77	600	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
88	ELDORADO AND PLATEAU	MAIN	UPPER CATARACT CREEK	x	1.00	1.00	0.048	0.78	700	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
89	ELDORADO AND PLATEAU	AREA 2	UPPER CATARACT CREEK	x	0.10	0.18	0.500	0.20	700	0.10	8.0	0.30	8.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
90	ELMER	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.089	0.71	800	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
91	EVA MAY	MAIN	MIDDLE CATARACT CREEK	x	4.00	1.00	0.016	0.80	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	high	0.50	high
92	EVA MAY	AREA 2	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	3.7	0.30	3.7	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
93	EVENING STAR	MAIN	UNCLE SAM GULCH	x	3.00	1.00	0.500	0.20	1800	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	medium
94	FIRST SHOT / LAST SHOT	MAIN	JACK CREEK	x	6.00	1.00	0.500	0.20	800	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	medium
95	FIRST SHOT / LAST SHOT	AREA 2	JACK CREEK	x	0.10	0.18	1.322	0.20	800	0.10	2.3	0.30	2.3	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
96	GRAY LEAD	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.500	0.20	5100	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
97	GREAT SHIELD	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	1650	0.10	4.3	0.30	4.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
98	HANNA	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	300	0.72	3.3	0.30	3.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
99	HIAWATHA	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1250	0.10	1.6	0.30	1.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
100	HIDDEN TREASURE	MAIN	LOWER BASIN CREEK		0.10	0.18	0.057	0.75	100	1.34	0.7	0.30	0.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
101	HATTIE FERGUSON	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.004	0.80	200	1.03	2.4	0.30	2.4	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low

Site Number	Site Name	Subsite Name	Subarea	Site-Specific Soil Chem. Data	Waste Area (acres)	Waste Area (modifier)	Distance to Primary Road (mi)	Distance to Primary Road (modifier)	Distance to Perennial Stream (feet)	Distance to Perennial Stream (modifier)	Distance to Nearest Residence (mi)	Distance to Nearest Residence (modifier)	Distance to Recreation Cabin (mi)	Distance to Recreation Cabin (modifier)	Distance to Residential Well (feet)	Distance to Residential Well (modifier)	Distance to Recreation Well (feet)	Distance to Recreation Well (modifier)	Prior Reclamation	Prior Reclamation (modifier)	Leachability/Acid generation potential (score)	Leachability/Acid generation potential (modifier)	Potential For Landslide (score)	Potential For Landslide (modifier)	Evidence of erosion, leaching or off-site releases (score)
102	HATTIE FERGUSON	LOWER	MIDDLE CATARACT CREEK	x	2.00	1.00	0.500	0.20	10	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
103	SW NW SECTION 28	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.671	0.20	550	0.10	2.4	0.30	2.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
104	HATTIE FERGUSON	UPPER	MIDDLE CATARACT CREEK	x	2.00	1.00	0.500	0.20	150	1.19	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
105	SW NW SECTION 29	MAIN	UNCLE SAM GULCH	x	0.50	0.55	0.114	0.68	60	1.47	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
106	IDA M.	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.076	0.73	800	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
107	IDA M.	AREA 2	MIDDLE CATARACT CREEK	x	0.10	0.18	0.500	0.20	1700	0.10	2.9	0.30	2.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
108	IDA MAY	MAIN	UPPER CATARACT CREEK	x	2.00	1.00	0.500	0.20	3500	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
109	IDA MAY	AREA 2	UPPER CATARACT CREEK	x	0.10	0.18	0.500	0.20	3500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
110	INDEPENDENCE MINE	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	50	1.50	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
111	JAMES	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	750	0.10	4.1	0.30	4.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
112	JOHN T.	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	1.463	0.20	1800	0.10	4.1	0.30	4.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
113	JUMBO	MAIN	MIDDLE CATARACT CREEK	x	1.50	1.00	1.831	0.20	2300	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
114	KLONDYKE	MAIN	MIDDLE CATARACT CREEK	x	3.00	1.00	0.500	0.20	800	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
115	LADY NELL	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.985	0.20	1400	0.10	5.6	0.30	5.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
116	LIZZIE OSBORNE	MAIN	MIDDLE CATARACT CREEK	x	0.75	0.77	0.860	0.20	35	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
117	LIZZIE OSBORNE	AREA 2	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	35	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
118	LOUISE	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1350	0.10	1.1	0.30	1.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
120	MAMMOTH	MAIN	UNCLE SAM GULCH	x	0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
121	MANHATTAN	MAIN	LOWER CATARACT CREEK	x	1.00	1.00	0.020	0.80	600	0.10	0.8	0.30	0.8	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	low
122	MANTLE	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.040	0.78	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
123	MANTLE SOUTH	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
124	MARSHALL-CHANGES MINE	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.040	0.77	600	0.10	2.4	0.30	2.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
125	MARY ANNE	MAIN	MIDDLE CATARACT CREEK	x	4.00	1.00	0.165	0.62	2000	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	high
126	MARY ANNE	AREA 2	MIDDLE CATARACT CREEK	x	0.10	0.18	0.500	0.20	2000	0.10	4.0	0.30	4.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
127	MIDDLE SNOWDRIFT CREE	MAIN	MIDDLE CATARACT CREEK	x	5.00	1.00	1.831	0.20	200	1.03	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
128	MIKE #14	MAIN	MIDDLE CATARACT CREEK	x	1.50	1.00	0.500	0.20	1400	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
129	MINNEAPOLIS	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	250	0.88	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
130	MINNEAPOLIS	AREA 2	LOWER CATARACT CREEK		0.10	0.18	0.016	0.90	300	0.72	0.7	0.30	0.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
131	MORNING GLORY	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.500	0.20	20	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
132	MORNING GLORY	TAILINGS	MIDDLE CATARACT CREEK	x	5.00	1.00	0.120	0.67	0	1.50	1.4	0.30	1.4	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
133	MORNING MARIE	MAIN	MIDDLE CATARACT CREEK	x	1.50	1.00	0.500	0.20	150	1.19	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	medium
134	MOUNTAIN CHIEF	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	1300	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
135	MOUNTAIN CHIEF	AREA 2	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	1000	0.10	1.7	0.30	1.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
136	MT. THOMPSON	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1600	0.10	2.0	0.30	2.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
137	NE NE SECTION 28	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	3900	0.10	8.5	0.30	8.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
138	NE NW SECTION 3	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	850	0.10	2.0	0.30	2.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
139	NE THREE BROTHERS	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	3100	0.10	6.9	0.30	6.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
140	NEW COTTAGE	MAIN	LOWER CATARACT CREEK	x	2.00	1.00	0.500	0.20	60	1.47	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
141	OUSLEY	MAIN	UPPER CATARACT CREEK		0.10	0.18	1.127	0.20	550	0.10	7.8	0.30	7.8	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
142	OVERLAND CREEK	MAIN	UPPER CATARACT CREEK	x	2.00	1.00	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	medium
143	PEN YAN	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.042	0.77	1400	0.10	5.6	0.30	5.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
144	PHANTOM	MAIN	LOWER CATARACT CREEK	x	0.25	0.32	0.500	0.20	0	1.50	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	high	1.0	high	0.50	high
145	PLACER 2623	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	600	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
146	PROTECTION	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.444	0.27	50	1.50	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
147	QUARTZ CREEK	MAIN	UPPER CATARACT CREEK	x	0.25	0.32	0.500	0.20	300	0.72	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
148	RED BIRD	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.500	0.20	70	1.44	3.5	0.30	3.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
149	REDEMPTION	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	2000	0.10	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
150	REDWING	MAIN	LOWER CATARACT CREEK	x	1.00	1.00	0.500	0.20	0	1.50	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	medium	0.25	low
151	ROBIE BURNS	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	1.673	0.20	900	0.10	3.3	0.30	3.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
152	ROCKER	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	0.500	0.20	0	1.50	1.5	0.30	1.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	high
153	ROCKER EXTENSION	MAIN	MIDDLE CATARACT CREEK		0.25	0.32	0.500	0.20	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	high	0.50	high
154	ROSE MINE	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	600	0.10	0.9	0.30	0.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
155	ROSE MINE	AREA 2	LOWER CATARACT CREEK		0.10	0.18	0.084	0.72	600	0.10	0.9	0.30	0.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
156	RUTH	MAIN	LOWER CATARACT CREEK	x	0.75	0.77	0.084	0.72	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	high	0.50	high
157	RUTH	AREA 2	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
158	SAINT LAWRENCE	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
159	SAINT NICK	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.034	0.78	400	0.41	3.0	0.30	3.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
160	SATURDAY NIGHT	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
161	SEATTLE	MAIN	Lower Cataract Creek	x	6.00	1.00	0.500	0.20	50	1.50	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	medium
162	SELF - RISER	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	700	0.10	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
163	SE NE SECTION 28	MAIN	UPPER CATARACT CREEK		0.10	0.18	1.581	0.20	800	0.10	8.0	0.30	8.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
164	SIRIUS	MAIN	MIDDLE CATARACT CREEK	x	3.00	1.00	0.185	0.59	1800	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
165	SPARKING WATER	MAIN	UNCLE SAM GULCH	x	0.10	0.18	0.185	0.59	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
166	SPARKING WATER	AREA 2	UNCLE SAM GULCH	x	0.10	0.18	0.529	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
167	SYLVAN	MAIN	LOWER CATARACT CREEK	x	2.00	1.00	0.500	0.20	150	1.19	0.8	0.30	0.8	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
168	TOTTEN MINE	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.065	0.74	300	0.72	4.3	0.30	4.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
169	UNCLE SAM	MAIN	UNCLE SAM GULCH	x	0.50	0.55	0.500	0.20	300	0.72	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
170	UNNAMED LEAD & SILVER	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.073	0.73	1700	0.10	1.7	0.30	1.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
171	UNNAMED 001	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	1.526	0.20	200	1.03	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	high	0.50	high
172	UNNAMED 002	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	1.021	0.20	2300	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	high	0.50	medium
173	UNNAMED 003	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	1.391	0.20	700	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
174	UNNAMED 004	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	0.230	0.54	2400	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
175	VERA AND MARIE	MAIN	MIDDLE CATARACT CREEK	x	4.00	1.00	0.727	0.20	50	1.50	3.0	0.30	3.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	high	0.50	medium
176	VERA AND MARIE	AREA 2	MIDDLE CATARACT CREEK		0.10	0.18	0.043	0.77	50	1.50	1.6	0.30	1.6	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
177	WALDY	MAIN	LOWER CATARACT CREEK	x	0.25	0.32	0.500	0.20	0	1.50	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	medium	0.25	medium
178	WALDY NORTH	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.036	0.78	850	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
247	BUCKEYE MINE	MAIN	UPPER BASIN CREEK	x	0.10	0.18	0.353	0.38	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	good	0.01	low	0.1	low	0.01	low
248	BUCKEYE MINE	MINE 2	UPPER BASIN CREEK	x	0.10	0.18	0.500	0.20	0	1.50	3.6	0.30	3.6	0.20	1000	0.30	1000	0.20	good	0.01	low	0.1	low	0.01	low
249	BUCKEYE MINE (CATARAC	MAIN	LOWER CATARACT CREEK		1.00	1.00	0.036	0.78	800	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
250	BUCKEYE MINE	EXTRA AF	UPPER BASIN CREEK	x	0.10	0.18	0.500	0.20	0	1.50	3.6	0.30	3.6	0.20	1000	0.30	1000	0.20	good	0.01	low	0.1	low	0.01	low
251	BULLION MINE	MAIN	JACK CREEK	x	0.10	0.18	0.371	0.36	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	good	0.01	low	0.1	low	0.01	low
252	BULLION SMELTER	MAIN	JACK CREEK	x	0.10	0.18	0.500	0.20	50	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	good	0.01	low	0.1	low	0.01	low
253	BUSTER	MAIN	LOWER BASIN CREEK		0.10	0.18	0.074	0.73	50	1.50	0.1	0.84	0.1	0.67	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
254	COLUMBUS	MAIN	LOWER BASIN CREEK	x	1.00	1.00	0.342	0.40	80	1.41	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
255	CRYSTAL GROUP	MAIN	UPPER BASIN CREEK		0.10	0.18	0.057	0.75	850	0.10	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
256	DAILY WEST	MAIN	LOWER BASIN CREEK	x	0.10	0.18	0.057	0.75	300	0.72	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
257	DAILY WEST	AREA 2	LOWER BASIN CREEK	x	0.10	0.18	0.021	0.80	300	0.72	0.2	0.49	0.2	0.37	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
258	DELGATE	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	200	1.03	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
259	DIMON	MAIN	LOWER BASIN CREEK		0.10	0.18	0.116	0.68	600	0.10	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
260	DORIS	MAIN	LOWER BASIN CREEK	x	0.10	0.18	0.048	0.77	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
261	DORIS	AREA 2	LOWER BASIN CREEK	x	3.67	1.00	0.191	0.59	0	1.50	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	high
262	DOROTHY SNOW	MAIN	UPPER BASIN CREEK	x	0.10	0.18	0.015	0.80	50	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low

Site Number	Site Name	Subsite Name	Subarea	Site-Specific Soil Chem. Data	Waste Area (acres)	Waste Area (modifier)	Distance to Primary Road (mi)	Distance to Primary Road (modifier)	Distance to Perennial Stream (feet)	Distance to Perennial Stream (modifier)	Distance to Nearest Residence (mi)	Distance to Nearest Residence (modifier)	Distance to Recreation Cabin (mi)	Distance to Recreation Cabin (modifier)	Distance to Residential Well (feet)	Distance to Residential Well (modifier)	Distance to Recreation Well (feet)	Distance to Recreation Well (modifier)	Prior Reclamation	Prior Reclamation (modifier)	Leachability/Acid generation potential (score)	Leachability/Acid generation potential (modifier)	Potential For Landslide (score)	Potential For Landslide (modifier)	Evidence of erosion, leaching or off-site releases (score)
263	DOUBLE SHAFT	MAIN	UPPER BASIN CREEK	x	2.00	1.00	0.500	0.20	250	0.88	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
264	DUMORTIERITE PROSPECT	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	750	0.10	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
266	ENTERPRISE MINE	MAIN	UPPER BASIN CREEK	x	0.10	0.18	0.388	0.34	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	good	0.01	low	0.1	low	0.01	low
267	GOLDEN GLOW	MAIN	UPPER BASIN CREEK		0.10	0.18	0.056	0.75	150	1.19	5.0	0.30	5.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
268	GRUB CREEK STATION	MAIN	UPPER BASIN CREEK	x	3.00	1.00	0.500	0.20	100	1.34	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	medium	0.25	medium
269	HAWKEYE MINE	MAIN	JACK CREEK	x	0.10	0.18	0.301	0.45	200	1.03	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
270	HECTOR	MAIN	LOWER BASIN CREEK	x	0.10	0.18	0.301	0.45	50	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
271	HECTOR	AREA 2	LOWER BASIN CREEK	x	0.10	0.18	0.500	0.20	50	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
272	HIGHLAND	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	1350	0.10	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
273	HOPE	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	2600	0.10	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
274	JACK CREEK RIDGE	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	900	0.10	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
275	JACK CREEK RIDGE	AREA 2	JACK CREEK		0.10	0.18	0.500	0.20	900	0.10	0.6	0.30	0.6	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
276	JACK CREEK TAILINGS	MAIN	JACK CREEK	x	0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
277	JESSIE	MAIN	LOWER BASIN CREEK	x	10.00	1.00	0.500	0.20	50	1.50	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	low
278	JIB SHAFT	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	200	1.03	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
279	JIB SHAFT	JIB MILL	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	50	1.50	0.1	0.57	0.1	0.43	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
280	JIB SHAFT	JIB MILL F	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	200	1.03	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
281	JOE BOWER'S MINE	MAIN	UPPER BASIN CREEK	x	0.10	0.18	0.500	0.20	200	1.03	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
282	JOE METESH LESSEE	MAIN	LOWER BASIN CREEK		0.10	0.18	0.036	0.78	50	1.50	0.0	0.92	0.0	0.73	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
283	JOSEPHINE	MAIN	UPPER BASIN CREEK	x	8.00	1.00	0.036	0.78	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	medium
284	JOSEPHINE	MINE 2	UPPER BASIN CREEK	x	0.10	0.18	0.500	0.20	0	1.50	4.0	0.30	4.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
285	KATIE & KATIE EXTENSION	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	550	0.10	0.0	0.92	0.0	0.73	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
286	KELLER'S HEMATITE	MAIN	JACK CREEK		0.10	0.18	0.274	0.48	1000	0.10	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
287	LADY HENNESSEY	MAIN	UPPER BASIN CREEK	x	0.10	0.18	0.274	0.48	2000	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
288	LADY HENNESSEY	MINE 2	UPPER BASIN CREEK	x	0.10	0.18	1.255	0.20	550	0.10	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
289	LADY LEITH	MAIN	UPPER BASIN CREEK	x	0.10	0.18	1.255	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
290	LADY LEITH	AREA 2	UPPER BASIN CREEK	x	0.10	0.18	0.500	0.20	650	0.10	3.9	0.30	3.9	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
292	LOG CABIN AND STONE FIF	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	50	1.50	0.9	0.30	0.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
293	LONE STAR	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	650	0.10	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
294	LOTTA	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	150	1.19	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
295	LOWER DITCH	MAIN	UPPER BASIN CREEK		0.10	0.18	0.153	0.63	550	0.10	4.4	0.30	4.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
296	HECTOR - LOWER	MAIN	LOWER BASIN CREEK	x	0.10	0.18	0.500	0.20	50	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
297	LULA BELL	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	50	1.50	5.0	0.30	5.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
298	LYONS PROSPECT	MAIN	UPPER BASIN CREEK		0.10	0.18	0.021	0.80	2000	0.10	1.1	0.30	1.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
299	MAGDELENA GROUP	MAIN	UPPER BASIN CREEK	x	3.00	1.00	0.500	0.20	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	medium	0.25	high
300	MARGUERITE	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	3600	0.10	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
301	MARGUERITE	AREA 2	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	3200	0.10	1.4	0.30	1.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
302	MEYERS GULCH	MAIN	LOWER BASIN CREEK	x	0.50	0.55	0.500	0.20	300	0.72	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
303	MOCCASON	MAIN	JACK CREEK	x	0.10	0.18	0.116	0.68	1400	0.10	1.9	0.30	1.9	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
304	MOLLY SNOW	MAIN	UPPER BASIN CREEK	x	1.00	1.00	0.041	0.77	150	1.19	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
305	MORNING	MAIN	JACK CREEK	x	0.10	0.18	0.041	0.77	2000	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
306	MORNING	AREA 2	JACK CREEK	x	0.10	0.18	0.135	0.66	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
307	MORNING STAR	MAIN	UPPER BASIN CREEK	x	2.00	1.00	0.500	0.20	120	1.28	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	low
308	N462471	MAIN	Lower Basin Creek		0.10	0.18	0.500	0.20	650	0.10	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
309	WEST MOUNT THOMPSON	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	1900	0.10	2.3	0.30	2.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
310	WHITE PINE	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
311	WHITE PINE	AREA 2	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
312	BASIN GOLD & SILVER	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
313	CATARACT CREEK PLACEF	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	100	1.34	5.0	0.30	5.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
314	CREDEN MINES	MAIN	LOWER BASIN CREEK		0.10	0.18	0.041	0.77	100	1.34	0.0	0.96	0.0	0.77	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
315	GARFIELD	EXTENSIC	UNCLE SAM GULCH	x	2.00	1.00	0.361	0.37	300	0.72	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
316	GOLDEN ASSETS MINE	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
317	JACK MTN. IRON	MAIN	JACK CREEK		0.10	0.18	0.774	0.20	400	0.41	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
318	NE NW SECTION 16 (51)	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	550	0.10	4.8	0.30	4.8	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
319	NW SW SECTION 27	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	700	0.10	8.0	0.30	8.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
320	NW SW SECTION 29	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
321	SE NW SECTION 30	MAIN	UPPER BASIN CREEK	x	2.00	1.00	0.021	0.80	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	medium
322	SE SE SECTION 35	MAIN	UPPER BASIN CREEK	x	1.00	1.00	0.500	0.20	150	1.19	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
323	SE SW SECTION 2	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	2500	0.10	6.2	0.30	6.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
324	SE SW SECTION 28	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	900	0.10	1.9	0.30	1.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
325	SE SW SECTION 32	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	200	1.03	0.0	0.30	0.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
326	SW SE SECTION 1	MAIN	LOWER BASIN CREEK		0.10	0.18	0.029	0.79	250	0.88	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
327	SW SE SECTION 29	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
330	BASIN CREEK PLACER 3	MAIN	MIDDLE BASIN CREEK		0.10	0.18	0.500	0.20	50	1.50	0.1	0.77	0.1	0.60	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
332	BIG MEDICINE	MAIN	LOWER CATARACT CREEK	x	0.25	0.32	0.500	0.20	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	medium
334	CAPTAIN COOK	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	750	0.10	1.6	0.30	1.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
335	CATARACT CITY	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.062	0.75	300	0.72	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
338	DEW DROP	MAIN	JACK CREEK	x	2.00	1.00	0.029	0.79	550	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	medium
339	EDNA	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	0.500	0.20	450	0.26	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
340	ELEPHANT	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	700	0.10	3.1	0.30	3.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
343	FATHER MURPHY	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	350	0.57	1.5	0.30	1.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
344	FINN'S CABIN AND SAUNA	MAIN	LOWER BOULDER RIVER		0.10	0.18	0.723	0.20	2100	0.10	0.7	0.30	0.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
345	FOURTH OF JULY	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	0.500	0.20	3200	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	medium
346	FREE SILVER	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.041	0.77	1850	0.10	5.0	0.30	5.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
347	GARFIELD	MAIN	UNCLE SAM GULCH	x	2.00	1.00	0.500	0.20	300	0.72	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	medium
349	GOLD FLAKE	MAIN	LOWER CATARACT CREEK	x	2.50	1.00	0.500	0.20	150	1.19	0.1	0.53	0.1	0.40	1000	0.30	1000	0.20	none	1	medium	0.5	high	0.50	medium
351	GOLDEN REEF	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	600	0.10	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
352	HUOT	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	3500	0.10	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
353	LADY LANE	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	150	1.19	5.0	0.30	5.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
354	LAPLATE	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	50	1.50	1.1	0.30	1.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
355	LAST SHOT	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	1500	0.10	2.7	0.30	2.7	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
356	LINCOLN	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
357	LIZZIE	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1150	0.10	1.7	0.30	1.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
358	BLUEBIRD	LOWER	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
359	LULA	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	350	0.57	0.1	0.77	0.1	0.60	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
360	MAYFLOWER	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	1800	0.10	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
361	MIDNIGHT	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	1500	0.10	2.3	0.30	2.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
362	MONTANA	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1100	0.10	0.9	0.30	0.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
363	MONTANA CENTRAL RR OF	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	50	1.50	0.7	0.30	0.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
365	NW NE SECTION 32	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
366	OBELISK	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	350	0.57	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
370	PENN PLACER	MAIN	MIDDLE BASIN CREEK		0.10	0.18	0.500	0.20	100	1.34	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low

Site Number	Site Name	Subsite Name	Subarea	Site-Specific Soil Chem Data	Waste Area (acres)	Waste Area (modifier)	Distance to Primary Road (mi)	Distance to Primary Road (modifier)	Distance to Perennial Stream (feet)	Distance to Perennial Stream (modifier)	Distance to Nearest Residence (mi)	Distance to Nearest Residence (modifier)	Distance to Recreation Cabin (mi)	Distance to Recreation Cabin (modifier)	Distance to Residential Well (feet)	Distance to Residential Well (modifier)	Distance to Recreation Well (feet)	Distance to Recreation Well (modifier)	Prior Reclamation	Prior Reclamation (modifier)	Leachability/Acid generation potential (score)	Leachability/Acid generation potential (modifier)	Potential For Landslide (score)	Potential For Landslide (modifier)	Evidence of erosion, leaching or off-site releases (score)
371	PIRATE	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1200	0.10	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
373	REDEMPTION	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	550	0.10	2.2	0.30	2.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
374	REGALIA	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	50	1.50	1.2	0.30	1.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
375	ROCKY POINT	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	1150	0.10	4.2	0.30	4.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
376	RUBY DIGGINGS	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	2000	0.10	5.0	0.30	5.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
377	SAGINAW	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	150	1.19	1.1	0.30	1.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
378	SE SE SECTION 21	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
379	SILVER REEF	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.198	0.56	900	0.10	1.1	0.30	1.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
381	SNOWBIRD	MAIN	UNCLE SAM GULCH	x	1.00	1.00	0.500	0.20	2500	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	medium	0.25	medium
383	T&B	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	1200	0.10	4.8	0.30	4.8	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
384	BLUEBIRD	MAIN - UP	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
385	VICTORY	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	100	1.34	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
386	VIOLA	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	6600	0.10	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
388	HOGBACK	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1200	0.10	1.2	0.30	1.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
391	SILICA QUARTZ MINE	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	200	1.03	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
393	HOLLAND	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.212	0.56	750	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
394	ALPINE	MAIN	MIDDLE CATARACT CREEK	x	1.00	1.00	0.500	0.20	100	1.34	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
395	BIG CHIEF	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	850	0.10	4.7	0.30	4.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
396	VIRGINIA	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	600	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
397	VANDALIA	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
507	BASIN JIBE	MAIN	Upper Boulder River		0.10	0.18	0.500	0.20	600	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
508	MINNEAPOLIS PLACER & PI	MAIN	Lower Cataract Creek		0.10	0.18	0.500	0.20	300	0.72	1.1	0.30	1.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
509	SMELTER CREEK ADIT	MAIN	Jack Creek		1.00	1.00	0.500	0.20	30	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	good	0.01	low	0.1	medium	0.25	medium
510	NE BASIN	MAIN	Lower Cataract Creek		0.10	0.18	0.500	0.20	150	1.19	0.8	0.30	0.8	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
511	LAST CHANCE	MAIN	Lower Basin Creek		0.10	0.18	0.500	0.20	750	0.10	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
588	CLEVELAND/DELBERT CLA	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	50	1.50	0.1	0.65	0.1	0.50	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
589	24JF0247	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	1000	0.10	4.9	0.30	4.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
590	24JF0142	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	2900	0.10	5.3	0.30	5.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
591	24JF0131	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	400	0.41	4.7	0.30	4.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
592	RTI RECON: P	MAIN	JACK CREEK	x	0.75	0.77	0.500	0.20	300	0.72	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	high	1.0	medium	0.25	medium
593	24JF0444	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	300	0.72	4.2	0.30	4.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
594	RTI RECON: O	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	200	1.03	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
595	CULLEN CLAIM	MAIN	UPPER BASIN CREEK		0.10	0.18	0.500	0.20	700	0.10	4.6	0.30	4.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
596	24JF0250	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	1500	0.10	5.8	0.30	5.8	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
597	24JF0249	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	6.1	0.30	6.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
598	HANSON	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	700	0.10	6.2	0.30	6.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
599	24JF0132	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	3700	0.10	6.5	0.30	6.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
600	24JF0134	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	2400	0.10	6.5	0.30	6.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
601	24JF0141	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	2100	0.10	6.2	0.30	6.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
602	RTI RECON: E	MAIN	JACK CREEK		0.10	0.18	0.500	0.20	250	0.88	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
603	24JF0833	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	550	0.10	3.3	0.30	3.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
604	24JF0490	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
605	24JF0489	MAIN	UNCLE SAM GULCH		0.10	0.18	0.500	0.20	500	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
606	24JF0683	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	450	0.26	1.7	0.30	1.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
607	24JF0696	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.028	0.79	700	0.10	1.7	0.30	1.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
608	MORNING GLORY	TAILINGS	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	50	1.50	1.3	0.30	1.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
609	24JF0676	MAIN	MIDDLE CATARACT CREEK		0.10	0.18	0.500	0.20	1100	0.10	1.4	0.30	1.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
610	24JF0890	MAIN	LOWER BASIN CREEK		0.10	0.18	0.080	0.73	1750	0.10	1.1	0.30	1.1	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
611	RTI RECON: R	MAIN	LOWER BASIN CREEK	x	1.00	1.00	0.500	0.20	400	0.41	2.0	0.30	2.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
612	GOLD HILL	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.500	0.20	1900	0.10	2.0	0.30	2.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
613	24JF0520	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	50	1.50	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
614	24JF0525	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	50	1.50	0.7	0.30	0.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
615	ATLANTIC	MAIN	LOWER CATARACT CREEK		0.10	0.18	0.029	0.79	950	0.10	1.6	0.30	1.6	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
616	24JF0524	MAIN	LOWER BASIN CREEK	x	0.25	0.32	0.500	0.20	170	1.13	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
617	24JF0241	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	50	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
618	24JF0240	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	200	1.03	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
619	RTI RECON: A	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	50	1.50	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
620	BASIN HISTORIC DISTRICT	MAIN	LOWER BASIN CREEK		0.10	0.18	0.500	0.20	300	0.72	0.0	0.30	0.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
621	24JF0188	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	50	1.50	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
622	CONFIDENCE	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	20	1.50	0.4	0.30	0.4	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
623	24JF0185	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	200	1.03	0.8	0.30	0.8	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
624	LAST CHANCE	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	400	0.41	0.1	0.53	0.1	0.40	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
625	24JF0516	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	200	1.03	0.9	0.30	0.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
626	24JF0183	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	50	1.50	0.9	0.30	0.9	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
627	24JF0179	MAIN	LOWER BOULDER RIVER		0.10	0.18	0.500	0.20	550	0.10	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
628	24JF0515	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	350	0.57	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
629	24JF0178	MAIN	LOWER BOULDER RIVER		0.10	0.18	0.500	0.20	0	1.50	0.2	0.49	0.2	0.37	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
630	24JF0517	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	200	1.03	0.7	0.30	0.7	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
631	24JF0177	MAIN	LOWER BOULDER RIVER		0.01	0.10	0.500	0.20	350	0.57	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
701	SW SE SECTION 4	MAIN	UPPER CATARACT CREEK	x	1.50	1.00	0.321	0.42	600	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	medium
702	TIMBERLINE	MAIN	MIDDLE CATARACT CREEK	x	3.00	1.00	0.879	0.20	600	0.10	0.1	0.69	0.1	0.53	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	medium
703	NE SE SECTION 14	MAIN	MIDDLE CATARACT CREEK	x	0.50	0.55	0.500	0.20	900	0.10	0.3	0.30	0.3	0.20	1000	0.30	1000	0.20	none	1	high	1.0	low	0.01	low
704	MERRY WIDOW	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
705	LADY RICKER	MAIN	UPPER CATARACT CREEK	x	1.20	1.00	0.500	0.20	0	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	low	0.1	medium	0.25	medium
706	NE NW SECTION 17	MAIN	MIDDLE CATARACT CREEK	x	3.00	1.00	0.500	0.20	25	1.50	1.0	0.30	1.0	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	medium	0.25	high
707	NEAR BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	x	0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
708	ROCKER WETLAND	MAIN	MIDDLE CATARACT CREEK	x	0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
709	NW SE SECTION 14	MAIN	MIDDLE CATARACT CREEK		2.00	1.00	0.500	0.20	0	1.50	0.5	0.30	0.5	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	high	0.50	high
710	NE SE SECTION 28	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
711	NEAR QUARTZ CREEK	MAIN	UPPER CATARACT CREEK		0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
712	VOGEL	MAIN	LOWER CATARACT CREEK	x	2.00	1.00	0.500	0.20	2300	0.10	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	medium	0.5	low	0.01	low
713	ATTWATER MILL	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.500	0.20	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low
714	BASIN STREET TAILINGS	MAIN	UPPER BOULDER RIVER		0.10	0.18	0.000	0.80	0	1.50	0.2	0.30	0.2	0.20	1000	0.30	1000	0.20	none	1	low	0.1	low	0.01	low

Appendix B.3
Site Scoring - Geochem Default Data
Basin Mining Area Operable Unit 2

	Average Maximum Surface Soil Concentrations (mg/kg)					
Subarea	Arsenic	Cadmium	Copper	Lead	Mercury	Zinc
Jack Creek	3192	5.7	359	2098	0.58	1255
Lower Basin Creek	75	6.8	319	3059	0.84	1611
Lower Cataract Creek	274	1.5	72	1117	1.07	280
Middle Cataract Creek	629	2.2	160	1196	0.43	445
Uncle Sam Gulch	208	1.4	82	222	0.17	342
Upper Basin Creek	363	1.6	81	908	0.38	317
Upper Cataract Creek	127	1.2	141	569	0.22	397
Middle Basin Creek	0	0.0	0	0	0.00	0
Lower Boulder River	0	0.0	0	0	0.00	0
Upper Boulder River	0	0.0	0	0	0.00	0

	Baseline Surface Soil Concentrations (mg/kg)					
Area	Arsenic	Cadmium	Copper	Lead	Mercury	Zinc
Basin Creek Watershed	5.4	0.13	9.3	21.3	0.59	29.2
Cataract Creek Watershed	96.9	0.02	6.2	39.9	0.36	16.5

Note: Where no site specific surface soil data are available, mine sites are assigned these default values for scoring. Subarea default values are the average of maximum values for all mine sites in the subarea for which data are available.

Appendix B.3
Site Scoring - Physical Default Data
Basin Mining Area Operable Unit 2

	Physical Parameters										
Subarea	Waste Area (ac)	Distance to Primary Road (mi)	Distance to Perennial Stream (ft)	Distance to Residence (mi)	Distance to Cabin (mi)	Distance to Residential Well (ft)	Distance to Recreational Well (ft)	Prior Reclamation (none, poor,	Leachability (low, medium, high)	Potential for Landslide (low, medium, high)	Evidence of Release (low,
Jack Creek	0.1	0.5	500	0.2	0.2	1000	1000	none	high	low	low
Lower Basin Creek	0.1	0.5	500	0.2	0.2	1000	1000	none	low	low	low
Lower Cataract Creek	0.1	0.5	500	0.2	0.2	1000	1000	none	low	low	low
Middle Cataract Creek	0.1	0.5	500	0.2	0.2	1000	1000	none	low	low	low
Middle Basin Creek	0.1	0.5	500	0.2	0.2	1000	1000	none	low	low	low
Uncle Sam Gulch	0.1	0.5	500	0.2	0.2	1000	1000	none	high	low	low
Upper Basin Creek	0.1	0.5	500	0.2	0.2	1000	1000	none	low	low	low
Upper Cataract Creek	0.1	0.5	500	0.2	0.2	1000	1000	none	low	low	low
Lower Boulder River	0.1	0.5	500	0.2	0.2	1000	1000	none	low	low	low
Upper Boulder River	0.1	0.5	500	0.2	0.2	1000	1000	none	low	low	low

Note: Where no site specific data are available, mine sites are assigned these default values for scoring.

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Scoring												Surface Water Impact Scoring							Solid Waste/Leachate Release Score								Ground Water Impact Scoring						
					Ecological COC Score							Human Health COC Score					Surface Water COCs															Ground Water COC Score						
					Eco COC Score (As)	Eco COC Score (Cd)	Eco COC Score (Cu)	Eco COC Score (Pb)	Eco COC Score (Hg)	Eco COC Score (Zn)	Eco COC Score (total)	HH COC Score (As)	HH COC Score (Pb)	Total HH COC Score	HH Modifier	Total DC Score	COC Score (As)	COC Score (Cd)	COC Score (Cu)	COC Score (Pb)	COC Score (Zn)	Total COC Score	Eco COC Score (As)	Eco COC Score (Cd)	Eco COC Score (Cu)	Eco COC Score (Pb)	Eco COC Score (Zn)	Total Eco COC Score	Waste Release Score	Total SW Score	COC Score (As)	COC Score (Cd)	COC Score (Pb)	Total COC Score	Leachate Release Score	Total GW	TOTAL SCORE
1	ADELAIDE	MAIN	LOWER BASIN CREEK	x	7	0	2	96	8	15	100	0	48	48	1.30	162	0	17	0	0	0	17	274	55	159	1000	25	1000	2250	2267	0	0	0	0	48	24	2453
2	ADIT, MINE, WASTE ROCK DUMP	MAIN	UPPER BASIN CREEK	x	5	0	0	1	1	2	10	0	0	0	1.19	5	0	0	0	0	0	0	198	34	21	55	0	500	33	33	0	0	0	0	0	0	38
3	ALMA NO. 2	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
4	AURORA	MAIN	LOWER BASIN CREEK	x	19	29	27	100	7	100	100	0	254	254	1.10	380	0	21	0	0	10	31	704	1000	1000	1000	24	1000	1472	1504	0	0	0	0	254	127	2011
5	AURORA	AREA 2	LOWER BASIN CREEK	x	19	29	27	100	7	100	100	0	254	254	1.30	430	0	21	0	0	10	31	704	1000	1000	1000	24	1000	1472	1504	0	0	0	0	254	127	2061
6	BASIN BELLE	MAIN	LOWER BASIN CREEK	x	3	4	36	37	10	26	100	0	18	18	1.24	22	0	17	0	0	0	17	123	989	1000	1000	33	750	122	139	0	0	0	0	2	1	162
7	BASIN CREEK MINE	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
8	BASIN CREEK MINE	AREA 2	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
9	BASIN CREEK PLACER	MAIN	LOWER BASIN CREEK	x	5	0	0	2	0	4	11	0	0	0	0.70	11	0	21	0	0	10	31	192	215	65	115	0	0	0	31	0	0	0	0	0	0	43
10	BASIN CREEK PLACER 1	MAIN	MIDDLE BASIN CREEK		0	0	0	0	0	0	0	0	0	0	0.70	0	0	21	0	0	10	31	0	0	0	0	0	0	0	31	0	0	0	0	0	0	31
11	BASIN CREEK PLACER 2	MAIN	MIDDLE BASIN CREEK		0	0	0	0	0	0	0	0	0	0	1.30	0	0	44	12	0	21	78	0	0	0	0	0	0	0	78	0	0	0	0	0	0	78
13	BASIN MILLSITE	MAIN	UPPER BOULDER RIVER	x	100	100	24	100	6	100	100	36	119	155	0.70	38	0	0	37	0	0	37	1000	1000	1000	1000	0	0	0	37	0	0	0	0	3	1	76
17	NE NE SECTION 13	MAIN	JACK CREEK		100	4	9	42	8	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	22	370	0	0	0	0	8	4	397
18	NEPTUNE	MAIN	UPPER BASIN CREEK	x	100	1	0	33	3	15	100	12	17	29	1.18	134	0	0	0	0	0	0	1000	262	62	1000	0	750	691	691	0	0	0	0	14	7	832
19	NEPTUNE CABINS	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
20	NORTH ADA - PIERMONT	MAIN	UPPER CATARACT CREEK	x	100	6	5	100	5	37	100	37	63	100	1.30	230	0	25	28	0	0	54	1000	1000	581	1000	25	1000	2250	2304	0	0	0	0	100	50	2583
21	OLD BASIN MILLSITE	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	1.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	OLD BASIN MILLSITE	AREA 2	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	1.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	OLD BALDY GROUP	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
25	PEARL	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	16	16	1000	246	174	853	0	1000	22	38	0	0	0	0	0	0	50
26	PERRY PARKS	MAIN	UPPER BASIN CREEK	x	7	100	100	0	100	2	100	0	0	0	0.92	18	0	0	0	0	0	0	274	1000	1000	23	1000	0	0	0	0	0	0	0	0	0	18
27	PERRY PARKS	AREA 2	UPPER BASIN CREEK	x	7	100	100	0	100	2	100	0	0	0	0.90	18	0	0	0	0	0	0	274	1000	1000	23	1000	0	0	0	0	0	0	0	0	0	18
28	PLACER	MAIN	UPPER BASIN CREEK	x	5	0	0	0	0	3	8	0	0	0	0.70	8	0	0	0	0	0	0	177	102	61	42	0	500	1005	1005	0	0	0	0	0	0	1013
29	PLACER DITCH	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	33	0	0	0	0	33	1000	246	174	853	0	1000	135	168	0	0	0	0	0	0	180
30	PLACER 2313	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	273	26	0	67	366	57	1000	232	560	59	1000	135	501	0	0	0	0	0	0	515
32	SE SE SECTION 25	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
33	SOLAR	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	16	16	1000	246	174	853	0	1000	78	94	0	0	0	0	0	0	106
34	SOLAR	AREA 2	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	16	16	1000	246	174	853	0	1000	78	94	0	0	0	0	0	0	106
35	SW NW SECTION 7	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	1.25	28	0	220	36	0	92	348	1000	877	772	1000	0	1000	192	539	0	0	0	0	8	4	571
36	UNNAMED FIRE CLAY	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	163	511	0	0	0	0	8	4	539
37	UNNAMED PLACER	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	11	0	0	0	0	11	1000	246	174	853	0	1000	107	117	0	0	0	0	0	0	130
38	UNNAMED QUARRY	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	1.57	12	11	0	0	0	0	11	1000	246	174	853	0	1000	163	174	0	0	0	0	0	0	186
39	UNNAMED SILVER, LEAD, & ZINC	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	21	0	0	10	31	278	1000	686	1000	28	1000	22	53	0	0	0	0	1	0	76
41	UPPER DITCH	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	50	50	0	0	0	0	0	0	62
42	VENUS	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	276	276	0	0	0	0	0	0	288
43	VINDICATOR	MAIN	JACK CREEK	x	100	40	26	77	5	100	100	28	39	66	1.28	185	0	220	36	0	92	348	1000	1000	1000	1000	0	1000	2128	2476	0	0	0	0	66	33	2694
44	VINDICATOR	AREA 2	JACK CREEK	x	100	40	26	77	5	100	100	28	39	66	1.28	34	0	220	36	0	92	348	1000	1000	1000	1000	0	1000	163	511	0	0	0	0	12	6	551
46	WINTER'S CAMP	MAIN	UPPER BASIN CREEK	x	1	3	3	19	2	7	35	0	0	0	0.70	6	11	0	0	0	0	11	55	646	265	889	0	0	0	11	0	0	0	0	0	0	17
47	WINTER'S CAMP	AREA 2	UPPER BASIN CREEK	x	1	3	3	19	2	7	35	0	0	0	0.77	6	11	0	0	0	0	11	55	646	265	889	0	0	0	11	0	0	0	0	0	0	17
48	ADA	MAIN	MIDDLE CATARACT CREEK	x	100	1	26	100	13	6	100	21	54	75	0.70	152	0	25	28	0	0	54	610	1000	1000	1000	69	750	1883	1936	0	0	0	0	37	19	2107
49	ALSACE	MAIN	UPPER CATARACT CREEK	x	0	0	0	0	0	0	0	0	0	0	1.04	0	0	0	0	0	0	0	0	40	65	0	0	500	97	97	0	0	0	0	0	0	97
50	AMERICAN EAGLE	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	36	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	276	276	0	0	0	0	0	0	283
51	APOLLO	MAIN	MIDDLE CATARACT CREEK	x	100	0	0	15	2	1	100	182	0	182	1.24	326	0	33	24	0	20	77	1000	89	53	367	0	1000	3000	3077	34	0	0	34	182	108	3511
52	BAKAMA	MAIN	MIDDLE CATARACT CREEK	x	22	0	18	12	7	7	66	0	0	0	0.70	66	0	0	0	0	0	0	45	1000	1000	308	37	500	60	60	0	0	0	0	0	0	126
53	BAKAMA	AREA 2	MIDDLE CATARACT CREEK	x	22	0	18	12	7	7	66	0	0	0	0.70	12	0	0	0	0	0	0	45	1000	1000	308	37	500	11	11	0	0	0	0	0	0	23
54	BASIN QUARTZ MASS	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	273	26	0	67	366	57	1000	232	560	59	1000	22	388	0	0	0	0	0	0	402
55	BAZZER CLAIM	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	33	24	0	20	77	130	1000	516	599	24	1000	22	99	0	0	0	0	0	0	119
56	BEE CLAIM	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
57	BIG LUMBER GULCH	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
58	BILLIE T.	MAIN	MIDDLE CATARACT CREEK	x	100	3	5	71	2	23	100	13	36	49	0.70	24	0	0	0	0	0	0	400	1000	639	1000	0	0	0	0	0	0	0	0	1	0	25
59	BING HAMPTON	MAIN	MIDDLE CATARACT CREEK	x	2	0	0	0	0	0	2	0	0	0	1.28	2	0	25	28	0	0	54	0	79	50	0	0	500	760	814	0	0	0	0	0	0	816
60	BLACK BEAR	MAIN	MIDDLE CATARACT CREEK	x	100	7	20	59	100	100	100	500	30	500	0.70	82	0	0	0	0	24	24	1000	1000	1000	1000	1000	1000	276	300	0	0	0	0	91	45	427
61	BLACK BEAR	AREA 2	MIDDLE CATARACT CREEK	x	100	100	100	100	8	100	100	113	184	297	0.70	308	0	500	19	0	0	500	1000	1000	1000	1000	44	1000	850	1350	0	0	0	0	297	149	1806
62	BLUE DIAMOND / OCCIDENTAL	MAIN	MIDDLE CATARACT CREEK	x	100	3	5	71	2	23	100	13	36	49	1.06	152	0	0	0	0	0	0	400	1000	639	1000	0	750	1140	1140	0	0	0	0	25	12	1305
63	BOSTON	MAIN	LOWER CATARACT CREEK	x	44	10	13	100	4	49	100	0	292	292	0.70	304	0	0	0	0	0	0	90	1000	1000	1000	24	750	1713	1713	0	0	0	0	146	73	2090
64	BOULDER CHIEF	MAIN	MIDDLE CATARACT CREEK	x	19	100	16	100	8	100	100	0	243	243	0.70	270	0	67	0	0	64	131	38	1000	1000	1000	46	0	0	131	0	0	0	0	24	12	413
65	BOULDER CHIEF	MINE 2	MIDDLE CATARACT CREEK	x	19	100	16	100	8	100	100	0	243	243	0.70	49	0	67	0	0	64	131	38	1000	1000	1000	46	0	0	131	0	0	0	0	4	2	182
66	BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	x	3	0	0	0	4	2	9	0	0	0	1.04	9	0	393	35	0	106	500	0	280	86	22	23	500	60	560	0	0	0	0	0	0	569
67	CALIFORNIA	MAIN	LOWER CATARACT CREEK	x	44	10	13	100	4	49	100	0	292	292	0.70	304	0	0	0	0	0	0	90	1000	1000	1000	24	0	0	0	0	0	0	0	29	15	319
68	CARTWRIGHT CABINS	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	76	0	0	0	0	0	0	57	1000	232	560	59	1000	1520	1520	0	0	0	0	1	1	1596
69	CARTWRIGHT CABINS 2	MAIN	LOWER CATARACT CREEK	x	44	0	0	73	3	7	100	0	37	37	0.82	130	0	0	0	0	0	0	90	1000	105	1000	0	1000	3000	3000	0	0	0	0	37	18	3149
70	CATARACT	MAIN	MIDDLE CATARACT CREEK	x	100	4	17	72	100	21	100	0	36	36	0.70	125	0	500	19	0	0	500	235	1000	1000	1000	1000	750	1883	2383	0	0	0	0	18	9	2517
71	CATERACT FLATS PLACER	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	273	26	0	67	366	57	1000	232	560	59	1000	276	642	0	0	0	0	0	0	656
72	CATARACT MEADOWS CORRAL	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
73	CATARACT PLACER	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.25	26	0	273	26	0	67	366	57	1000	232	560	59	1000	484	850	0	0	0	0	0	0	876
74	CATARACT TAILS	MAIN	MIDDLE CATARACT CREEK	x	20	2	22	14	0	10	68	0	0	0	0.70	68	0	500	19	0	0	500	41	1000	1000	345	0	750	1883	2383	15	0	44	59	0	29	2479
75	CLIPPER	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	1.26	21	0	500	19	0	0	500	130	1000	516	599	24	1000	22	522	0	0	0	0	0	0	543
76	CLIPPER / EDNA	MAIN	MIDDLE CATARACT CREEK	x	100	4	17	72	100	21	100	0	36	36	1.28	146	0	500	19	0	0	500	235	1000	1000	1000	1000	1000	1472	1972	0	0	0	0	36	18	2136
77	CORBITT	MAIN	UPPER CATARACT CREEK	x	1	2	0	100	4	11	100	0	68	68	0.78	153	0	0	0	0	0	0	0	1000	119	1000	0	1000	120	120	26	0	69	94	68	81	354
78	CRACKER	MAIN	MIDDLE CATARACT CREEK	x	100	20	10	100	3	62	100	18	215	233	2.31	638	0	13	0	0	0	13	522	1000	1000	1000	0	1000	610	623	0	0	0	0	233	116	1377
79	CRESCENT	MAIN	UPPER CATARACT CREEK	x	27	96	33	100	3	22	100	0	64	64	1.23	179	0	0	0	0	0	0	56	1000	1000	1000	0	0	0	0	0	0	0	0	6	3	182
80	CRESCENT	AREA 2	UPPER CATARACT CREEK	x	27	96	33	100	3	22	100	0	64	64	1.28	33	0	0	0	0	0	0	56	1000	1000	1000	0	0	0	0	0	0	0	0	1	1	34
82	CRYSTAL	MAIN	UNCLE SAM GULCH	x	100	100	40	100	5	100	100	77	69	146	1.28	52	0	500	385	0	500	500	1000	1000	1000	1000	27	1000	276	776	0	0	0	0	26	13	842
83	CRYSTAL	AREA 2	UNCLE SAM GULCH	x	100	100	40	100	5	100	100	77	69	146	0.70	202	0	500	385	0	500	500	1000	1000	1000	1000	27	1000	2510	3010	0	0	0	0	146	73	3295
84	CUSTER	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
85	CUSTER	AREA 2	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.30	15	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	37
86	DEER LODGE	MAIN	LOWER CATARACT CREEK	x	44	10	13	100	4	49	100	0	292	292	1.30	87	0	0	0	0	0	0	90	1000	1000	1000	24	0	0	0	0	0	0	0	5	3	90
87	DEER LODGE	AREA 2	LOWER CATARACT CREEK	x	44	10	13	100	4	49	100	0	292	292	1.27	85	0	0	0	0	0	0	90	1000	1000	1000	24	0	0	0	0	0	0	0	5	3	88
88	ELDORADO AND PLATEAU	MAIN	UPPER CATARACT CREEK	x	100	5	25	100	6	33	100	0	63	63	1.26	179	0	0	0	0	0	0	283	1000	1000	1000	33	1000	120	120	23	0	208	231	63	147	446
89	ELDORADO AND PLATEAU	AREA 2	UPPER CATARACT CREEK	x	100	5	25	100	6	33	100	0	63	63	0.70	26	0	0	0	0	0	0	283	1000	1000	1000	33	1000	22	22	0	0	0	0	11	6	54
90	ELMER	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.21	15	0	500	66	0	181	500	57	1000	232	560	59	1000	22	522	0	0	0	0	0	0	537
91	EVA MAY	MAIN	MIDDLE CATARACT CREEK	x	100	100	100	100	8	100	100	113	184	297	1.30	486	0	33	24	0	20	77	1000	1000	1000	1000	44	750	2250	2327	20	11	39	70	149	109	2922
92	EVA MAY	AREA 2	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	33	24	0	20	77	130	1000	516	599	24	1000	276	354	0	0	0	0	1	1	374
93	EVENING STAR	MAIN	UNCLE SAM GULCH	x	47	1	2	11	4	8	72	0	0	0	0.70	72	0	500	385	0	500	500	96	1000	214	279	21	750	458	958	0	0	0	0	0	0	1030
94	FIRST SHOT / LAST SHOT	MAIN	JACK CREEK	x	2	5	2	7	0	23	39	0	0	0	0.70	39	0	500	500	23	500	500	80	1000	208	332	0	750	638	1138	0	0	0	0	0	0	1177
95	FIRST SHOT / LAST SHOT	AREA 2	JACK CREEK	x	2	5	2	7	0	23	39	0	0	0	0.70	7	0	500	500	23	500	500	80	1000	208	332	0	750	16	516	0	0	0	0	0	0	524
96	GRAY LEAD	MAIN	MIDDLE CATARACT CREEK	x	100	75	20	100	100	100	100	117	235	352	0.70	63	0	33	24	0	20	77	1000	1000	1000	1000	1000	750	16	94	0	0	0	0	32	16	173
97	GREAT SHIELD	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	25	28	0	0	54	130	1000	516	599	24	1000	22	75	0	0	0	0	0	0	95
98	HANNA	MAIN	MID

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Scoring											Surface Water Impact Scoring							Ground Water Impact Scoring						TOTAL SCORE
					Ecological COC Score							Human Health COC Score					Surface Water COCs						Solid Waste/Leachate Release Score								Ground Water COC Score						
					Eco COC Score (As)	Eco COC Score (Cd)	Eco COC Score (Cu)	Eco COC Score (Pb)	Eco COC Score (Hg)	Eco COC Score (Zn)	Eco COC Score (total)	HH COC Score (As)	HH COC Score (Pb)	**Total HH COC Score**	HH Modifier	Total DC Score	COC Score (As)	COC Score (Cd)	COC Score (Cu)	COC Score (Pb)	COC Score (Zn)	Total COC Score	Eco COC Score (As)	Eco COC Score (Cd)	Eco COC Score (Cu)	Eco COC Score (Pb)	Eco COC Score (Zn)	Total Eco COC Score	Waste Release Score	**Total SW Score**	COC Score (As)	COC Score (Cd)	COC Score (Pb)	Total COC Score	Leachate Release Score	Total GW	
101	HATTIE FERGUSON	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	1.30	21	0	13	0	0	0	13	130	1000	516	599	24	1000	192	205	0	0	0	0	2	1	227
102	HATTIE FERGUSON	LOWER	MIDDLE CATARACT CREEK	x	100	54	17	100	13	100	100	29	211	240	0.70	268	0	40	0	0	48	88	867	1000	1000	1000	72	1000	1520	1608	0	0	0	0	240	120	1996
103	SW NW SECTION 28	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	55
104	HATTIE FERGUSON	UPPER	MIDDLE CATARACT CREEK	x	100	54	17	100	13	100	100	29	211	240	0.70	268	0	40	0	0	48	88	867	1000	1000	1000	72	1000	1939	2027	46	258	500	500	240	370	2665
105	SW NW SECTION 29	MAIN	UNCLE SAM GULCH	x	0	0	0	0	0	0	0	0	0	0	1.18	0	0	500	385	0	500	500	0	40	99	0	0	0	0	500	0	0	0	0	0	0	500
106	IDA M.	MAIN	MIDDLE CATARACT CREEK	x	19	100	16	100	8	100	100	0	243	243	1.23	73	0	67	0	0	64	131	38	1000	1000	1000	46	0	0	131	0	0	0	0	4	2	206
107	IDA M.	AREA 2	MIDDLE CATARACT CREEK	x	19	100	16	100	8	100	100	0	243	243	0.70	49	0	67	0	0	64	131	38	1000	1000	1000	46	0	0	131	0	0	0	0	4	2	182
108	IDA MAY	MAIN	UPPER CATARACT CREEK	x	2	63	6	20	3	100	100	0	0	0	0.70	100	0	0	0	0	0	0	0	1000	823	497	0	500	60	60	0	0	0	0	0	0	160
109	IDA MAY	AREA 2	UPPER CATARACT CREEK	x	2	63	6	20	3	100	100	0	0	0	0.70	18	0	0	0	0	0	0	0	1000	823	497	0	500	11	11	0	0	0	0	0	0	29
110	INDEPENDENCE MINE	MAIN	LOWER CATARACT CREEK	x	3	0	0	0	4	2	9	0	0	0	0.70	2	0	393	35	0	106	500	0	280	86	22	23	0	0	500	0	0	0	0	0	0	502
111	JAMES	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	25	28	0	0	54	130	1000	516	599	24	1000	22	75	0	0	0	0	0	0	95
112	JOHN T.	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	25	28	0	0	54	130	1000	516	599	24	1000	22	75	0	0	0	0	0	0	95
113	JUMBO	MAIN	MIDDLE CATARACT CREEK	x	17	17	3	11	2	81	100	0	0	0	0.70	100	0	33	24	0	20	77	36	1000	448	270	0	500	60	137	0	0	0	0	0	0	237
114	KLONDYKE	MAIN	MIDDLE CATARACT CREEK	x	100	0	7	100	8	10	100	24	88	112	0.70	179	0	40	0	0	48	88	727	1000	897	1000	42	1000	850	936	163	0	500	500	112	306	1423
115	LADY NELL	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
116	LIZZIE OSBORNE	MAIN	MIDDLE CATARACT CREEK	x	83	0	2	23	0	4	100	0	12	12	0.70	84	0	0	0	0	0	0	170	640	196	581	0	1000	1739	1739	0	0	0	0	9	4	1827
117	LIZZIE OSBORNE	AREA 2	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	276	276	0	0	0	0	2	1	297
118	LOUISE	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
120	MAMMOTH	MAIN	UNCLE SAM GULCH	x	100	100	40	100	5	100	100	77	69	146	0.70	37	0	500	385	0	500	500	1000	1000	1000	1000	27	0	0	500	0	0	0	0	26	13	550
121	MANHATTAN	MAIN	LOWER CATARACT CREEK	x	38	1	5	56	4	7	100	0	28	28	1.30	136	0	0	0	0	0	0	78	1000	587	1000	22	750	270	270	0	0	0	0	14	7	413
122	MANTLE	MAIN	LOWER CATARACT CREEK	x	14	82	2	8	3	9	100	0	0	0	1.28	18	0	393	35	0	106	500	29	1000	215	207	0	0	0	500	0	0	0	0	0	0	518
123	MANTLE SOUTH	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	393	35	0	106	500	57	1000	232	560	59	1000	276	776	0	0	0	0	0	0	790
124	MARSHALL-CHANGES MINES	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	1.27	21	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	56
125	MARY ANNE	MAIN	MIDDLE CATARACT CREEK	x	100	0	3	30	2	4	100	19	15	34	1.12	138	0	25	28	0	0	54	574	590	397	757	0	1000	1350	1404	0	0	0	0	34	17	1559
126	MARY ANNE	AREA 2	MIDDLE CATARACT CREEK	x	100	0	3	30	2	4	100	19	15	34	0.70	23	0	25	28	0	0	54	574	590	397	757	0	1000	22	75	0	0	0	0	6	3	101
127	MIDDLE SNOWDRIFT CREEK	MAIN	MIDDLE CATARACT CREEK	x	68	0	2	15	0	4	89	0	0	0	0.70	89	0	0	0	0	0	0	141	950	264	387	0	1000	1053	1053	0	0	0	0	0	0	1143
128	MIKE #14	MAIN	MIDDLE CATARACT CREEK	x	0	3	0	1	7	4	14	0	0	0	0.70	14	0	40	0	0	48	88	0	1000	30	26	40	500	60	148	0	0	0	0	0	0	162
129	MINNEAPOLIS	MAIN	LOWER CATARACT CREEK	x	44	10	13	100	4	49	100	0	292	292	0.70	55	0	0	0	0	0	0	90	1000	1000	1000	24	0	0	0	0	0	0	0	5	3	58
130	MINNEAPOLIS	AREA 2	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.30	15	0	393	35	0	106	500	57	1000	232	560	59	1000	135	635	0	0	0	0	0	0	650
131	MORNING GLORY	MAIN	MIDDLE CATARACT CREEK	x	100	100	5	41	5	29	100	16	21	36	0.70	23	0	13	0	0	0	13	464	1000	659	1000	30	750	207	221	0	0	0	0	3	2	245
132	MORNING GLORY	TAILINGS	MIDDLE CATARACT CREEK	x	100	18	8	89	100	100	100	19	45	63	1.17	174	0	13	0	0	0	13	553	1000	1000	1000	1000	750	1140	1153	0	0	0	0	32	16	1344
133	MORNING MARIE	MAIN	MIDDLE CATARACT CREEK	x	22	5	1	15	5	13	61	0	0	0	0.70	61	0	13	0	0	0	13	45	1000	158	366	28	500	849	863	0	0	0	0	0	0	924
134	MOUNTAIN CHIEF	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	55
135	MOUNTAIN CHIEF	AREA 2	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	55
136	MT. THOMPSON	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
137	NE NE SECTION 28	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
138	NE NW SECTION 3	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
139	NE THREE BROTHERS	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
140	NEW COTTAGE	MAIN	LOWER CATARACT CREEK	x	35	0	0	10	2	5	52	0	0	0	0.70	52	0	0	0	0	0	0	72	480	124	258	0	1000	2219	2219	0	0	0	0	0	0	2271
141	OUSLEY	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
142	OVERLAND CREEK	MAIN	UPPER CATARACT CREEK	x	37	1	3	18	1	9	69	0	0	0	0.70	69	0	0	0	0	0	0	76	1000	323	463	0	500	1005	1005	31	0	51	82	0	41	1115
143	PEN YAN	MAIN	MIDDLE CATARACT CREEK	x	100	3	5	71	2	23	100	13	36	49	1.27	30	0	0	0	0	0	0	400	1000	639	1000	0	0	0	0	0	0	0	0	1	0	30
144	PHANTOM	MAIN	LOWER CATARACT CREEK	x	36	7	3	28	100	100	100	0	14	14	0.70	35	0	500	66	0	181	500	74	1000	355	707	1000	1000	955	1455	0	0	0	0	4	2	1492
145	PLACER 2623	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	393	35	0	106	500	57	1000	232	560	59	1000	22	522	0	0	0	0	0	0	536
146	PROTECTION	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.77	14	0	0	0	0	0	0	57	1000	232	560	59	1000	276	276	0	0	0	0	0	0	290
147	QUARTZ CREEK	MAIN	UPPER CATARACT CREEK	x	12	0	1	0	0	1	15	0	0	0	0.70	5	0	0	0	0	0	0	25	40	145	0	0	500	118	118	0	0	0	0	0	0	123
148	RED BIRD	MAIN	MIDDLE CATARACT CREEK	x	100	100	100	100	8	100	100	113	184	297	0.70	56	0	500	19	0	0	500	1000	1000	1000	1000	44	0	0	500	0	0	0	0	5	3	559
149	REDEMPTION	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	393	35	0	106	500	57	1000	232	560	59	1000	22	522	0	0	0	0	0	0	536
150	REDWING	MAIN	LOWER CATARACT CREEK	x	34	3	2	40	100	100	100	0	20	20	0.70	114	0	0	0	0	0	0	70	1000	219	1000	1000	0	0	0	0	0	0	0	2	1	115
151	ROBIE BURNS	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	500	19	0	0	500	130	1000	516	599	24	1000	22	522	0	0	0	0	0	0	542
152	ROCKER	MAIN	MIDDLE CATARACT CREEK	x	100	0	4	7	100	2	100	0	0	0	0.70	100	0	25	28	0	0	54	210	340	523	179	1000	0	0	54	0	0	0	0	0	0	154
153	ROCKER EXTENSION	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	34	0	25	28	0	0	54	130	1000	516	599	24	1000	955	1008	0	0	0	0	0	0	1043
154	ROSE MINE	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	393	35	0	106	500	57	1000	232	560	59	1000	22	522	0	0	0	0	0	0	536
155	ROSE MINE	AREA 2	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.22	15	0	393	35	0	106	500	57	1000	232	560	59	1000	22	522	0	0	0	0	0	0	537
156	RUTH	MAIN	LOWER CATARACT CREEK	x	31	0	1	0	26	0	59	0	0	0	1.22	45	0	393	35	0	106	500	65	40	166	0	144	750	1739	2239	0	0	0	0	0	0	2284
157	RUTH	AREA 2	LOWER CATARACT CREEK	x	31	0	1	0	26	0	59	0	0	0	0.70	11	0	393	35	0	106	500	65	40	166	0	144	750	207	707	0	0	0	0	0	0	718
158	SAINT LAWRENCE	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	22	522	80	0	30	110	0	55	583
159	SAINT NICK	MAIN	MIDDLE CATARACT CREEK	x	100	0	7	100	8	10	100	24	88	112	1.28	44	0	40	0	0	48	88	727	1000	897	1000	42	0	0	88	0	0	0	0	2	1	133
160	SATURDAY NIGHT	MAIN	LOWER CATARACT CREEK	x	54	5	7	100	5	31	100	0	51	51	0.70	25	0	393	35	0	106	500	111	1000	890	1000	28	750	207	707	0	0	0	0	5	2	734
161	SEATTLE	MAIN	LOWER CATARACT CREEK	x	50	4	5	100	4	25	100	0	116	116	0.70	181	0	0	0	0	0	0	104	1000	600	1000	24	750	1688	1688	0	0	0	0	58	29	1898
162	SELF - RISER	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
163	SE NE SECTION 28	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
164	SIRIUS	MAIN	MIDDLE CATARACT CREEK	x	100	24	9	100	8	78	100	119	197	316	1.09	446	0	40	0	0	48	88	1000	1000	1000	1000	43	1000	850	938	0	0	0	0	316	158	1542
165	SPARKING WATER	MAIN	UNCLE SAM GULCH	x	100	100	40	100	5	100	100	77	69	146	1.09	47	0	500	385	0	500	500	1000	1000	1000	1000	27	0	0	500	0	0	0	0	26	13	560
166	SPARKING WATER	AREA 2	UNCLE SAM GULCH	x	100	100	40	100	5	100	100	77	69	146	0.70	37	0	500	385	0	500	500	1000	1000	1000	1000	27	0	0	500	0	0	0	0	26	13	550
167	SYLVAN	MAIN	LOWER CATARACT CREEK	x	23	9	10	100	3	40	100	0	147	147	0.70	203	0	0	0	0	0	0	47	1000	1000	1000	0	1000	1939	1939	0	0	0	0	147	74	2215
168	TOTTEN MINE	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	1.24	21	0	0	0	0	0	0	130	1000	516	599	24	1000	135	135	0	0	0	0	0	0	156
169	UNCLE SAM	MAIN	UNCLE SAM GULCH	x	7	0	0	0	0	2	9	0	0	0	0.70	5	0	500	385	0	500	500	0	210	102	0	0	500	202	702	0	0	0	0	0	0	707
170	UNNAMED LEAD & SILVER	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.23	15	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	37
171	UNNAMED 001	MAIN	MIDDLE CATARACT CREEK	x	14	0	2	33	2	7	58	0	16	16	0.70	69	0	33	24	0	20	77	29	1000	276	822	0	1000	2533	2610	0	0	0	0	16	8	2688
172	UNNAMED 002	MAIN	MIDDLE CATARACT CREEK	x	100	0	2	11	0	6	100	0	0	0	0.70	100	0	33	24	0	20	77	297	1000	270	280	0	750	825	902	0	0	0	0	0	0	1002
173	UNNAMED 003	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	500	19	0	0	500	130	1000	516	599	24	1000	22	522	0	0	0	0	0	0	542
174	UNNAMED 004	MAIN	MIDDLE CATARACT CREEK	x	38	3	0	15	2	19	77	0	0	0	1.04	77	0	33	24	0	20	77	79	1000	110	376	0	500	60	137	0	0	0	0	0	0	215
175	VERA AND MARIE	MAIN	MIDDLE CATARACT CREEK	x	18	0	0	8	4	2	31	0	0	0	0.70	31	0	13	0	0	0	13	37	40	78	197	21	750	1875	1888	0	0	0	0	0	0	1920
176	VERA AND MARIE	AREA 2	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	1.27	21	0	13	0	0	0	13	130	1000	516	599	24	1000	276	290	0	0	0	0	0	1	311
177	WALDY	MAIN	LOWER CATARACT CREEK	x	34	3	2	40	100	100	100	0	20	20	0.70	36	0	0	0	0	0	0	70	1000	219	1000	1000	0	0	0	0	0	0	0	1	0	37
178	WALDY NORTH	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.28	15	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	37
247	BUCKEYE MINE	MAIN	UPPER BASIN CREEK	x	0	0	0	0	6	0	6	0	0	0	0.88	0	33	0	0	0	0	33	0	0	0	0	0	500	1	35	0	0	0	0	0	0	35
248	BUCKEYE MINE	MINE 2	UPPER BASIN CREEK	x	0	0	0	0	6	0	6	0	0	0	0.70	0	33	0	0	0	0	33	0	0	0	0	0	500	1	35	0	0	0	0	0	0	35
249	BUCKEYE MINE (CATARACT)	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.28	82	0	0	0	0	0	0	57	1000	232	560	59	1000	120	120	0	0	0	0	1	1	203
250	BUCKEYE MINE	EXTRA AF	UPPER BASIN CREEK	x	0	0	0	0	6	0	6	0	0	0	0.70	0	33	0	0	0	0	33	0	0	0	0	0	500	1	35	0	0	0	0	0	0	35
251	BULLION MINE	MAIN	JACK CREEK	x	0	0	0	0	6	0	6	0	0	0	0.86	0	0	500	500	23	500	500	0	0	0	0	0	500	1	501	0	0	0	0	0	0	501
252	BULLION SMELTER	MAIN	JACK CREEK	x	0	0	0	0	6	0	6	0	0	0	0.70	0	0	220	36	0	92	348	0	0	0	0	0	500	1	349	0	0	0	0	0	0	349
253	BUSTER	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	2.24	31	0	17	0	0	0	17	278	1000	686	1000	28	1000	276	293	0	0	0	0	1	0	324
254	COLUMBUS	MAIN	LOWER BASIN CREEK	x	5	3	4	10	19	17	58	0	0	0	0.90	58	0	17	0	0	0	17	182	800	342	456	64	1000	2157	2173	0	0	0	0	0	0	2231
255	CRYSTAL GROUP	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	1.25	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
256	DAILY WEST	MAIN	LOWER BASIN CREEK	x	14	31	39	100	12	100	100	0	399	399	1.25	109	0	21	0	0	10	31	519	1000	1000	1000	41	1000	135	166	0	0	0	0	73	36	312
257	DAILY WEST	AREA 2	LOWER BASIN CREEK	x	14	31	39	100	12	100	100	0	399	399	1.66	139	0	21	0	0	10	31	519	1000	1000	1000	41	1000	135	166	0	0	0	0	73	36	341
258	DELGATE	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Scoring											Surface Water Impact Scoring														Ground Water Impact Scoring						
					Ecological COC Score							Human Health COC Score						Surface Water COCs						Solid Waste/Leachate Release Score								Ground Water COC Score						
					Eco COC Score (As)	Eco COC Score (Cd)	Eco COC Score (Cu)	Eco COC Score (Pb)	Eco COC Score (Hg)	Eco COC Score (Zn)	Eco COC Score (total)	HH COC Score (As)	HH COC Score (Pb)	Total HH COC Score	HH Modifier	Total DC Score	COC Score (As)	COC Score (Cd)	COC Score (Cu)	COC Score (Pb)	COC Score (Zn)	Total COC Score	Eco COC Score (As)	Eco COC Score (Cd)	Eco COC Score (Cu)	Eco COC Score (Pb)	Eco COC Score (Zn)	Total Eco COC Score	Waste Release Score	Total SW Score	COC Score (As)	COC Score (Cd)	COC Score (Pb)	Total COC Score	Leachate Release Score	Total GW	TOTAL SCORE
261	DORIS	AREA 2	LOWER BASIN CREEK	x	4	7	18	70	33	100	100	0	35	35	1.09	138	0	17	0	0	0	17	164	1000	1000	1000	113	750	1883	1899	0	0	0	0	17	9	2046
262	DOROTHY SNOW	MAIN	UPPER BASIN CREEK	x	12	2	1	17	2	9	43	0	0	0	1.30	8	0	0	0	0	0	0	452	369	124	781	0	750	207	207	0	0	0	0	0	0	215
263	DOUBLE SHAFT	MAIN	UPPER BASIN CREEK	x	2	1	0	3	0	6	13	0	0	0	0.70	13	0	0	0	0	0	0	60	354	64	157	0	500	449	449	0	0	0	0	0	0	462
264	DUMORTIERITE PROSPECT	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	22	370	0	0	0	0	8	4	397
266	ENTERPRISE MINE	MAIN	UPPER BASIN CREEK	x	0	0	0	0	6	0	6	0	0	0	0.84	0	33	0	0	0	0	33	0	0	0	0	0	500	1	35	0	0	0	0	0	0	35
267	GOLDEN GLOW	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	1.25	12	0	0	0	0	0	0	1000	246	174	853	0	1000	220	220	0	0	0	0	0	0	232
268	GRUB CREEK STATION	MAIN	UPPER BASIN CREEK	x	0	0	0	0	6	0	6	0	0	0	0.70	6	0	0	0	0	0	0	0	0	0	0	0	500	1047	1047	0	0	0	0	0	0	1053
269	HAWKEYE MINE	MAIN	JACK CREEK	x	10	2	2	2	5	6	27	0	0	0	0.95	5	0	0	0	0	0	0	362	494	133	116	0	0	0	0	0	0	0	0	0	0	5
270	HECTOR	MAIN	LOWER BASIN CREEK	x	16	44	18	81	16	100	100	0	41	41	0.95	25	0	220	36	0	92	348	593	1000	1000	1000	54	1000	276	624	0	0	0	0	7	4	653
271	HECTOR	AREA 2	LOWER BASIN CREEK	x	16	44	18	81	16	100	100	0	41	41	0.70	23	0	17	0	0	0	17	593	1000	1000	1000	54	1000	276	293	0	0	0	0	7	4	320
272	HIGHLAND	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	17	0	0	0	17	278	1000	686	1000	28	1000	22	38	0	0	0	0	1	0	61
273	HOPE	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	17	0	0	0	17	278	1000	686	1000	28	1000	22	38	0	0	0	0	1	0	61
274	JACK CREEK RIDGE	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	21	0	0	10	31	1000	877	772	1000	0	1000	22	53	0	0	0	0	8	4	81
275	JACK CREEK RIDGE	AREA 2	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	22	370	0	0	0	0	8	4	397
276	JACK CREEK TAILINGS	MAIN	JACK CREEK	x	100	3	23	23	0	11	100	25	11	36	0.70	23	0	220	36	0	92	348	1000	615	1000	1000	0	750	207	555	0	0	0	0	3	2	579
277	JESSIE	MAIN	LOWER BASIN CREEK	x	19	1	8	74	22	9	100	0	37	37	0.70	126	0	220	36	0	92	348	685	262	669	1000	75	750	1320	1668	0	0	0	0	19	9	1803
278	JIB SHAFT	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	37	0	0	37	0	0	0	0	0	0	0	37	0	0	0	0	0	0	37
279	JIB SHAFT	JIB MILL	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	1.21	0	0	0	37	0	0	37	0	0	0	0	0	0	0	37	0	0	0	0	0	0	37
280	JIB SHAFT	JIB MILL F	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	37	0	0	37	0	0	0	0	0	0	0	37	0	0	0	0	0	0	37
281	JOE BOWER'S MINE	MAIN	UPPER BASIN CREEK	x	1	3	3	19	2	7	35	0	0	0	0.70	6	11	0	0	0	0	11	55	646	265	889	0	0	0	11	0	0	0	0	0	0	17
282	JOE METESH LESSEE	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	2.44	32	0	17	0	0	0	17	278	1000	686	1000	28	1000	276	293	0	0	0	0	1	0	325
283	JOSEPHINE	MAIN	UPPER BASIN CREEK	x	100	0	4	100	7	7	100	36	106	142	1.28	282	0	45	44	144	23	256	1000	62	381	1000	24	750	1688	1943	22	0	500	500	71	286	2511
284	JOSEPHINE	MINE 2	UPPER BASIN CREEK	x	100	0	4	100	7	7	100	36	106	142	0.70	36	0	45	44	144	23	256	1000	62	381	1000	24	750	207	463	0	0	0	0	13	6	506
285	KATIE & KATIE EXTENSION	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	1.86	0	0	0	37	0	0	37	0	0	0	0	0	0	0	37	0	0	0	0	0	0	37
286	KELLER'S HEMATITE	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.98	26	0	220	36	0	92	348	1000	877	772	1000	0	1000	22	370	0	0	0	0	8	4	399
287	LADY HENNESSEY	MAIN	UPPER BASIN CREEK	x	22	0	14	100	3	2	100	0	200	200	0.98	54	0	0	0	0	0	0	822	118	1000	1000	0	1000	22	22	0	0	0	0	36	18	94
288	LADY HENNESSEY	MINE 2	UPPER BASIN CREEK	x	22	0	14	100	3	2	100	0	200	200	0.70	44	0	0	0	0	0	0	822	118	1000	1000	0	1000	22	22	0	0	0	0	36	18	84
289	LADY LEITH	MAIN	UPPER BASIN CREEK	x	100	63	26	100	100	100	100	69	206	275	0.70	53	0	0	0	0	0	0	1000	1000	1000	1000	1000	1000	276	276	0	0	0	0	50	25	355
290	LADY LEITH	AREA 2	UPPER BASIN CREEK	x	100	63	26	100	100	100	100	69	206	275	0.70	53	0	0	0	0	0	0	1000	1000	1000	1000	1000	1000	22	22	0	0	0	0	50	25	100
292	LOG CABIN AND STONE FIREPLACI	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	393	35	0	106	500	57	1000	232	560	59	1000	276	776	0	0	0	0	0	0	790
293	LONE STAR	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	0	0	0	0	0	278	1000	686	1000	28	1000	22	22	0	0	0	0	1	0	44
294	LOTTA	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
295	LOWER DITCH	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	1.13	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
296	HECTOR - LOWER	MAIN	LOWER BASIN CREEK	x	19	4	15	38	15	27	100	0	19	19	0.70	21	0	17	0	0	0	17	704	983	1000	1000	51	1000	276	293	0	0	0	0	3	2	315
297	LULA BELL	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	276	276	0	0	0	0	0	0	288
298	LYONS PROSPECT	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	1.30	12	11	0	0	0	0	11	1000	246	174	853	0	1000	22	33	0	0	0	0	0	0	45
299	MAGDELENA GROUP	MAIN	UPPER BASIN CREEK	x	2	0	0	0	0	1	3	0	0	0	0.70	3	0	0	0	0	0	0	61	0	48	31	0	500	1375	1375	0	0	0	0	0	0	1378
300	MARGUERITE	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
301	MARGUERITE	AREA 2	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
302	MEYERS GULCH	MAIN	LOWER BASIN CREEK	x	6	2	3	42	2	19	74	0	21	21	0.70	49	0	17	0	0	0	17	236	462	217	1000	0	750	304	320	0	0	0	0	6	3	372
303	MOCCASON	MAIN	JACK CREEK	x	100	100	100	100	24	100	100	90	160	250	1.18	72	0	220	36	0	92	348	1000	1000	1000	1000	80	0	0	348	0	0	0	0	46	23	442
304	MOLLY SNOW	MAIN	UPPER BASIN CREEK	x	100	0	0	98	2	1	100	13	49	62	1.27	179	0	0	0	0	0	0	1000	0	65	1000	0	750	907	907	0	0	0	0	31	15	1101
305	MORNING	MAIN	JACK CREEK	x	100	11	12	100	100	100	100	81	140	221	1.27	68	0	220	36	0	92	348	1000	1000	1000	1000	1000	1000	22	370	0	0	0	0	40	20	458
306	MORNING	AREA 2	JACK CREEK	x	100	11	12	100	100	100	100	81	140	221	1.16	65	0	220	36	0	92	348	1000	1000	1000	1000	1000	1000	276	624	0	0	0	0	40	20	709
307	MORNING STAR	MAIN	UPPER BASIN CREEK	x	1	3	3	19	2	7	35	0	0	0	0.70	35	11	0	0	0	0	11	55	646	265	889	0	750	1157	1157	0	0	0	0	0	0	1203
308	N462471	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	21	0	0	10	31	278	1000	686	1000	28	1000	22	53	0	0	0	0	1	0	76
309	WEST MOUNT THOMPSON	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	55
310	WHITE PINE	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	393	35	0	106	500	57	1000	232	560	59	1000	276	776	0	0	0	0	0	0	790
311	WHITE PINE	AREA 2	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	393	35	0	106	500	57	1000	232	560	59	1000	276	776	0	0	0	0	0	0	790
312	BASIN GOLD & SILVER	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	276	776	0	0	0	0	0	0	783
313	CATARACT CREEK PLACER	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	248	248	0	0	0	0	0	0	268
314	CREDEN MINES	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	2.50	32	0	17	0	0	0	17	278	1000	686	1000	28	1000	248	265	0	0	0	0	1	0	297
315	GARFIELD	EXTENSIC	UNCLE SAM GULCH	x	4	2	0	4	3	9	20	0	0	0	0.87	20	0	500	385	0	500	500	0	1000	97	90	0	0	0	500	0	0	0	0	0	0	520
316	GOLDEN ASSETS MINE	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	22	522	0	0	0	0	0	0	528
317	JACK MTN. IRON	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	78	426	0	0	0	0	8	4	454
318	NE NW SECTION 16 (51)	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	25	28	0	0	54	130	1000	516	599	24	1000	22	75	0	0	0	0	1	1	96
319	NW SW SECTION 27	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
320	NW SW SECTION 29	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	22	522	0	0	0	0	0	0	528
321	SE NW SECTION 30	MAIN	UPPER BASIN CREEK	x	47	0	0	12	2	4	65	0	0	0	1.30	65	0	0	0	0	0	0	1000	71	70	553	0	750	1688	1688	0	0	0	0	0	0	1752
322	SE SE SECTION 35	MAIN	UPPER BASIN CREEK	x	62	4	2	99	1	32	100	0	49	49	0.70	135	12	0	0	0	0	12	1000	1000	191	1000	0	750	907	918	0	0	0	0	25	12	1065
323	SE SW SECTION 2	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
324	SE SW SECTION 28	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	55
325	SE SW SECTION 32	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	17	0	0	0	17	278	1000	686	1000	28	1000	192	208	0	0	0	0	1	0	231
326	SW SE SECTION 1	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	1.29	25	0	21	0	0	10	31	278	1000	686	1000	28	1000	163	195	0	0	0	0	1	0	220
327	SW SE SECTION 29	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	22	522	0	0	0	0	0	0	528
330	BASIN CREEK PLACER 3	MAIN	MIDDLE BASIN CREEK		0	0	0	0	0	0	0	0	0	0	1.57	0	0	44	12	0	21	78	0	0	0	0	0	0	0	78	0	0	0	0	0	0	78
332	BIG MEDICINE	MAIN	LOWER CATARACT CREEK	x	10	0	0	2	6	0	18	0	0	0	0.70	6	0	0	0	0	0	0	0	40	0	54	34	750	537	537	0	0	0	0	0	0	543
334	CAPTAIN COOK	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	55
335	CATARACT CITY	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
338	DEW DROP	MAIN	JACK CREEK	x	100	0	2	47	0	3	100	500	24	500	1.29	745	0	220	36	0	92	348	1000	60	162	1000	0	1000	610	958	0	0	0	0	500	250	1952
339	EDNA	MAIN	MIDDLE CATARACT CREEK	x	6	1	0	1	0	5	13	0	0	0	0.70	13	0	500	19	0	0	500	0	1000	63	33	0	500	138	638	0	0	0	0	0	0	651
340	ELEPHANT	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	24	24	130	1000	516	599	24	1000	22	46	0	0	0	0	0	0	65
343	FATHER MURPHY	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	107	107	0	0	0	0	0	0	121
344	FINN'S CABIN AND SAUNA	MAIN	LOWER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
345	FOURTH OF JULY	MAIN	MIDDLE CATARACT CREEK	x	16	0	0	2	1	4	23	0	0	0	0.70	23	0	33	24	0	20	77	32	600	90	49	0	500	305	382	0	0	0	0	0	0	405
346	FREE SILVER	MAIN	MIDDLE CATARACT CREEK	x	100	6	5	100	5	37	100	37	63	100	1.27	41	0	25	28	0	0	54	1000	1000	581	1000	25	0	0	54	0	0	0	0	2	1	96
347	GARFIELD	MAIN	UNCLE SAM GULCH	x	4	2	0	4	3	9	20	0	0	0	0.70	20	0	500	385	0	500	500	0	1000	97	90	0	500	616	1116	0	0	0	0	0	0	1136
349	GOLD FLAKE	MAIN	LOWER CATARACT CREEK	x	19	0	0	5	1	1	26	0	0	0	1.13	26	0	0	0	0	0	0	40	170	33	115	0	750	1642	1642	0	0	0	0	0	0	1668
351	GOLDEN REEF	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	273	26	0	67	366	57	1000	232	560	59	1000	22	388	0	0	0	0	0	0	402
352	HUOT	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
353	LADY LANE	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	220	220	0	0	0	0	0	0	232
354	LAPLATE	MAIN	LOWER CATARACT CREEK	x	36	7	3	28	100	100	100	0	14	14	0.70	20	0	500	66	0	181	500	74	1000	355	707	1000	0	0	500	0	0	0	0	0	0	520
355	LAST SHOT	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	22	370	0	0	0	0	8	4	397
356	LINCOLN	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	22	522	0	0	0	0	0	0	528
357	LIZZIE	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
358	BLUEBIRD	LOWER	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
359	LULA	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	1.57	27	0	17	0	0	0	17	278	1000	686	1000	28	1000	107	123	0	0	0	0	1	0	151
360	MAYFLOWER	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	17	0	0	0	17	278	1000	686	1000	28	1000	22	38	0	0	0	0	1	0	61
361	MIDNIGHT	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	22	370	0	0	0	0	8	4	397
362	MONTANA	MAIN	LOWER CATARACT CREEK		27

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Scoring											Surface Water Impact Scoring														Ground Water Impact Scoring						TOTAL SCORE
					Ecological COC Score							Human Health COC Score																							
					Eco COC Score (As)	Eco COC Score (Cd)	Eco COC Score (Cu)	Eco COC Score (Pb)	Eco COC Score (Hg)	Eco COC Score (Zn)	Eco COC Score (total)	HH COC Score (As)	HH COC Score (Pb)	Total HH COC Score	HH Modifier	Total DC Score	Surface Water COCs: COC Score (As)	COC Score (Cd)	COC Score (Cu)	COC Score (Pb)	COC Score (Zn)	Total COC Score	Solid Waste/Leachate Release Score: Eco COC Score (As)	Eco COC Score (Cd)	Eco COC Score (Cu)	Eco COC Score (Pb)	Eco COC Score (Zn)	Total Eco COC Score	Waste Release Score	Total SW Score	Ground Water COC Score: COC Score (As)	COC Score (Cd)	COC Score (Pb)	Total COC Score	Leachate Release Score	Total GW	
365	NW NE SECTION 32	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	22	522	0	0	0	0	0	0	528
366	OBELISK	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
370	PENN PLACER	MAIN	MIDDLE BASIN CREEK		0	0	0	0	0	0	0	0	0	0	0.70	0	0	44	12	0	21	78	0	0	0	0	0	0	0	78	0	0	0	0	0	0	78
371	PIRATE	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	393	35	0	108	500	57	1000	232	560	59	1000	22	522	0	0	0	0	0	0	536
373	REDEMPTION	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
374	REGALIA	MAIN	LOWER CATARACT CREEK	x	36	7	3	28	100	100	100	0	14	14	0.70	20	0	500	66	0	181	500	74	1000	355	707	1000	0	0	500	0	0	0	0	0	0	520
375	ROCKY POINT	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	25	28	0	0	54	130	1000	516	599	24	1000	22	75	0	0	0	0	0	0	95
376	RUBY DIGGINGS	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
377	SAGINAW	MAIN	LOWER CATARACT CREEK	x	36	7	3	28	100	100	100	0	14	14	0.70	20	0	500	66	0	181	500	74	1000	355	707	1000	0	0	500	0	0	0	0	0	0	520
378	SE SE SECTION 21	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	276	276	0	0	0	0	0	0	283
379	SILVER REEF	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.08	15	0	273	26	0	67	366	57	1000	232	560	59	1000	22	388	0	0	0	0	0	0	402
381	SNOWBIRD	MAIN	UNCLE SAM GULCH	x	94	1	2	7	0	6	100	0	0	0	0.70	100	0	500	385	0	500	500	193	1000	318	184	0	500	425	925	0	0	0	0	0	0	1025
383	T&B	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
384	BLUEBIRD	MAIN - UP	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	1000	338	344	1000	0	1000	22	22	0	0	0	0	0	0	42
385	VICTORY	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	248	248	0	0	0	0	0	0	262
386	VIOLA	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	500	66	0	181	500	57	1000	232	560	59	1000	22	522	0	0	0	0	0	0	536
388	HOGBACK	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	273	26	0	67	366	57	1000	232	560	59	1000	22	388	0	0	0	0	0	0	402
391	SILICA QUARTZ MINE	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
393	HOLLAND	MAIN	MIDDLE CATARACT CREEK	x	3	0	0	5	0	1	9	0	0	0	1.06	2	0	25	28	0	0	54	0	120	81	119	0	500	11	65	0	0	0	0	0	0	66
394	ALPINE	MAIN	MIDDLE CATARACT CREEK	x	59	0	3	13	8	0	82	0	0	0	0.70	82	0	25	28	0	0	54	121	80	358	322	46	750	1023	1077	0	0	0	0	0	0	1159
395	BIG CHIEF	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
396	VIRGINIA	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
397	VANDALIA	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
507	BASIN JIBE	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	37	0	0	37	0	0	0	0	0	0	0	37	0	0	0	0	0	0	37
508	MINNEAPOLIS PLACER & PROSPEC	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	135	135	0	0	0	0	0	0	149
509	SMELTER CREEK ADIT	MAIN	JACK CREEK		0	0	0	0	6	0	6	0	0	0	0.70	0	0	220	36	0	92	348	0	0	0	0	0	0	0	348	0	0	0	0	0	0	348
510	NE BASIN	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	273	26	0	67	366	57	1000	232	560	59	1000	220	586	0	0	0	0	0	0	600
511	LAST CHANCE	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	17	0	0	0	17	278	1000	686	1000	28	1000	22	38	0	0	0	0	1	0	61
588	CLEVELAND/DELBERT CLAIMS	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	1.35	12	11	0	0	0	0	11	1000	246	174	853	0	1000	276	287	0	0	0	0	0	0	299
589	24JF0247	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
590	24JF0142	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
591	24JF0131	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	78	78	0	0	0	0	0	0	98
592	RTI RECON: P	MAIN	JACK CREEK	x	100	0	0	14	3	4	100	37	0	37	0.70	97	0	500	500	23	500	500	1000	0	32	652	0	1000	1138	1638	0	0	0	0	28	14	1749
593	24JF0444	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	25	28	0	0	54	130	1000	516	599	24	1000	135	189	0	0	0	0	0	0	208
594	RTI RECON: O	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	192	539	0	0	0	0	8	4	567
595	CULLEN CLAIM	MAIN	UPPER BASIN CREEK		36	0	2	18	4	6	67	0	0	0	0.70	12	0	0	0	0	0	0	1000	246	174	853	0	1000	22	22	0	0	0	0	0	0	34
596	24JF0250	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
597	24JF0249	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	276	276	0	0	0	0	0	0	283
598	HANSON	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	22	22	0	0	0	0	0	0	29
599	24JF0132	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
600	24JF0134	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
601	24JF0141	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	0	0	0	0	0	130	1000	516	599	24	1000	22	22	0	0	0	0	0	0	42
602	RTI RECON: E	MAIN	JACK CREEK		100	4	9	42	6	25	100	22	21	43	0.70	24	0	220	36	0	92	348	1000	877	772	1000	0	1000	163	511	0	0	0	0	8	4	539
603	24JF0833	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	55
604	24JF0490	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	276	776	0	0	0	0	0	0	783
605	24JF0489	MAIN	UNCLE SAM GULCH		21	0	2	4	2	7	36	0	0	0	0.70	7	0	500	385	0	500	500	43	1000	265	111	0	1000	22	522	0	0	0	0	0	0	528
606	24JF0683	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	33	24	0	20	77	130	1000	516	599	24	1000	50	127	0	0	0	0	0	0	147
607	24JF0696	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	1.29	21	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	56
608	MORNING GLORY	TAILINGS	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	500	66	0	181	500	57	1000	232	560	59	1000	276	776	0	0	0	0	0	0	790
609	24JF0676	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	20	0	13	0	0	0	13	130	1000	516	599	24	1000	22	35	0	0	0	0	0	0	55
610	24JF0890	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	1.23	25	0	21	0	0	10	31	278	1000	686	1000	28	1000	22	53	0	0	0	0	1	0	78
611	RTI RECON: R	MAIN	LOWER BASIN CREEK	x	5	4	4	100	6	30	100	0	148	148	0.70	204	0	21	0	0	10	31	189	985	325	1000	0	750	323	355	0	0	0	0	74	37	595
612	GOLD HILL	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	0.70	14	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	36
613	24JF0520	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	17	0	0	0	17	278	1000	686	1000	28	1000	276	293	0	0	0	0	1	0	315
614	24JF0525	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	17	0	0	0	17	278	1000	686	1000	28	1000	276	293	0	0	0	0	1	0	315
615	ATLANTIC	MAIN	LOWER CATARACT CREEK		27	0	2	22	11	6	68	0	11	11	1.29	15	0	0	0	0	0	0	57	1000	232	560	59	1000	22	22	0	0	0	0	0	0	37
616	24JF0524	MAIN	LOWER BASIN CREEK	x	2	6	7	25	14	17	71	0	12	12	0.70	25	0	17	0	0	0	17	66	1000	643	1000	47	500	182	199	0	0	0	0	0	0	225
617	24JF0241	MAIN	LOWER CATARACT CREEK	x	31	0	1	0	26	0	59	0	0	0	0.70	11	0	393	35	0	106	500	65	40	166	0	144	0	0	500	0	0	0	0	0	0	511
618	24JF0240	MAIN	LOWER CATARACT CREEK	x	31	0	1	0	26	0	59	0	0	0	0.70	11	0	393	35	0	106	500	65	40	166	0	144	0	0	500	0	0	0	0	0	0	511
619	RTI RECON: A	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	17	0	0	0	17	278	1000	686	1000	28	1000	276	293	0	0	0	0	1	0	315
620	BASIN HISTORIC DISTRICT	MAIN	LOWER BASIN CREEK		8	4	8	61	8	32	100	0	31	31	0.70	22	0	0	0	0	0	0	278	1000	686	1000	28	1000	135	135	0	0	0	0	1	0	157
621	24JF0188	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
622	CONFIDENCE	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	33	0	0	33	0	0	0	0	0	0	0	33	0	0	0	0	0	0	33
623	24JF0185	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
624	LAST CHANCE	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	1.13	0	0	0	37	0	0	37	0	0	0	0	0	0	0	37	0	0	0	0	0	0	37
625	24JF0516	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
626	24JF0183	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
627	24JF0179	MAIN	LOWER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
628	24JF0515	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
629	24JF0178	MAIN	LOWER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	1.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
630	24JF0517	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
631	24JF0177	MAIN	LOWER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
701	SW SE SECTION 4	MAIN	UPPER CATARACT CREEK	x	26	0	2	19	1	2	50	0	0	0	0.92	50	0	0	0	0	0	0	53	90	287	467	0	750	638	638	0	0	0	0	0	0	688
702	TIMBERLINE	MAIN	MIDDLE CATARACT CREEK	x	100	0	0	36	0	4	100	17	18	35	1.42	150	0	0	0	0	0	0	510	780	110	892	0	1000	610	610	0	0	0	0	35	17	777
703	NE SE SECTION 14	MAIN	MIDDLE CATARACT CREEK	x	26	0	0	4	2	0	33	0	0	0	0.70	18	0	0	0	0	0	0	54	130	95	110	0	1000	65	65	0	0	0	0	0	0	83
704	MERRY WIDOW	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	33	0	0	33	0	0	0	0	0	0	0	33	0	0	0	0	0	0	33
705	LADY RICKER	MAIN	UPPER CATARACT CREEK	x	5	0	4	0	7	0	16	0	0	0	0.70	16	0	0	0	0	0	0	0	40	565	0	38	500	1125	1125	0	0	0	0	0	0	1141
706	NE NW SECTION 17	MAIN	MIDDLE CATARACT CREEK	x	70	0	3	13	2	2	88	0	0	0	0.70	88	0	25	28	0	0	54	144	130	355	324	0	750	2063	2116	40	0	36	76	0	38	2242
707	NEAR BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	x	3	0	0	0	4	2	9	0	0	0	0.70	2	0	0	0	0	0	0	0	280	86	22	23	0	0	0	0	0	0	0	0	0	2
708	ROCKER WETLAND	MAIN	MIDDLE CATARACT CREEK	x	47	3	100	5	2	11	100	0	0	0	0.70	18	0	25	28	0	0	54	96	1000	1000	130	0	0	0	54	386	0	10	396	0	198	270
709	NW SE SECTION 14	MAIN	MIDDLE CATARACT CREEK		63	1	4	24	4	9	100	0	12	12	0.70	108	0	0	0	0	0	0	130	1000	516	599	24	1000	3000	3000	0	0	0	0	6	3	3111
710	NE SE SECTION 28	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	276	276	0	0	0	0	0	0	283
711	NEAR QUARTZ CREEK	MAIN	UPPER CATARACT CREEK		13	0	4	11	2	8	38	0	0	0	0.70	7	0	0	0	0	0	0	26	1000	455	285	0	1000	276	276	0	0	0	0	0	0	283
712	VOGEL	MAIN	LOWER CATARACT CREEK	x	43	0	0	0	4	0	47	0	0	0	0.70	47	0	0	0	0	0	0	89	40	30	0	0	750	90	90	0	0	0	0	0	0	137
713	ATTWATER MILL	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	0.70	0	0	0	33	0	0	33	0	0	0	0	0	0	0	33	0	0	0	0	0	0	33
714	BASIN STREET TAILINGS	MAIN	UPPER BOULDER RIVER		0	0	0	0	0	0	0	0	0	0	1.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-5
Site Scoring - Summary
Basin Mining Area Operable Unit 2

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Total	Surface Water Total	Ground Water Total	TOTAL SCORE	Scored with Site Data	Site Category	Environ. Impact Potential
1	ADELAIDE	MAIN	LOWER BASIN CREEK	x	162	2267	24	2453	yes	High	High
2	ADIT, MINE, WASTE ROCK [	MAIN	UPPER BASIN CREEK	x	5	33	0	38	yes	Very Low	Low
3	ALMA NO. 2	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
4	AURORA	MAIN	LOWER BASIN CREEK	x	380	1504	127	2011	yes	High	High
5	AURORA	AREA 2	LOWER BASIN CREEK	x	430	1504	127	2061	yes	High	High
6	BASIN BELLE	MAIN	LOWER BASIN CREEK	x	22	139	1	162	yes	Low	Medium
7	BASIN CREEK MINE	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
8	BASIN CREEK MINE	AREA 2	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
9	BASIN CREEK PLACER	MAIN	LOWER BASIN CREEK	x	11	31	0	43	yes	Very Low	Unknown
10	BASIN CREEK PLACER 1	MAIN	MIDDLE BASIN CREEK		0	31	0	31	no	Very Low	Low
11	BASIN CREEK PLACER 2	MAIN	MIDDLE BASIN CREEK		0	78	0	78	no	Very Low	Low
13	BASIN MILLSITE	MAIN	UPPER BOULDER RIVER	x	38	37	1	76	yes	Very Low	Unknown
17	NE NE SECTION 13	MAIN	JACK CREEK		24	370	4	397	no	Medium	Unknown
18	NEPTUNE	MAIN	UPPER BASIN CREEK	x	134	691	7	832	yes	High	Medium
19	NEPTUNE CABINS	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
20	NORTH ADA - PIERMONT	MAIN	UPPER CATARACT CREEK	x	230	2304	50	2583	yes	High	High
21	OLD BASIN MILLSITE	MAIN	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	
22	OLD BASIN MILLSITE	AREA 2	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	
23	OLD BALDY GROUP	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
25	PEARL	MAIN	UPPER BASIN CREEK		12	38	0	50	no	Very Low	Unknown
26	PERRY PARKS	MAIN	UPPER BASIN CREEK	x	18	0	0	18	yes	Very Low	Unknown
27	PERRY PARKS	AREA 2	UPPER BASIN CREEK	x	18	0	0	18	yes	Very Low	Unknown
28	PLACER	MAIN	UPPER BASIN CREEK	x	8	1005	0	1013	yes	High	Low
29	PLACER DITCH	MAIN	UPPER BASIN CREEK		12	168	0	180	no	Low	Low
30	PLACER 2313	MAIN	LOWER CATARACT CREEK		14	501	0	515	no	Medium-High	Low
32	SE SE SECTION 25	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
33	SOLAR	MAIN	UPPER BASIN CREEK		12	94	0	106	no	Low	Unknown
34	SOLAR	AREA 2	UPPER BASIN CREEK		12	94	0	106	no	Low	Unknown
35	SW NW SECTION 7	MAIN	JACK CREEK		28	539	4	571	no	Medium-High	Low
36	UNNAMED FIRE CLAY	MAIN	JACK CREEK		24	511	4	539	no	Medium-High	Low
37	UNNAMED PLACER	MAIN	UPPER BASIN CREEK		12	117	0	130	no	Low	Low
38	UNNAMED QUARRY	MAIN	UPPER BASIN CREEK		12	174	0	186	no	Low	Low
39	UNNAMED SILVER; LEAD; &	MAIN	LOWER BASIN CREEK		22	53	0	76	no	Very Low	Unknown
41	upper ditch										
42	venus										
43	VINDICATOR	MAIN	JACK CREEK	x	185	2476	33	2694	yes	High	High
44	VINDICATOR	AREA 2	JACK CREEK	x	34	511	6	551	yes	Medium-High	High
46	WINTER'S CAMP	MAIN	UPPER BASIN CREEK	x	6	11	0	17	yes	Very Low	Medium
47	WINTER'S CAMP	AREA 2	UPPER BASIN CREEK	x	6	11	0	17	yes	Very Low	Medium
48	ADA	MAIN	MIDDLE CATARACT CREEK	x	152	1936	19	2107	yes	High	Medium
49	ALSACE	MAIN	UPPER CATARACT CREEK	x	0	97	0	97	yes	Very Low	Low
50	american eagle										
51	APOLLO	MAIN	MIDDLE CATARACT CREEK	x	326	3077	108	3511	yes	High	High
52	BAKAMA	MAIN	MIDDLE CATARACT CREEK	x	66	60	0	126	yes	Low	Medium
53	BAKAMA	AREA 2	MIDDLE CATARACT CREEK	x	12	11	0	23	yes	Very Low	Medium
54	BASIN QUARTZ MASS	MAIN	LOWER CATARACT CREEK		14	388	0	402	no	Medium	Unknown
55	BAZZER CLAIM	MAIN	MIDDLE CATARACT CREEK		20	99	0	119	no	Low	Low
56	BEE CLAIM	MAIN	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Low
57	BIG LUMBER GULCH	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
58	BILLIE T.	MAIN	MIDDLE CATARACT CREEK	x	24	0	0	25	yes	Very Low	High
59	BING HAMPTON	MAIN	MIDDLE CATARACT CREEK	x	2	814	0	816	yes	High	Low
60	BLACK BEAR	MAIN	MIDDLE CATARACT CREEK	x	82	300	45	427	yes	Medium	High
61	BLACK BEAR	AREA 2	MIDDLE CATARACT CREEK	x	308	1350	149	1806	yes	High	High
62	BLUE DIAMOND / OCCIDEN	MAIN	MIDDLE CATARACT CREEK	x	152	1140	12	1305	yes	High	Medium
63	BOSTON	MAIN	LOWER CATARACT CREEK	x	304	1713	73	2090	yes	High	Medium
64	BOULDER CHIEF	MAIN	MIDDLE CATARACT CREEK	x	270	131	12	413	yes	Medium	High
65	BOULDER CHIEF	MINE 2	MIDDLE CATARACT CREEK	x	49	131	2	182	yes	Low	High
66	BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	x	9	560	0	569	yes	Medium-High	Low
67	CALIFORNIA	MAIN	LOWER CATARACT CREEK	x	304	0	15	319	yes	Medium	High
68	CARTWRIGHT CABINS	MAIN	LOWER CATARACT CREEK		76	1520	1	1596	no	High	Low
69	CARTWRIGHT CABINS 2	MAIN	LOWER CATARACT CREEK	x	130	3000	18	3149	yes	High	High
70	CATARACT	MAIN	MIDDLE CATARACT CREEK	x	125	2383	9	2517	yes	High	Medium
71	CATERACT FLATS PLACER	MAIN	LOWER CATARACT CREEK		14	642	0	656	no	Medium-High	High
72	CATARACT MEADOWS COF	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	High
73	CATARACT PLACER	MAIN	LOWER CATARACT CREEK		26	850	0	876	no	High	High
74	CATARACT TAILS	MAIN	MIDDLE CATARACT CREEK	x	68	2383	29	2479	yes	High	Medium
75	CLIPPER	MAIN	MIDDLE CATARACT CREEK		21	522	0	543	no	Medium-High	High
76	CLIPPER / EDNA	MAIN	MIDDLE CATARACT CREEK	x	146	1972	18	2136	yes	High	High
77	CORBITT	MAIN	UPPER CATARACT CREEK	x	153	120	81	354	yes	Medium	High
78	CRACKER	MAIN	MIDDLE CATARACT CREEK	x	638	623	116	1377	yes	High	High
79	CRESCENT	MAIN	UPPER CATARACT CREEK	x	179	0	3	182	yes	Low	Low
80	CRESCENT	AREA 2	UPPER CATARACT CREEK	x	33	0	1	34	yes	Very Low	Low

Notes:
Score >=750, High
500 - 750, Medium High
250 - 500, Medium
100 - 250, Low
<=100, Very Low

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Total	Surface Water Total	Ground Water Total	TOTAL SCORE	Scored with Site Data	Site Category	Environ. Impact Potential
82	CRYSTAL	MAIN	UNCLE SAM GULCH	x	52	778	13	842	yes	High	High
83	CRYSTAL	AREA 2	UNCLE SAM GULCH	x	202	3010	73	3285	yes	High	High
84	CUSTER	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
85	CUSTER	AREA 2	LOWER CATARACT CREEK		15	22	0	37	no	Very Low	Unknown
86	DEER LODGE	MAIN	LOWER CATARACT CREEK	x	87	0	3	90	yes	Very Low	High
87	DEER LODGE	AREA 2	LOWER CATARACT CREEK	x	85	0	3	88	yes	Very Low	High
88	ELDORADO AND PLATEAU	MAIN	UPPER CATARACT CREEK	x	179	120	147	446	yes	Medium	High
89	ELDORADO AND PLATEAU	AREA 2	UPPER CATARACT CREEK	x	26	22	6	54	yes	Very Low	High
90	ELMER	MAIN	LOWER CATARACT CREEK		15	522	0	537	no	Medium-High	Unknown
91	EVA MAY	MAIN	MIDDLE CATARACT CREEK	x	486	2327	109	2922	yes	High	Medium
92	EVA MAY	AREA 2	MIDDLE CATARACT CREEK		20	354	1	374	no	Medium	Medium
93	EVENING STAR	MAIN	UNCLE SAM GULCH	x	72	958	0	1030	yes	High	Medium
94	FIRST SHOT / LAST SHOT	MAIN	JACK CREEK	x	39	1138	0	1177	yes	High	Medium
95	FIRST SHOT / LAST SHOT	AREA 2	JACK CREEK	x	7	516	0	524	yes	Medium-High	Medium
96	GRAY LEAD	MAIN	MIDDLE CATARACT CREEK	x	63	94	16	173	yes	Low	Medium
97	GREAT SHIELD	MAIN	MIDDLE CATARACT CREEK		20	75	0	95	no	Very Low	Low
98	HANNA	MAIN	MIDDLE CATARACT CREEK		20	635	0	655	no	Medium-High	Low
99	HIAWATHA	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
100	hidden treasure										
101	HATTIE FERGUSON	MAIN	MIDDLE CATARACT CREEK		21	205	1	227	no	Low	High
102	HATTIE FERGUSON	LOWER	MIDDLE CATARACT CREEK	x	268	1608	120	1996	yes	High	High
103	SW NW SECTION 28	MAIN	MIDDLE CATARACT CREEK		20	35	0	55	no	Very Low	Unknown
104	HATTIE FERGUSON	UPPER	MIDDLE CATARACT CREEK	x	268	2027	370	2665	yes	High	High
105	SW NW SECTION 29	MAIN	UNCLE SAM GULCH	x	0	500	0	500	yes	Medium-High	Unknown
106	IDA M.	MAIN	MIDDLE CATARACT CREEK	x	73	131	2	206	yes	Low	High
107	IDA M.	AREA 2	MIDDLE CATARACT CREEK	x	49	131	2	182	yes	Low	High
108	IDA MAY	MAIN	UPPER CATARACT CREEK	x	100	60	0	160	yes	Low	Low
109	IDA MAY	AREA 2	UPPER CATARACT CREEK	x	18	11	0	29	yes	Very Low	Low
110	INDEPENDENCE MINE	MAIN	LOWER CATARACT CREEK	x	2	500	0	502	yes	Medium-High	Low
111	JAMES	MAIN	MIDDLE CATARACT CREEK		20	75	0	95	no	Very Low	Low
112	JOHN T.	MAIN	MIDDLE CATARACT CREEK		20	75	0	95	no	Very Low	Low
113	JUMBO	MAIN	MIDDLE CATARACT CREEK	x	100	137	0	237	yes	Low	Low
114	KLONDYKE	MAIN	MIDDLE CATARACT CREEK	x	179	938	306	1423	yes	High	High
115	LADY NELL	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	Unknown
116	LIZZIE OSBORNE	MAIN	MIDDLE CATARACT CREEK	x	84	1739	4	1827	yes	High	High
117	LIZZIE OSBORNE	AREA 2	MIDDLE CATARACT CREEK		20	276	1	297	no	Medium	High
118	LOUISE	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
120	MAMMOTH	MAIN	UNCLE SAM GULCH	x	37	500	13	550	yes	Medium-High	High
121	MANHATTAN	MAIN	LOWER CATARACT CREEK	x	136	270	7	413	yes	Medium	Medium
122	MANTLE	MAIN	LOWER CATARACT CREEK	x	18	500	0	518	yes	Medium-High	Unknown
123	MANTLE SOUTH	MAIN	LOWER CATARACT CREEK		14	776	0	790	no	High	Unknown
124	MARSHALL-CHANGES MINE	MAIN	MIDDLE CATARACT CREEK		21	35	0	56	no	Very Low	Unknown
125	MARY ANNE	MAIN	MIDDLE CATARACT CREEK	x	138	1404	17	1559	yes	High	High
126	MARY ANNE	AREA 2	MIDDLE CATARACT CREEK	x	23	75	3	101	yes	Low	High
127	MIDDLE SNOWDRIFT CREE	MAIN	MIDDLE CATARACT CREEK	x	89	1053	0	1143	yes	High	High
128	MIKE #14	MAIN	MIDDLE CATARACT CREEK	x	14	148	0	162	yes	Low	Low
129	MINNEAPOLIS	MAIN	LOWER CATARACT CREEK	x	55	0	3	58	yes	Very Low	Unknown
130	MINNEAPOLIS	AREA 2	LOWER CATARACT CREEK		15	635	0	650	no	Medium-High	Unknown
131	MORNING GLORY	MAIN	MIDDLE CATARACT CREEK	x	23	221	2	245	yes	Low	Medium
132	MORNING GLORY	TAILINGS	MIDDLE CATARACT CREEK	x	174	1153	16	1344	yes	High	Medium
133	MORNING MARIE	MAIN	MIDDLE CATARACT CREEK	x	61	863	0	924	yes	High	Low
134	MOUNTAIN CHIEF	MAIN	MIDDLE CATARACT CREEK		20	35	0	55	no	Very Low	Unknown
135	MOUNTAIN CHIEF	AREA 2	MIDDLE CATARACT CREEK		20	35	0	55	no	Very Low	Unknown
136	MT. THOMPSON	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
137	NE NE SECTION 28	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	Unknown
138	NE NW SECTION 3	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
139	NE THREE BROTHERS	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	Unknown
140	NEW COTTAGE	MAIN	LOWER CATARACT CREEK	x	52	2219	0	2271	yes	High	High
141	OUSLEY	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	Low
142	OVERLAND CREEK	MAIN	UPPER CATARACT CREEK	x	69	1005	41	1115	yes	High	Low
143	PEN YAN	MAIN	MIDDLE CATARACT CREEK	x	30	0	0	30	yes	Very Low	High
144	PHANTOM	MAIN	LOWER CATARACT CREEK	x	35	1455	2	1492	yes	High	High
145	PLACER 2623	MAIN	LOWER CATARACT CREEK		14	522	0	536	no	Medium-High	Unknown
146	PROTECTION	MAIN	LOWER CATARACT CREEK		14	276	0	290	no	Medium	Low
147	QUARTZ CREEK	MAIN	UPPER CATARACT CREEK	x	5	118	0	123	yes	Low	Low
148	RED BIRD	MAIN	MIDDLE CATARACT CREEK	x	56	500	3	559	yes	Medium-High	High
149	REDEMPTION	MAIN	LOWER CATARACT CREEK		14	522	0	536	no	Medium-High	Low
150	REDWING	MAIN	LOWER CATARACT CREEK	x	114	0	1	115	yes	Low	Medium
151	ROBIE BURNS	MAIN	MIDDLE CATARACT CREEK		20	522	0	542	no	Medium-High	Unknown
152	ROCKER	MAIN	MIDDLE CATARACT CREEK	x	100	54	0	154	yes	Low	Unknown
153	ROCKER EXTENSION	MAIN	MIDDLE CATARACT CREEK		34	1008	0	1043	no	High	Medium
154	ROSE MINE	MAIN	LOWER CATARACT CREEK		14	522	0	536	no	Medium-High	Unknown

Notes:
Score >=750, High
500 - 750, Medium High
250 - 500, Medium
100 - 250, Low
<=100, Very Low

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Total	Surface Water Total	Ground Water Total	TOTAL SCORE	Scored with Site Data	Site Category	Environ. Impact Potential
155	ROSE MINE	AREA 2	LOWER CATARACT CREEK		15	522	0	537	no	Medium-High	Unknown
156	RUTH	MAIN	LOWER CATARACT CREEK	x	45	2239	0	2284	yes	High	Medium
157	RUTH	AREA 2	LOWER CATARACT CREEK	x	11	707	0	718	yes	Medium-High	Medium
158	SAINT LAWRENCE	MAIN	UNCLE SAM GULCH		7	522	55	583	no	Medium-High	Low
159	SAINT NICK	MAIN	MIDDLE CATARACT CREEK	x	44	88	1	133	yes	Low	Medium
160	SATURDAY NIGHT	MAIN	LOWER CATARACT CREEK	x	25	707	2	734	yes	Medium-High	Medium
161	SEATTLE	MAIN	LOWER CATARACT CREEK	x	181	1688	29	1898	yes	High	Medium
162	SELF - RISER	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
163	SE NE SECTION 28	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	Unknown
164	SIRIUS	MAIN	MIDDLE CATARACT CREEK	x	446	938	158	1542	yes	High	High
165	SPARKING WATER	MAIN	UNCLE SAM GULCH	x	47	500	13	560	yes	Medium-High	Unknown
166	SPARKING WATER	AREA 2	UNCLE SAM GULCH	x	37	500	13	550	yes	Medium-High	Unknown
167	SYLVAN	MAIN	LOWER CATARACT CREEK	x	203	1939	74	2215	yes	High	High
168	TOTTEN MINE	MAIN	MIDDLE CATARACT CREEK		21	135	0	156	no	Low	Low
169	UNCLE SAM	MAIN	UNCLE SAM GULCH	x	5	702	0	707	yes	Medium-High	Low
170	UNNAMED LEAD & SILVER	MAIN	LOWER CATARACT CREEK		15	22	0	37	no	Very Low	Unknown
171	UNNAMED 001	MAIN	MIDDLE CATARACT CREEK	x	69	2610	8	2688	yes	High	High
172	UNNAMED 002	MAIN	MIDDLE CATARACT CREEK	x	100	902	0	1002	yes	High	Medium
173	UNNAMED 003	MAIN	MIDDLE CATARACT CREEK		20	522	0	542	no	Medium-High	High
174	UNNAMED 004	MAIN	MIDDLE CATARACT CREEK	x	77	137	0	215	yes	Low	Low
175	VERA AND MARIE	MAIN	MIDDLE CATARACT CREEK	x	31	1888	0	1920	yes	High	Medium
176	VERA AND MARIE	AREA 2	MIDDLE CATARACT CREEK		21	290	1	311	no	Medium	Medium
177	WALDY	MAIN	LOWER CATARACT CREEK	x	36	0	0	37	yes	Very Low	Unknown
178	WALDY NORTH	MAIN	LOWER CATARACT CREEK		15	22	0	37	no	Very Low	Unknown
247	BUCKEYE MINE	MAIN	UPPER BASIN CREEK	x	0	35	0	35	yes	Very Low	High
248	BUCKEYE MINE	MINE 2	UPPER BASIN CREEK	x	0	35	0	35	yes	Very Low	High
249	BUCKEYE MINE (CATARACT	MAIN	LOWER CATARACT CREEK		82	120	1	203	no	Low	Unknown
250	BUCKEYE MINE	EXTRA AR	UPPER BASIN CREEK	x	0	35	0	35	yes	Very Low	High
251	BULLION MINE	MAIN	JACK CREEK	x	0	501	0	501	yes	Medium-High	High
252	BULLION SMELTER	MAIN	JACK CREEK	x	0	349	0	349	yes	Medium	High
253	BUSTER	MAIN	LOWER BASIN CREEK		31	293	0	324	no	Medium	Unknown
254	COLUMBUS	MAIN	LOWER BASIN CREEK	x	58	2173	0	2231	yes	High	High
255	CRYSTAL GROUP	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	
256	DAILY WEST	MAIN	LOWER BASIN CREEK	x	109	166	36	312	yes	Medium	High
257	DAILY WEST	AREA 2	LOWER BASIN CREEK	x	139	166	36	341	yes	Medium	High
258	DELGATE	MAIN	JACK CREEK		24	539	4	567	no	Medium-High	Low
259	DIMON	MAIN	LOWER BASIN CREEK		25	38	0	64	no	Very Low	Unknown
260	DORIS	MAIN	LOWER BASIN CREEK	x	26	224	2	252	yes	Medium	Medium
261	DORIS	AREA 2	LOWER BASIN CREEK	x	138	1899	9	2046	yes	High	Medium
262	DOROTHY SNOW	MAIN	UPPER BASIN CREEK	x	8	207	0	215	yes	Low	Medium
263	DOUBLE SHAFT	MAIN	UPPER BASIN CREEK	x	13	449	0	462	yes	Medium	Low
264	DUMORTIERITE PROSPECT	MAIN	JACK CREEK		24	370	4	397	no	Medium	Unknown
266	ENTERPRISE MINE	MAIN	UPPER BASIN CREEK	x	0	35	0	35	yes	Very Low	High
267	GOLDEN GLOW	MAIN	UPPER BASIN CREEK		12	220	0	232	no	Low	Low
268	GRUB CREEK STATION	MAIN	UPPER BASIN CREEK	x	6	1047	0	1053	yes	High	Low
269	HAWKEYE MINE	MAIN	JACK CREEK	x	5	0	0	5	yes	Very Low	Unknown
270	HECTOR	MAIN	LOWER BASIN CREEK	x	25	624	4	653	yes	Medium-High	High
271	HECTOR	AREA 2	LOWER BASIN CREEK	x	23	293	4	320	yes	Medium	High
272	HIGHLAND	MAIN	LOWER BASIN CREEK		22	38	0	61	no	Very Low	Low
273	HOPE	MAIN	LOWER BASIN CREEK		22	38	0	61	no	Very Low	Unknown
274	JACK CREEK RIDGE	MAIN	JACK CREEK		24	53	4	81	no	Very Low	Unknown
275	JACK CREEK RIDGE	AREA 2	JACK CREEK		24	370	4	397	no	Medium	Unknown
276	JACK CREEK TAILINGS	MAIN	JACK CREEK	x	23	555	2	579	yes	Medium-High	Medium
277	JESSIE	MAIN	LOWER BASIN CREEK	x	126	1668	9	1803	yes	High	Medium
278	JIB SHAFT	MAIN	UPPER BOULDER RIVER		0	37	0	37	no	Very Low	Unknown
279	JIB SHAFT	JIB MILL	UPPER BOULDER RIVER		0	37	0	37	no	Very Low	Unknown
280	JIB SHAFT	JIB MILL F	UPPER BOULDER RIVER		0	37	0	37	no	Very Low	Unknown
281	JOE BOWER'S MINE	MAIN	UPPER BASIN CREEK	x	6	11	0	17	yes	Very Low	Medium
282	JOE METESH LESSEE	MAIN	LOWER BASIN CREEK		32	293	0	325	no	Medium	Low
283	JOSEPHINE	MAIN	UPPER BASIN CREEK	x	282	1943	286	2511	yes	High	Medium
284	JOSEPHINE	MINE 2	UPPER BASIN CREEK	x	36	463	6	506	yes	Medium-High	Medium
285	KATIE & KATIE EXTENSION	MAIN	UPPER BOULDER RIVER		0	37	0	37	no	Very Low	Unknown
286	KELLER'S HEMATITE	MAIN	JACK CREEK		26	370	4	399	no	Medium	Unknown
287	LADY HENNESSEY	MAIN	UPPER BASIN CREEK	x	54	22	18	94	yes	Very Low	High
288	LADY HENNESSEY	MINE 2	UPPER BASIN CREEK	x	44	22	18	84	yes	Very Low	High
289	LADY LEITH	MAIN	UPPER BASIN CREEK	x	53	276	25	355	yes	Medium	High
290	LADY LEITH	AREA 2	UPPER BASIN CREEK	x	53	22	25	100	yes	Low	High
292	LOG CABIN AND STONE FIR	MAIN	LOWER CATARACT CREEK		14	776	0	790	no	High	Low
293	LONE STAR	MAIN	LOWER BASIN CREEK		22	22	0	44	no	Very Low	
294	LOTTA	MAIN	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	
295	lower ditch										
296	HECTOR - LOWER	MAIN	LOWER BASIN CREEK	x	21	293	2	315	yes	Medium	High

Notes:
Score >=750, High
500 - 750, Medium High
250 - 500, Medium
100 - 250, Low
<=100, Very Low

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Total	Surface Water Total	Ground Water Total	TOTAL SCORE	Scored with Site Data	Site Category	Environ. Impact Potential
297	lula bell										
298	LYONS PROSPECT	MAIN	UPPER BASIN CREEK		12	33	0	45	no	Very Low	Unknown
299	MAGDELENA GROUP	MAIN	UPPER BASIN CREEK	x	3	1375	0	1378	yes	High	Low
300	MARGUERITE	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
301	MARGUERITE	AREA 2	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
302	MEYERS GULCH	MAIN	LOWER BASIN CREEK	x	49	320	3	372	yes	Medium	Medium
303	MOCCASON	MAIN	JACK CREEK	x	72	348	23	442	yes	Medium	High
304	MOLLY SNOW	MAIN	UPPER BASIN CREEK	x	179	907	15	1101	yes	High	Medium
305	MORNING	MAIN	JACK CREEK	x	69	370	20	459	yes	Medium	High
306	MORNING	AREA 2	JACK CREEK	x	65	624	20	709	yes	Medium-High	High
307	MORNING STAR	MAIN	UPPER BASIN CREEK	x	35	1167	0	1203	yes	High	Medium
308	N462471	MAIN	LOWER BASIN CREEK		22	53	0	76	no	Very Low	Unknown
309	WEST MOUNT THOMPSON	MAIN	MIDDLE CATARACT CREEK		20	35	0	55	no	Very Low	Low
310	WHITE PINE	MAIN	LOWER CATARACT CREEK		14	776	0	790	no	High	Unknown
311	WHITE PINE	AREA 2	LOWER CATARACT CREEK		14	776	0	790	no	High	Unknown
312	BASIN GOLD & SILVER	MAIN	UNCLE SAM GULCH		7	776	0	783	no	High	Unknown
313	CATARACT CREEK PLACER	MAIN	MIDDLE CATARACT CREEK		20	248	0	268	no	Medium	High
314	CREDEN MINES	MAIN	LOWER BASIN CREEK		32	265	0	297	no	Medium	Low
315	GARFIELD	EXTENSIO	UNCLE SAM GULCH	x	20	500	0	520	yes	Medium-High	Low
316	GOLDEN ASSETS MINE	MAIN	UNCLE SAM GULCH		7	522	0	528	no	Medium-High	Low
317	JACK MTN. IRON	MAIN	JACK CREEK		24	426	4	454	no	Medium	Low
318	NE NW SECTION 16 (51)	MAIN	MIDDLE CATARACT CREEK		20	75	1	96	no	Very Low	Unknown
319	NW SW SECTION 27	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	Low
320	NW SW SECTION 29	MAIN	UNCLE SAM GULCH		7	522	0	528	no	Medium-High	Low
321	SE NW SECTION 30	MAIN	UPPER BASIN CREEK	x	65	1688	0	1752	yes	High	Medium
322	SE SE SECTION 35	MAIN	UPPER BASIN CREEK	x	135	918	12	1065	yes	High	Medium
323	SE SW SECTION 2	MAIN	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
324	SE SW SECTION 28	MAIN	MIDDLE CATARACT CREEK		20	35	0	55	no	Very Low	Unknown
325	SE SW SECTION 32	MAIN	LOWER BASIN CREEK		22	208	0	231	no	Low	Low
326	SW SE SECTION 1	MAIN	LOWER BASIN CREEK		25	195	0	220	no	Low	Low
327	SW SE SECTION 29	MAIN	UNCLE SAM GULCH		7	522	0	528	no	Medium-High	Low
330	BASIN CREEK PLACER 3	MAIN	MIDDLE BASIN CREEK		0	78	0	78	no	Very Low	Low
332	BIG MEDICINE	MAIN	LOWER CATARACT CREEK	x	6	537	0	543	yes	Medium-High	Medium
334	CAPTAIN COOK	MAIN	MIDDLE CATARACT CREEK		20	35	0	55	no	Very Low	Unknown
335	CATARACT CITY	MAIN	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	Low
338	DEW DROP	MAIN	JACK CREEK	x	745	958	250	1952	yes	High	High
339	EDNA	MAIN	MIDDLE CATARACT CREEK	x	13	638	0	651	yes	Medium-High	Low
340	ELEPHANT	MAIN	MIDDLE CATARACT CREEK		20	46	0	65	no	Very Low	Unknown
343	FATHER MURPHY	MAIN	LOWER CATARACT CREEK		14	107	0	121	no	Low	Low
344	FINN'S CABIN AND SAUNA	MAIN	LOWER BOULDER RIVER		0	0	0	0	no	Very Low	Unknown
345	FOURTH OF JULY	MAIN	MIDDLE CATARACT CREEK	x	23	382	0	405	yes	Medium	Low
346	FREE SILVER	MAIN	MIDDLE CATARACT CREEK	x	41	54	1	96	yes	Very Low	High
347	GARFIELD	MAIN	UNCLE SAM GULCH	x	20	1116	0	1136	yes	High	Low
349	GOLD FLAKE	MAIN	LOWER CATARACT CREEK	x	26	1642	0	1668	yes	High	Medium
351	GOLDEN REEF	MAIN	LOWER CATARACT CREEK		14	388	0	402	no	Medium	Unknown
352	HUOT	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
353	LADY LANE	MAIN	UPPER BASIN CREEK		12	220	0	232	no	Low	Low
354	LAPLATE	MAIN	LOWER CATARACT CREEK	x	20	500	0	520	yes	Medium-High	High
355	LAST SHOT	MAIN	JACK CREEK		24	370	4	397	no	Medium	Low
356	LINCOLN	MAIN	UNCLE SAM GULCH		7	522	0	528	no	Medium-High	Low
357	LIZZIE	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
358	BLUEBIRD	LOWER	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
359	LULA	MAIN	LOWER BASIN CREEK		27	123	0	151	no	Low	Low
360	MAYFLOWER	MAIN	LOWER BASIN CREEK		22	38	0	61	no	Very Low	Unknown
361	MIDNIGHT	MAIN	JACK CREEK		24	370	4	397	no	Medium	Unknown
362	MONTANA	MAIN	LOWER CATARACT CREEK		14	522	0	536	no	Medium-High	Unknown
363	MONTANA CENTRAL RR OR	MAIN	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	
365	NW NE SECTION 32	MAIN	UNCLE SAM GULCH		7	522	0	528	no	Medium-High	Unknown
366	OBELISK	MAIN	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	Low
370	PENN PLACER	MAIN	MIDDLE BASIN CREEK		0	78	0	78	no	Very Low	Low
371	PIRATE	MAIN	LOWER CATARACT CREEK		14	522	0	536	no	Medium-High	Unknown
373	REDEMPTION	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Low
374	REGALIA	MAIN	LOWER CATARACT CREEK	x	20	500	0	520	yes	Medium-High	High
375	ROCKY POINT	MAIN	MIDDLE CATARACT CREEK		20	75	0	95	no	Very Low	Low
376	RUBY DIGGINGS	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
377	SAGINAW	MAIN	LOWER CATARACT CREEK	x	20	500	0	520	yes	Medium-High	High
378	SE SE SECTION 21	MAIN	UPPER CATARACT CREEK		7	276	0	283	no	Medium	Unknown
379	SILVER REEF	MAIN	LOWER CATARACT CREEK		15	388	0	402	no	Medium	Unknown
381	SNOWBIRD	MAIN	UNCLE SAM GULCH	x	100	925	0	1025	yes	High	Low
383	T&B	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
384	BLUEBIRD	MAIN - UP	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
385	VICTORY	MAIN	LOWER CATARACT CREEK		14	248	0	262	no	Medium	Unknown

Notes:
Score >=750, High
500 - 750, Medium High
250 - 500, Medium
100 - 250, Low
<=100, Very Low

Site Number	Site Name	Subsite Name	Subarea	Scored w/Site Data	Direct Contact Total	Surface Water Total	Ground Water Total	TOTAL SCORE	Scored with Site Data	Site Category	Environ. Impact Potential
386	VIOLA	MAIN	LOWER CATARACT CREEK		14	522	0	536	no	Medium-High	Unknown
388	HOGBACK	MAIN	LOWER CATARACT CREEK		14	388	0	402	no	Medium	Unknown
391	SILICA QUARTZ MINE	MAIN	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	Low
393	HOLLAND	MAIN	MIDDLE CATARACT CREEK	x	2	65	0	66	yes	Very Low	Low
394	ALPINE	MAIN	MIDDLE CATARACT CREEK	x	82	1077	0	1159	yes	High	Medium
395	BIG CHIEF	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
396	VIRGINIA	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	High
397	VANDALIA	MAIN	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
507	BASIN JIBE	MAIN	UPPER BOULDER RIVER		0	37	0	37	no	Very Low	Unknown
508	MINNEAPOLIS PLACER & P	MAIN	LOWER CATARACT CREEK		14	135	0	149	no	Low	Unknown
509	SMELTER CREEK ADIT	MAIN	JACK CREEK		0	348	0	348	no	Medium	Unknown
510	NE BASIN	MAIN	LOWER CATARACT CREEK		14	586	0	600	no	Medium-High	Unknown
511	LAST CHANCE	MAIN	LOWER BASIN CREEK		22	38	0	61	no	Very Low	Unknown
588	CLEVELAND/DELBERT CLA	MAIN	UPPER BASIN CREEK		12	287	0	299	no	Medium	Unknown
589	24JF0247	MAIN	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
590	24JF0142	MAIN	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
591	24JF0131	MAIN	MIDDLE CATARACT CREEK		20	78	0	98	no	Very Low	Unknown
592	RTI RECON: P	MAIN	JACK CREEK	x	97	1638	14	1749	yes	High	High
593	24JF0444	MAIN	MIDDLE CATARACT CREEK		20	189	0	208	no	Low	Unknown
594	RTI RECON: O	MAIN	JACK CREEK		24	539	4	567	no	Medium-High	Unknown
595	CULLEN CLAIM	MAIN	UPPER BASIN CREEK		12	22	0	34	no	Very Low	Unknown
596	24JF0250	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	Unknown
597	24jf0249										
598	HANSON	MAIN	UPPER CATARACT CREEK		7	22	0	29	no	Very Low	Unknown
599	24JF0132	MAIN	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
600	24JF0134	MAIN	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
601	24JF0141	MAIN	MIDDLE CATARACT CREEK		20	22	0	42	no	Very Low	Unknown
602	RTI RECON: E	MAIN	JACK CREEK		24	511	4	539	no	Medium-High	Unknown
603	24JF0833	MAIN	MIDDLE CATARACT CREEK		20	35	0	55	no	Very Low	Unknown
604	24JF0490	MAIN	UNCLE SAM GULCH		7	776	0	783	no	High	Unknown
605	24JF0489	MAIN	UNCLE SAM GULCH		7	522	0	528	no	Medium-High	Unknown
606	24JF0683	MAIN	MIDDLE CATARACT CREEK		20	127	0	147	no	Low	Unknown
607	24JF0696	MAIN	MIDDLE CATARACT CREEK		21	35	0	56	no	Very Low	Unknown
608	MORNING GLORY	TAILINGS	LOWER CATARACT CREEK		14	776	0	790	no	High	Medium
609	24JF0676	MAIN	MIDDLE CATARACT CREEK		20	35	0	55	no	Very Low	Unknown
610	24JF0890	MAIN	LOWER BASIN CREEK		25	53	0	78	no	Very Low	Unknown
611	RTI RECON: R	MAIN	LOWER BASIN CREEK	x	204	355	37	595	yes	Medium-High	Medium
612	GOLD HILL	MAIN	LOWER CATARACT CREEK		14	22	0	36	no	Very Low	Unknown
613	24jf0520										
614	24jf0525										
615	ATLANTIC	MAIN	LOWER CATARACT CREEK		15	22	0	37	no	Very Low	Unknown
616	24JF0524	MAIN	LOWER BASIN CREEK	x	25	199	0	225	yes	Low	Low
617	24JF0241	MAIN	LOWER CATARACT CREEK	x	11	500	0	511	yes	Medium-High	Low
618	24JF0240	MAIN	LOWER CATARACT CREEK	x	11	500	0	511	yes	Medium-High	Low
619	RTI RECON: A	MAIN	LOWER BASIN CREEK		22	293	0	315	no	Medium	Unknown
620	BASIN HISTORIC DISTRICT	MAIN	LOWER BASIN CREEK		22	135	0	157	no	Low	Unknown
631	24jf0177										
621	24jf0188										
622	CONFIDENCE	MAIN	UPPER BOULDER RIVER		0	33	0	33	no	Very Low	Unknown
623	24jf0185										
624	LAST CHANCE	MAIN	UPPER BOULDER RIVER		0	37	0	37	no	Very Low	Unknown
625	24jf0516										
626	24JF0183	MAIN	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	Unknown
627	24jf0179										
628	24jf0515										
629	24jf0178										
630	24jf0517										
701	SW SE SECTION 4	MAIN	UPPER CATARACT CREEK	x	50	638	0	688	yes	Medium-High	Medium
702	TIMBERLINE	MAIN	MIDDLE CATARACT CREEK	x	150	610	17	777	yes	High	High
703	NE SE SECTION 14	MAIN	MIDDLE CATARACT CREEK	x	18	65	0	83	yes	Very Low	High
704	MERRY WIDOW	MAIN	UPPER BOULDER RIVER		0	33	0	33	no	Very Low	Unknown
705	LADY RICKER	MAIN	UPPER CATARACT CREEK	x	16	1125	0	1141	yes	High	Low
706	NE NW SECTION 17	MAIN	MIDDLE CATARACT CREEK	x	88	2116	38	2242	yes	High	Medium
707	NEAR BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	x	2	0	0	2	yes	Very Low	Unknown
708	ROCKER WETLAND	MAIN	MIDDLE CATARACT CREEK	x	18	54	198	270	yes	Medium	Unknown
709	NW SE SECTION 14	MAIN	MIDDLE CATARACT CREEK		108	3000	3	3111	no	High	Unknown
710	NE SE SECTION 28	MAIN	UPPER CATARACT CREEK		7	276	0	283	no	Medium	Low
711	NEAR QUARTZ CREEK	MAIN	UPPER CATARACT CREEK		7	276	0	283	no	Medium	Unknown
712	VOGEL	MAIN	LOWER CATARACT CREEK	x	47	90	0	137	yes	Low	Medium
713	ATTWATER MILL	MAIN	UPPER BOULDER RIVER		0	33	0	33	no	Very Low	Unknown
714	BASIN STREET TAILINGS	MAIN	UPPER BOULDER RIVER		0	0	0	0	no	Very Low	Unknown

Notes
Score >=750, High
500 - 750, Medium High
250 - 500, Medium
100 - 250, Low
<=100, Very Low

Appendix C
Remedial Alternative Cost Estimates

Table C1-WR1 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative WR1 - No Action for Mine Wastes

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 20, 2003

Checked By: K. Zambrano
Date: 07/7/05

CAPITAL COSTS:

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					$ -		$ -		$ -		$ -		$ -	

PERIODIC COSTS (EPA):

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					$ 17,834		$ 17,834		$ 17,834		$ 17,834		$ 17,834	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4841	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
TOTAL PRESENT VALUE OF ALTERNATIVE WR1				$44,300		$44,300		$44,300		$44,300		$44,300	

Notes:
- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.484149784	Periodic cost, every 5 years beginning in year 5

Table C1-WR2 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 07/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	1,173.3	$ 5,573	0	$ -	7,699	$ 36,571	4,436	$ 21,070	1,734	$ 8,235	
Site preparation and storm water control	CW-6	AC	$12,543	0.2	$ 2,509	0.0	$ -	2.0	$ 25,086	1.0	$ 12,543	20.8	$ 260,270	Includes long-term site surface water controls.
Waste grading and consolidation	CW-7	CY	$3.43	490.0	$ 1,681	0	$ -	3,715	$ 12,742	36,735	$ 126,001	29,665	$ 101,751	
Backfill and close mine openings	CW-8	EA	$12,635	2.0	$ 25,270	0	$ -	11	$ 138,985	10	$ 126,350	4	$ 50,540	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	968.0	$ 16,766	0.0	$ -	9,680.0	$ 167,658	4,840.0	$ 83,829	100,430.0	$ 1,739,448	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.2	$ 525	0.0	$ -	2.0	$ 5,253	1.0	$ 2,627	20.8	$ 54,500	
Erosion control mat	CW-11	SY	$1.33	193.6	$ 257	0	$ -	1,936	$ 2,575	968	$ 1,287	20,086	$ 26,714	
Reclaim Access roads	CW-12	SY	$4.23	1,173.3	$ 4,963	0	$ -	7,699	$ 32,567	4,436	$ 18,763	1,734	$ 7,333	
Post-Construction Submittals	CW-13	LS	$23,976	1.0	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 193,745		$ 136,200		$ 557,637		$ 528,670		$ 2,384,992	
Construction Contingencies		15%			$ 29,062		$ 20,430		$ 83,646		$ 79,301		$ 357,749	10% Scope, 5% Bid
				SUBTOTAL	$ 222,807		$ 156,630		$ 641,283		$ 607,971		$ 2,742,740	
Project Management		8%			$ 17,825		$ 12,530		$ 51,303		$ 48,638		$ 219,419	EPA Cost Guidance
Remedial Design		15%			$ 33,421		$ 23,495		$ 96,192		$ 91,196		$ 411,411	EPA Cost Guidance
Construction Management		10%			$ 22,281		$ 15,663		$ 64,128		$ 60,797		$ 274,274	EPA Cost Guidance
				SUBTOTAL	$ 73,526		$ 51,688		$ 211,623		$ 200,630		$ 905,104	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	2	$ 800	0	$ -	11	$ 4,400	10	$ 4,000	4	$ 1,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 297,133**		**$ 208,319**		**$ 857,306**		**$ 812,601**		**$ 3,649,445**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	8	$ 500	0	$ -	44	$ 1,100	40	$ 1,000	16	$ 500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	2	$ 1,000	0	$ -	11	$ 5,500	10	$ 5,000	4	$ 2,000	Engineering Estimate
				SUBTOTAL	$ 1,500	SUBTOTAL	$ -		$ 6,600		$ 6,000		$ 2,500	
O&M Contingencies		25%			$ 375		$ -		$ 1,650		$ 1,500		$ 625	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,875**		**$ -**		**$ 8,250**		**$ 7,500**		**$ 3,125**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	0	$ -	1	$ -	1	$ -	1	$ -	Cost divided equally amoung categories
IC Plan Revew Review/Update	CW-23	LS	$1,150	1	$ 1,150	0	$ -	1	$ -	1	$ -	1	$ -	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ -		$ -		$ -		$ -	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ -**		**$ -**		**$ -**		**$ -**	

Table C1-WR2 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 07/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$297,133	$297,133	$208,319	$208,319	$857,306	$857,306	$812,601	$812,601	$3,649,445	$3,649,445	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$1,875	$26,786	$0	$0	$8,250	$117,857	$7,500	$107,143	$3,125	$44,643	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$0	$0	$0	$0	$0	$0	$0	$0	Periodic cost, every 5 years beginning in year 5
				$371,792		$208,319		$975,163		$919,744		$3,694,087	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$371,800		$208,300		$975,200		$919,700		$3,694,100	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-WR3 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated

Prepared By: B. Comon
Date: January 20, 2003
Checked By: K. Zambrano
Date: 07/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	1,173	$ 5,573	0	$ -	7,699	$ 36,571	4,436	$ 21,070	1,734	$ 8,235	
Site preparation and storm water control	CW-6	AC	$12,543	0.2	$ -	0.0	$ -	2.0	$ 156,789	1.0	$ 7,526	20.8	$ 123,550	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	490	$ -	0	$ -	3,715	$ 103,758	36,735	$ 4,980	29,665	$ 3,021	
Backfill and close mine openings	CW-8	EA	$11,957	2	$ -	0	$ -	11	$ 71,742	10	$ 71,742	4	$ 59,785	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	968.0	$ 16,766	0.0	$ -	9,680.0	$ 167,658	4,840.0	$ 83,829	100,430.0	$ 1,739,448	
Place 18" coversoil on wastes	CW-14	AC	$42,562	0.2	$ 8,512	0	$ -	2.0	$ 85,124	1.0	$ 42,562	20.8	$ 883,152	Includes purchase and delivery of fill from offsite
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.2	$ 525	0.0	$ -	2.0	$ 5,253	1.0	$ 2,627	20.8	$ 54,500	
Erosion control mat	CW-11	SY	$1.33	194	$ 257	0	$ -	1,936	$ 2,575	968	$ 1,287	20,086	$ 26,714	
Reclaim Access roads	CW-12	SY	$4.23	1,173	$ 4,963	0.0	$ -	7,699	$ 32,567	4,436	$ 18,763	1,734	$ 7,333	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 172,798		$ 136,200		$ 798,236		$ 390,586		$ 3,041,948	
Construction Contingencies		15%			$ 25,920		$ 20,430		$ 119,735		$ 58,588		$ 456,292	10% Scope, 5% Bid
				SUBTOTAL	$ 198,718		$ 156,630		$ 917,972		$ 449,174		$ 3,498,240	
Project Management		8%			$ 15,897		$ 12,530		$ 73,438		$ 35,934		$ 279,859	EPA Cost Guidance
Remedial Design		15%			$ 29,808		$ 23,495		$ 137,696		$ 67,376		$ 524,736	EPA Cost Guidance
Construction Management		10%			$ 19,872		$ 15,663		$ 91,797		$ 44,917		$ 349,824	EPA Cost Guidance
				SUBTOTAL	$ 65,577		$ 51,688		$ 302,931		$ 148,227		$ 1,154,419	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	2	$ 800	0	$ -	11	$ 4,400	10	$ 4,000	4	$ 1,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 265,094**		**$ 208,319**		**$ 1,225,302**		**$ 601,402**		**$ 4,654,259**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	8	$ 500	0	$ -	44	$ 1,100	40	$ 1,000	16	$ 500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	2	$ 1,000	0	$ -	11	$ 5,500	10	$ 5,000	4	$ 2,000	Engineering Estimate
				SUBTOTAL	$ 1,500	SUBTOTAL	$ -		$ 6,600		$ 6,000		$ 2,500	
O&M Contingencies		25%			$ 375		$ -		$ 1,650		$ 1,500		$ 625	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,875**		**$ -**		**$ 8,250**		**$ 7,500**		**$ 3,125**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	0	$ -	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	0	$ -	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ -		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ -**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C1-WR3 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site:	**Basin Mining Area OU2**	**Description:** Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated	**Prepared By:** B. Colton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 07/7/05

PRESENT VALUE ANALYSIS

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$265,094	$265,094	$208,319	$208,319	$1,225,302	$1,225,302	$601,402	$601,402	$4,654,259	$4,654,259	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$1,875	$26,786	$0	$0	$8,250	$117,857	$7,500	$107,143	$3,125	$44,643	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$0	$0	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$339,753		$208,319		$1,391,033		$756,418		$4,746,775	
TOTAL PRESENT VALUE OF ALTERNATIVE WR3				$339,800		$208,300		$1,391,000		$756,400		$4,746,800	

Notes:
- Total annual expenditure is the total cost per year with no discounting
- Present value (PV) is the total cost per year including a 7% discount factor for that year
- Total present value is rounded to the nearest $100
- Minimum item cost = $500
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-WR4 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: Buz Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 07/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	1,173	$ 5,573	0	$ -	7,699	$ 36,571	4,436	$ 21,070	1,734	$ 8,235	
Site preparation and storm water control	CW-6	AC	$12,543	0.2	$ -	0.0	$ -	2.0	$ 156,789	1.0	$ 7,526	20.8	$ 123,550	Includes long-term site surface water controls
Excavate mine waste	CW-15	CY	$4.84	980	$ 4,547	0	$ -	7,430	$ 34,475	73,470	$ 340,901	59,330	$ 275,291	
Transport mine waste		CY-MI	$ 0.60	13,916	$ 8,350	0	$ -	113,771	$ 68,262	1,084,130	$ 650,478	848,152	$ 508,891	EPA Cost Estimate
Spread and compact mine waste	CW-16	CY	$ 0.81	980	$ 795	0	$ -	7,430	$ 6,031	73,470	$ 59,632	59,330	$ 48,155	
Luttrell Repository disposal		CY	$ 5.00	980	$ 4,900	0	$ -	7,430	$ 37,150	73,470	$ 367,350	59,330	$ 296,650	EPA Cost Estimate
Backfill and close mine openings	CW-8	EA	$11,957	2	$ -	0	$ -	11	$ 71,742	10	$ 71,742	4	$ 59,785	
6" coversoil on excavated areas	CW-14	AC	$22,270	0.2	$ 4,454	0	$ -	2.0	$ 44,540	1.0	$ 22,270	20.8	$ 462,103	Includes purchase and delivery of fill from offsite
Organic amendment	CW-17	SY	$0.62	968.0	$ -	0.0	$ -	9,680.0	$ 6,002	4,840.0	$ 3,001	100,430.0	$ 62,267	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.2	$ 525	0.0	$ -	2.0	$ 5,253	1.0	$ 2,627	20.8	$ 54,500	
Erosion control mat	CW-11	SY	$1.33	194	$ 257	0	$ -	1,936	$ 2,575	968	$ 1,287	20,086	$ 26,714	
Reclaim Access roads	CW-12	SY	$4.23	1,173	$ 4,963	0	$ -	7,699	$ 32,567	4,436	$ 18,763	1,734	$ 7,333	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 170,566		$ 136,200		$ 638,157		$ 1,702,846		$ 2,069,675	
Construction Contingencies		15%			$ 25,585		$ 20,430		$ 95,724		$ 255,427		$ 310,451	10% Scope, 5% Bid
				SUBTOTAL	$ 196,151		$ 156,630		$ 733,881		$ 1,958,273		$ 2,380,126	
Project Management		8%			$ 15,692		$ 12,530		$ 58,710		$ 156,662		$ 190,410	EPA Cost Guidance
Remedial Design		15%			$ 29,423		$ 23,495		$ 110,082		$ 293,741		$ 357,019	EPA Cost Guidance
Construction Management		10%			$ 19,615		$ 15,663		$ 73,388		$ 195,827		$ 238,013	EPA Cost Guidance
				SUBTOTAL	$ 64,730		$ 51,688		$ 242,181		$ 646,230		$ 785,441	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	2	$ 800	0	$ -	11	$ 4,400	10	$ 4,000	4	$ 1,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 261,681**		**$ 208,319**		**$ 980,481**		**$ 2,606,503**		**$ 3,167,167**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	8	$ 500	0	$ -	44	$ 1,100	40	$ 1,000	16	$ 500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	2	$ 1,000	0	$ -	11	$ 5,500	10	$ 5,000	4	$ 2,000	Engineering Estimate
				SUBTOTAL	$ 1,500	SUBTOTAL	$ -		$ 6,600		$ 6,000		$ 2,500	
O&M Contingences		25%			$ 375		$ -		$ 1,650		$ 1,500		$ 625	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,875**		**$ -**		**$ 8,250**		**$ 7,500**		**$ 3,125**	

ANNUAL O&M COSTS (EPA Years 0-10)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	0	$ -	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	813	$ 250	0	$ -	6,167	$ 1,893	60,980	$ 18,721	49,244	$ 15,118	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	0	$ -	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,950		$ -		$ 3,593		$ 20,421		$ 16,818	
O&M Contingences		25%			$ 487		$ -		$ 898		$ 5,105		$ 4,204	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 2,437**		**$ -**		**$ 4,492**		**$ 25,526**		**$ 21,022**	

ANNUAL O&M COSTS (State of Montana years 11-200)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	0	$ -	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	81	$ 25	0	$ -	617	$ 189	6,098	$ 1,872	4,924	$ 1,512	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	0	$ -	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,725		$ -		$ 1,889		$ 3,572		$ 3,212	
O&M Contingences		25%			$ 431		$ -		$ 472		$ 893		$ 803	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 2,156**		**$ -**		**$ 2,362**		**$ 4,465**		**$ 4,015**	

Table C1-WR4 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: Buz Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 07/7/05

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	0	$ -	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	0	$ -	1	$ -	1	$ -	1	$ -	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ -		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					$ 19,272		$ -		$ 17,834		$ 17,834		$ 17,834	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$261,681	$261,681	$208,319	$208,319	$980,461	$980,461	$2,608,503	$2,608,503	$3,167,167	$3,167,167	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	14.2857	$1,875	$26,786	$0	$0	$8,250	$117,857	$7,500	$107,143	$3,125	$44,643	Annual cost, years 1 through 200
Annual Luttrell O&M Cost (EPA)	1 - 10	7.0236	$2,437	$17,117	$0	$0	$4,492	$31,547	$25,526	$179,285	$21,022	$147,652	Annual cost, years 1 through 10
Annual Luttrell O&M Cost (Montana)	11 - 200	7.2621	$2,156	$15,659	$0	$0	$2,362	$17,151	$4,465	$32,426	$4,015	$29,155	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$0	$0	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$369,116		$208,319		$1,191,317		$2,971,659		$3,432,919	
TOTAL PRESENT VALUE OF ALTERNATIVE WR4				$369,100		$208,300		$1,191,300		$2,971,700		$3,432,900	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.484149478	Periodic cost, every 5 years beginning in year 5

Table C1-AD1 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			6		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			6	ls	$ -	$ -	
TOTAL CAPITAL COSTS						$ -	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C1-AD1 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE AD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-AD2 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction		6		$ -	$ -	There are no construction costs for this alternative.
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Institutional Controls for Adit Areas		6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,400**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections and Sampling		24	hr	$ 25.00	$ 600	4 hr/site, once/yr by local technician
Laboratory (3 samples per site per year)		18	each	$ 250.00	$ 4,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 5,600	
O&M Contingencies			25%		$ 1,400	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 7,000**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C1-AD2 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,400	1.0000	$2,400	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$7,000	14.2857	$100,000	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$341,766	
TOTAL PRESENT VALUE OF ALTERNATIVE AD2				$341,800	

Notes:

- There are no capital costs associated with this alternative
- Total annual expenditure is the total cost per year with no discounting
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-AD3 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$ 8,998	
Access Roads		CW-5	13,698	SY	$4.75	$ 65,067	To adit site.
Site Preparation and Storm Water Control		CW-6	14.05	AC	$3,022	$ 42,459	
Subsurface Grouting		CW-24	8,609	LF	$6,347	$ 54,639,409	20% of the length of all adits grouted.
Surface Water Controls		CW-25	14.05	AC	$9,120	$ 128,139	
Fertilize, seed and mulch		CW-10	14.05	AC	$2,626.51	$ 36,902	
Erosion control mat		CW-11	6800.2	SY	$1.33	$ 9,044	Used on 10% of area
Reclaim Access roads		CW-12	13,698	SY	$4.23	$ 57,944	
Post-Construction Submittals		CW-13	1	LS	$119,879	$ 119,879	
	SUBTOTAL					$ 55,628,529	
Construction Contingencies				15%		$ 8,344,279	10% Scope, 5% Bid
	SUBTOTAL					$ 63,972,808	
Project Management				8%		$ 5,117,825	EPA Cost Guidance
Remedial Design				15%		$ 9,595,921	EPA Cost Guidance
Construction Management				10%		$ 6,397,281	EPA Cost Guidance
	SUBTOTAL					$ 21,111,027	
Institutional Controls for Adit Areas			6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 85,086,235**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections			12	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 1,000	
O&M Contingencies				25%		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 1,250**	

Table C1-AD3 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$85,086,235	1.0000	$85,086,235	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$85,343,458	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$85,343,500	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-AD4 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Road	CW-5	13,698	SY	$4.75	$ 65,067	To treatment site.
Construct Wetland Treatment Facility	CW-26	18.2	GPM	$21,386	$ 389,232	Based on cost to treat 5 gpm
Reclaim Access roads	CW-12	13,698	SY	$4.23	$ 57,944	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 1,161,807	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 92,945	
Construction Contingencies			15%		$ 174,271	10% Scope, 5% Bid
SUBTOTAL					$ 1,429,023	
Project Management			8%		$ 114,322	EPA Cost Guidance
Remedial Design			15%		$ 214,353	EPA Cost Guidance
Construction Management			10%		$ 142,902	EPA Cost Guidance
SUBTOTAL					$ 471,577	
Institutional Controls for Adit Areas		6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,903,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	
Remove FWS Spent Substrate, Disposal at Luttrell Repos		763	cy	$ 15.00	$ 11,439	Assume 1/15th of material spent (15 yr life)
Remove SF Spent Substrate, Disposal at Luttrell Repos.		223	cy	$ 15.00	$ 3,341	Assume 1/15th of material spent (15 yr life)
Remove ALD Spent Substrate, Disposal at Luttrell Repos.		212	cy	$ 15.00	$ 3,178	Assume 1/15th of material spent (15 yr life)
Replace FWS Substrate (1/15 per year)		763	cy	$ 22.63	$ 17,254	
Replace SF Substrate (1/15 per year)		223	cy	$ 34.27	$ 7,632	
Replace ALD Substrate (1/15 per year)		212	cy	$ 70.54	$ 14,943	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 62,185	
O&M Contingencies			25%		$ 15,546	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 77,732**	

Table C1-AD4 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$1,903,000	1.0000	$1,903,000	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$77,732	7.0236	$545,955	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$77,732	7.2621	$564,497	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$3,252,819	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4				$3,252,800	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-AD4B Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD4B - Biological Treatment of Acid Mine Drainage at Single Subarea Location

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD4B consists of the construction of a wetland treatment system for all mine sites flowing adits withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Road	CW-5	13,698	SY	$4.75	$ 65,067	To treatment site
Site Preparation and Storm Water Control	CW-6	14.05	AC	$12,543	$ 176,231	Includes long-term site surface water controls
Construct Wetland Treatment Facility	CW-26	18.2	GPM	$21,386	$ 389,232	Based on cost to treat 5 gpm
Install ARD Collection Piping (each site)	CW-27	6	EA	$34,822	$ 208,932	System includes 1000 feet of pipe in trench
Fertilize, seed and mulch	CW-10	18.20	AC	$2,626.51	$ 47,802	
Erosion control mat	CW-11	8808.8	SY	$1.33	$ 11,716	
Reclaim Access roads	CW-12	13,698	SY	$4.23	$ 57,944	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 1,606,488	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 128,519	
Construction Contingencies			15%		$ 240,973	10% Scope, 5% Bid
SUBTOTAL					$ 1,975,981	
Project Management			8%		$ 158,078	EPA Cost Guidance
Remedial Design			15%		$ 296,397	EPA Cost Guidance
Construction Management			10%		$ 197,598	EPA Cost Guidance
SUBTOTAL					$ 652,074	
Institutional Controls for Adit Areas		6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,630,454**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	Engineering Estimate
Spent Substrate Removal and Disposal at Luttrell Repository		3,096	cy	$ 15.00	$ 46,439	Engineering Estimate/Min. $500
Replace Substrate (1/15 per year)		3,096	cy	$ 70.63	$ 218,652	Engineering Estimate/Min. $500
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 269,490	
O&M Contingencies			25%		$ 67,373	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 336,863**	

Table C1-AD4B Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD4B - Biological Treatment of Acid Mine Drainage at Single Subarea Location

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4B consists of the construction of a wetland treatment system for all mine sites flowing adits withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,630,454	1.0000	$2,630,454	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$336,863	7.0236	$2,365,984	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$336,863	7.2621	$2,446,337	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$7,682,142	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4B				$7,682,100	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-AD5 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: May 29, 2003
Checked By: K. Zambrano
Date: 7/07/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$	119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$	384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$	15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$	8,998	
Access Roads		CW-5	13,698	SY	$4.75	$	65,067	To adit site
Site Preparation and Storm Water Control		CW-6	14.05	AC	$3,022	$	42,459	
Site Characterization		CW-33	2	LS	$152,403	$	304,806	Investigation of Vindicator and Bullion Mine adits.
Underground Subsurface Grouting		CW-32	1	LS	$850,212	$	850,212	Grouting of Vindicator and Bullion Mine adits.
Surface Water Controls		CW-25	14.05	AC	$9,120	$	128,139	
Fertilize, seed and mulch		CW-10	14.05	AC	$2,627	$	36,902	
Erosion control mat		CW-11	13,600	SY	$1.33	$	18,089	
Reclaim Access roads		CW-12	13,698	SY	$4.23	$	57,944	
Post-Construction Submittals		CW-13	1	LS	$119,879	$	119,879	
	SUBTOTAL					$	2,153,182	
Construction Contingencies				15%		$	322,977	10% Scope, 5% Bid
	SUBTOTAL					$	2,476,160	
Project Management				8%		$	198,093	EPA Cost Guidance
Remedial Design				15%		$	371,424	EPA Cost Guidance
Construction Management				10%		$	247,616	EPA Cost Guidance
	SUBTOTAL					$	817,133	
Propretary Controls for Adit Areas			6	ls	$ 400.00	$	2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						$	**3,295,693**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Site Inspections			12	hr	$ 25.00	$	500	2 hr/site, once/yr by local technician
Materials and Supplies (per year)			1	ls	$ 500.00	$	500	Engineering Estimate
	SUBTOTAL					$	1,000	
O&M Contingencies				25%		$	250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						$	**1,250**	

Table C1-AD5 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** May 29, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		**Date:** 7/07/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$3,295,693	1.0000	$3,295,693	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$3,552,916	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$3,552,900	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-SD1 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** Janaury 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 07/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				15%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C1-SD1 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** Janaury 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-SD2 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** Janaury 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date. 07/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no construction costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)			32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara, twice/year)			24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 7,300	
O&M Contingencies				25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C1-SD2 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** Janaury 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 07/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$371,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$371,700	

Notes:

- There are no capital costs associated with this alternative
- Total annual expenditure is the total cost per year with no discounting
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-SW1 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** Janaury 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Surface Water Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						$ -	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C1-SW1 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** Janaury 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SW1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-SW2 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 07/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			15%		$ -	
SUBTOTAL					$ -	
Project Management			8%		$ -	
Remedial Design			15%		$ -	
Construction Management			10%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Surface Water Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	8 hrs twice/yr by 2 local technicians
Analytical (5 /subara; twice/year)		10	each	$ 250.00	$ 2,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 3,800	
O&M Contingencies			15%		$ 570	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 4,370**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C1-SW2 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 07/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,370	14.2857	$62,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$303,795	
TOTAL PRESENT VALUE OF ALTERNATIVE SW2				$303,800	

Notes:

- There are no capital costs associated with this alternative
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C1-SW3 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9387	SY	$4.75	$ 44,587	To diversion and treatment sites.
Site Preparation and Storm Water Control	CW-6	69.4	AC	$12,543	$ 870,044	Includes long-term site surface water controls.
Construct Wetland Treatment Facility	CW-26	448.6	GPM	$21,386	$ 9,598,200	Based on cost to treat 5 gpm
Install Surface Water Collection Piping	CW-28	1	EA	$93,623	$ 93,623	24-inch diameter piping system
Fertilize, seed and mulch	CW-10	69.36411004	AC	$2,626.51	$ 182,186	
Erosion control mat	CW-11	67144.45852	SY	$1.33	$ 89,302	
Reclaim Access roads	CW-12	9387	SY	$4.23	$ 39,706	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 11,567,212	
Construction Contingencies			15%		$ 1,735,082	10% Scope, 5% Bid
SUBTOTAL					$ 13,302,294	
Project Management			8%		$ 1,064,183	EPA Cost Guidance
Remedial Design			15%		$ 1,995,344	EPA Cost Guidance
Construction Management			10%		$ 1,330,229	EPA Cost Guidance
SUBTOTAL					$ 4,389,757	
Proprietary Controls for Surface Water Areas		0	ls	$ 400.00	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 17,692,050**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 2,000.00	$ 2,000	Engineering Estimate
Spent Substrate Removal and Disposal at Luttrell Repository		72,103	cy	$ 15.00	$ 1,081,544	Engineering Estimate/Min. $500
Replace Substrate (1/15 per year)		72,103	cy	$ 70.63	$ 5,092,319	Engineering Estimate/Min. $500
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 6,179,263	
O&M Contingencies			15%		$ 926,889	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 7,106,152**	

Table C1-SW3 Remedial Alternative Cost Summary, Jack Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$17,692,050	1.0000	$17,692,050	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$7,106,152	7.0236	$49,910,640	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$7,106,152	7.2621	$51,605,686	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$119,447,743	
TOTAL PRESENT VALUE OF ALTERNATIVE SW3				$119,447,700	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-WR1 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative WR1 - No Action for Mine Wastes

Site:	Basin Mining Area OU2	**Description:** Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton **Date:** January 22, 2003
Location:	Jefferson County, Montana		
Phase:	Feasibility Study (-30% to +50%)		**Checked By:** K. Zambrano
Base Year:	2003		Date: 7/7/05
Date:	January 2003		

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4841	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
TOTAL PRESENT VALUE OF ALTERNATIVE WR1				$44,300		$44,300		$44,300		$44,300		$44,300	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-WR2 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	0	$ -	0	$ -	0	$ -	9,184	$ 43,622	3,606	$ 17,127	
Site preparation and storm water control	CW-6	AC	$12,543	0.0	$ -	0.0	$ -	0.0	$ -	4.0	$ 50,173	21.3	$ 267,169	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	0	$ -	0	$ -	0	$ -	3,900	$ 13,377	26,330	$ 90,312	
Backfill and close mine openings	CW-8	EA	$12,635	0	$ -	0	$ -	0	$ -	13	$ 164,255	7	$ 88,445	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	0.0	$ -	0.0	$ -	0.0	$ -	19,360.0	$ 335,315	103,092.0	$ 1,785,553	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.0	$ -	0.0	$ -	0.0	$ -	4.0	$ 10,506	21.3	$ 55,945	
Erosion control mat	CW-11	SY	$1.33	0	$ -	0	$ -	0	$ -	3,872	$ 5,150	20,618	$ 27,422	
Reclaim Access roads	CW-12	SY	$4.23	0	$ -	0	$ -	0	$ -	9,184	$ 38,847	3,606	$ 15,252	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 136,200		$ 136,200		$ 136,200		$ 797,445		$ 2,483,426	
Construction Contingencies		15%			$ 20,430		$ 20,430		$ 20,430		$ 119,617		$ 372,514	10% Scope, 5% Bid
				SUBTOTAL	$ 156,630		$ 156,630		$ 156,630		$ 917,061		$ 2,855,940	
Project Management		8%			$ 12,530		$ 12,530		$ 12,530		$ 73,365		$ 228,475	EPA Cost Guidance
Remedial Design		15%			$ 23,495		$ 23,495		$ 23,495		$ 137,559		$ 428,391	EPA Cost Guidance
Construction Management		10%			$ 15,663		$ 15,663		$ 15,663		$ 91,706		$ 285,594	EPA Cost Guidance
				SUBTOTAL	$ 51,688		$ 51,688		$ 51,688		$ 302,630		$ 942,460	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	0	$ -	0	$ -	0	$ -	13	$ 5,200	7	$ 2,800	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 208,319**		**$ 208,319**		**$ 208,319**		**$ 1,224,891**		**$ 3,801,200**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	52	$ 1,300	28	$ 700	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	13	$ 6,500	7	$ 3,500	Engineering Estimate
				SUBTOTAL	$ -	SUBTOTAL	$ -		$ -		$ 7,800		$ 4,200	
O&M Contingencies		25%			$ -		$ -		$ -		$ 1,950		$ 1,050	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ 9,750**		**$ 5,250**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	0	$ -	0	$ -	0	$ -	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	0	$ -	0	$ -	0	$ -	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ -		$ -		$ -		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ -**		**$ -**		**$ -**		**$ 19,272**		**$ 19,272**	

Table C2-WR2 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$1,224,891	$1,224,891	$3,801,200	$3,801,200	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$0	$0	$0	$0	$0	$0	$9,750	$139,286	$5,250	$75,000	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$0	$0	$0	$0	$0	$0	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$208,319		$208,319		$208,319		$1,412,050		$3,924,074	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$208,300		$208,300		$208,300		$1,412,100		$3,924,100	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-WR3 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	0	$ -	0	$ -	0	$ -	9,184	$ 43,622	3,606	$ 17,127	
Site preparation and storm water control	CW-6	AC	$12,543	0.0	$ -	0.0	$ -	0.0	$ -	4.0	$ 50,173	21.3	$ 267,169	Includes long-term site surface water controls.
Waste grading and consolidation	CW-7	CY	$3.43	0	$ -	0	$ -	0	$ -	3,900	$ 13,377	26,330	$ 90,312	
Backfill and close mine openings	CW-8	EA	$12,635	0	$ -	0	$ -	0	$ -	13	$ 164,255	7	$ 88,445	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	0.0	$ -	0.0	$ -	0.0	$ -	19,360.0	$ 335,315	103,092.0	$ 1,785,553	
Place 18" coversoil on wastes	CW-14	AC	$42,562	0	$ -	0	$ -	0	$ -	4.0	$ 170,248	21.3	$ 906,571	Includes purchase and delivery of fill from offsite.
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.0	$ -	0.0	$ -	0.0	$ -	4.0	$ 10,506	21.3	$ 55,945	
Erosion control mat	CW-11	SY	$1.33	0	$ -	0	$ -	0	$ -	3,872	$ 5,150	20,618	$ 27,422	
Reclaim Access roads	CW-12	SY	$4.23	0	$ -	0	$ -	0	$ -	9,184	$ 38,847	3,606	$ 15,252	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 136,200		$ 136,200		$ 136,200		$ 867,693		$ 3,389,997	
Construction Contingencies		15%			$ 20,430		$ 20,430		$ 20,430		$ 145,154		$ 508,500	10% Scope, 5% Bid
				SUBTOTAL	$ 156,630		$ 156,630		$ 156,630		$ 1,112,846		$ 3,898,496	
Project Management		8%			$ 12,530		$ 12,530		$ 12,530		$ 89,028		$ 311,880	EPA Cost Guidance
Remedial Design		15%			$ 23,495		$ 23,495		$ 23,495		$ 166,927		$ 584,774	EPA Cost Guidance
Construction Management		10%			$ 15,663		$ 15,663		$ 15,663		$ 111,285		$ 389,850	EPA Cost Guidance
				SUBTOTAL	$ 51,688		$ 51,688		$ 51,688		$ 367,239		$ 1,286,504	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	0	$ -	0	$ -	0	$ -	13	$ 5,200	7	$ 2,800	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 208,319**		**$ 208,319**		**$ 208,319**		**$ 1,485,286**		**$ 5,187,800**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	52	$ 1,300	28	$ 700	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	13	$ 6,500	7	$ 3,500	Engineering Estimate
				SUBTOTAL	$ -	SUBTOTAL	$ -		$ -		$ 7,800		$ 4,200	
O&M Contingencies		25%			$ -		$ -		$ -		$ 1,950		$ 1,050	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ 9,750**		**$ 5,250**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	0	$ -	0	$ -	0	$ -	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	0	$ -	0	$ -	0	$ -	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ -		$ -		$ -		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ -**		**$ -**		**$ -**		**$ 19,272**		**$ 19,272**	

Table C2-WR3 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$1,485,286	$1,485,286	$5,167,600	$5,167,600	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$0	$0	$0	$0	$0	$0	$9,750	$139,286	$5,250	$75,000	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$0	$0	$0	$0	$0	$0	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$208,319		$208,319		$208,319		$1,672,445		$5,310,673	
TOTAL PRESENT VALUE OF ALTERNATIVE WR3				$208,300		$208,300		$208,300		$1,672,400		$5,310,700	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-WR4 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	0	$ -	0	$ -	0	$ -	9,184	$ 43,622	3,606	$ 17,127	
Site preparation and storm water control	CW-6	AC	$12,543	0.0	$ -	0.0	$ -	0.0	$ -	4	$ 50,173	21	$ 267,169	Includes long-term site surface water controls.
Excavate mine waste	CW-15	CY	$4.64	0	$ -	0	$ -	0	$ -	7,800	$ 36,192	52,660	$ 244,342	
Transport mine waste		CY-MI	$ 0.60	0	$ -	0	$ -	0	$ -	144,030	$ 86,418	922,320	$ 553,392	EPA Cost Estimate
Spread and compact mine waste	CW-16	CY	$ 0.81	0	$ -	0	$ -	0	$ -	7,800	$ 6,331	52,660	$ 42,741	
Luttrell Repository disposal		CY	$ 5.00	0	$ -	0	$ -	0	$ -	7,800	$ 39,000	52,660	$ 263,300	EPA Cost Estimate
Backfill and close mine openings	CW-8	EA	$12,635	1	$ -	1	$ -	1	$ -	13	$ 164,255	7	$ 88,445	
6" coversoil on excavated areas	CW-14	AC	$22,270	0	$ -	0	$ -	0	$ -	4	$ 89,080	21	$ 474,351	Includes purchase and delivery of fill from offsite
Organic amendment	CW-17	SY	$0.62	0.0	$ -	0.0	$ -	0.0	$ -	19,360.0	$ 12,003	103,092.0	$ 63,917	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.0	$ -	0.0	$ -	0.0	$ -	4	$ 10,506	21	$ 55,945	
Erosion control mat	CW-11	SY	$1.33	0	$ -	0	$ -	0	$ -	3,872	$ 5,150	20,618	$ 27,422	
Reclaim Access roads	CW-12	SY	$4.23	0	$ -	0	$ -	0	$ -	9,184	$ 38,847	3,606	$ 15,252	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 136,200		$ 136,200		$ 136,200		$ 717,776		$ 2,249,604	
Construction Contingencies		15%			$ 20,430		$ 20,430		$ 20,430		$ 107,666		$ 337,441	10% Scope, 5% Bid
				SUBTOTAL	$ 156,630		$ 156,630		$ 156,630		$ 825,443		$ 2,587,045	
Project Management		8%			$ 12,530		$ 12,530		$ 12,530		$ 66,035		$ 206,964	EPA Cost Guidance
Remedial Design		15%			$ 23,495		$ 23,495		$ 23,495		$ 123,816		$ 388,057	EPA Cost Guidance
Construction Management		10%			$ 15,663		$ 15,663		$ 15,663		$ 82,544		$ 258,705	EPA Cost Guidance
				SUBTOTAL	$ 51,688		$ 51,688		$ 51,688		$ 272,396		$ 853,725	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	0	$ -	0	$ -	0	$ -	13	$ 5,200	7	$ 2,800	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 208,319**		**$ 208,319**		**$ 208,319**		**$ 1,103,039**		**$ 3,443,570**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	52	$ 1,300	28	$ 700	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	13	$ 6,500	7	$ 3,500	Engineering Estimate
				SUBTOTAL	$ -	SUBTOTAL	$ -		$ -		$ 7,800		$ 4,200	
O&M Contingencies		25%			$ -		$ -		$ -		$ 1,950		$ 1,050	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ 9,750**		**$ 5,250**	

ANNUAL O&M COSTS (EPA Years 0-10)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	0	$ -	0	$ -	0	$ -	6,474	$ 1,988	43,708	$ 13,418	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ -		$ -		$ -		$ 3,688		$ 15,118	
O&M Contingencies		25%			$ -		$ -		$ -		$ 922		$ 3,780	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ 4,609**		**$ 18,898**	

ANNUAL O&M COSTS (State of Montana years 11-200)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	0	$ -	0	$ -	0	$ -	647	$ 199	4,371	$ 1,342	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ -		$ -		$ -		$ 1,899		$ 3,042	
O&M Contingencies		25%			$ -		$ -		$ -		$ 475		$ 760	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ 2,373**		**$ 3,802**	

Table C2-WR4 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Colton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	0	$ -	0	$ -	1	$ -	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	0	$ -	0	$ -	1	$ -	1	$ -	1	$ -	Cost divided equally amoung categories
Contingencies		25%			$ -		$ -		$ -		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					$ -		$ -		$ -		$ 17,834		$ 17,834	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$1,103,039	$1,103,039	$3,443,570	$3,443,570	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	14.2857	$0	$0	$0	$0	$0	$0	$9,750	$139,286	$5,250	$75,000	Annual cost, years 1 through 200
Annual Luttrell O&M Cost (EPA)	1 - 10	7.0236	$0	$0	$0	$0	$0	$0	$4,609	$32,374	$18,898	$132,731	Annual cost, years 1 through 10
Annual Luttrell O&M Cost (Montana)	11 - 200	7.2621	$0	$0	$0	$0	$0	$0	$2,373	$17,236	$3,802	$27,613	Annual cost, years 1 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$0	$0	$0	$0	$0	$0	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$208,319		$208,319		$208,319		$1,336,237		$3,723,215	
TOTAL PRESENT VALUE OF ALTERNATIVE WR4				$208,300		$208,300		$208,300		$1,336,200		$3,723,200	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.484149484	Periodic cost, every 5 years beginning in year 5

Table C2-AD1 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the allernative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			3		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			3	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C2-AD1 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE AD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-AD2 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			3		$ -	$ -	There are no construction costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			3	ls	$ 400.00	$ 1,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 1,200**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections and Sampling			6	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Laboratory (3 samples per site per year)			9	each	$ 250.00	$ 2,250	Engineering Estimate
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 3,250	
O&M Contingencies				25%		$ 813	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 4,063**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C2-AD2 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$1,200	1.0000	$1,200	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,063	14.2857	$58,036	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$298,602	
TOTAL PRESENT VALUE OF ALTERNATIVE AD2				$298,600	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-AD3 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$ 8,998	
Access Roads		CW-5	1624	SY	$4.75	$ 7,712	To adit site
Site Preparation and Storm Water Control		CW-6	18.00	AC	$3,022	$ 54,398	
Subsurface Grouting		CW-24	3929	LF	$6,347	$ 24,937,692	Per linear foot of adit length. 20% of adit grouted
Surface Water Controls		CW-25	18.00	AC	$9,120	$ 164,164	
Fertilize, seed and mulch		CW-10	18.00	AC	$2,626.51	$ 47,277	
Erosion control mat		CW-11	17424	SY	$1.33	$ 23,174	
Reclaim Access roads		CW-12	1624	SY	$4.23	$ 6,867	
Post-Construction Submittals		CW-13	1	LS	$119,879	$ 119,879	
	SUBTOTAL					$ 25,890,847	
Construction Contingencies				15%		$ 3,883,627	10% Scope, 5% Bid
	SUBTOTAL					$ 29,774,474	
Project Management				8%		$ 2,381,958	EPA Cost Guidance
Remedial Design				15%		$ 4,466,171	EPA Cost Guidance
Construction Management				10%		$ 2,977,447	EPA Cost Guidance
	SUBTOTAL					$ 9,825,577	
Proprietary Controls for Adit Areas			3	ls	$ 400.00	$ 1,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 39,601,251**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections			6	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 1,000	
O&M Contingencies				25%		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 1,250**	

Table C2-AD3 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$39,601,251	1.0000	$39,601,251	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$39,858,475	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$39,858,500	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-AD4 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Road	CW-5	1,624	SY	$4.75	$ 7,712	To treatment site.
Construct Wetland Treatment Facility	CW-26	51.5	GPM	$21,386	$ 1,101,398	Based on cost to treat 5 gpm, 0.155 acre/gpm
Reclaim Access roads	CW-12	1,624	SY	$4.23	$ 6,867	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 1,765,542	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 141,243	
Construction Contingencies			15%		$ 264,831	10% Scope, 5% Bid
SUBTOTAL					$ 2,171,616	
Project Management			8%		$ 173,729	EPA Cost Guidance
Remedial Design			15%		$ 325,742	EPA Cost Guidance
Construction Management			10%		$ 217,162	EPA Cost Guidance
SUBTOTAL					$ 716,633	
Institutional Controls for Adit Areas		3	ls	$ 400.00	$ 1,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,889,450**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	
Remove FWS Spent Substrate, Disposal at Luttrell Repos.		1,830	cy	$ 15.00	$ 27,448	Assume 1/15th of material spent (15 yr life)
Remove SF Spent Substrate, Disposal at Luttrell Repos.		302	cy	$ 15.00	$ 4,534	Assume 1/15th of material spent (15 yr life)
Remove ALD Spent Substrate, Disposal at Luttrell Repos.		272	cy	$ 15.00	$ 4,073	Assume 1/15th of material spent (15 yr life)
Replace FWS Substrate (1/15 per year)		1,830	cy	$ 22.63	$ 41,403	
Replace SF Substrate (1/15 per year)		302	cy	$ 34.27	$ 10,358	
Replace ALD Substrate (1/15 per year)		272	cy	$ 70.54	$ 19,153	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 111,370	
O&M Contingencies			25%		$ 27,842	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 139,212**	

Table C2-AD4 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review.
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						$	96,358	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,889,450	1.0000	$2,889,450	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$139,212	7.0236	$977,768	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$139,212	7.2621	$1,010,975	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$5,117,560	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4				$5,117,600	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year
- Total present value is rounded to the nearest $100
- Minimum item cost = $500
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-AD5 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: May 29, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	1,624	SY	$4.75	$ 7,712	To adit site
Site Preparation and Storm Water Control	CW-6	18.00	AC	$3,022	$ 54,396	
Site Characterization	CW-33	1	LS	$152,403	$ 152,403	Investigation of Crystal Mine adit only
Underground Subsurface Grouting	CW-32	1	LS	$998,135	$ 998,135	Grouting of Crystal Mine adit only
Surface Water Controls	CW-25	18.00	AC	$9,120	$ 164,164	
Fertilize, seed and mulch	CW-10	18.00	AC	$2,627	$ 47,277	
Erosion control mat	CW-11	17,424	SY	$1.33	$ 23,174	
Reclaim Access roads	CW-12	1,624	SY	$4.23	$ 6,867	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 2,103,693	
Construction Contingencies			15%		$ 315,554	10% Scope, 5% Bid
SUBTOTAL					$ 2,419,247	
Project Management			8%		$ 193,540	EPA Cost Guidance
Remedial Design			15%		$ 362,887	EPA Cost Guidance
Construction Management			10%		$ 241,925	EPA Cost Guidance
SUBTOTAL					$ 798,352	
Proprietary Controls for Adit Areas		3	ls	$ 400.00	$ 1,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 3,218,799**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		6	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 1,000	
O&M Contingencies			25%		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**	

Table C2-AD5 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** May 29, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$3,218,799	1.0000	$3,218,799	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$3,476,022	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$3,476,000	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-SD1 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C2-SD1 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-SD2 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara; twice/year)		24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 7,300	
O&M Contingencies			25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C2-SD2 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$371,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$371,700	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-SW1 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Surface Water			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C2-SW1 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SW1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C2-SW2 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Surface Water		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	8 hrs twice/yr by 2 local technicians
Analytical (5 /subara, twice/year)		10	each	$ 250.00	$ 2,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 3,800	
O&M Contingencies			15%		$ 570	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 4,370**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C2-SW2 Remedial Alternative Cost Summary, Uncle Sam Gulch Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,370	14.2857	$62,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$303,795	
TOTAL PRESENT VALUE OF ALTERNATIVE SW2				$303,800	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-WR1 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative WR1 - No Action for Mine Wastes

Site:	Basin Mining Area OU2	**Description:** Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	Jefferson County, Montana		**Date:** January 22,2003
Phase:	Feasibility Study (-30% to +50%)		
Base Year:	2003		**Checked By:** K. Zambrano
Date:	January 2003		Date:7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative.
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories.
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4841	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
TOTAL PRESENT VALUE OF ALTERNATIVE WR1				$44,300		$44,300		$44,300		$44,300		$44,300	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
6 - 200	2.484149784	Periodic cost, every 5 years beginning in year 5

Table C3-WR2 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22,2003
Checked By: K. Zambrano
Date:7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	27,885	$ 132,453	62,118	$ 295,059	30,365	$ 144,236	8,507	$ 40,408	69,406	$ 329,679	
Site preparation and storm water control	CW-6	AC	$12,843	3.7	$ 46,410	8.2	$ 102,854	9.6	$ 120,414	1.5	$ 18,815	76.0	$ 953,279	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	7,590	$ 26,034	18,985	$ 65,119	8,735	$ 29,961	1,265	$ 4,339	106,490	$ 365,261	
Backfill and close mine openings	CW-8	EA	$12,635	33	$ 416,955	17	$ 214,795	8	$ 101,080	6	$ 75,810	27	$ 341,145	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	17,908.0	$ 310,167	39,688.0	$ 687,396	46,464.0	$ 804,756	7,260.0	$ 125,743	367,840.0	$ 6,370,989	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	3.7	$ 9,718	8.2	$ 21,537	9.6	$ 25,214	1.5	$ 3,940	76.0	$ 199,615	
Erosion control mat	CW-11	SY	$1.33	3,582	$ 4,764	7,938	$ 10,557	9,293	$ 12,359	1,452	$ 1,931	73,568	$ 97,845	
Reclaim Access roads	CW-12	SY	$4.23	27,885	$ 117,953	62,118	$ 262,758	30,365	$ 128,446	8,507	$ 35,985	69,406	$ 293,588	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 1,200,653		$ 1,796,275		$ 1,502,668		$ 443,171		$ 9,087,600	
Construction Contingencies		15%			$ 180,098		$ 269,441		$ 225,400		$ 66,476		$ 1,363,140	10% Scope, 5% Bid
				SUBTOTAL	$ 1,380,751		$ 2,065,716		$ 1,728,068		$ 509,647		$ 10,450,740	
Project Management		8%			$ 110,460		$ 165,257		$ 138,245		$ 40,772		$ 836,059	EPA Cost Guidance
Remedial Design		15%			$ 207,113		$ 309,857		$ 259,210		$ 76,447		$ 1,567,611	EPA Cost Guidance
Construction Management		10%			$ 138,075		$ 206,572		$ 172,807		$ 50,965		$ 1,045,074	EPA Cost Guidance
				SUBTOTAL	$ 455,648		$ 681,686		$ 570,263		$ 168,183		$ 3,448,744	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	33	$ 13,200	17	$ 6,800	8	$ 3,200	6	$ 2,400	27	$ 10,800	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,849,598**		**$ 2,754,202**		**$ 2,301,531**		**$ 680,230**		**$ 13,910,284**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	132	$ 3,300	68	$ 1,700	32	$ 800	24	$ 600	108	$ 2,700	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	33	$ 16,500	17	$ 8,500	8	$ 4,000	6	$ 3,000	27	$ 13,500	Engineering Estimate
				SUBTOTAL	$ 19,800	SUBTOTAL	$ 10,200		$ 4,800		$ 3,600		$ 16,200	
O&M Contingencies		25%			$ 4,950		$ 2,550		$ 1,200		$ 900		$ 4,050	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 24,750**		**$ 12,750**		**$ 6,000**		**$ 4,500**		**$ 20,250**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C3-WR2 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site:	**Basin Mining Area OU2**	**Description:** Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$1,849,598	$1,849,598	$2,754,202	$2,754,202	$2,301,531	$2,301,531	$680,230	$680,230	$13,910,284	$13,910,284	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$24,750	$353,571	$12,750	$182,143	$6,000	$85,714	$4,500	$64,286	$20,250	$289,285	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$2,251,042		$2,984,218		$2,435,118		$792,389		$14,247,443	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$2,251,000		$2,984,200		$2,435,100		$792,400		$14,247,400	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study". EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.484149784	Periodic cost: every 5 years beginning in year 5

Table C3-WR3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22 2003
Checked By: K. Zambrano
Date 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	27,885	$ 132,453	62,118	$ 295,059	30,365	$ 144,236	8,507	$ 40,408	69,406	$ 329,679	
Site preparation and storm water control	CW-6	AC	$12,543	3.7	$ 46,410	8.2	$ 102,854	9.6	$ 120,414	1.5	$ 18,815	76.0	$ 953,279	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	7,590	$ 26,034	18,985	$ 65,119	8,735	$ 29,961	1,265	$ 4,339	106,490	$ 365,261	
Backfill and close mine openings	CW-8	EA	$12,635	33	$ 416,955	17	$ 214,795	8	$ 101,080	6	$ 75,810	27	$ 341,145	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	17,908.0	$ 310,167	39,688.0	$ 687,396	46,464.0	$ 804,756	7,260.0	$ 125,743	367,840.0	$ 6,370,989	
Place 18" coversoil on wastes	CW-14	AC	$42,562	4	$ 157,479	8	$ 349,008	10	$ 408,595	2	$ 63,843	76	$ 3,234,712	Includes purchase and delivery of fill from offsite
Fertilize, seed and mulch	CW-10	AC	$2,626.51	3.7	$ 9,718	8.2	$ 21,537	9.6	$ 25,214	1.5	$ 3,940	76.0	$ 199,615	
Erosion control mat	CW-11	SY	$1.33	3,582	$ 4,764	7,938	$ 10,557	9,293	$ 12,359	1,452	$ 1,931	73,568	$ 97,845	
Reclaim Access roads	CW-12	SY	$4.23	27,885	$ 117,953	62,118	$ 262,758	30,365	$ 128,446	8,507	$ 35,985	69,406	$ 293,588	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 1,358,132		$ 2,145,283		$ 1,911,263		$ 507,014		$ 12,322,312	
Construction Contingencies		15%			$ 203,720		$ 321,792		$ 286,690		$ 76,052		$ 1,848,347	10% Scope, 5% Bid
				SUBTOTAL	$ 1,561,852		$ 2,467,075		$ 2,197,953		$ 583,066		$ 14,170,659	
Project Management		8%			$ 124,948		$ 197,366		$ 175,836		$ 46,645		$ 1,133,653	EPA Cost Guidance
Remedial Design		15%			$ 234,278		$ 370,061		$ 329,693		$ 87,460		$ 2,125,599	EPA Cost Guidance
Construction Management		10%			$ 156,185		$ 246,708		$ 219,795		$ 58,307		$ 1,417,066	EPA Cost Guidance
				SUBTOTAL	$ 515,411		$ 814,135		$ 725,324		$ 192,412		$ 4,676,317	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	33	$ 13,200	17	$ 6,800	8	$ 3,200	6	$ 2,400	27	$ 10,800	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,090,463**		**$ 3,288,010**		**$ 2,926,477**		**$ 777,878**		**$ 18,857,776**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	132	$ 3,300	68	$ 1,700	32	$ 800	24	$ 600	108	$ 2,700	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	33	$ 16,500	17	$ 8,500	8	$ 4,000	6	$ 3,000	27	$ 13,500	Engineering Estimate
				SUBTOTAL	$ 19,800	SUBTOTAL	$ 10,200		$ 4,800		$ 3,600		$ 16,200	
O&M Contingencies		25%			$ 4,950		$ 2,550		$ 1,200		$ 900		$ 4,050	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 24,750**		**$ 12,750**		**$ 6,000**		**$ 4,500**		**$ 20,250**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C3-WR3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22,2003
Checked By: K. Zambrano
Date 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$2,090,463	$2,090,463	$3,288,010	$3,288,010	$2,926,477	$2,926,477	$777,878	$777,878	$18,857,776	$18,857,776	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$24,750	$353,571	$12,750	$182,143	$6,000	$85,714	$4,500	$64,286	$20,250	$289,285	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$2,491,907		$3,518,026		$3,060,065		$890,037		$19,194,935	
TOTAL PRESENT VALUE OF ALTERNATIVE WR3				$2,491,900		$3,518,000		$3,060,100		$890,000		$19,194,900	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:
EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-WR4 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22,2003
Checked By: K. Zambrano
Date 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	GW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	27,885	$ 132,453	62,118	$ 295,059	30,365	$ 144,236	8,507	$ 40,408	69,406	$ 329,679	
Site preparation and storm water control	CW-6	AC	$12,543	3.7	$ 46,410	8.2	$ 102,854	9.6	$ 120,414	1.5	$ 18,815	76.0	$ 953,278	Includes long-term site surface water controls
Excavate mine waste	CW-15	CY	$4.64	15,180	$ 70,435	37,970	$ 176,181	17,470	$ 81,061	2,530	$ 11,739	212,980	$ 988,227	
Transport mine waste		CY-MI	$ 0.60	290,744	$ 174,446	948,803	$ 569,282	341,992	$ 205,195	40,101	$ 24,060	5,586,588	$ 3,351,953	EPA Cost Estimate
Spread and compact mine waste	CW-16	CY	$ 0.81	15,180	$ 12,321	37,970	$ 30,818	17,470	$ 14,179	2,530	$ 2,053	212,980	$ 172,865	
Luttrell Repository disposal		CY	$ 5.00	15,180	$ 75,900	37,970	$ 189,850	17,470	$ 87,350	2,530	$ 12,650	212,980	$ 1,064,900	EPA Cost Estimate
Backfill and close mine openings	CW-8	EA	$12,635	33	$ 416,955	17	$ 214,795	8	$ 101,080	6	$ 75,810	27	$ 341,145	
6" coversoil on excavated areas	CW-14	AC	$22,270	4	$ 82,399	8	$ 182,614	10	$ 213,792	2	$ 33,405	76	$ 1,692,520	Includes purchase and delivery of fill from offsite
Organic amendment	CW-17	SY	$0.62	17,908.0	$ 11,103	39,688.0	$ 24,607	46,464.0	$ 28,808	7,260.0	$ 4,501	367,840.0	$ 228,061	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	3.7	$ 9,718	8.2	$ 21,537	9.6	$ 25,214	1.5	$ 3,940	76.0	$ 199,615	
Erosion control mat	CW-11	SY	$1.33	3,582	$ 4,764	7,938	$ 10,557	9,293	$ 12,359	1,452	$ 1,931	73,568	$ 97,845	
Reclaim Access roads	CW-12	SY	$4.23	27,885	$ 117,953	62,118	$ 262,758	30,365	$ 128,446	8,507	$ 35,985	69,406	$ 293,588	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 1,291,057		$ 2,217,111		$ 1,298,336		$ 401,498		$ 9,849,876	
Construction Contingencies		15%			$ 193,659		$ 332,567		$ 194,750		$ 60,225		$ 1,477,481	10% Scope, 5% Bid
				SUBTOTAL	$ 1,484,715		$ 2,549,678		$ 1,493,086		$ 461,723		$ 11,327,356	
Project Management		8%			$ 118,777		$ 203,974		$ 119,447		$ 36,938		$ 906,189	EPA Cost Guidance
Remedial Design		15%			$ 222,707		$ 382,452		$ 223,963		$ 69,258		$ 1,699,104	EPA Cost Guidance
Construction Management		10%			$ 148,472		$ 254,968		$ 149,309		$ 46,172		$ 1,132,736	EPA Cost Guidance
				SUBTOTAL	$ 489,956		$ 841,394		$ 492,718		$ 152,369		$ 3,738,028	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	33	$ 13,200	17	$ 6,800	8	$ 3,200	6	$ 2,400	27	$ 10,800	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,987,871**		**$ 3,397,872**		**$ 1,989,004**		**$ 616,491**		**$ 15,076,186**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	132	$ 3,300	68	$ 1,700	32	$ 800	24	$ 600	108	$ 2,700	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	33	$ 16,500	17	$ 8,500	8	$ 4,000	6	$ 3,000	27	$ 13,500	Engineering Estimate
				SUBTOTAL	$ 19,800	SUBTOTAL	$ 10,200		$ 4,800		$ 3,600		$ 16,200	
O&M Contingences		25%			$ 4,950		$ 2,550		$ 1,200		$ 900		$ 4,050	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 24,750**		**$ 12,750**		**$ 6,000**		**$ 4,500**		**$ 20,250**	

ANNUAL O&M COSTS (EPA Years 0-10)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	12,598	$ 3,868	31,515	$ 9,675	14,500	$ 4,452	2,100	$ 645	176,773	$ 54,269	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 5,568		$ 11,375		$ 6,152		$ 2,345		$ 55,969	
O&M Contingences		25%			$ 1,392		$ 2,844		$ 1,538		$ 586		$ 13,992	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 6,960**		**$ 14,219**		**$ 7,689**		**$ 2,931**		**$ 69,962**	

ANNUAL O&M COSTS (State of Montana years 11-200)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	1,260	$ 387	3,152	$ 968	1,450	$ 445	210	$ 64	17,677	$ 5,427	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 2,087		$ 2,668		$ 2,145		$ 1,764		$ 7,127	
O&M Contingences		25%			$ 522		$ 667		$ 536		$ 441		$ 1,782	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 2,609**		**$ 3,334**		**$ 2,681**		**$ 2,206**		**$ 8,909**	

Table C3-WR4 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date 7/7/05

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$1,987,871	$1,987,871	$3,397,872	$3,397,872	$1,989,004	$1,989,004	$616,491	$616,491	$15,076,186	$15,076,186	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	14.2857	$24,750	$353,571	$12,750	$182,143	$6,000	$85,714	$4,500	$64,286	$20,250	$289,285	Annual cost, years 1 through 200
Annual Luttrell O&M Cost (EPA)	1 - 10	7.0236	$6,960	$48,884	$14,219	$99,868	$7,689	$54,007	$2,931	$20,585	$69,962	$491,382	Annual cost, years 1 through 10
Annual Luttrell O&M Cost (Montana)	11 - 200	7.2621	$2,609	$18,943	$3,334	$24,215	$2,681	$19,473	$2,206	$16,017	$8,909	$64,696	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$2,457,143		$3,751,970		$2,196,072		$765,252		$15,969,423	
TOTAL PRESENT VALUE OF ALTERNATIVE WR4				$2,457,100		$3,752,000		$2,196,100		$765,300		$15,969,400	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1-200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-AD1 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			24		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			24	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C3-AD1 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
	TOTAL PRESENT VALUE OF ALTERNATIVE AD1			$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-AD2 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 22,2003

Checked By: K. Zambrano
Date 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			24		$ -	$ -	There are no construction costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			24	ls	$ 400.00	$ 9,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 9,600**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections and Sampling			48	hr	$ 25.00	$ 1,200	2 hr/site; once/yr by local technician
Laboratory (3 samples per site per year)			72	each	$ 250.00	$ 18,000	Engineering Estimate
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 19,700	
O&M Contingencies				25%		$ 4,925	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 24,625**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C3-AD2 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date:7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$9,600	1.0000	$9,600	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$24,625	14.2857	$351,785	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$600,752	
TOTAL PRESENT VALUE OF ALTERNATIVE AD2				$600,800	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-AD3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22,2003

Checked By: K. Zambrano
Date:7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$ 8,998	
Access Roads		CW-5	101426	SY	$4.75	$ 481,773	To adit site
Site Preparation and Storm Water Control		CW-6	52.15	AC	$3,022	$ 157,597	
Subsurface Grouting		CW-24	14281.32	LF	$6,347	$ 90,643,565	Per linear foot of adit length. 25% of adit grouted
Surface Water Controls		CW-25	52.15	AC	$9,120	$ 475,620	
Fertilize, seed and mulch		CW-10	52.15	AC	$2,626.51	$ 136,972	
Erosion control mat		CW-11	50481.2	SY	$1.33	$ 67,140	
Reclaim Access roads		CW-12	101426	SY	$4.23	$ 429,032	
Post-Construction Submittals		CW-13	1	LS	$119,879	$ 119,879	
	SUBTOTAL					$ 93,041,266	
Construction Contingencies				15%		$ 13,956,190	10% Scope, 5% Bid
	SUBTOTAL					$ 106,997,455	
Project Management				8%		$ 8,559,796	EPA Cost Guidance
Remedial Design				15%		$ 16,049,618	EPA Cost Guidance
Construction Management				10%		$ 10,699,746	EPA Cost Guidance
	SUBTOTAL					$ 35,309,160	
Proprietary Controls for Adit Areas			24	ls	$ 400.00	$ 9,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 142,316,216**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections			48	hr	$ 25.00	$ 1,200	2 hr/site; once/yr by local technician
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 1,700	
O&M Contingencies				25%		$ 425	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 2,125**	

Table C3-AD3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$142,316.216	1.0000	$142,316,216	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$2,125	14.2857	$30,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$142,585,939	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$142,585,900	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-AD4 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	101,426	SY	$4.75	$ 481,773	To adit site
Construct Wetland Treatment Facility	CW-26	36.80	GPM	$21,386	$ 787,018	Based on cost to treat 5 gpm, 0.155 acre/gpm
Reclaim Access roads	CW-12	101,426	SY	$4.23	$ 429,032	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 2,347,389	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 187,791	
Construction Contingencies			15%		$ 352,108	10% Scope, 5% Bid
SUBTOTAL					$ 2,887,288	
Project Management			8%		$ 230,983	EPA Cost Guidance
Remedial Design			15%		$ 433,093	EPA Cost Guidance
Construction Management			10%		$ 288,729	EPA Cost Guidance
SUBTOTAL					$ 952,805	
Proprietary Controls for Adit Areas		24	ls	$ 400.00	$ 9,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 3,849,693**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	
Remove FWS Spent Substrate, Disposal at Luttrell Repos		1,359	cy	$ 15.00	$ 20,381	Assume 1/15th of material spent (15 yr life)
Remove SF Spent Substrate, Disposal at Luttrell Repos		267	cy	$ 15.00	$ 4,008	Assume 1/15th of material spent (15 yr life)
Remove ALD Spent Substrate, Disposal at Luttrell Repos		245	cy	$ 15.00	$ 3,678	Assume 1/15th of material spent (15 yr life)
Replace FWS Substrate (1/15 per year)		1,359	cy	$ 22.63	$ 30,743	
Replace SF Substrate (1/15 per year)		267	cy	$ 34.27	$ 9,155	
Replace ALD Substrate (1/15 per year)		245	cy	$ 70.54	$ 17,294	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 89,658	
O&M Contingencies			25%		$ 22,414	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 112,072**	

Table C3-AD4 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$3,849,693	1.0000	$3,849,693	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$112,072	7.0236	$787,148	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$112,072	7.2621	$813,881	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$5,690,089	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4				$5,690,100	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-AD4B Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD4B - Biological Treatment of Acid Mine Drainage at Single Subarea Location

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4B consists of the construction of a wetland treatment system for all mine sites flowing adits withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	101426	SY	$4.75	$ 481,773	To adit site
Site Preparation and Storm Water Control	CW-6	52.15	AC	$3,022	$ 157,597	
Construct Wetland Treatment Facility	CW-26	36.80	GPM	$21,386	$ 787,018	Based on cost to treat 5 gpm
Install ARD Collection Piping (each site)	CW-27	24	EA	$34,822	$ 835,728	System includes 1000 feet of pipe in trench
Fertilize, seed and mulch	CW-10	52.15	AC	$2,626.51	$ 136,972	
Erosion control mat	CW-11	50481.2	SY	$1.33	$ 67,140	
Reclaim Access roads	CW-12	101426	SY	$4.23	$ 429,032	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 3,544,826	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 283,586	
Construction Contingencies			15%		$ 531,724	10% Scope, 5% Bid
SUBTOTAL					$ 4,360,136	
Project Management			8%		$ 348,811	EPA Cost Guidance
Remedial Design			15%		$ 654,020	EPA Cost Guidance
Construction Management			10%		$ 436,014	EPA Cost Guidance
SUBTOTAL					$ 1,438,845	
Proprietary Controls for Adit Areas		24	ls	$ 400.00	$ 9,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 5,808,582**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	Engineering Estimate
Spent Substrate Removal and Disposal at Luttrell Repository		6,077	cy	$ 15.00	$ 91,151	Engineering Estimate/Min. $500
Replace Substrate (1/15 per year)		6,077	cy	$ 70.63	$ 429,172	Engineering Estimate/Min. $500
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 524,723	
O&M Contingencies			25%		$ 131,181	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 655,904**	

Table C3-AD4B Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD4B - Biological Treatment of Acid Mine Drainage at Single Subarea Location

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4B consists of the construction of a wetland treatment system for all mine sites flowing adits withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$5,808,582	1.0000	$5,808,582	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$655,904	7.0236	$4,606,793	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$655,904	7.2621	$4,763,247	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$15,417,989	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4B				$15,418,000	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1-200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-AD5 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: May 29, 2003
Checked By: K. Zambrano
Date: 7/07/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$	119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$	384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$	15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$	8,998	
Access Roads		CW-5	101,426	SY	$4.75	$	481,773	To adit site
Site Preparation and Storm Water Control		CW-6	52.15	AC	$3,022	$	157,597	
Site Characterization		CW-33	3	LS	$152,403	$	457,209	Investig. of Cracker, Rocker and Eva May adits.
Underground Subsurface Grouting		CW-32	1	LS	$1,193,006	$	1,193,006	Grouting of Cracker, Rocker and Eva May adits.
Surface Water Controls		CW-25	52.15	AC	$9,120	$	475,620	
Fertilize, seed and mulch		CW-10	52.15	AC	$2,627	$	136,972	
Erosion control mat		CW-11	50,481	SY	$1.33	$	67,140	
Reclaim Access roads		CW-12	101,426	SY	$4.23	$	429,032	
Post-Construction Submittals		CW-13	1	LS	$119,879	$	119,879	
	SUBTOTAL					$	4,047,915	
Construction Contingencies				15%		$	607,187	10% Scope, 5% Bid
	SUBTOTAL					$	4,655,103	
Project Management				8%		$	372,408	EPA Cost Guidance
Remedial Design				15%		$	698,265	EPA Cost Guidance
Construction Management				10%		$	465,510	EPA Cost Guidance
	SUBTOTAL					$	1,536,184	
Proprietary Controls for Adit Areas			24	ls	$ 400.00	$	9,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$**	**6,200,886**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Site Inspections			48	hr	$ 25.00	$	1,200	2 hr/site; once/yr by local technician
Materials and Supplies (per year)			1	ls	$ 500.00	$	500	Engineering Estimate
	SUBTOTAL					$	1,700	
O&M Contingencies				25%		$	425	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$**	**2,125**	

Table C3-AD5 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	Prepared By: B. Cotton
Location:	**Jefferson County, Montana**		Date: May 29, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		Checked By: K. Zambrano
Date:	**January 2003**		Date: 7/07/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						$	96,358	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$6,200,886	1.0000	$6,200,886	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$2,125	14.2857	$30,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$6,470,610	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$6,470,600	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-SD1 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C3-SD1 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-SD2 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara; twice/year)		24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 7,300	
O&M Contingencies			25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C3-SD2 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$371,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$371,700	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-SD3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9387	SY	$4.75	$ 44,587	To stream bed excavation locations
Site Preparation and Storm Water Control	CW-6	2	AC	$12,543	$ 25,086	Includes long-term site surface water controls.
Stream Diversion	CW-29	1	EA	$82,807	$ 82,807	24-inch diameter piping system
Excavate Stream Sediments	CW-15	2098	CY	$4.64	$ 9,735	
Transport Stream Sediments	–	27,696	CY-MI	$ 0.60	$ 16,617	EPA Cost Estimate
Spread and compact mine waste	CW-16	2098	CY	$ 0.81	$ 1,703	
Luttrell Repository disposal	–	2098	CY	$ 5.00	$ 10,491	EPA Cost Estimate
Stream Restoration	CW-31	6,294	SY	$91	$ 572,120	
Reclaim Access roads	CW-12	9387	SY	$4.23	$ 39,706	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 1,452,417	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 116,193	
Construction Contingencies			30%		$ 435,725	20% Scope, 10% Bid
SUBTOTAL					$ 2,004,335	
Project Management			8%		$ 160,347	EPA Cost Guidance
Remedial Design			15%		$ 300,650	EPA Cost Guidance
Construction Management			10%		$ 200,433	EPA Cost Guidance
SUBTOTAL					$ 661,431	
Proprietary Controls for Sediment Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,667,766**	

Table C3-SD3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Excavation with Disposal in Luttrell Repository		8	hr	$ 25.00	$ 200	8 hr once/yr by local technician
Materials and Supplies		167	ls	$ 5.00	$ 835	Engineering Estimate
		SUBTOTAL			$ 1,035	
O&M Contingencies			25%		$ 259	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,294**	

ANNUAL O&M COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Luttrell Leachate Treatment		78	gal	$ 0.31	$ 500	EPA Cost Estimate
Materials and Supplies		1	ls	$ 500.00	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,000	
O&M Contingencies		25%			$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C3-SD3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,667,766	1.0000	$2,667,766	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,294	14.2857	$18,482	Annual cost, years 1 through 200
Annual Site O&M Cost (EPA)	1 - 10	$1,250	7.0236	$8,779	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$1,250	7.2621	$9,078	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$2,943,471	
		TOTAL PRESENT VALUE OF ALTERNATIVE SD3		$2,943,500	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-SW1 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Surface Water			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C3-SW1 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date:7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SW1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-SW2 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/07/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Surface Water		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	8 hrs twice/yr by 2 local technicians
Analytical (5 /subara; twice/year)		10	each	$ 250.00	$ 2,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 3,800	
O&M Contingencies			15%		$ 570	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 4,370**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C3-SW2 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/07/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,370	14.2857	$62,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$303,795	
TOTAL PRESENT VALUE OF ALTERNATIVE SW2				$303,800	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C3-SW3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B Cotton
Date: January 22,2003
Checked By: K. Zambrano
Date:7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$ 8,998	
Access Roads		CW-5	9387	SY	$4.75	$ 44,587	To treatment site
Site Preparation and Storm Water Control		CW-6	69.4	AC	$12,543	$ 870,044	Includes long-term site surface water controls
Construct Wetland Treatment Facility		CW-26	448.8	GPM	$21,386	$ 9,598,200	Based on cost to treat 5 gpm
Install Surface Water Collection Piping		CW-28	1	EA	$38,914	$ 38,914	8-inch diameter piping system
Fertilize, seed and mulch		CW-10	69.364	AC	$2,626.51	$ 182,186	
Erosion control mat		CW-11	67144	SY	$1.33	$ 89,302	
Reclaim Access roads		CW-12	9387	SY	$4.23	$ 39,706	
Post-Construction Submittals		CW-13	1	LS	$119,879	$ 119,879	
	SUBTOTAL					$ 11,512,503	
Construction Contingencies				15%		$ 1,726,875	10% Scope, 5% Bid
	SUBTOTAL					$ 13,239,378	
Project Management				8%		$ 1,059,150	EPA Cost Guidance
Remedial Design				15%		$ 1,985,907	EPA Cost Guidance
Construction Management				10%		$ 1,323,938	EPA Cost Guidance
	SUBTOTAL					$ 4,368,995	
Proprietary Controls for Surface Water			5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 17,610,373**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections			96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance			1	ls	$ 2,000.00	$ 2,000	Engineering Estimate
Spent Substrate Removal and Disposal at Luttrell Repository			72,103	cy	$ 15.00	$ 1,081,544	Engineering Estimate/Min. $500
Replace Substrate (1/15 per year)			72,103	cy	$ 70.63	$ 5,092,319	Engineering Estimate/Min. $500
Sample Analysis			4	ea	$ 250.00	$ 1,000	quarterly sampling
	SUBTOTAL					$ 6,179,263	
O&M Contingencies				15%		$ 926,889	10% Scope, 5% Bid
TOTAL YEARLY O&M COST						**$ 7,106,152**	

Table C3-SW3 Remedial Alternative Cost Summary, Middle Cataract Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22,2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date:7/7/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$17,610,373	1.0000	$17,610,373	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$7,106,152	7.0236	$49,910,640	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$7,106,152	7.2621	$51,605,686	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$119,366,066	
TOTAL PRESENT VALUE OF ALTERNATIVE SW3				$119,366,100	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-WR1 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative WR1 - No Action for Mine Wastes

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative.
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4641	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
TOTAL PRESENT VALUE OF ALTERNATIVE WR1				$44,300		$44,300		$44,300		$44,300		$44,300	

Notes:
- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4641494784	Periodic cost, every 5 years beginning in year 5

Table C4-WR2 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	11,984	$ 56,926	2,933	$ 13,933	4,693	$ 22,293	13,279	$ 63,076	14,981	$ 71,158	
Site preparation and storm water control	CW-6	AC	$12,543	2.5	$ 30,731	4.2	$ 52,681	2.6	$ 32,612	3.4	$ 42,020	19.3	$ 241,455	Includes long-term site surface water controls.
Waste grading and consolidation	CW-7	CY	$3.43	5,130	$ 17,586	4,630	$ 15,881	3,965	$ 13,600	9,090	$ 31,179	16,815	$ 57,675	
Backfill and close mine openings	CW-8	EA	$12,635	23	$ 290,605	5	$ 63,175	8	$ 101,080	23	$ 290,605	15	$ 189,525	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	11,858.0	$ 205,381	20,328.0	$ 352,081	12,584.0	$ 217,955	16,214.0	$ 280,826	93,170.0	$ 1,613,704	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	2.5	$ 6,435	4.2	$ 11,031	2.6	$ 6,829	3.4	$ 8,799	19.3	$ 50,560	
Erosion control mat	CW-11	SY	$1.33	2,372	$ 3,154	4,066	$ 5,407	2,517	$ 3,347	3,243	$ 4,313	18,634	$ 24,783	
Reclaim Access roads	CW-12	SY	$4.23	11,984	$ 50,694	2,933	$ 12,408	4,693	$ 19,853	13,279	$ 56,171	14,981	$ 63,368	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 797,723		$ 662,798		$ 553,770		$ 913,189		$ 2,448,430	
Construction Contingencies		15%			$ 119,658		$ 99,420		$ 83,065		$ 136,978		$ 367,264	10% Scope; 5% Bid
				SUBTOTAL	$ 917,381		$ 762,218		$ 636,835		$ 1,050,167		$ 2,815,694	
Project Management		8%			$ 73,390		$ 60,977		$ 50,947		$ 84,013		$ 225,256	EPA Cost Guidance
Remedial Design		15%			$ 137,607		$ 114,333		$ 95,525		$ 157,525		$ 422,354	EPA Cost Guidance
Construction Management		10%			$ 91,738		$ 76,222		$ 63,684		$ 105,017		$ 281,569	EPA Cost Guidance
				SUBTOTAL	$ 302,736		$ 251,532		$ 210,156		$ 346,555		$ 929,179	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	23	$ 9,200	5	$ 2,000	8	$ 3,200	23	$ 9,200	15	$ 6,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,229,317**		**$ 1,015,750**		**$ 850,191**		**$ 1,405,922**		**$ 3,750,874**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	92	$ 2,300	20	$ 500	32	$ 800	92	$ 2,300	60	$ 1,500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	23	$ 11,500	5	$ 2,500	8	$ 4,000	23	$ 11,500	15	$ 7,500	Engineering Estimate
				SUBTOTAL	$ 13,800	SUBTOTAL	$ 3,000		$ 4,800		$ 13,800		$ 9,000	
O&M Contingencies		25%			$ 3,450		$ 750		$ 1,200		$ 3,450		$ 2,250	10% Scope; 15% Bid
TOTAL YEARLY O&M COST					**$ 17,250**		**$ 3,750**		**$ 6,000**		**$ 17,250**		**$ 11,250**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope; 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C4-WR2 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site:	**Basin Mining Area OU2**	**Description:** Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	***Jefferson County, Montana***		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	**YEAR(S)**	**DISCOUNT FACTOR (7%)**	**TOTAL COST/YR**	**PRESENT VALUE**	**TOTAL COST/YR**	**PRESENT VALUE**	**TOTAL COST/YR**	**PRESENT VALUE**	**TOTAL COST/YR**	**PRESENT VALUE**	**TOTAL COST/YR**	**PRESENT VALUE**	**NOTES**
Capital Cost	0	1.0000	$1,229,317	$1,229,317	$1,015,750	$1,015,750	$850,191	$850,191	$1,405,922	$1,405,922	$3,750,874	$3,750,874	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$17,250	$246,428	$3,750	$53,571	$6,000	$85,714	$17,250	$246,428	$11,250	$160,714	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$1,523,618		$1,117,195		$983,778		$1,700,224		$3,959,461	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$1,523,600		$1,117,200		$983,800		$1,700,200		$3,959,500	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year.
5 - 200	2.484149784	Periodic cost, every 5 years beginning in year 5.

Table C4-WR3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	11,984	$ 56,926	2,933	$ 13,933	4,693	$ 22,293	13,279	$ 63,076	14,981	$ 71,158	
Site preparation and storm water control	CW-6	AC	$12,543	2.5	$ 30,731	4.2	$ 52,681	2.6	$ 32,612	3.4	$ 42,020	19.3	$ 241,455	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	5,130	$ 17,596	4,630	$ 15,881	3,965	$ 13,600	9,090	$ 31,179	16,815	$ 57,675	
Backfill and close mine openings	CW-8	EA	$12,635	23	$ 290,605	5	$ 63,175	8	$ 101,080	23	$ 290,605	15	$ 189,525	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	11,858.0	$ 205,381	20,328.0	$ 352,081	12,584.0	$ 217,955	16,214.0	$ 280,826	93,170.0	$ 1,613,704	
Place 18" coversoil on wastes	CW-14	AC	$42,562	2	$ 104,277	4	$ 178,760	3	$ 110,661	3	$ 142,583	19	$ 819,319	Includes purchase and delivery of fill from offsite
Fertilize, seed and mulch	CW-10	AC	$2,626.51	2.5	$ 6,435	4.2	$ 11,031	2.6	$ 6,829	3.4	$ 8,799	19.3	$ 50,560	
Erosion control mat	CW-11	SY	$1.33	2,372	$ 3,154	4,066	$ 5,407	2,517	$ 3,347	3,243	$ 4,313	18,634	$ 24,783	
Reclaim Access roads	CW-12	SY	$4.23	11,984	$ 50,694	2,933	$ 12,408	4,693	$ 19,853	13,279	$ 56,171	14,981	$ 63,368	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 901,999		$ 841,559		$ 664,431		$ 1,055,771		$ 3,267,748	
Construction Contingencies		15%			$ 135,300		$ 126,234		$ 99,665		$ 158,366		$ 490,162	10% Scope, 5% Bid
				SUBTOTAL	$ 1,037,299		$ 967,793		$ 764,096		$ 1,214,137		$ 3,757,911	
Project Management		8%			$ 82,984		$ 77,423		$ 61,128		$ 97,131		$ 300,633	EPA Cost Guidance
Remedial Design		15%			$ 155,595		$ 145,169		$ 114,614		$ 182,121		$ 563,687	EPA Cost Guidance
Construction Management		10%			$ 103,730		$ 96,779		$ 76,410		$ 121,414		$ 375,791	EPA Cost Guidance
				SUBTOTAL	$ 342,309		$ 319,372		$ 252,152		$ 400,665		$ 1,240,111	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	23	$ 9,200	5	$ 2,000	8	$ 3,200	23	$ 9,200	15	$ 6,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,388,808**		**$ 1,289,164**		**$ 1,019,447**		**$ 1,624,002**		**$ 5,004,021**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	92	$ 2,300	20	$ 500	32	$ 800	92	$ 2,300	60	$ 1,500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	23	$ 11,500	5	$ 2,500	8	$ 4,000	23	$ 11,500	15	$ 7,500	Engineering Estimate
				SUBTOTAL	$ 13,800	SUBTOTAL	$ 3,000		$ 4,800		$ 13,800		$ 9,000	
O&M Contingencies		25%			$ 3,450		$ 750		$ 1,200		$ 3,450		$ 2,250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 17,250**		**$ 3,750**		**$ 6,000**		**$ 17,250**		**$ 11,250**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C4-WR3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non-flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$1,388,808	$1,388,808	$1,289,164	$1,289,164	$1,019,447	$1,019,447	$1,624,002	$1,624,002	$5,004,021	$5,004,021	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$17,250	$246,428	$3,750	$53,571	$6,000	$85,714	$17,250	$246,428	$11,250	$160,714	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$1,683,110		$1,390,609		$1,153,035		$1,918,304		$5,212,609	
TOTAL PRESENT VALUE OF ALTERNATIVE WR3				$1,683,100		$1,390,600		$1,153,000		$1,918,300		$5,212,600	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.484149784	Periodic cost, every 5 years beginning in year 5

Table C4-WR4 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	11,984	$ 56,926	2,933	$ 13,933	4,693	$ 22,293	13,279	$ 63,076	14,981	$ 71,158	
Site preparation and storm water control	CW-6	AC	$12,543	2.5	$ 30,731	4.2	$ 52,681	2.6	$ 32,612	3.4	$ 42,020	19.3	$ 241,455	Includes long-term site surface water controls
Excavate mine waste	CW-15	CY	$4.64	10,260	$ 47,606	9,260	$ 42,966	7,930	$ 36,795	18,180	$ 84,355	33,630	$ 156,043	
Transport mine waste		CY-MI	$ 0.60	184,093	$ 110,456	151,864	$ 91,118	132,431	$ 79,459	330,212	$ 198,127	620,592	$ 372,355	EPA Cost Estimate
Spread and compact mine waste	CW-16	CY	$ 0.81	10,260	$ 8,328	9,260	$ 7,516	7,930	$ 6,436	18,180	$ 14,756	33,630	$ 27,296	
Luttrell Repository disposal		CY	$ 5.00	10,260	$ 51,300	9,260	$ 46,300	7,930	$ 39,650	18,180	$ 90,900	33,630	$ 168,150	EPA Cost Estimate
Backfill and close mine openings	CW-8	EA	$12,535	1	$ 12,535	1	$ 12,635	1	$ 12,635	1	$ 12,635	1	$ 12,635	
6" coversoil on excavated areas	CW-14	AC	$22,270	2	$ 54,562	4	$ 93,534	3	$ 57,902	3	$ 74,605	19	$ 428,698	Includes purchase and delivery of fill from offsite
Organic amendment	CW-17	SY	$0.62	11,858.0	$ 7,352	20,328.0	$ 12,603	12,584.0	$ 7,802	16,214.0	$ 10,053	93,170.0	$ 57,765	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	2.5	$ 6,435	4.2	$ 11,031	2.6	$ 6,829	3.4	$ 8,799	19.3	$ 50,560	
Erosion control mat	CW-11	SY	$1.33	2,372	$ 3,154	4,066	$ 5,407	2,517	$ 3,347	3,243	$ 4,313	18,634	$ 24,783	
Reclaim Access roads	CW-12	SY	$4.23	11,984	$ 50,694	2,933	$ 12,408	4,693	$ 19,853	13,279	$ 56,171	14,981	$ 63,368	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 576,379		$ 536,335		$ 461,814		$ 796,009		$ 1,810,467	
Construction Contingencies		15%			$ 86,457		$ 80,750		$ 69,272		$ 119,401		$ 271,570	10% Scope, 5% Bid
				SUBTOTAL	$ 662,836		$ 619,085		$ 531,086		$ 915,410		$ 2,082,037	
Project Management		8%			$ 53,027		$ 49,527		$ 42,487		$ 73,233		$ 166,563	EPA Cost Guidance
Remedial Design		15%			$ 99,425		$ 92,863		$ 79,663		$ 137,312		$ 312,306	EPA Cost Guidance
Construction Management		10%			$ 66,284		$ 61,908		$ 53,109		$ 91,541		$ 208,204	EPA Cost Guidance
				SUBTOTAL	$ 218,736		$ 204,298		$ 175,258		$ 302,085		$ 687,072	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	1	$ 400	1	$ 400	1	$ 400	1	$ 400	1	$ 400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 881,972**		**$ 823,783**		**$ 706,745**		**$ 1,217,896**		**$ 2,769,509**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	4	$ 500	4	$ 500	4	$ 500	4	$ 500	4	$ 500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,000	SUBTOTAL	$ 1,000		$ 1,000		$ 1,000		$ 1,000	
O&M Contingencies		25%			$ 250		$ 250		$ 250		$ 250		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**		**$ 1,250**		**$ 1,250**		**$ 1,250**		**$ 1,250**	

ANNUAL O&M COSTS (EPA Years 0-10)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	8,516	$ 2,614	7,686	$ 2,360	6,582	$ 2,021	15,089	$ 4,632	27,913	$ 8,569	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 4,314		$ 4,060		$ 3,721		$ 6,332		$ 10,269	
O&M Contingencies		25%			$ 1,079		$ 1,015		$ 930		$ 1,583		$ 2,567	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 5,393**		**$ 5,074**		**$ 4,651**		**$ 7,916**		**$ 12,837**	

ANNUAL O&M COSTS (State of Montana years 11-200)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	852	$ 261	769	$ 236	658	$ 202	1,509	$ 463	2,791	$ 857	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,961		$ 1,936		$ 1,902		$ 2,163		$ 2,557	
O&M Contingencies		25%			$ 490		$ 484		$ 476		$ 541		$ 639	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 2,452**		**$ 2,420**		**$ 2,378**		**$ 2,704**		**$ 3,196**	

Table C4-WR4 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					$ 19,272		$ 19,272		$ 19,272		$ 19,272		$ 19,272	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$881,972	$881,972	$823,783	$823,783	$706,745	$706,745	$1,217,896	$1,217,896	$2,769,509	$2,769,509	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	14.2857	$1,250	$17,857	$1,250	$17,857	$1,250	$17,857	$1,250	$17,857	$1,250	$17,857	Annual cost, years 1 through 200
Annual Luttrell O&M Cost (EPA)	1 - 10	7.0236	$5,393	$37,878	$5,074	$35,641	$4,651	$32,665	$7,916	$55,596	$12,837	$90,159	Annual cost, years 1 through 10
Annual Luttrell O&M Cost (Montana)	11 - 200	7.2621	$2,452	$17,805	$2,420	$17,574	$2,378	$17,266	$2,704	$19,637	$3,196	$23,211	Annual cost, years 1 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$1,003,386		$942,728		$822,407		$1,358,859		$2,948,609	
TOTAL PRESENT VALUE OF ALTERNATIVE WR4				$1,003,400		$942,700		$822,400		$1,358,900		$2,948,600	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:
EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1-200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.484149784	Periodic cost, every 5 years beginning in year 5

Table C4-AD1 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			8		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			8	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C4-AD1 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE AD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-AD2 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction		8		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Institutional Controls for Adit Areas		8	ls	$ 400.00	$ 3,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 3,200**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections and Sampling		16	hr	$ 25.00	$ 500	2 hr/site, once/yr by local technician
Laboratory (3 samples per site per year)		24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 7,000	
O&M Contingencies			25%		$ 1,750	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 8,750**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C4-AD2 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$3,200	1.0000	$3,200	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$8,750	14.2857	$125,000	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$367,566	
TOTAL PRESENT VALUE OF ALTERNATIVE AD2				$367,600	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-AD3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site: Basin Mining Area OU2
Location: *Jefferson County, Montana*
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD3 consists of the construction of surface water run-on *controls to limit infiltration and subsurface grouting to reduce ground water* discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$	119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$	384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$	15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$	8,998	
Access Roads		CW-5	17690	SY	$4.75	$	84,025	To adit site.
Site Preparation and Storm Water Control		CW-6	14.50	AC	$3,022	$	43,819	
Subsurface Grouting		CW-24	1888	LF	$6,347	$	11,980,533	Per linear foot of adit length 25% of adit grouted.
Surface Water Controls		CW-25	14.5	AC	$9,120	$	132,243	
Fertilize, seed and mulch		CW-10	14.5	AC	$2,626.51	$	38,084	
Erosion control mat		CW-11	14036	SY	$1.33	$	18,668	
Reclaim Access roads		CW-12	17690	SY	$4.23	$	74,827	
Post-Construction Submittals		CW-13	1	LS	$119,879	$	119,879	
	SUBTOTAL					$	13,021,765	
Construction Contingencies				15%		$	1,953,265	10% Scope, 5% Bid
	SUBTOTAL					$	14,975,029	
Project Management				8%		$	1,198,002	EPA Cost Guidance
Remedial Design				15%		$	2,246,254	EPA Cost Guidance
Construction Management				10%		$	1,497,503	EPA Cost Guidance
	SUBTOTAL					$	4,941,760	
Proprietary Controls for Adit Areas			0	ls	$ 400.00	$	-	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$**	**19,916,789**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Site Inspections			16	hr	$ 25.00	$	500	2 hr/site; once/yr by local technician
Materials and Supplies (per year)			1	ls	$ 500.00	$	500	Engineering Estimate
	SUBTOTAL					$	1,000	
O&M Contingencies				25%		$	250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$**	**1,250**	

Table C4-AD3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$19,916,789	1.0000	$19,916,789	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$20,174,013	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$20,174,000	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-AD4 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	17690	SY	$4.75	$ 84,025	To adit site
Construct Wetland Treatment Facility	CW-26	5.93	GPM	$21,386	$ 126,821	Based on cost to treat 5 gpm, 0.155 acre/gpm
Reclaim Access roads	CW-12	17690	SY	$4.23	$ 74,827	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 935,238	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 74,819	
Construction Contingencies			15%		$ 140,286	10% Scope, 5% Bid
SUBTOTAL					$ 1,150,343	
Project Management			8%		$ 92,027	EPA Cost Guidance
Remedial Design			15%		$ 172,551	EPA Cost Guidance
Construction Management			10%		$ 115,034	EPA Cost Guidance
SUBTOTAL					$ 379,613	
Proprietary Controls for Adit Areas		8	ls	$ 400.00	$ 3,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,533,156**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	
Remove FWS Spent Substrate, Disposal at Luttrell Repos.		369	cy	$ 15.00	$ 5,539	Assume 1/15th of material spent (15 yr life)
Remove SF Spent Substrate, Disposal at Luttrell Repos.		193	cy	$ 15.00	$ 2,901	Assume 1/15th of material spent (15 yr life)
Remove ALD Spent Substrate, Disposal at Luttrell Repos		190	cy	$ 15.00	$ 2,848	Assume 1/15th of material spent (15 yr life)
Replace FWS Substrate (1/15 per year)		369	cy	$ 22.63	$ 8,356	
Replace SF Substrate (1/15 per year)		193	cy	$ 34.27	$ 6,627	
Replace ALD Substrate (1/15 per year)		190	cy	$ 70.54	$ 13,392	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 44,063	
O&M Contingencies			25%		$ 11,016	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 55,078**	

Table C4-AD4 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				35%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$1,533,156	1.0000	$1,533,156	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$55,078	7.0236	$386,846	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$55,078	7.2621	$399,984	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$2,559,352	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4				$2,559,400	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-AD4B Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD4B - Biological Treatment of Acid Mine Drainage at Single Subarea Location

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD4B consists of the construction of a wetland treatment system for all mine sites flowing adits withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	17690	SY	$4.75	$ 84,025	To adit site.
Construct Wetland Treatment Facility	CW-26	5.93	GPM	$21,386	$ 126,821	Based on cost to treat 5 gpm, 0.155 acre/gpm
Install ARD Collection Piping (each site)	CW-27	8	EA	$34,822	$ 278,576	System includes 1000 feet of pipe in trench
Reclaim Access roads	CW-12	17690	SY	$4.23	$ 74,827	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 1,213,814	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 97,105	
Construction Contingencies			15%		$ 182,072	10% Scope, 5% Bid
SUBTOTAL					$ 1,492,991	
Project Management			8%		$ 119,439	EPA Cost Guidance
Remedial Design			15%		$ 223,949	EPA Cost Guidance
Construction Management			10%		$ 149,299	EPA Cost Guidance
SUBTOTAL					$ 492,687	
Proprietary Controls for Adit Areas		8	ls	$ 400.00	$ 3,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,988,878**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	
Remove FWS Spent Substrate, Disposal at Luttrell Repos.		436	cy	$ 15.00	$ 6,535	Assume 1/15th of material spent (15 yr life)
Remove SF Spent Substrate, Disposal at Luttrell Repos.		198	cy	$ 15.00	$ 2,975	Assume 1/15th of material spent (15 yr life)
Remove ALD Spent Substrate, Disposal at Luttrell Repos.		194	cy	$ 15.00	$ 2,904	Assume 1/15th of material spent (15 yr life)
Replace FWS Substrate (1/15 per year)		436	cy	$ 22.63	$ 9,857	
Replace SF Substrate (1/15 per year)		198	cy	$ 34.27	$ 6,796	
Replace ALD Substrate (1/15 per year)		194	cy	$ 70.54	$ 13,653	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 47,120	
O&M Contingencies			25%		$ 11,780	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 58,900**	

Table C4-AD4B Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD4B - Biological Treatment of Acid Mine Drainage at Single Subarea Location

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4B consists of the construction of a wetland treatment system for all mine sites flowing adits withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date 7/7/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$1,988,878	1.0000	$1,988,878	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$58,900	7.0236	$413,688	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$58,900	7.2621	$427,738	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$3,069,671	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4B				$3,069,700	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-AD5 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Colton
Location:	**Jefferson County, Montana**		**Date:** May 29, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	17,690	SY	$4.75	$ 84,025	To adit site
Site Preparation and Storm Water Control	CW-6	14.50	AC	$3,022	$ 43,819	
Site Characterization	CW-33	1	LS	$152,403	$ 152,403	Investigation of Seattle Mine adit only
Underground Subsurface Grouting	CW-32	1	LS	$611,823	$ 611,823	Grouting of Seattle Mine adit only
Surface Water Controls	CW-25	14.50	AC	$9,120	$ 132,243	
Fertilize, seed and mulch	CW-10	14.50	AC	$2,627	$ 38,084	
Erosion control mat	CW-11	14,036	SY	$1.33	$ 18,668	
Reclaim Access roads	CW-12	17690	SY	$4.23	$ 74,827	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 1,805,457	
Construction Contingencies			15%		$ 270,819	10% Scope, 5% Bid
SUBTOTAL					$ 2,076,276	
Project Management			8%		$ 166,102	EPA Cost Guidance
Remedial Design			15%		$ 311,441	EPA Cost Guidance
Construction Management			10%		$ 207,628	EPA Cost Guidance
SUBTOTAL					$ 685,171	
Proprietary Controls for Adit Areas		8	ls	$ 400.00	$ 3,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,764,647**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		16	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 1,000	
O&M Contingencies			25%		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**	

Table C4-AD5 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** May 29, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,764,647	1.0000	$2,764,647	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$3,021,871	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$3,021,900	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-SD1 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C4-SD1 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-SD2 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara; twice/year)		24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 7,300	
O&M Contingencies			25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C4-SD2 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$371,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$371,700	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-SD3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9387	SY	$4.75	$ 44,587	To stream bed excavation locations
Site Preparation and Storm Water Control	CW-6	2	AC	$12,543	$ 25,086	Includes long-term site surface water controls
Stream Diversion	CW-29	1	EA	$82,807	$ 82,807	24-inch diameter piping system
Excavate Stream Sediments	CW-15	8926	CY	$4.64	$ 41,416	
Transport Stream Sediments	--	150,848	CY-MI	$ 0.60	$ 90,509	EPA Cost Estimate
Spread and compact mine waste	CW-16	8926	CY	$ 0.81	$ 7,245	
Luttrell Repository disposal	--	8926	CY	$ 5.00	$ 44,630	EPA Cost Estimate
Stream Restoration	CW-31	26,778	SY	$ 90.89	$ 2,433,907	
Reclaim Access roads	CW-12	9387	SY	$4.23	$ 39,706	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 3,459,457	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 276,757	
Construction Contingencies			30%		$ 1,037,837	20% Scope, 10% Bid
SUBTOTAL					$ 4,774,051	
Project Management			8%		$ 381,924	EPA Cost Guidance
Remedial Design			15%		$ 716,108	EPA Cost Guidance
Construction Management			10%		$ 477,405	EPA Cost Guidance
SUBTOTAL					$ 1,575,437	
Proprietary Controls for Sediment Areas		0	ls	$ 400.00	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 6,349,488**	

Table C4-SD3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Excavation with Disposal in Luttrell Repository		8	hr	$ 25.00	$ 200	8 hr once/yr by local technician
Materials and Supplies		167	ls	$ 5.00	$ 835	Engineering Estimate
		SUBTOTAL			$ 1,035	
O&M Contingencies			25%		$ 259	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,294**	

ANNUAL O&M COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Luttrell Leachate Treatment		330	gal	$ 0.31	$ 500	EPA Cost Estimate
Materials and Supplies		1	ls	$ 500.00	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,000	
O&M Contingencies		25%			$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C4-SD3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	***Jefferson County, Montana***		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$6,349,488	1.0000	$6,349,488	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,294	14.2857	$18,482	Annual cost, years 1 through 200
Annual Site O&M Cost (EPA)	1 - 10	$1,250	7.0236	$8,779	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$1,250	7.2621	$9,078	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$6,625,194	
		TOTAL PRESENT VALUE OF ALTERNATIVE SD3		$6,625,200	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-SW1 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Surface Water			0	LS	$	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C4-SW1 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SW1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-SW2 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Surface Water		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	8 hrs twice/yr by 2 local technicians
Analytical (5 /subara; twice/year)		10	each	$ 250.00	$ 2,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 3,800	
O&M Contingencies			15%		$ 570	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 4,370**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C4-SW2 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,370	14.2857	$62,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$303,795	
TOTAL PRESENT VALUE OF ALTERNATIVE SW2				$303,800	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C4-SW3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9387	SY	$4.75	$ 44,587	To treatment site
Site Preparation and Storm Water Control	CW-6	138.728	AC	$12,543	$ 1,740,087	Includes long-term site surface water controls
Construct Wetland Treatment Facility	CW-26	897.6	GPM	$21,386	$ 19,196,400	Based on cost to treat 5 gpm
Install Surface Water Collection Piping	CW-28	1	EA	$38,914	$ 38,914	8-inch diameter piping system
Fertilize, seed and mulch	CW-10	138.728	AC	$2,626.51	$ 364,371	
Erosion control mat	CW-11	134289	SY	$1.33	$ 178,604	
Reclaim Access roads	CW-12	9387	SY	$4.23	$ 39,706	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 22,252,234	
Construction Contingencies			15%		$ 3,337,835	10% Scope, 5% Bid
SUBTOTAL					$ 25,590,070	
Project Management			8%		$ 2,047,206	EPA Cost Guidance
Remedial Design			15%		$ 3,838,510	EPA Cost Guidance
Construction Management			10%		$ 2,559,007	EPA Cost Guidance
SUBTOTAL					$ 8,444,723	
Proprietary Controls for Surface Water		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 34,036,793**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 2,000.00	$ 2,000	Engineering Estimate
Spent Substrate Removal and Disposal at Luttrell Repository		144,027	cy	$ 15.00	$ 2,160,399	Engineering Estimate/Min. $500
Replace Substrate (1/15 per year)		144,027	cy	$ 70.63	$ 10,171,980	Engineering Estimate/Min. $500
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 12,337,779	
O&M Contingencies			15%		$ 1,850,667	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 14,188,446**	

Table C4-SW3 Remedial Alternative Cost Summary, Lower Cataract Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$34,036,793	1.0000	$34,036,793	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$14,188,446	7.0236	$99,653,707	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$14,188,446	7.2621	$103,038,109	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$236,967,974	
TOTAL PRESENT VALUE OF ALTERNATIVE SW3				$236,968,000	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1-200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-WR1 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative WR1 - No Action for Mine Wastes

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4841	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
TOTAL PRESENT VALUE OF ALTERNATIVE WR1				**$44,300**		**$44,300**		**$44,300**		**$44,300**		**$44,300**	

Notes:
- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-WR2 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: E.Borisova
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	21,656	$ 102,867	14,281	$ 67,835	8,037	$ 38,178	214	$ 1,015	4,115	$ 19,545	
Site preparation and storm water control	CW-6	AC	$12,543	2.9	$ 36,375	0.9	$ 11,289	2.2	$ 27,595	0.1	$ 1,254	32.0	$ 401,380	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	39,920	$ 136,926	1,790	$ 6,140	2,190	$ 7,512	245	$ 840	29,780	$ 102,145	
Backfill and close mine openings	CW-8	EA	$12,635	25	$ 315,875	9	$ 113,715	3	$ 37,905	1	$ 12,635	9	$ 113,715	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	14,036.0	$ 243,104	4,356.0	$ 75,446	10,648.0	$ 184,423	484.0	$ 8,383	154,860.0	$ 2,682,522	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	2.9	$ 7,617	0.9	$ 2,364	2.2	$ 5,778	0.1	$ 500	32.0	$ 84,048	
Erosion control mat	CW-11	SY	$1.33	2,807	$ 3,734	871	$ 1,159	2,130	$ 2,832	97	$ 129	30,976	$ 41,198	
Reclaim Access roads	CW-12	SY	$4.23	21,656	$ 91,606	14,281	$ 60,409	8,037	$ 33,998	214	$ 904	4,115	$ 17,406	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 1,074,303		$ 474,557		$ 474,422		$ 161,860		$ 3,598,160	
Construction Contingencies		15%			$ 161,146		$ 71,184		$ 71,163		$ 24,279		$ 539,724	10% Scope, 5% Bid
				SUBTOTAL	$ 1,235,449		$ 545,741		$ 545,586		$ 186,139		$ 4,137,884	
Project Management		8%			$ 98,836		$ 43,659		$ 43,647		$ 14,891		$ 331,031	EPA Cost Guidance
Remedial Design		15%			$ 185,317		$ 81,861		$ 81,838		$ 27,921		$ 620,683	EPA Cost Guidance
Construction Management		10%			$ 123,545		$ 54,574		$ 54,559		$ 18,614		$ 413,788	EPA Cost Guidance
				SUBTOTAL	$ 407,698		$ 180,094		$ 180,043		$ 61,426		$ 1,365,502	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	25	$ 10,000	9	$ 3,600	3	$ 1,200	1	$ 400	9	$ 3,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,653,147**		**$ 729,435**		**$ 726,829**		**$ 247,965**		**$ 5,506,986**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	100	$ 2,500	36	$ 900	12	$ 500	4	$ 500	36	$ 900	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	25	$ 12,500	9	$ 4,500	3	$ 1,500	1	$ 500	9	$ 4,500	Engineering Estimate
				SUBTOTAL	$ 15,000	SUBTOTAL	$ 5,400		$ 2,000		$ 1,000		$ 5,400	
O&M Contingencies		25%			$ 3,750		$ 1,350		$ 500		$ 250		$ 1,350	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 18,750**		**$ 6,750**		**$ 2,500**		**$ 1,250**		**$ 6,750**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C5-WR2 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site:	**Basin Mining Area OU2**	**Description:** Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:E.Borisova**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$1,653,147	$1,653,147	$729,435	$729,435	$726,829	$726,829	$247,965	$247,965	$5,506,986	$5,506,986	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$18,750	$267,857	$6,750	$96,428	$2,500	$35,714	$1,250	$17,857	$6,750	$96,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$1,968,877		$873,737		$810,417		$313,695		$5,651,288	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$1,968,900		$873,700		$810,400		$313,700		$5,651,300	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-WR3 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: E.Bonsova
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	21,656	$ 102,867	14,281	$ 67,835	8,037	$ 38,178	214	$ 1,015	4,115	$ 19,545	
Site preparation and storm water control	CW-6	AC	$12,543	2.9	$ 36,375	0.9	$ 11,289	2.2	$ 27,595	0.1	$ 1,254	32.0	$ 401,380	Includes long-term site surface water controls.
Waste grading and consolidation	CW-7	CY	$3.43	39,920	$ 136,926	1,790	$ 6,140	2,190	$ 7,512	245	$ 840	29,780	$ 102,145	
Backfill and close mine openings	CW-8	EA	$12,635	25	$ 315,875	9	$ 113,715	3	$ 37,905	1	$ 12,635	9	$ 113,715	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	14,036.0	$ 243,104	4,356.0	$ 75,446	10,648.0	$ 184,423	484.0	$ 8,383	154,860.0	$ 2,682,522	
Place 18" coversoil on wastes	CW-14	AC	$42,562	3	$ 123,430	1	$ 38,306	2	$ 93,636	0.1	$ 4,256	32	$ 1,361,984	Includes purchase and delivery of fill from offsite
Fertilize, seed and mulch	CW-10	AC	$2,626.51	3	$ 7,617	1	$ 2,364	2	$ 5,778	0.1	$ 500	32	$ 84,048	
Erosion control mat	CW-11	SY	$1.33	2,807	$ 3,734	871	$ 1,159	2,130	$ 2,832	97	$ 129	30,976	$ 41,198	
Reclaim Access roads	CW-12	SY	$4.23	21,656	$ 91,606	14,281	$ 60,409	8,037	$ 33,998	214	$ 904	4,115	$ 17,406	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 1,197,733		$ 512,863		$ 568,058		$ 166,116		$ 4,960,144	
Construction Contingencies		15%			$ 179,660		$ 76,929		$ 85,209		$ 24,917		$ 744,022	10% Scope, 5% Bid
				SUBTOTAL	$ 1,377,393		$ 589,792		$ 653,268		$ 191,034		$ 5,704,166	
Project Management		8%			$ 110,191		$ 47,183		$ 52,261		$ 15,283		$ 456,333	EPA Cost Guidance
Remedial Design		15%			$ 206,609		$ 88,469		$ 97,990		$ 28,655		$ 855,625	EPA Cost Guidance
Construction Management		10%			$ 137,739		$ 58,979		$ 65,327		$ 19,103		$ 570,417	EPA Cost Guidance
				SUBTOTAL	$ 454,540		$ 194,631		$ 215,578		$ 63,041		$ 1,882,375	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	25	$ 10,000	9	$ 3,600	3	$ 1,200	1	$ 400	9	$ 3,600	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,841,933**		**$ 788,024**		**$ 870,046**		**$ 254,475**		**$ 7,590,140**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	100	$ 2,500	36	$ 900	12	$ 300	4	$ 100	36	$ 900	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	25	$ 12,500	9	$ 4,500	3	$ 1,500	1	$ 500	9	$ 4,500	Engineering Estimate
				SUBTOTAL	$ 15,000	SUBTOTAL	$ 5,400		$ 2,000		$ 1,000		$ 5,400	
O&M Contingencies		25%			$ 3,750		$ 1,350		$ 500		$ 250		$ 1,350	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 18,750**		**$ 6,750**		**$ 2,500**		**$ 1,250**		**$ 6,750**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Revew/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C5-WR3 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site:	**Basin Mining Area OU2**	**Description:** Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** E Borisova
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$1,841,933	$1,841,933	$788,024	$788,024	$870,046	$870,046	$254,475	$254,475	$7,590,140	$7,590,140	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$18,750	$267,857	$6,750	$96,428	$2,500	$35,714	$1,250	$17,857	$6,750	$96,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$2,157,663		$932,326		$953,633		$320,205		$7,734,442	
TOTAL PRESENT VALUE OF ALTERNATIVE WR3				$2,157,700		$932,300		$953,600		$320,200		$7,734,400	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1-200	14.28569531	Annual Cost, every year
5-200	2.484149784	Periodic cost, every 5 years beginning in year 5

Table C5-WR4 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: E Borisova
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	21,656	$ 102,867	14,281	$ 67,835	8,037	$ 38,178	214	$ 1,015	4,115	$ 19,545	
Site preparation and storm water control	CW-6	AC	$12,543	3	$ 36,375	1	$ 11,289	2	$ 27,595	0.1	$ 1,254	32	$ 401,380	Includes long-term site surface water controls
Excavate mine waste	CW-15	CY	$4.64	79,840	$ 370,458	3,580	$ 16,611	4,380	$ 20,323	490	$ 2,274	59,560	$ 276,358	
Transport mine waste		CY-MI	$ 0.60	925,458	$ 555,275	36,997	$ 22,198	40,603	$ 24,362	3,889	$ 2,333	512,298	$ 307,379	EPA Cost Estimate
Spread and compact mine waste	CW-16	CY	$ 0.81	79,840	$ 64,802	3,580	$ 2,905	4,380	$ 3,555	490	$ 398	59,560	$ 48,342	
Luttrell Repository disposal		CY	$ 5.00	79,840	$ 399,200	3,580	$ 17,900	4,380	$ 21,900	490	$ 2,450	59,560	$ 297,800	EPA Cost Estimate
Backfill and close mine openings	CW-8	EA	$12,635	1	$ 12,635	1	$ 12,635	1	$ 12,635	1	$ 12,635	1	$ 12,635	
6" coversoil on excavated areas	CW-14	AC	$22,270	3	$ 64,583	1	$ 20,043	2	$ 48,994	0.1	$ 2,227	32	$ 712,640	Includes purchase and delivery of fill from offsite
Organic amendment	CW-17	SY	$0.62	14,036.0	$ 8,702	4,356.0	$ 2,701	10,648.0	$ 6,602	484.0	$ 500	154,880.0	$ 96,026	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	3	$ 7,617	1	$ 2,364	2	$ 5,778	0.1	$ 500	32	$ 84,048	
Erosion control mat	CW-11	SY	$1.33	2,807	$ 3,734	871	$ 1,159	2,130	$ 2,832	97	$ 129	30,976	$ 41,198	
Reclaim Access roads	CW-12	SY	$4.23	21,656	$ 91,606	14,281	$ 60,409	8,037	$ 33,998	214	$ 904	4,115	$ 17,406	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 1,854,054		$ 374,250		$ 382,953		$ 162,818		$ 2,450,958	
Construction Contingencies		15%			$ 278,108		$ 56,138		$ 57,443		$ 24,423		$ 367,644	10% Scope, 5% Bid
				SUBTOTAL	$ 2,132,162		$ 430,388		$ 440,396		$ 187,241		$ 2,818,602	
Project Management		8%			$ 170,573		$ 34,431		$ 35,232		$ 14,979		$ 225,486	EPA Cost Guidance
Remedial Design		15%			$ 319,824		$ 64,558		$ 66,059		$ 28,086		$ 422,790	EPA Cost Guidance
Construction Management		10%			$ 213,216		$ 43,039		$ 44,040		$ 18,724		$ 281,860	EPA Cost Guidance
				SUBTOTAL	$ 703,614		$ 142,028		$ 145,331		$ 61,790		$ 930,139	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	1	$ 400	1	$ 400	1	$ 400	1	$ 400	1	$ 400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,836,176**		**$ 572,816**		**$ 586,127**		**$ 249,431**		**$ 3,749,140**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	4	$ 500	4	$ 500	4	$ 500	4	$ 500	4	$ 500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,000	SUBTOTAL	$ 1,000		$ 1,000		$ 1,000		$ 1,000	
O&M Contingencies		25%			$ 250		$ 250		$ 250		$ 250		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**		**$ 1,250**		**$ 1,250**		**$ 1,250**		**$ 1,250**	

ANNUAL O&M COSTS (EPA Years 0-10)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	66,267	$ 20,344	2,971	$ 912	3,635	$ 1,116	407	$ 125	49,435	$ 15,176	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 22,044		$ 2,612		$ 2,816		$ 1,825		$ 16,876	
O&M Contingencies		25%			$ 5,511		$ 653		$ 704		$ 456		$ 4,219	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 27,555**		**$ 3,265**		**$ 3,520**		**$ 2,281**		**$ 21,096**	

ANNUAL O&M COSTS (State of Montana years 11-200)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	6,627	$ 2,034	297	$ 91	364	$ 112	41	$ 12	4,943	$ 1,518	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 3,734		$ 1,791		$ 1,812		$ 1,712		$ 3,218	
O&M Contingencies		25%			$ 934		$ 448		$ 453		$ 428		$ 804	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 4,668**		**$ 2,239**		**$ 2,265**		**$ 2,141**		**$ 4,022**	

Table C5-WR4 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: E Borisova
Date: 7/7/05

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					$ 19,272		$ 19,272		$ 19,272		$ 19,272		$ 19,272	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$2,836,176	$2,836,176	$572,816	$572,816	$586,127	$586,127	$249,431	$249,431	$3,749,140	$3,749,140	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	14.2857	$1,250	$17,857	$1,250	$17,857	$1,250	$17,857	$1,250	$17,857	$1,250	$17,857	Annual cost, years 1 through 200
Annual Luttrell O&M Cost (EPA)	1 - 10	7.0236	$27,555	$193,535	$3,265	$22,934	$3,520	$24,724	$2,261	$16,021	$21,096	$148,167	Annual cost, years 1 through 10
Annual Luttrell O&M Cost (Montana)	11 - 200	7.2621	$4,668	$33,900	$2,239	$16,260	$2,265	$16,445	$2,141	$15,545	$4,022	$29,209	Annual cost, years 1 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$3,129,341		$677,740		$693,026		$346,728		$3,992,246	
TOTAL PRESENT VALUE OF ALTERNATIVE WR4				$3,129,300		$677,700		$693,000		$346,700		$3,992,200	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.484149484	Periodic cost, every 5 years beginning in year 5

Table C5-AD1 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			6		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			6	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C5-AD1 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE AD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-AD2 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction		6		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Institutional Controls for Adit Areas		6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,400**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections and Sampling		12	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Laboratory (3 samples per site per year)		18	each	$ 250.00	$ 4,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 5,500	
O&M Contingencies			25%		$ 1,375	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 6,875**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C5-AD2 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,400	1.0000	$2,400	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$6,875	14.2857	$98,214	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$339,981	
TOTAL PRESENT VALUE OF ALTERNATIVE AD2				$340,000	

Notes:

- There are no capital costs associated with this alternative
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-AD3 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	14446	SY	$4.75	$ 68,621	To adit site
Site Preparation and Storm Water Control	CW-6	12	AC	$3,022	$ 37,171	
Subsurface Grouting	CW-24	5896	LF	$6,347	$ 37,423,550	Per linear foot of adit length. 25% of adit grouted
Surface Water Controls	CW-25	12	AC	$9,120	$ 112,179	
Fertilize, seed and mulch	CW-10	12	AC	$2,626.51	$ 32,306	
Erosion control mat	CW-11	11906	SY	$1.33	$ 15,836	
Reclaim Access roads	CW-12	14446	SY	$4.23	$ 61,108	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 38,400,335	
Construction Contingencies			15%		$ 5,760,050	10% Scope, 5% Bid
SUBTOTAL					$ 44,160,385	
Project Management			8%		$ 3,532,831	EPA Cost Guidance
Remedial Design			15%		$ 6,624,058	EPA Cost Guidance
Construction Management			10%		$ 4,416,038	EPA Cost Guidance
SUBTOTAL					$ 14,572,927	
Proprietary Controls for Adit Areas		6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 58,735,712**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		12	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 1,000	
O&M Contingencies			25%		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**	

Table C5-AD3 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:**	Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**			**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**			**Checked By: K. Zambrano**
Base Year:	**2003**			Date: 7/7/05
Date:	**January 2003**			

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$58,735,712	1.0000	$58,735,712	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$58,992,936	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$58,992,900	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-AD4 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	14446	SY	$4.75	$ 68,621	To adit site
Construct Wetland Treatment Facility	CW-26	8.79	GPM	$21,386	$ 187,986	Based on cost to treat 5 gpm, 0.155 acre/gpm
Reclaim Access roads	CW-12	14446	SY	$4.23	$ 61,108	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 967,280	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 77,382	
Construction Contingencies			15%		$ 145,092	10% Scope, 5% Bid
SUBTOTAL					$ 1,189,754	
Project Management			8%		$ 95,180	EPA Cost Guidance
Remedial Design			15%		$ 178,463	EPA Cost Guidance
Construction Management			10%		$ 118,975	EPA Cost Guidance
SUBTOTAL					$ 392,619	
Proprietary Controls for Adit Areas		6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,584,773**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	
Remove FWS Spent Substrate, Disposal at Luttrell Repos.		461	cy	$ 15.00	$ 6,914	Assume 1/15th of material spent (15 yr life)
Remove SF Spent Substrate, Disposal at Luttrell Repos.		200	cy	$ 15.00	$ 3,004	Assume 1/15th of material spent (15 yr life)
Remove ALD Spent Substrate, Disposal at Luttrell Repos.		195	cy	$ 15.00	$ 2,925	Assume 1/15th of material spent (15 yr life)
Replace FWS Substrate (1/15 per year)		461	cy	$ 22.63	$ 10,430	
Replace SF Substrate (1/15 per year)		200	cy	$ 34.27	$ 6,861	
Replace ALD Substrate (1/15 per year)		195	cy	$ 70.54	$ 13,753	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 48,287	
O&M Contingencies			25%		$ 12,072	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 60,358**	

Table C5-AD4 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	Basin Mining Area OU2	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	Jefferson County, Montana		**Date:** January 22, 2003
Phase:	Feasibility Study (-30% to +50%)		
Base Year:	2003		**Checked By: K. Zambrano**
Date:	January 2003		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$1,584,773	1.0000	$1,584,773	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$60,358	7.0236	$423,933	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$60,358	7.2621	$438,330	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$2,686,402	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4				$2,686,400	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-SD1 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		**Date:** 7/07/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C5-SD1 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Colton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		**Date:** 7/07/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-SD2 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no construction costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)			32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara, twice/year)			24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 7,300	
O&M Contingencies				25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C5-SD2 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		**Date:** 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$371,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$371,700	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-SW1 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Surface Water			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C5-SW1 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SW1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C5-SW2 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** E.Borisova
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction			0		$ -	$ -	There are no construction costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Surface Water			5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)			32	hr	$ 25.00	$ 800	8 hrs twice/yr by 2 local technicians
Analytical (5 /subara; twice/year)			10	each	$ 250.00	$ 2,500	Engineering Estimate
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 3,800	
O&M Contingencies				15%		$ 570	10% Scope, 5% Bid
TOTAL YEARLY O&M COST						**$ 4,370**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C5-SW2 Remedial Alternative Cost Summary, Upper Basin Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** E Borisova
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,370	14.2857	$62,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$303,795	
TOTAL PRESENT VALUE OF ALTERNATIVE SW2				$303,800	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C6-WR1 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative WR1 - No Action for Mine Wastes

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4841	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
OTAL PRESENT VALUE OF ALTERNATIVE WR1				$44,300		$44,300		$44,300		$44,300		$44,300	

Notes:

- There are no capital costs associated with this alternative
- Total annual expenditure is the total cost per year with no discounting
- Present value (PV) is the total cost per year including a 7% discount factor for that year
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.484149478	Periodic cost, every 5 years beginning in year 5

Table C6-WR2 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 07/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	5,867	$ 27,867	2,931	$ 13,921	6,952	$ 33,022	1,847	$ 8,773	2,398	$ 11,391	
Site preparation and storm water control	CW-6	AC	$12,543	1.9	$ 23,832	0.8	$ 9,407	1.4	$ 17,560	1.1	$ 13,797	25.7	$ 322,024	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	2,595	$ 8,901	1,585	$ 5,437	2,275	$ 7,803	980	$ 3,361	27,170	$ 93,193	
Backfill and close mine openings	CW-8	EA	$12,635	10	$ 126,350	6	$ 75,810	10	$ 126,350	4	$ 50,540	6	$ 75,810	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	9,196.0	$ 159,275	3,630.0	$ 62,872	6,776.0	$ 117,360	5,324.0	$ 92,212	124,257.8	$ 2,152,145	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	1.9	$ 4,990	0.8	$ 1,970	1.4	$ 3,677	1.1	$ 2,889	25.7	$ 67,431	
Erosion control mat	CW-11	SY	$1.33	1,839	$ 2,446	726	$ 966	1,355	$ 1,802	1,065	$ 1,416	24,852	$ 33,053	
Reclaim Access roads	CW-12	SY	$4.23	5,867	$ 24,816	2,931	$ 12,397	6,952	$ 29,407	1,847	$ 7,813	2,398	$ 10,144	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 514,677		$ 318,979		$ 473,183		$ 317,002		$ 2,901,387	
Construction Contingencies		15%			$ 77,202		$ 47,847		$ 70,977		$ 47,550		$ 435,208	10% Scope, 5% Bid
				SUBTOTAL	$ 591,879		$ 366,825		$ 544,160		$ 364,553		$ 3,336,595	
Project Management		8%			$ 47,350		$ 29,346		$ 43,533		$ 29,164		$ 266,928	EPA Cost Guidance
Remedial Design		15%			$ 88,782		$ 55,024		$ 81,624		$ 54,683		$ 500,489	EPA Cost Guidance
Construction Management		10%			$ 59,188		$ 36,683		$ 54,416		$ 36,455		$ 333,660	EPA Cost Guidance
				SUBTOTAL	$ 195,320		$ 121,052		$ 179,573		$ 120,302		$ 1,101,076	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	10	$ 4,000	6	$ 2,400	10	$ 4,000	4	$ 1,600	6	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 791,199**		**$ 490,278**		**$ 727,733**		**$ 486,455**		**$ 4,440,071**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	40	$ 1,000	24	$ 600	40	$ 1,000	16	$ 500	24	$ 600	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	10	$ 5,000	6	$ 3,000	10	$ 5,000	4	$ 2,000	6	$ 3,000	Engineering Estimate
				SUBTOTAL	$ 6,000	SUBTOTAL	$ 3,600		$ 6,000		$ 2,500		$ 3,600	
O&M Contingencies		25%			$ 1,500		$ 900		$ 1,500		$ 625		$ 900	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 7,500**		**$ 4,500**		**$ 7,500**		**$ 3,125**		**$ 4,500**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C6-WR2 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 07/7/05

PRESENT VALUE ANALYSIS

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$791,199	$791,199	$490,278	$490,278	$727,733	$727,733	$486,455	$486,455	$4,440,071	$4,440,071	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$7,500	$107,143	$4,500	$64,286	$7,500	$107,143	$3,125	$44,643	$4,500	$64,286	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$946,215		$602,437		$882,749		$578,971		$4,552,230	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$946,200		$602,400		$882,700		$579,000		$4,552,200	

Notes:
- Total annual expenditure is the total cost per year with no discounting
- Present value (PV) is the total cost per year including a 7% discount factor for that year
- Total present value is rounded to the nearest $100
- Minimum item cost = $500
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.484149784	Periodic cost, every 5 years beginning in year 5

Table C6-WR3 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 07/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	5,867	$ 27,867	2,931	$ 13,921	6,952	$ 33,022	1,847	$ 8,773	2,398	$ 11,391	
Site preparation and storm water control	CW-6	AC	$12,543	1.9	$ 23,832	0.8	$ 9,407	1.4	$ 17,560	1.1	$ 13,797	25.7	$ 322,021	Includes long-term site surface water controls.
Waste grading and consolidation	CW-7	CY	$3.43	2,595	$ 8,901	1,585	$ 5,437	2,275	$ 7,803	980	$ 3,361	27,170	$ 93,193	
Backfill and close mine openings	CW-8	EA	$12,635	10	$ 126,350	6	$ 75,810	10	$ 126,350	4	$ 50,540	6	$ 75,810	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	9,196.0	$ 159,275	3,630.0	$ 62,872	6,776.0	$ 117,360	5,324.0	$ 92,212	124,257.8	$ 2,152,145	
Place 18" coversoil on wastes	CW-14	AC	$42,552	1.9	$ 80,868	0.8	$ 31,922	1.4	$ 59,587	1.1	$ 46,818	25.7	$ 1,092,698	Includes purchase and delivery of fill from offsite
Fertilize, seed and mulch	CW-10	AC	$2,626.51	1.9	$ 4,990	0.8	$ 1,970	1.4	$ 3,677	1.1	$ 2,889	25.7	$ 67,431	
Erosion control mat	CW-11	SY	$1.33	1,839	$ 2,446	726	$ 966	1,355	$ 1,802	1,065	$ 1,416	24,852	$ 33,053	
Reclaim Access roads	CW-12	SY	$4.23	5,867	$ 24,816	2,931	$ 12,397	6,952	$ 29,407	1,847	$ 7,813	2,398	$ 10,144	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 596,545		$ 350,900		$ 532,770		$ 363,821		$ 3,994,085	
Construction Contingencies		15%			$ 89,332		$ 52,635		$ 79,915		$ 54,573		$ 599,113	10% Scope, 5% Bid
				SUBTOTAL	$ 684,877		$ 403,535		$ 612,685		$ 418,394		$ 4,593,198	
Project Management		8%			$ 54,790		$ 32,283		$ 49,015		$ 33,471		$ 367,456	EPA Cost Guidance
Remedial Design		15%			$ 102,731		$ 60,530		$ 91,903		$ 62,759		$ 688,980	EPA Cost Guidance
Construction Management		10%			$ 68,488		$ 40,354		$ 61,269		$ 41,839		$ 459,320	EPA Cost Guidance
				SUBTOTAL	$ 226,009		$ 133,167		$ 202,186		$ 138,070		$ 1,515,755	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	10	$ 4,000	6	$ 2,400	10	$ 4,000	4	$ 1,600	6	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 914,886**		**$ 539,102**		**$ 818,871**		**$ 558,064**		**$ 6,111,353**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	40	$ 1,000	24	$ 600	40	$ 1,000	16	$ 500	24	$ 600	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	10	$ 5,000	6	$ 3,000	10	$ 5,000	4	$ 2,000	6	$ 3,000	Engineering Estimate
				SUBTOTAL	$ 6,000	SUBTOTAL	$ 3,600		$ 6,000		$ 2,500		$ 3,600	
O&M Contingencies		25%			$ 1,500		$ 900		$ 1,500		$ 625		$ 900	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 7,500**		**$ 4,500**		**$ 7,500**		**$ 3,125**		**$ 4,500**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C6-WR3 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 07/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$914,886	$914,886	$539,102	$539,102	$818,871	$818,871	$558,064	$558,064	$6,111,353	$6,111,353	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$7,500	$107,143	$4,500	$64,286	$7,500	$107,143	$3,125	$44,643	$4,500	$64,286	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$1,069,902		$651,261		$973,887		$650,580		$6,223,512	
TOTAL PRESENT VALUE OF ALTERNATIVE WR3				$1,069,900		$651,300		$973,900		$650,600		$6,223,500	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:
EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C6-WR4 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 07/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	5,867	$ 27,867	2,931	$ 13,921	6,952	$ 33,022	1,847	$ 8,773	2,398	$ 11,391	
Site preparation and storm water control	CW-6	AC	$12,543	1.9	$ 23,832	0.8	$ 9,407	1.4	$ 17,560	1.1	$ 13,797	25.7	$ 322,021	Includes long-term site surface water controls.
Excavate mine waste	CW-15	CY	$4.64	5,190	$ 24,082	3,170.0	$ 14,709	4,550	$ 21,112	1,960	$ 9,094	54,340	$ 252,138	
Transport mine waste		CY-MI	$ 0.60	83,040	$ 49,824	49,134	$ 29,480	73,642	$ 44,185	30,017	$ 18,010	837,312	$ 502,387	EPA Cost Estimate
Spread and compact mine waste	CW-16	CY	$ 0.81	5,190	$ 4,212	3,170	$ 2,573	4,550	$ 3,693	1,960	$ 1,591	54,340	$ 44,105	
Luttrell Repository disposal		CY	$ 5.00	5,190	$ 25,950	3,170	$ 15,850	4,550	$ 22,750	1,960	$ 9,800	54,340	$ 271,700	EPA Cost Estimate
Backfill and close mine openings	CW-8	EA	$12,635	10	$ 126,350	6	$ 75,810	10	$ 126,350	4	$ 50,540	6	$ 75,810	
6" coversoil on excavated areas	CW-14	AC	$22,270	1.9	$ 42,313	0.8	$ 16,703	1.4	$ 31,178	1.1	$ 24,497	25.7	$ 571,740	Includes purchase and delivery of fill from offsite
Organic amendment	CW-17	SY	$0.62	9,196.0	$ 5,702	3,630.0	$ 2,251	6,776.0	$ 4,201	5,324.0	$ 3,301	124,257.8	$ 77,040	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	1.9	$ 4,990	0.8	$ 1,970	1.4	$ 3,677	1.1	$ 2,889	25.7	$ 67,431	
Erosion control mat	CW-11	SY	$1.33	1,839	$ 2,446	726	$ 966	1,355	$ 1,802	1,065	$ 1,416	24,852	$ 33,053	
Reclaim Access roads	CW-12	SY	$4.23	5,867	$ 24,816	2,931	$ 12,397	6,952	$ 29,407	1,847	$ 7,813	2,398	$ 10,144	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 498,584		$ 332,235		$ 475,138		$ 287,723		$ 2,375,158	
Construction Contingencies		15%			$ 74,788		$ 49,835		$ 71,271		$ 43,158		$ 356,274	10% Scope, 5% Bid
				SUBTOTAL	$ 573,372		$ 382,071		$ 546,409		$ 330,881		$ 2,731,432	
Project Management		8%			$ 45,870		$ 30,566		$ 43,713		$ 26,470		$ 218,515	EPA Cost Guidance
Remedial Design		15%			$ 86,006		$ 57,311		$ 81,961		$ 49,632		$ 409,715	EPA Cost Guidance
Construction Management		10%			$ 57,337		$ 38,207		$ 54,641		$ 33,088		$ 273,143	EPA Cost Guidance
				SUBTOTAL	$ 189,213		$ 126,083		$ 180,315		$ 109,191		$ 901,373	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	10	$ 4,000	6	$ 2,400	10	$ 4,000	4	$ 1,600	6	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 766,584**		**$ 510,554**		**$ 730,724**		**$ 441,672**		**$ 3,635,205**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	40	$ 1,000	24	$ 600	40	$ 1,000	16	$ 500	24	$ 600	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	10	$ 5,000	6	$ 3,000	10	$ 5,000	4	$ 2,000	6	$ 3,000	Engineering Estimate
				SUBTOTAL	$ 6,000	SUBTOTAL	$ 3,600		$ 6,000		$ 2,500		$ 3,600	
O&M Contingencies		25%			$ 1,500		$ 900		$ 1,500		$ 625		$ 900	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 7,500**		**$ 4,500**		**$ 7,500**		**$ 3,125**		**$ 4,500**	

ANNUAL O&M COSTS (EPA Years 0-10)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	4,308	$ 1,322	2,631	$ 808	3,777	$ 1,159	1,627	$ 499	45,102	$ 13,846	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 3,022		$ 2,508		$ 2,859		$ 2,199		$ 15,546	
O&M Contingencies		25%			$ 756		$ 627		$ 715		$ 550		$ 3,887	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 3,778**		**$ 3,135**		**$ 3,574**		**$ 2,749**		**$ 19,433**	

ANNUAL O&M COSTS (State of Montana years 11-200)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	431	$ 132	263	$ 81	378	$ 116	163	$ 50	4,510	$ 1,385	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,832		$ 1,781		$ 1,816		$ 1,750		$ 3,085	
O&M Contingencies		25%			$ 458		$ 445		$ 454		$ 437		$ 771	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 2,290**		**$ 2,226**		**$ 2,270**		**$ 2,187**		**$ 3,856**	

Table C6-WR4 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 07/7/05

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					$ 19,272		$ 19,272		$ 19,272		$ 19,272		$ 19,272	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$766,584	$766,584	$510,554	$510,554	$730,724	$730,724	$441,672	$441,672	$3,635,205	$3,635,205	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	14.2857	$7,500	$107,143	$4,500	$64,286	$7,500	$107,143	$3,125	$44,643	$4,500	$64,286	Annual cost, years 1 through 200
Annual Luttrell O&M Cost (EPA)	1 - 10	7.0236	$3,778	$26,536	$3,135	$22,017	$3,574	$25,104	$2,749	$19,310	$19,433	$136,489	Annual cost, years 1 through 10
Annual Luttrell O&M Cost (Montana)	11 - 200	7.2621	$2,290	$16,632	$2,226	$16,165	$2,270	$16,484	$2,187	$15,885	$3,856	$28,001	Annual cost, years 1 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$964,768		$660,895		$927,329		$569,383		$3,911,854	
TOTAL PRESENT VALUE OF ALTERNATIVE WR4				$964,800		$660,900		$927,300		$569,400		$3,911,900	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1-200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C6-SD1 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C6-SD1 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost.
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C6-SD2 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 07/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative.
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara; twice/year)		24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 7,300	
O&M Contingencies			25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C6-SD2 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$371,723	
		TOTAL PRESENT VALUE OF ALTERNATIVE SD2		$371,700	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C6-SD3 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$ 8,998	
Access Roads		CW-5	9387	SY	$4.75	$ 44,587	To stream bed excavation locations.
Site Preparation and Storm Water Control		CW-6	2	AC	$12,543	$ 25,086	Includes long-term site surface water controls
Stream Diversion		CW-29	1	EA	$23,147	$ 23,147	8-inch diameter piping system
Excavate Stream Sediments		CW-15	3370	CY	$4.64	$ 15,639	
Transport Stream Sediments		--	53,926	CY-MI	$ 0.60	$ 32,356	EPA Cost Estimate
Spread and compact mine waste		CW-16	3370	CY	$ 0.81	$ 2,736	
Luttrell Repository disposal		--	3370	CY	$ 5.00	$ 16,852	EPA Cost Estimate
Stream Restoration		CW-31	12,528	SY	$ 90.89	$ 1,138,685	
Reclaim Access roads		CW-12	9387	SY	$4.23	$ 39,706	
Post-Construction Submittals		CW-13	1	LS	$119,879	$ 119,879	
	SUBTOTAL					$ 1,988,357	
Mobilization/Demobilization, Bonding, and Insurance				8%		$ 159,069	
Construction Contingencies				30%		$ 596,507	20% Scope, 10% Bid
	SUBTOTAL					$ 2,743,932	
Project Management				8%		$ 219,515	EPA Cost Guidance
Remedial Design				15%		$ 411,590	EPA Cost Guidance
Construction Management				10%		$ 274,393	EPA Cost Guidance
	SUBTOTAL					$ 905,498	
Proprietary Controls for Sediment Areas			5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 3,651,430**	

Table C6-SD3 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Excavation with Disposal in Luttrell Repository		8	hr	$ 25.00	$ 200	8 hr once/yr by local technician
Materials and Supplies		167	ls	$ 5.00	$ 835	Engineering Estimate
		SUBTOTAL			$ 1,035	
O&M Contingencies			25%		$ 259	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,294**	

ANNUAL O&M COSTS (EPA Years 0-10: State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Luttrell Leachate Treatment		125	gal	$ 0.31	$ 500	EPA Cost Estimate
Materials and Supplies		1	ls	$ 500.00	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,000	
O&M Contingencies		25%			$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C6-SD3 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Colton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$3,651,430	1.0000	$3,651,430	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,294	14.2857	$18,482	Annual cost, years 1 through 200
Annual Site O&M Cost (EPA)	1 - 10	$1,250	7.0236	$8,779	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$1,250	7.2621	$9,078	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$3,927,136	
		TOTAL PRESENT VALUE OF ALTERNATIVE SD3		$3,927,100	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C6-SW1 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction		0		$ -	$ -	There are no capital costs for this alternative.
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Surface Water Areas		0	ls	$ -	$ -	
TOTAL CAPITAL COSTS					**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22 LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies			25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 89,169**	

Table C6-SW1 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 07/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$69,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SW1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C6-SW2 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 07/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Surface Water Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	8 hrs twice/yr by 2 local technicians
Analytical (5 /subara; twice/year)		10	each	$ 250.00	$ 2,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 3,800	
O&M Contingencies			15%		$ 570	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 4,370**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C6-SW2 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 07/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,370	14.2857	$62,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$303,795	
TOTAL PRESENT VALUE OF ALTERNATIVE SW2				$303,800	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C6-SW3 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9387	SY	$4.75	$ 44,587	To treatment site.
Site Preparation and Storm Water Control	CW-6	208.09	AC	$12,543	$ 2,610,131	Includes long-term site surface water controls.
Construct Wetland Treatment Facility	CW-26	1346.4	GPM	$21,386	$ 28,794,600	Based on cost to treat 5 gpm
Install Surface Water Collection Piping	CW-28	1	EA	$38,914	$ 38,914	8-inch diameter piping system
Fertilize, seed and mulch	CW-10	208.09	AC	$2,626.51	$ 546,557	
Erosion control mat	CW-11	201433	SY	$1.33	$ 267,906	
Reclaim Access roads	CW-12	9387	SY	$4.23	$ 39,706	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 32,991,966	
Construction Contingencies			15%		$ 4,948,795	10% Scope, 5% Bid
SUBTOTAL					$ 37,940,761	
Project Management			8%		$ 3,035,261	EPA Cost Guidance
Remedial Design			15%		$ 5,691,114	EPA Cost Guidance
Construction Management			10%		$ 3,794,076	EPA Cost Guidance
SUBTOTAL					$ 12,520,451	
Proprietary Controls for Surface Water		0	ls	$ 400.00	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 50,461,212**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 2,000.00	$ 2,000	Engineering Estimate
Spent Substrate Removal and Disposal at Luttrell Repository		215,950	cy	$ 15.00	$ 3,239,255	Engineering Estimate/Min $500
Replace Substrate (1/15 per year)		215,950	cy	$ 70.63	$ 15,251,641	Engineering Estimate/Min $500
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 18,496,295	
O&M Contingencies			15%		$ 2,774,444	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 21,270,740**	

Table C6-SW3 Remedial Alternative Cost Summary, Lower Basin Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$50,461,212	1.0000	$50,461,212	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$21,270,740	7.0236	$149,396,774	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$21,270,740	7.2621	$154,470,531	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$354,567,883	
		TOTAL PRESENT VALUE OF ALTERNATIVE SW3		$354,567,900	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-WR1 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative WR1 - No Action for Mine Wastes

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 21, 2003

Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4841	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
TOTAL PRESENT VALUE OF ALTERNATIVE WR1				$44,300		$44,300		$44,300		$44,300		$44,300	

Notes:
- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.484149484	Periodic cost, every 5 years beginning in year 5

Table C7-WR2 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	7,959	$ 37,806	3,646	$ 17,318	2,234	$ 10,609	587	$ 2,787	7,207	$ 34,235	
Site preparation and storm water control	CW-6	AC	$12,543	1.5	$ 18,188	6.3	$ 78,395	4.3	$ 53,936	1.5	$ 18,815	9.2	$ 115,397	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	2,975	$ 10,204	3,520	$ 12,074	1,590	$ 5,454	285	$ 978	805	$ 2,761	
Backfill and close mine openings	CW-8	EA	$12,635	13	$ 164,255	3	$ 37,905	5	$ 63,175	1	$ 12,635	3	$ 37,905	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	7,018.0	$ 121,552	30,250.0	$ 523,930	20,812.0	$ 360,464	7,260.0	$ 125,743	44,528.0	$ 771,225	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	1.5	$ 3,808	6.3	$ 16,416	4.3	$ 11,294	1.5	$ 3,940	9.2	$ 24,164	
Erosion control mat	CW-11	SY	$1.33	1,404	$ 1,867	6,050	$ 8,047	4,162	$ 5,536	1,452	$ 1,931	8,906	$ 11,844	
Reclaim Access roads	CW-12	SY	$4.23	7,959	$ 33,667	3,646	$ 15,422	2,234	$ 9,448	587	$ 2,482	7,207	$ 30,487	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 527,547		$ 845,706		$ 656,116		$ 305,510		$ 1,164,219	
Construction Contingencies		15%			$ 79,132		$ 126,856		$ 98,417		$ 45,827		$ 174,633	10% Scope, 5% Bid
				SUBTOTAL	$ 606,679		$ 972,562		$ 754,533		$ 351,337		$ 1,338,852	
Project Management		8%			$ 48,534		$ 77,805		$ 60,363		$ 28,107		$ 107,108	EPA Cost Guidance
Remedial Design		15%			$ 91,002		$ 145,884		$ 113,180		$ 52,700		$ 200,828	EPA Cost Guidance
Construction Management		10%			$ 60,668		$ 97,256		$ 75,453		$ 35,134		$ 133,885	EPA Cost Guidance
				SUBTOTAL	$ 200,204		$ 320,945		$ 248,996		$ 115,941		$ 441,821	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	13	$ 5,200	3	$ 1,200	5	$ 2,000	1	$ 400	3	$ 1,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 812,083**		**$ 1,294,707**		**$ 1,005,529**		**$ 467,678**		**$ 1,781,873**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	52	$ 1,300	12	$ 500	20	$ 500	4	$ 500	12	$ 500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	13	$ 6,500	3	$ 1,500	5	$ 2,500	1	$ 500	3	$ 1,500	Engineering Estimate
				SUBTOTAL	$ 7,800	SUBTOTAL	$ 2,000		$ 3,000		$ 1,000		$ 2,000	
O&M Contingencies		25%			$ 1,950		$ 500		$ 750		$ 250		$ 500	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,750**		**$ 2,500**		**$ 3,750**		**$ 1,250**		**$ 2,500**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C7-WR2 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 7/7/06

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$812,083	$812,083	$1,294,707	$1,294,707	$1,005,529	$1,005,529	$467,678	$467,678	$1,781,873	$1,781,873	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$9,750	$139,286	$2,500	$35,714	$3,750	$53,571	$1,250	$17,857	$2,500	$35,714	Annual cost: years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost: every 5 years beginning in year 5
				$999,242		$1,378,294		$1,106,973		$533,408		$1,865,461	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$999,200		$1,378,300		$1,107,000		$533,400		$1,865,500	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.484149784	Periodic cost, every 5 years beginning in year 5

Table C7-WR3 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	7,959	$ 37,806	3,646	$ 17,318	2,234	$ 10,609	587	$ 2,787	7,207	$ 34,235	
Site preparation and storm water control	CW-6	AC	$12,543	1.5	$ 18,188	6.3	$ 78,395	4.3	$ 53,936	1.5	$ 18,815	9.2	$ 115,397	Includes long-term site surface water controls
Waste grading and consolidation	CW-7	CY	$3.43	2,975	$ 10,204	3,520	$ 12,074	1,590	$ 5,454	285	$ 978	805	$ 2,761	
Backfill and close mine openings	CW-8	EA	$12,635	13	$ 164,255	3	$ 37,905	5	$ 63,175	1	$ 12,635	3	$ 37,905	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	7,018.0	$ 121,552	30,250.0	$ 523,930	20,812.0	$ 360,464	7,260.0	$ 125,743	44,526.0	$ 771,225	
Place 18" coversoil on wastes	CW-14	AC	$42,562	1.5	$ 61,715	6.3	$ 266,013	4.3	$ 183,017	1.5	$ 63,843	9.2	$ 391,570	Includes purchase and delivery of fill from offsite
Fertilize, seed and mulch	CW-10	AC	$2,626.51	1.5	$ 3,808	6.3	$ 16,416	4.3	$ 11,294	1.5	$ 3,940	9.2	$ 24,164	
Erosion control mat	CW-11	SY	$1.33	1,404	$ 1,867	6,050	$ 8,047	4,162	$ 5,536	1,452	$ 1,931	8,906	$ 11,844	
Reclaim Access roads	CW-12	SY	$4.23	7,959	$ 33,667	3,646	$ 15,422	2,234	$ 9,448	587	$ 2,482	7,207	$ 30,487	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 589,262		$ 1,111,716		$ 839,132		$ 368,353		$ 1,555,790	
Construction Contingencies		15%			$ 88,389		$ 166,758		$ 125,870		$ 55,403		$ 233,368	10% Scope, 5% Bid
				SUBTOTAL	$ 677,651		$ 1,278,476		$ 965,002		$ 424,756		$ 1,789,158	
Project Management		8%			$ 54,212		$ 102,278		$ 77,200		$ 33,980		$ 143,133	EPA Cost Guidance
Remedial Design		15%			$ 101,648		$ 191,771		$ 144,750		$ 63,713		$ 268,374	EPA Cost Guidance
Construction Management		10%			$ 67,765		$ 127,848		$ 96,500		$ 42,476		$ 178,916	EPA Cost Guidance
				SUBTOTAL	$ 223,625		$ 421,897		$ 318,451		$ 140,168		$ 590,422	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	13	$ 5,200	3	$ 1,200	5	$ 2,000	1	$ 400	3	$ 1,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 906,476**		**$ 1,701,573**		**$ 1,285,453**		**$ 565,325**		**$ 2,380,780**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	52	$ 1,300	12	$ 500	20	$ 500	4	$ 500	12	$ 500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	13	$ 6,500	3	$ 1,500	5	$ 2,500	1	$ 500	3	$ 1,500	Engineering Estimate
				SUBTOTAL	$ 7,800	SUBTOTAL	$ 2,000		$ 3,000		$ 1,000		$ 2,000	
O&M Contingencies		25%			$ 1,950		$ 500		$ 750		$ 250		$ 500	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,750**		**$ 2,500**		**$ 3,750**		**$ 1,250**		**$ 2,500**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Table C7-WR3 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative WR3 - Contain Mine Waste with Cover

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$906,476	$906,476	$1,701,573	$1,701,573	$1,285,453	$1,285,453	$565,325	$565,325	$2,380,780	$2,380,780	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$9,750	$139,286	$2,500	$35,714	$3,750	$53,571	$1,250	$17,857	$2,500	$35,714	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$1,093,635		$1,785,161		$1,386,897		$631,056		$2,464,368	
TOTAL PRESENT VALUE OF ALTERNATIVE WR3				$1,093,600		$1,785,200		$1,386,900		$631,100		$2,464,400	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-WR4 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	7,958	$ 37,806	3,646	$ 17,318	2,234	$ 10,609	587	$ 2,787	7,207	$ 34,235	
Site preparation and storm water control	CW-6	AC	$12,543	1.5	$ 18,188	6.3	$ 78,395	4.3	$ 53,936	1.5	$ 18,815	9.2	$ 115,397	Includes long-term site surface water controls.
Excavate mine waste	CW-15	CY	$3.64	5,950	$ 27,508	7,040	$ 32,666	3,180	$ 14,755	570	$ 2,645	1,610	$ 7,470	
Transport mine waste		CY-MI	$ 0.80	46,747	$ 28,048	50,135	$ 30,081	21,881	$ 13,128	3,762	$ 2,257	12,443	$ 7,466	EPA Cost Estimate
Spread and compact mine waste	CW-16	CY	$ 0.81	5,950	$ 4,829	7,040	$ 5,714	3,180	$ 2,581	570	$ 463	1,610	$ 1,307	
Luttrell Repository disposal		CY	$ 5.00	5,950	$ 29,750	7,040	$ 35,200	3,180	$ 15,900	570	$ 2,850	1,610	$ 8,050	EPA Cost Estimate
Backfill and close mine openings	CW-8	EA	$12,635	13	$ 164,255	3	$ 37,905	5	$ 63,175	1	$ 12,635	3	$ 37,905	
6" coversoil on excavated areas	CW-14	AC	$22,270	1.5	$ 32,292	6.3	$ 135,188	4.3	$ 95,761	1.5	$ 33,405	9.2	$ 204,884	Includes purchase and delivery of fill from offsite.
Organic amendment	CW-17	SY	$0.62	7,018.0	$ 4,351	30,250.0	$ 18,755	20,812.0	$ 12,903	7,260.0	$ 4,501	44,526.0	$ 27,607	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	1.5	$ 3,808	6.3	$ 16,416	4.3	$ 11,294	1.5	$ 3,940	9.2	$ 24,164	
Erosion control mat	CW-11	SY	$1.33	1,404	$ 1,867	6,050	$ 8,047	4,162	$ 5,536	1,452	$ 1,931	8,906	$ 11,844	
Reclaim Access roads	CW-12	SY	$4.23	7,959	$ 33,667	3,646	$ 15,422	2,234	$ 9,448	587	$ 2,482	7,207	$ 30,487	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 522,569		$ 571,305		$ 445,227		$ 224,910		$ 647,017	
Construction Contingencies		15%			$ 78,400		$ 85,696		$ 66,784		$ 33,737		$ 97,053	10% Scope, 5% Bid
				SUBTOTAL	$ 601,070		$ 657,001		$ 512,011		$ 258,647		$ 744,070	
Project Management		8%			$ 48,086		$ 52,560		$ 40,961		$ 20,692		$ 59,526	EPA Cost Guidance
Remedial Design		15%			$ 90,160		$ 98,550		$ 76,802		$ 38,797		$ 111,610	EPA Cost Guidance
Construction Management		10%			$ 60,107		$ 65,700		$ 51,201		$ 25,865		$ 74,407	EPA Cost Guidance
				SUBTOTAL	$ 198,353		$ 216,810		$ 168,964		$ 85,353		$ 245,543	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	13	$ 5,200	3	$ 1,200	5	$ 2,000	1	$ 400	3	$ 1,200	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 804,623**		**$ 875,011**		**$ 682,975**		**$ 344,400**		**$ 990,813**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	52	$ 1,300	12	$ 500	20	$ 500	4	$ 500	12	$ 500	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	13	$ 6,500	3	$ 1,500	5	$ 2,500	1	$ 500	3	$ 1,500	Engineering Estimate
				SUBTOTAL	$ 7,800	SUBTOTAL	$ 2,000		$ 3,000		$ 1,000		$ 2,000	
O&M Contingencies		25%			$ 1,950		$ 500		$ 750		$ 250		$ 500	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,750**		**$ 2,500**		**$ 3,750**		**$ 1,250**		**$ 2,500**	

ANNUAL O&M COSTS (EPA Years 0-10)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	4,939	$ 1,516	5,843	$ 1,794	2,639	$ 810	473	$ 145	1,336	$ 410	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 3,216		$ 3,494		$ 2,510		$ 1,845		$ 2,110	
O&M Contingencies		25%			$ 804		$ 873		$ 628		$ 461		$ 528	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 4,020**		**$ 4,367**		**$ 3,138**		**$ 2,307**		**$ 2,638**	

ANNUAL O&M COSTS (State of Montana years 11-200)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	48	$ 1,200	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	494	$ 152	584	$ 179	264	$ 81	47	$ 15	134	$ 41	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	1	$ 500	1	$ 500	1	$ 500	1	$ 500	1	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,852		$ 1,879		$ 1,781		$ 1,715		$ 1,741	
O&M Contingencies		25%			$ 463		$ 470		$ 445		$ 429		$ 435	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 2,315**		**$ 2,349**		**$ 2,226**		**$ 2,143**		**$ 2,176**	

Table C7-WR4 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative WR4 - Excavation of Mine Waste with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 7/7/05

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ 3,854		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					$ 19,272		$ 19,272		$ 19,272		$ 19,272		$ 19,272	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$804,623	$804,623	$875,011	$875,011	$682,975	$682,975	$344,400	$344,400	$990,813	$990,813	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	14.2857	$9,750	$139,286	$2,500	$35,714	$3,750	$53,571	$1,250	$17,857	$2,500	$35,714	Annual cost, years 1 through 200
Annual Luttrell O&M Cost (EPA)	1 - 10	7.0236	$4,020	$28,236	$4,367	$30,674	$3,138	$22,039	$2,307	$16,200	$2,638	$18,527	Annual cost, years 1 through 10
Annual Luttrell O&M Cost (Montana)	11 - 200	7.2621	$2,315	$16,806	$2,349	$17,060	$2,226	$16,168	$2,143	$15,564	$2,176	$15,804	Annual cost, years 1 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$1,036,826		$1,006,334		$822,626		$441,895		$1,108,732	
TOTAL PRESENT VALUE OF ALTERNATIVE WR4				$1,036,800		$1,006,300		$822,600		$441,900		$1,108,700	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:
EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-AD1 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			5		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			5	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$** -	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C7-AD1 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD1 - No Action for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE AD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- *Present value (PV) is the total cost per year including a 7% discount factor for that year.*
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-AD2 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction		5		$ -	$ -	There are no construction costs for this alternative.
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Institutional Controls for Adit Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections and Sampling		10	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Laboratory (3 samples per site per year)		15	each	$ 250.00	$ 3,750	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 4,750	
O&M Contingencies			25%		$ 1,188	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 5,938**	

Table C7-AD2 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD2 - Natural Attenuation of Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$5,938	14.2857	$84,821	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$326,188	
TOTAL PRESENT VALUE OF ALTERNATIVE AD2				$326,200	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-AD3 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	Prepared By: B. Cotton
Location:	**Jefferson County, Montana**		Date: January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		Checked By: K. Zambrano
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9205	SY	$4.75	$ 43,724	To adit site.
Site Preparation and Storm Water Control	CW-6	8.0	AC	$3,022	$ 24,025	
Subsurface Grouting	CW-24	733	LF	$6,347	$ 4,655,481	Per linear foot of adit length. 25% of adit grouted.
Surface Water Controls	CW-25	8	AC	$9,120	$ 72,506	
Fertilize, seed and mulch	CW-10	8	AC	$2,626.51	$ 20,881	
Erosion control mat	CW-11	7696	SY	$1.33	$ 10,235	
Reclaim Access roads	CW-12	9205	SY	$4.23	$ 38,938	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 5,515,354	
Construction Contingencies			15%		$ 827,303	10% Scope, 5% Bid
SUBTOTAL					$ 6,342,657	
Project Management			8%		$ 507,413	EPA Cost Guidance
Remedial Design			15%		$ 951,399	EPA Cost Guidance
Construction Management			10%		$ 634,266	EPA Cost Guidance
SUBTOTAL					$ 2,093,077	
Proprietary Controls for Adit Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					$ 8,437,734	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		10	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 1,000	
O&M Contingencies			25%		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					$ 1,250	

Table C7-AD3 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD3 - Source Water Controls for Acid Mine Drainage

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		Date: January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$8,437,734	1.0000	$8,437,734	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$8,694,958	
	TOTAL PRESENT VALUE OF ALTERNATIVE AD3			$8,695,000	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-AD4 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9205	SY	$4.75	$ 43,724	To adit site.
Construct Wetland Treatment Facility	CW-26	5.00	GPM	$21,386	$ 106,932	Based on cost to treat 5 gpm, 0.155 acre/gpm
Reclaim Access roads	CW-12	9205	SY	$4.23	$ 38,938	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 839,159	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 67,133	
Construction Contingencies			15%		$ 125,874	10% Scope, 5% Bid
SUBTOTAL					$ 1,032,165	
Project Management			8%		$ 82,573	EPA Cost Guidance
Remedial Design			15%		$ 154,825	EPA Cost Guidance
Construction Management			10%		$ 103,217	EPA Cost Guidance
SUBTOTAL					$ 340,614	
Proprietary Controls for Adit Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,374,780**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	
Remove FWS Spent Substrate, Disposal at Luttrell Repos.		339	cy	$ 15.00	$ 5,092	Assume 1/15th of material spent (15 yr life)
Remove SF Spent Substrate, Disposal at Luttrell Repos.		191	cy	$ 15.00	$ 2,868	Assume 1/15th of material spent (15 yr life)
Remove ALD Spent Substrate, Disposal at Luttrell Repos.		188	cy	$ 15.00	$ 2,823	Assume 1/15th of material spent (15 yr life)
Replace FWS Substrate (1/15 per year)		339	cy	$ 22.63	$ 7,681	
Replace SF Substrate (1/15 per year)		191	cy	$ 34.27	$ 6,551	
Replace ALD Substrate (1/15 per year)		188	cy	$ 70.54	$ 13,274	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 42,689	
O&M Contingencies			25%		$ 10,672	10% Scope; 15% Bid
TOTAL YEARLY O&M COST					**$ 53,361**	

Table C7-AD4 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD4 - Biological Treatment of Acid Mine Drainage at Mine Site

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$1,374,780	1.0000	$1,374,780	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$53,361	7.0236	$374,786	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$53,361	7.2621	$387,515	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$2,376,447	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4				$2,376,400	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-AD5 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** May 29, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9,205	SY	$4.75	$ 43,724	To adit site
Site Preparation and Storm Water Control	CW-6	7.95	AC	$3,022	$ 24,025	
Site Characterization	CW-33	1	LS	$152,403	$ 152,403	Investigation of Crescent Mine adit only
Underground Subsurface Grouting	CW-32	1	LS	$394,302	$ 394,302	Grouting of Crescent Mine adit only
Surface Water Controls	CW-25	7.95	AC	$9,120	$ 72,506	
Fertilize, seed and mulch	CW-10	7.95	AC	$2,627	$ 20,881	
Erosion control mat	CW-11	7,696	SY	$1.33	$ 10,235	
Reclaim Access roads	CW-12	9,205	SY	$4.23	$ 38,938	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 1,406,578	
Construction Contingencies			15%		$ 210,987	10% Scope, 5% Bid
SUBTOTAL					$ 1,617,565	
Project Management			8%		$ 129,405	EPA Cost Guidance
Remedial Design			15%		$ 242,635	EPA Cost Guidance
Construction Management			10%		$ 161,757	EPA Cost Guidance
SUBTOTAL					$ 533,797	
Proprietary Controls for Adit Areas		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,153,362**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		10	hr	$ 25.00	$ 500	2 hr/site; once/yr by local technician
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 1,000	
O&M Contingencies			25%		$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**	

Table C7-AD5 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative AD5 - Source Water Controls for Acid Mine Drainage (Underground Grouting)

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD5 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting from within the adit to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		Date: May 29, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,153,362	1.0000	$2,153,362	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,250	14.2857	$17,857	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$2,410,585	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$2,410,600	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-SD1 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	***Feasibility Study (-30% to +50%)***		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C7-SD1 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
		TOTAL PRESENT VALUE OF ALTERNATIVE SD1		$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C7-SD2 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no construction costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)			32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara; twice/year)			24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 7,300	
O&M Contingencies				25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C7-SD2 Remedial Alternative Cost Summary, Upper Cataract Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Colton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$371,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$371,700	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C8-WR1 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative WR1 - No Action for Mine Wastes

Site: Basin Mining Area OU2
Location: Montana
Phase: Feasibility Study (-50 % to ...)
Base Year: 2003
Date: January 2003

Description: Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 20, 2003

Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					$ -		$ -		$ -		$ -		$ -	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Category A Sites Qty	Category A Sites Cost	Category B Sites Qty	Category B Sites Cost	Category C Sites Qty	Category C Sites Cost	Category D Sites Qty	Category D Sites Cost	Category E Sites Qty	Category E Sites Cost	Source of Cost Data/Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					$ 17,834		$ 17,834		$ 17,834		$ 17,834		$ 17,834	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Category A Sites TOTAL COST/YR	Category A Sites PRESENT VALUE	Category B Sites TOTAL COST/YR	Category B Sites PRESENT VALUE	Category C Sites TOTAL COST/YR	Category C Sites PRESENT VALUE	Category D Sites TOTAL COST/YR	Category D Sites PRESENT VALUE	Category E Sites TOTAL COST/YR	Category E Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4841	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
TOTAL PRESENT VALUE OF ALTERNATIVE WR1				$44,300		$44,300		$44,300		$44,300		$44,300	

Notes:
- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C8-SD1 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				15%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C8-SD1 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
		TOTAL PRESENT VALUE OF ALTERNATIVE SD1		$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C8-SD2 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative.
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Mine Waste Areas		0	ls	$ 400.00	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ -**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara; twice/year)		24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 7,300	
O&M Contingencies			25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C8-SD2 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$369,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$369,700	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C8-SD3 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$	119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$	384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$	15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$	8,998	
Access Roads		CW-5	9387	SY	$4.75	$	44,587	To stream bed excavation locations.
Site Preparation and Storm Water Control		CW-6	2	AC	$12,543	$	25,086	Includes long-term site surface water controls.
Stream Diversion		CW-29	1	EA	$23,147	$	23,147	8-inch diameter piping system
Excavate Stream Sediments		CW-15	4176	CY	$4.64	$	19,376	
Transport Stream Sediments		--	49,694	CY-MI	$ 0.60	$	29,816	EPA Cost Estimate
Spread and compact mine waste		CW-16	4176	CY	$ 0.81	$	3,389	
Luttrell Repository disposal		--	4176	CY	$ 5.00	$	20,880	EPA Cost Estimate
Stream Restoration		CW-31	12,528	SY	$ 90.89	$	1,138,685	
Reclaim Access roads		CW-12	9387	SY	$4.23	$	39,706	
Post-Construction Submittals		CW-13	1	LS	$119,879	$	119,879	
	SUBTOTAL					$	1,994,237	
Mobilization/Demobilization, Bonding, and Insurance				8%		$	159,539	
Construction Contingencies				30%		$	598,271	20% Scope, 10% Bid
	SUBTOTAL					$	2,752,047	
Project Management				8%		$	220,164	EPA Cost Guidance
Remedial Design				15%		$	412,807	EPA Cost Guidance
Construction Management				10%		$	275,205	EPA Cost Guidance
	SUBTOTAL					$	908,175	
Proprietary Controls for Sediment Areas			5	ls	$ 400.00	$	2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$**	**3,662,222**	

Table C8-SD3 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Excavation with Disposal in Luttrell Repository		8	hr	$ 25.00	$ 200	8 hr once/yr by local technician
Materials and Supplies		167	ls	$ 5.00	$ 835	Engineering Estimate
		SUBTOTAL			$ 1,035	
O&M Contingencies			25%		$ 259	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,294**	

ANNUAL O&M COSTS (EPA Years 0-10: State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Luttrell Leachate Treatment		155	gal	$ 0.31	$ 500	EPA Cost Estimate
Materials and Supplies		1	ls	$ 500.00	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,000	
O&M Contingencies		25%			$ 250	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,250**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C8-SD3 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Lutrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$3,662,222	1.0000	$3,662,222	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,294	14.2857	$18,482	Annual cost, years 1 through 200
Annual Site O&M Cost (EPA)	1 - 10	$1,250	7.0236	$8,779	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$1,250	7.2621	$9,078	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$3,937,928	
TOTAL PRESENT VALUE OF ALTERNATIVE SD3				$3,937,900	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C8-SW1 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Surface Water			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C8-SW1 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
		TOTAL PRESENT VALUE OF ALTERNATIVE SW1		$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C8-SW2 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** janaury 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			15%		$ -	
SUBTOTAL					$ -	
Project Management			8%		$ -	
Remedial Design			15%		$ -	
Construction Management			10%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Surface Water		5	ls	$ 400.00	$ 2,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 2,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	8 hrs twice/yr by 2 local technicians
Analytical (5 /subara; twice/year)		10	each	$ 250.00	$ 2,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 3,800	
O&M Contingencies			15%		$ 570	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 4,370**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C8-SW2 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** janaury 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,000	1.0000	$2,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,370	14.2857	$62,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$303,795	
TOTAL PRESENT VALUE OF ALTERNATIVE SW2				$303,800	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C8-SW3 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 21, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$	119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$	384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$	15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$	8,998	
Access Roads		CW-5	9387	SY	$4.75	$	44,587	To treatment site.
Site Preparation and Storm Water Control		CW-6	138.73	AC	$12,543	$	1,740,087	Includes long-term site surface water controls.
Construct Wetland Treatment Facility		CW-26	897.6	GPM	$21,386	$	19,196,400	Based on cost to treat 5 gpm
Install Surface Water Collection Piping		CW-28	1	EA	$38,914	$	38,914	8-inch diameter piping system
Fertilize, seed and mulch		CW-10	138.73	AC	$2,626.51	$	364,371	
Erosion control mat		CW-11	134289	SY	$1.33	$	178,604	
Reclaim Access roads		CW-12	9387	SY	$4.23	$	39,706	
Post-Construction Submittals		CW-13	1	LS	$119,879	$	119,879	
	SUBTOTAL					$	22,252,234	
Construction Contingencies				15%		$	3,337,835	10% Scope, 5% Bid
	SUBTOTAL					$	25,590,070	
Project Management				8%		$	2,047,206	EPA Cost Guidance
Remedial Design				15%		$	3,838,510	EPA Cost Guidance
Construction Management				10%		$	2,559,007	EPA Cost Guidance
	SUBTOTAL					$	8,444,723	
Proprietary Controls for Surface Water			0	ls	$ 400.00	$	-	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$**	**34,034,793**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
Site Inspections			96	hr	$ 25.00	$	2,400	8 hrs per month by local technician
Site Maintenance			1	ls	$ 2,000.00	$	2,000	Engineering Estimate
Spent Substrate Removal and Disposal at Luttrell Repository			144,027	cy	$ 15.00	$	2,160,399	Engineering Estimate/Min. $500
Replace Substrate (1/15 per year)			144,027	cy	$ 70.63	$	10,171,980	Engineering Estimate/Min. $500
Sample Analysis			4	ea	$ 250.00	$	1,000	quarterly sampling
	SUBTOTAL					$	12,337,779	
O&M Contingencies				15%		$	1,850,667	10% Scope, 5% Bid
TOTAL YEARLY O&M COST						**$**	**14,188,446**	

Table C8-SW3 Remedial Alternative Cost Summary, Middle Basin Creek Subarea, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water withinn a subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 21, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$34,034,793	1.0000	$34,034,793	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$14,188,446	7.0236	$99,653,707	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$14,188,446	7.2621	$103,038,109	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$236,965,974	
TOTAL PRESENT VALUE OF ALTERNATIVE SW3				$236,966,000	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C9-WR1 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative WR1 - No Action for Mine Wastes

Site:	Basin Mining Area OU2	**Description:** Under the alternative WR1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	Jefferson County, Montana		**Date:** January 22, 2003
Phase:	Feasibility Study (-30% to +50%)		
Base Year:	2003		**Checked By:** K. Zambrano
Date:	January 2003		Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Mine Waste Remedial Construction			$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	There are no capital costs for this alternative.
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Construction Contingencies		0%			$ -		$ -		$ -		$ -		$ -	
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Project Management		0%			$ -		$ -		$ -		$ -		$ -	
Remedial Design		0%			$ -		$ -		$ -		$ -		$ -	
Construction Management		0%			$ -		$ -		$ -		$ -		$ -	
			SUBTOTAL		$ -		$ -		$ -		$ -		$ -	
Institutional Controls for Mine Waste Areas		ls	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
TOTAL CAPITAL COSTS					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
Contingencies		25%			$ 3,567		$ 3,567		$ 3,567		$ 3,567		$ 3,567	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**		**$ 17,834**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	2.4841	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	$17,834	$44,302	Periodic cost, every 5 years beginning in year 5
				$44,302		$44,302		$44,302		$44,302		$44,302	
TOTAL PRESENT VALUE OF ALTERNATIVE WR1				$44,300		$44,300		$44,300		$44,300		$44,300	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C9-WR2 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	10,562	$ 50,169	0	$ -	0	$ -	0	$ -	0	$ -	
Site preparation and storm water control	CW-6	AC	$12,543	21.9	$ 274,695	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	Includes long-term site surface water controls.
Waste grading and consolidation	CW-7	CY	$3.43	29,045	$ 99,624	0	$ -	0	$ -	0	$ -	0	$ -	
Backfill and close mine openings	CW-8	EA	$12,635	20	$ 252,700	0	$ -	0	$ -	0	$ -	0	$ -	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	105,996.0	$ 1,835,851	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	21.9	$ 57,521	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	
Erosion control mat	CW-11	SY	$1.33	21,199	$ 28,195	0	$ -	0	$ -	0	$ -	0	$ -	
Reclaim Access roads	CW-12	SY	$4.23	10,562	$ 44,677	0	$ -	0	$ -	0	$ -	0	$ -	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 2,779,631		$ 136,200		$ 136,200		$ 136,200		$ 136,200	
Construction Contingencies		15%			$ 416,945		$ 20,430		$ 20,430		$ 20,430		$ 20,430	10% Scope, 5% Bid
				SUBTOTAL	$ 3,196,576		$ 156,630		$ 156,630		$ 156,630		$ 156,630	
Project Management		8%			$ 255,726		$ 12,530		$ 12,530		$ 12,530		$ 12,530	EPA Cost Guidance
Remedial Design		15%			$ 479,486		$ 23,495		$ 23,495		$ 23,495		$ 23,495	EPA Cost Guidance
Construction Management		10%			$ 319,658		$ 15,663		$ 15,663		$ 15,663		$ 15,663	EPA Cost Guidance
				SUBTOTAL	$ 1,054,870		$ 51,688		$ 51,688		$ 51,688		$ 51,688	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	20	$ 8,000	0	$ -	0	$ -	0	$ -	0	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 4,259,445**		**$ 208,319**		**$ 208,319**		**$ 208,319**		**$ 208,319**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	80	$ 2,000	0	$ -	0	$ -	0	$ -	0	$ -	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	20	$ 10,000	0	$ -	0	$ -	0	$ -	0	$ -	Engineering Estimate
				SUBTOTAL	$ 12,000	SUBTOTAL	$ -		$ -		$ -		$ -	
O&M Contingencies		25%			$ 3,000		$ -		$ -		$ -		$ -	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 15,000**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	0	$ -	1	$ -	1	$ -	1	$ -	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	0	$ -	1	$ -	1	$ -	1	$ -	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ -		$ -		$ -		$ -	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ -**		**$ -**		**$ -**		**$ -**	

Table C9-WR2 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative WR2 - Mine Waste Surface Controls and Revegetation

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$4,259,445	$4,259,445	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$15,000	$214,285	$0	$0	$0	$0	$0	$0	$0	$0	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$0	$0	$0	$0	$0	$0	$0	$0	Periodic cost, every 5 years beginning in year 5
				$4,521,604		$208,319		$208,319		$208,319		$208,319	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$4,521,600		$208,300		$208,300		$208,300		$208,300	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:
EA each
QTY quantity
LS lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.484149478	Periodic cost, every 5 years beginning in year 5

Table C9-SD1 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C9-SD1 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C9-SD2 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no construction costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediment Areas			80	EA	$ 400.00	$ 32,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 32,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)			32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara; twice/year)			24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)			1	ls	$ 500.00	$ 500	Engineering Estimate
	SUBTOTAL					$ 7,300	
O&M Contingencies				25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C9-SD2 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$32,000	1.0000	$32,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$401,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$401,700	

Notes:

- There are no capital costs associated with this alternative
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C9-SD3 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9387	SY	$4.75	$ 44,587	To stream bed excavation locations.
Site Preparation and Storm Water Control	CW-6	2	AC	$12,543	$ 25,086	Includes long-term site surface water controls.
Stream Diversion	CW-29	4	EA	$82,807	$ 331,228	24-inch diameter piping system
Excavate Stream Sediments	CW-15	45,259	CY	$4.64	$ 210,003	
Transport Stream Sediments	--	764,881	CY-MI	$ 0.60	$ 458,929	EPA Cost Estimate
Spread and compact mine waste	CW-16	45,259	CY	$ 0.81	$ 36,735	
Luttrell Repository disposal	--	45,259	CY	$ 5.00	$ 226,296	EPA Cost Estimate
Stream Restoration	CW-31	135,778	SY	$ 90.89	$ 12,341,222	
Reclaim Access roads	CW-12	9387	SY	$4.23	$ 39,706	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 14,363,357	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 1,149,069	
Construction Contingencies			30%		$ 4,309,007	20% Scope, 10% Bid
SUBTOTAL					$ 19,821,432	
Project Management			8%		$ 1,585,715	EPA Cost Guidance
Remedial Design			15%		$ 2,973,215	EPA Cost Guidance
Construction Management			10%		$ 1,982,143	EPA Cost Guidance
SUBTOTAL					$ 6,541,073	
Proprietary Controls for Sediment Areas		80	EA	$ 400.00	$ 32,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 26,394,505**	

Table C9-SD3 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Excavation with Disposal in Luttrell Repository		8	hr	$ 25.00	$ 200	8 hr once/yr by local technician
Materials and Supplies		167	ls	$ 5.00	$ 835	Engineering Estimate
		SUBTOTAL			$ 1,035	
O&M Contingencies			25%		$ 259	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,294**	

ANNUAL O&M COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Luttrell Leachate Treatment		1675	gal	$ 0.31	$ 514	EPA Cost Estimate
Materials and Supplies		1	ls	$ 500.00	$ 500	Engineering Estimate
				SUBTOTAL	$ 1,014	
O&M Contingencies		25%			$ 254	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 1,268**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C9-SD3 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SD3 - Excavation of Stream Sediments with Disposal in Luttrell Repository

Site:	**Basin Mining Area OU2**	**Description:** Alternative SD3 consists of diversion of the stream containing contaminated sediments, excavation of the contaminated sediments, transport and disposal of the sediments at the Luttrell Repository, and restoration of the stream channel. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$26,394,505	1.0000	$26,394,505	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$1,294	14.2857	$18,482	Annual cost, years 1 through 200
Annual Site O&M Cost (EPA)	1 - 10	$1,268	7.0236	$8,903	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$1,268	7.2621	$9,206	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$26,670,462	
TOTAL PRESENT VALUE OF ALTERNATIVE SD3				$26,670,500	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C9-SW1 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Surface Water			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C9-SW1 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SW1 - No Action for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SW1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C9-SW2 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Surface Water Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Surface Water		80	EA	$ 400.00	$ 32,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 32,000**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	8 hrs twice/yr by 2 local technicians
Analytical (5 /subara; twice/year)		10	each	$ 250.00	$ 2,500	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 3,800	
O&M Contingencies			15%		$ 570	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 4,370**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C9-SW2 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SW2 - Natural Attenuation for Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SW2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated surface water. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$32,000	1.0000	$32,000	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$4,370	14.2857	$62,428	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$333,795	
TOTAL PRESENT VALUE OF ALTERNATIVE SW2				$333,800	

Notes:

- There are no capital costs associated with this alternative
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C9-SW3 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SW3 - Biological Treatment of Surface Water

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water within the subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated. The system size is based on low flow conditions in the Boulder River (30cfs).

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	9,387	SY	$4.75	$ 44,587	To treatment site.
Site Preparation and Storm Water Control	CW-6	2,081	AC	$12,543	$ 26,101,312	Includes long-term site surface water controls.
Construct Wetland Treatment Facility	CW-26	13,464	GPM	$21,386	$ 287,946,005	Based on cost to treat 5 gpm
Install Surface Water Collection Piping	CW-28	4	EA	$93,623	$ 374,492	24-inch diameter piping system
Fertilize, seed and mulch	CW-10	2,081	AC	$2,626.51	$ 5,465,566	
Erosion control mat	CW-11	2,014,334	SY	$1.33	$ 2,679,064	
Reclaim Access roads	CW-12	9,387	SY	$4.23	$ 39,706	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 323,300,296	
Construction Contingencies			15%		$ 48,495,044	10% Scope, 5% Bid
SUBTOTAL					$ 371,795,341	
Project Management			8%		$ 29,743,627	EPA Cost Guidance
Remedial Design			15%		$ 55,769,301	EPA Cost Guidance
Construction Management			10%		$ 37,179,534	EPA Cost Guidance
SUBTOTAL					$ 122,692,462	
Proprietary Controls for Surface Water		80	EA	$ 400.00	$ 32,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 494,519,803**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 2,000.00	$ 2,000	Engineering Estimate
Spent Substrate Removal and Disposal at Luttrell Repository		431,721	cy	$ 15.00	$ 6,475,821	
Replace Substrate (1/15 per year)		431,721	cy	$ 70.63	$ 30,490,623	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 36,971,844	
O&M Contingencies			15%		$ 5,545,777	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 42,517,621**	

Table C9-SW3 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SW3 - Biological Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW3 consists of the construction of a wetland treatment system for treatment of surface water within the subarea. Annual maintenance will be provided for the wetland. Every 5 years a five-year review report will be completed and the institution control plan updated. The system size is based on low flow conditions in the Boulder River (30cfs).	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$494,519,803	1.0000	$494,519,803	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$42,517,621	7.0236	$298,625,975	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$42,517,621	7.2621	$308,767,798	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$1,102,152,943	
TOTAL PRESENT VALUE OF ALTERNATIVE SW3				$1,102,152,900	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year.
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C9-SW4 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SW4 - Physical-Chemical Treatment of Surface Water

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative SW4 consists of the construction of a single physical-chemical treatment system for treatment of surface water withinn a subarea. Annual operation and maintenance will be provided for the facility. Every 5 years a five-year review report will be completed and the institution control plan updated. The system size is based on local supply of 200 gpm.

Prepared By: B. Cotton
Date: January 22, 2003
Checked By: K. Zambrano
Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans		CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities		CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization		CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment		CW-4	1	LS	$8,998	$ 8,998	
Access Roads		CW-5	9387	SY	$4.75	$ 44,587	To treatment site
Site Preparation and Storm Water Control		CW-6	2	AC	$12,543	$ 25,086	Includes long-term site surface water controls.
Construct Treatment Facility		CW-30	1	LS	$6,750,506	$ 6,750,506	200 gpm treatment system
Install Surface Water Collection Piping		CW-28	1	EA	$93,623	$ 93,623	24-inch diameter piping system
Fertilize, seed and mulch		CW-10	0.5	AC	$2,626.51	$ 1,313	
Erosion control mat		CW-11	484	SY	$1.33	$ 644	
Post-Construction Submittals		CW-13	1	LS	$119,879	$ 119,879	
	SUBTOTAL					$ 7,565,324	
Construction Contingencies				30%		$ 2,269,597	10% Scope, 5% Bid
	SUBTOTAL					$ 9,834,921	
Project Management				5%		$ 491,746	EPA Cost Guidance
Remedial Design				8%		$ 786,794	EPA Cost Guidance
Construction Management				6%		$ 590,095	EPA Cost Guidance
	SUBTOTAL					$ 1,868,635	
Proprietary Controls for Surface Water			80	EA	$ 400.00	$ 32,000	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 11,735,556**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Facility Operations		4,160	hr	$ 25.00	$ 104,000	Full time crew of 2
Electrical supply		383,800	kwh	$ 0.12	$ 46,056	1,000W base load+1000kwh/gpm
Site Maintenance		1	ls	$ 20,000.00	$ 20,000	Engineering Estimate
Sludge Disposal at Luttrell Repository		26	cy	$ 15.00	$ 500	Engineering Estimate/Min. $500
Sludge Stabilization		26	cy	$ 37.35	$ 984	Means 2000; 2340-500-1360
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
	SUBTOTAL				$ 172,540	
O&M Contingencies			15%		$ 25,881	10% Scope, 5% Bid
TOTAL YEARLY O&M COST					**$ 198,421**	

Table C9-SW4 Remedial Alternative Cost Summary, Boulder River Subareas, Alternative SW4 - Physical-Chemical Treatment of Surface Water

Site:	**Basin Mining Area OU2**	**Description:** Alternative SW4 consists of the construction of a single physical-chemical treatment system for treatment of surface water withinn a subarea. Annual operation and maintenance will be provided for the facility. Every 5 years a five-year review report will be completed and the institution control plan updated. The system size is based on local supply of 200 gpm.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 22, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$	71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$	5,751	Cost of entire review
Contingencies				25%		$	19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	**96,358**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$11,735,556	1.0000	$11,735,556	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$198,421	7.0236	$1,393,626	Annual cost, years 1 through 10
Annual Site O&M Cost (Montana)	11 - 200	$198,421	7.2621	$1,440,956	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$14,809,505	
TOTAL PRESENT VALUE OF ALTERNATIVE SW4				$14,809,500	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C10-SD1 Remedial Alternative Cost Summary, South Fork Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 17, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction			0		$ -	$ -	There are no capital costs for this alternative
	SUBTOTAL					$ -	
Construction Contingencies				15%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Proprietary Controls for Sediments			0	ls	$ -	$ -	
TOTAL CAPITAL COSTS						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
Contingencies				25%		$ 17,834	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 89,169**	

Table C10-SD1 Remedial Alternative Cost Summary, South Fork Subarea, Alternative SD1 - No Action for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD1, no action, there are no capital or annual O&M costs. Five-year reviews are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** Janaury 17, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By: K. Zambrano**
Date:	**January 2003**		Date: 7/7/05

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Five-Year Review Reports	5 - 200	$89,169	2.4841	$221,509	Periodic cost, every 5 years beginning in year 5
				$221,509	
TOTAL PRESENT VALUE OF ALTERNATIVE SD1				$221,500	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Table C10-SD2 Remedial Alternative Cost Summary, South Fork Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 17, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Sediment Remedial Construction		0		$ -	$ -	There are no construction costs for this alternative.
SUBTOTAL					$ -	
Construction Contingencies			0%		$ -	
SUBTOTAL					$ -	
Project Management			0%		$ -	
Remedial Design			0%		$ -	
Construction Management			0%		$ -	
SUBTOTAL					$ -	
Proprietary Controls for Sediments		0	ls	$ 400.00	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ -**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Field Sampling (twice/year)		32	hr	$ 25.00	$ 800	2 local technicians, 2 days per year
Analytical (12 /subara; twice/year)		24	each	$ 250.00	$ 6,000	Engineering Estimate
Materials and Supplies (per year)		1	ls	$ 500.00	$ 500	Engineering Estimate
SUBTOTAL					$ 7,300	
O&M Contingencies			25%		$ 1,825	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 9,125**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	1		$71,335	$ 71,335	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	1		$5,751	$ 5,751	Cost of entire review
Contingencies				25%		$ 19,272	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ 96,358**	

Table C10-SD2 Remedial Alternative Cost Summary, South Fork Subarea, Alternative SD2 - Natural Attenuation for Stream Sediments

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative SD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated sediments. Site inspections, sediment and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 17, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By: K. Zambrano**
Base Year:	**2003**		Date: 7/7/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$0	1.0000	$0	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$9,125	14.2857	$130,357	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$96,358	2.4841	$239,366	Periodic cost, every 5 years beginning in year 5
				$369,723	
TOTAL PRESENT VALUE OF ALTERNATIVE SD2				$369,700	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Appendix D

Remedial Alternative Cost Estimating Templates

Section 1
Introduction

In writing the Proposed Plan or Record of Decision, CDM recognizes that the state of Montana may need to calculate costs for treatment of smaller subsets of waste rock or adits than those presented in the FS. Therefore, CDM has prepared this Appendix to facilitate using the FS cost sheets for costing remediation of smaller subsets of waste media in each subarea of the Basin OU2 site. This will involve using the following three Excel files:

- Basin OU2 Blank Costing.xls
- Individual Mine Costing.xls
- Individual Adit Costing.xls

1.1 Waste Rock Alternatives

CDM will demonstrate how to use the Jack Creek subarea cost worksheets to determine the cost of remediating only the Vindicator mine site. The Vindicator mine site is a high priority waste site. When using a subset of a medium-high, medium, low or very low waste, the same steps would apply under the appropriate column heading.

1.1.1 Alternative WR1

CDM will calculate the cost for implementing Alternative WR1 for the Vindicator Mine using the following steps.

- Open both the Basin OU2 Blank Costing.xls and Individual Mine Costing.xls files.
- Click on the Update data prompt for each cost sheet.
- As Alternative WR1 is not dependent on quantities, the Total Cost presented under the WR1 tab is the same for any subset of waste rock in the Jack Creek subarea

1.1.2 Alternative WR2

CDM will calculate the cost for implementing Alternative WR2 for the Vindicator Mine using the following steps.

- Open tab WR2 in the Basin OU2 Blank Costing.xls file
- Go to the line 7 of the Individual Mine Costing.xls file.
- Read the access road distance in Column O for the Vindicator Mine (yellow highlight)
- Convert miles to square yards, using and estimate of 10 feet road width.

- (0.033 miles * 5280 ft/mile * 10 ft)/(9 ft^2/yd^2) = 193.6 square yards

- Insert 193.6 on line 16 of the Basin OU2 Blank Costing.xls file under High Sites (Column N - yellow highlight)
- Read the estimated acres for the Vindicator Mine under Column M of the Individual Mine Costing.xls file - 12 (pink highlight)
- Insert 12 on line 17 of the Basin OU2 Blank Costing.xls file, Column N (pink highlight)
- Read the total volume (CY) in Column N of the Individual Mine Costing.xls file - 5080 (green highlight)
- Divide 5080 by 2.
- Insert 2540 on line 18 of the Basin OU2 Blank Costing.xls file, Column N (green highlight)
- Read the estimated number of mine openings for the Vindicator Mine under Column P of the Individual Mine Costing.xls file -1 (blue highlight)
- Insert 1on line 19 of the Basin OU2 Blank Costing.xls file, Column N (blue highlight)
- Insert 1 as the quantity used to calculate both annual and periodic O&M costs under Column N, lines 43,44,54,55, and 57 of the Basin OU2 Blank Costing.xls file (orange highlight)
- Read the total cost under the High Sites, this is the cost for implementing Alternative WR2 for only the Vindicator Mine.

1.1.3 Alternative WR3

CDM will calculate the cost for implementing Alternative WR3 for the Vindicator Mine using the following steps.

- Open tab WR3 in the Basin OU2 Blank Costing.xls file
- Go to the line 7 of the Individual Mine Costing.xls file.
- Read the access road distance in Column O for the Vindicator Mine (yellow highlight)
- Convert miles to square yards, using and estimate of 10 feet road width.
  - (0.033 miles * 5280 ft/mile * 10 ft)/(9 ft^2/yd^2) = 193.6 square yards

- Insert 193.6 on line 16 of the Basin OU2 Blank Costing.xls file under High Sites (Column N - yellow highlight)
- Read the estimated acres for the Vindicator Mine under Column M of the Individual Mine Costing.xls file - 12 (pink highlight)
- Insert 12 on line 17 of the Basin OU2 Blank Costing.xls file, Column N (pink highlight)
- Read the total volume (CY) in Column N of the Individual Mine Costing.xls file - 5080 (green highlight)
- Divide 5080 by 2.
- Insert 2540 on line 18 of the Basin OU2 Blank Costing.xls file, Column N (green highlight)
- Read the estimated number of mine openings for the Vindicator Mine under Column P of the Individual Mine Costing.xls file -1 (blue highlight)
- Insert 1on line 19 of the Basin OU2 Blank Costing.xls file, Column N (blue highlight)
- Insert 1 as the quantity used to calculate both annual and periodic O&M costs under Column N, lines 43, 44, 46, 54, 55, and 57 of the Basin OU2 Blank Costing.xls file (orange highlights)
- Read the total cost under the High Sites, this is the cost for implementing Alternative WR3 for only the Vindicator Mine (red highlight).

1.1.4 Alternative WR4

CDM will calculate the cost for implementing Alternative WR4 for the Vindicator Mine using the following steps.

- Open tab WR4 in the Basin OU2 Blank Costing.xls file
- Go to the line 7 of the Individual Mine Costing.xls file.
- Read the access road distance in Column O for the Vindicator Mine (yellow highlight)
- Convert miles to square yards, using and estimate of 10 feet road width.
  - (0.033 miles * 5280 ft/mile * 10 ft)/(9 ft^2/yd^2) = 193.6 square yards
- Insert 193.6 on line 16 of the Basin OU2 Blank Costing.xls file under High Sites (Column N - yellow highlight)

- Read the estimated acres for the Vindicator Mine under Column M of the Individual Mine Costing.xls file - 12 (pink highlight)
- Insert 12 on line 17 of the Basin OU2 Blank Costing.xls file, Column N (pink highlight)
- Read the total volume (CY) in Column N of the Individual Mine Costing.xls file - 5080 (green highlight)
- Insert 5080 on line 18 of the Basin OU2 Blank Costing.xls file, Column N (green highlight)
- Take 5080 CY of waste and multiply it by the sum of the access road distance in Column O for the Vindicator Mine (yellow highlight) plus 14 miles
  - 5080*(0.033+14)=71,287.6 CY*Mi
- Insert 71,287.6 on line 19 of the Basin OU2 Blank Costing.xls file, Column N (purple highlight)
- Read the estimated number of mine openings for the Vindicator Mine under Column P of the Individual Mine Costing.xls file -1 (blue highlight)
- Insert 1on line 19 of the Basin OU2 Blank Costing.xls file, Column N (blue highlight)
- Insert 1 as the quantity used to calculate both annual and periodic O&M costs under Column N, lines 47, 48, 50, 58,59, 60, 62, 70, 71, 72, and 74of the Basin OU2 Blank Costing.xls file (orange highlights)
- Read the total cost under the High Sites, this is the cost for implementing Alternative WR4 for only the Vindicator Mine (red highlight).

1.2 AMD/ARD Alternatives

CDM will demonstrate how to use the Jack Creek subarea cost worksheets to determine the cost of remediating only the Vindicator Mine adit. Note that Alternative AD5 is not included in this exercise. The numbers used to calculate the costs of Alternative AD5 were based on specific individual adits and cannot be reduced further.

1.2.1 Alternative AD1

CDM will calculate the cost for implementing Alternative AD1 for the Vindicator Mine adit using the following steps.

- Open both the Basin OU2 Blank Costing.xls and Individual Adit Costing.xls files.

- Click on the Update data prompt for each cost sheet.
- As Alternative AD1 is not dependent on quantities, the Total Cost presented under the AD1 tab is the same for any subset of adits in the Jack Creek subarea.

1.2.2 Alternative AD2

CDM will calculate the cost for implementing Alternative AD1 for the Vindicator Mine adit using the following steps.

- Open both the Basin OU2 Blank Costing.xls and Individual Adit Costing.xls files.
- Click on the Update data prompt for each cost sheet.
- Capital costs for Alternative AD2are not dependent on quantities so no changes need to made to Alternative AD any subset of adits in the Jack Creek subarea.
- Insert 1 as the quantity used to calculate both annual and periodic O&M costs under Column E, lines 29, 30, 31, 40, and 41 of the Basin OU2 Blank Costing.xls file (orange highlights).
- Read the total cost for implementing Alternative AD2 for only the Vindicator Mine adit (red highlight).

1.2.3 Alternative AD3

CDM will calculate the cost for implementing Alternative AD3 for the Vindicator Mine adit using the following steps.

- Open tab AD3 in the Basin OU2 Blank Costing.xls file
- Go to the line 13 of the Individual Adit Costing.xls file.
- Read the access road distance in Column H for the Vindicator Mine adit (yellow highlight)
- Convert miles to square yards, using and estimate of 12 feet road width.
  - (0.033 miles * 5280 ft/mile * 12 ft)/(9 ft^2/yd^2) = 232.2 square yards
- Insert 232 on line 15 of the Basin OU2 Blank Costing.xls file in Column E - yellow highlight)
- Read the estimated acres on line 13 for the Vindicator Mine adit under Column D of the Individual Adit Costing.xls file - 12 (pink highlight)
- Insert 12 on line 16 of the Basin OU2 Blank Costing.xls file, Column E (pink highlight) and line 18, Column E (blue highlight)

- Read the estimated adit length from Column F of the Individual Adit Costing.xls file – 23,061 ft. (green highlight)
- Calculate 20% of adit length by multiplying 23,061 by 0.2= 4612 ft
- Insert 4612 ft on line 17, Column E of the Basin OU2 Blank Costing.xls file (green highlight).
- Insert 1 as the quantity used to calculate both annual and periodic O&M costs under Column N, lines 40, 41, 50, and 51of the Basin OU2 Blank Costing.xls file (orange highlights).
- Read the total cost for implementing Alternative AD3 for only the Vindicator Mine adit (red highlight).

1.2.4 Alternative AD4

CDM will calculate the cost for implementing Alternative AD4 for the Vindicator Mine adit using the following steps.

- Open tab AD4 in the Basin OU2 Blank Costing.xls file
- Go to the line 13 of the Individual Adit Costing.xls file.
- Read the access road distance in Column H for the Vindicator Mine adit (yellow highlight)
- Convert miles to square yards, using and estimate of 12 feet road width.
  - (0.033 miles * 5280 ft/mile * 12 ft)/(9 ft^2/yd^2) = 232.2 square yards
- Insert 232 on line 15 of the Basin OU2 Blank Costing.xls file in Column E - yellow highlight)
- Read the estimated adit flow rate in Column G for the Vindicator Mine adit - 7.0 (yellow highlight)
- Insert 7 gpm on line 16 of the Basin OU2 Blank Costing.xls file in Column E - blue highlight).
- Insert 1 as the quantity used to calculate both annual and periodic O&M costs under Column N, lines 55 and 56 of the Basin OU2 Blank Costing.xls file (orange highlights).
- Read the total cost for implementing Alternative AD4 for only the Vindicator Mine adit (red highlight).

Appendix D Summary of Individual Mine Sites, Scoring, Waste Volumes, and Waste Area Template

SiteName	SiteNameSub	SubBasin	Category	Estimated Site Area (acres) or Default	Total Volume (yd3) or Calc.	Distance to Primary Road (miles) or Default	Number of Mine Openings
DEW DROP	MAIN	JACK CREEK	High	2	510	0.062074982	1
FIRST SHOT / LAST SHOT	MAIN	JACK CREEK	High	6	450	0.1	1
RTI RECON: P	MAIN	JACK CREEK	High	0.75	290	0.1	1
VINDICATOR	MAIN	JACK CREEK	High	12	58080	0.03342977	1
BULLION MINE	MAIN	JACK CREEK	Medium-High	0.1	46550	0.1	1
DELGATE	MAIN	JACK CREEK	Medium-High	0.1	490	0.020940209	1
FIRST SHOT / LAST SHOT	AREA 2	JACK CREEK	Medium-High	0.1	490	0.1	1
JACK CREEK TAILINGS	MAIN	JACK CREEK	Medium-High	0.1	23000	0.1	1
MORNING	AREA 2	JACK CREEK	Medium-High	0.1	490	0.040886224	1
RTI RECON: E	MAIN	JACK CREEK	Medium-High	0.1	490	0.1	1
RTI RECON: O	MAIN	JACK CREEK	Medium-High	0.1	490	0.1	1
SW NW SECTION 7	MAIN	JACK CREEK	Medium-High	0.1	490	0.06083224	1
UNNAMED FIRE CLAY	MAIN	JACK CREEK	Medium-High	0.1	490	0.1	1
VINDICATOR	AREA 2	JACK CREEK	Medium-High	0.1	490	0.03342977	1
BULLION SMELTER	MAIN	JACK CREEK	Medium	0.1	2720	0.371455699	1
DUMORTIERITE PROSPECT	MAIN	JACK CREEK	Medium	0.1	490	0.1	1
JACK CREEK RIDGE	AREA 2	JACK CREEK	Medium	0.1	490	0.1	1
JACK MTN. IRON	MAIN	JACK CREEK	Medium	0.1	490	0.1	1
KELLER'S HEMATITE	MAIN	JACK CREEK	Medium	0.1	490	0.1	1
LAST SHOT	MAIN	JACK CREEK	Medium	0.1	490	0.1	1
MIDNIGHT	MAIN	JACK CREEK	Medium	0.1	490	0.1	1
MOCCASON	MAIN	JACK CREEK	Medium	0.1	490	0.1	1
MORNING	MAIN	JACK CREEK	Medium	0.1	490	0.040886224	1
NE NE SECTION 13	MAIN	JACK CREEK	Medium	0.1	490	0.1	1
SMELTER CREEK ADIT	MAIN	JACK CREEK	Medium	1	300	0.1	1
ADELAIDE	MAIN	LOWER BASIN CREEK	High	1	3100	0.01	1
AURORA	MAIN	LOWER BASIN CREEK	High	5	24200	0.177215064	1
AURORA	AREA 2	LOWER BASIN CREEK	High	5	2660	0.000124274	1
COLUMBUS	MAIN	LOWER BASIN CREEK	High	1	1430	0.073570349	1
DORIS	AREA 2	LOWER BASIN CREEK	High	3.673094582	4470	0.047845582	1
JESSIE	MAIN	LOWER BASIN CREEK	High	10	18480	0.1	1
HECTOR	MAIN	LOWER BASIN CREEK	Medium-High	0.1	490	0.301054343	1
RTI RECON: R	MAIN	LOWER BASIN CREEK	Medium-High	1	580	0.079721924	1
BUSTER	MAIN	LOWER BASIN CREEK	Medium	0.1	490	0.1	1
CREDEN MINES	MAIN	LOWER BASIN CREEK	Medium	0.1	490	0.1	1
DAILY WEST	MAIN	LOWER BASIN CREEK	Medium	0.1	490	0.057414698	1
DAILY WEST	AREA 2	LOWER BASIN CREEK	Medium	0.1	490	0.057414698	1
DORIS	MAIN	LOWER BASIN CREEK	Medium	0.1	490	0.115947864	1
HECTOR	AREA 2	LOWER BASIN CREEK	Medium	0.1	490	0.301054343	1
HECTOR - LOWER	MAIN	LOWER BASIN CREEK	Medium	0.1	490	0.153167999	1
JOE METESH LESSEE	MAIN	LOWER BASIN CREEK	Medium	0.1	490	0.1	1
MEYERS GULCH	MAIN	LOWER BASIN CREEK	Medium	0.5	630	0.1	1
RTI RECON: A	MAIN	LOWER BASIN CREEK	Medium	0.1	490	0.1	1
BOSTON	MAIN	LOWER CATARACT CREEK	High	3	420	0.629262606	1
CARTWRIGHT CABINS	MAIN	LOWER CATARACT CREEK	High	1	1330	0.1	1
CARTWRIGHT CABINS 2	MAIN	LOWER CATARACT CREEK	High	1	4840	0.401654339	1
CATARACT PLACER	MAIN	LOWER CATARACT CREEK	High	0.25	30	0.1	1
GOLD FLAKE	MAIN	LOWER CATARACT CREEK	High	2.5	12100	0.1	1
LOG CABIN AND STONE FIREPLACE	MAIN	LOWER CATARACT CREEK	High	0.1	490	0.1	1
MANTLE SOUTH	MAIN	LOWER CATARACT CREEK	High	0.1	490	0.039519208	1
MORNING GLORY	TAILINGS 2	LOWER CATARACT CREEK	High	0.1	490	0.027837429	1
NEW COTTAGE	MAIN	LOWER CATARACT CREEK	High	2	7430	0.1	1
PHANTOM	MAIN	LOWER CATARACT CREEK	High	0.25	250	0.042191104	1
RUTH	MAIN	LOWER CATARACT CREEK	High	0.75	450	0.084320071	1
SEATTLE	MAIN	LOWER CATARACT CREEK	High	6	3280	0.1	1
SYLVAN	MAIN	LOWER CATARACT CREEK	High	2	1540	0.528724747	1
WHITE PINE	MAIN	LOWER CATARACT CREEK	High	0.1	490	0.1	1
WHITE PINE	AREA 2	LOWER CATARACT CREEK	High	0.1	490	0.1	1
24JF0240	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
24JF0241	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
BIG MEDICINE	MAIN	LOWER CATARACT CREEK	Medium-High	0.25	110	0.1	1
BOULDER VESTAL	MAIN	LOWER CATARACT CREEK	Medium-High	1	3330	0.225433469	1
CATERACT FLATS PLACER	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
ELMER	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
INDEPENDENCE MINE	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
LAPLATE	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
MANTLE	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	4150	0.02	1
MINNEAPOLIS	AREA 2	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
MONTANA	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
NE BASIN	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
PIRATE	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
PLACER 2313	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
PLACER 2623	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
REDEMPTION	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
REGALIA	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
ROSE MINE	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
ROSE MINE	AREA 2	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
RUTH	AREA 2	LOWER CATARACT CREEK	Medium-High	0.1	490	0.084320071	1
SAGINAW	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
SATURDAY NIGHT	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	1770	0.033740456	1
VIOLA	MAIN	LOWER CATARACT CREEK	Medium-High	0.1	490	0.1	1
BASIN QUARTZ MASS	MAIN	LOWER CATARACT CREEK	Medium	0.1	490	0.1	1
CALIFORNIA	MAIN	LOWER CATARACT CREEK	Medium	1	150	0.1	1
GOLDEN REEF	MAIN	LOWER CATARACT CREEK	Medium	0.1	490	0.1	1
HOGBACK	MAIN	LOWER CATARACT CREEK	Medium	0.1	490	0.1	1
MANHATTAN	MAIN	LOWER CATARACT CREEK	Medium	1	4840	0.1	1
PROTECTION	MAIN	LOWER CATARACT CREEK	Medium	0.1	490	0.1	1
SILVER REEF	MAIN	LOWER CATARACT CREEK	Medium	0.1	490	0.1	1
VICTORY	MAIN	LOWER CATARACT CREEK	Medium	0.1	490	0.1	1
ADA	MAIN	MIDDLE CATARACT CREEK	High	2	4090	1.991121848	1
ALPINE	MAIN	MIDDLE CATARACT CREEK	High	1	680	0.212446811	1
APOLLO	MAIN	MIDDLE CATARACT CREEK	High	2	4810	0.065368249	1
BING HAMPTON	MAIN	MIDDLE CATARACT CREEK	High	8	20	0.036536626	1
BLACK BEAR	AREA 2	MIDDLE CATARACT CREEK	High	3	20	0.768263342	1
BLUE DIAMOND / OCCIDENTAL	MAIN	MIDDLE CATARACT CREEK	High	3.5	1700	0.208780721	1
CATARACT	MAIN	MIDDLE CATARACT CREEK	High	5	1850	0.031130697	1
CATARACT TAILS	MAIN	MIDDLE CATARACT CREEK	High	5	24200	0.062137119	1
CLIPPER / EDNA	MAIN	MIDDLE CATARACT CREEK	High	1	5130	0.052381592	1
CRACKER	MAIN	MIDDLE CATARACT CREEK	High	1	170	0.432660761	1
EVA MAY	MAIN	MIDDLE CATARACT CREEK	High	4	139990	0.088545395	1

Appendix D Summary of Individual Mine Sites, Scoring, Waste Volumes, and Waste Area Template

SiteName	SiteNameSub	SubBasin	Category	Estimated Site Area (acres) or Default	Total Volume (yd3) or Calc.	Distance to Primary Road (miles) or Default	Number of Mine Openings
HATTIE FERGUSON	LOWER	MIDDLE CATARACT CREEK	High	2	2610	0.003787879	1
HATTIE FERGUSON	UPPER	MIDDLE CATARACT CREEK	High	2	2020	0.670770202	1
KLONDYKE	MAIN	MIDDLE CATARACT CREEK	High	3	700	1.830808081	1
LIZZIE OSBORNE	MAIN	MIDDLE CATARACT CREEK	High	0.75	600	0.984500517	1
MARY ANNE	MAIN	MIDDLE CATARACT CREEK	High	4	1290	0.040389127	1
MIDDLE SNOWDRIFT CREEK	MAIN	MIDDLE CATARACT CREEK	High	5	240	0.1	1
MORNING GLORY	TAILINGS	MIDDLE CATARACT CREEK	High	5	7200	0.1	1
MORNING MARIE	MAIN	MIDDLE CATARACT CREEK	High	1.5	110	0.120173189	1
NE NW SECTION 17	MAIN	MIDDLE CATARACT CREEK	High	3	520	0.1	1
NW SE SECTION 14	MAIN	MIDDLE CATARACT CREEK	High	2	9680	0.1	1
ROCKER EXTENSION	MAIN	MIDDLE CATARACT CREEK	High	0.25	630	0.1	1
SIRIUS	MAIN	MIDDLE CATARACT CREEK	High	3	3040	1.581016862	1
TIMBERLINE	MAIN	MIDDLE CATARACT CREEK	High	3	850	0.321186769	1
UNNAMED 001	MAIN	MIDDLE CATARACT CREEK	High	1	390	0.072576155	1
UNNAMED 002	MAIN	MIDDLE CATARACT CREEK	High	1	260	1.525963374	1
VERA AND MARIE	MAIN	MIDDLE CATARACT CREEK	High	4	180	0.230031615	1
CLIPPER	MAIN	MIDDLE CATARACT CREEK	Medium-High	0.1	490	0.1	1
EDNA	MAIN	MIDDLE CATARACT CREEK	Medium-High	1	80	0.028583075	1
HANNA	MAIN	MIDDLE CATARACT CREEK	Medium-High	0.1	490	0.1	1
RED BIRD	MAIN	MIDDLE CATARACT CREEK	Medium-High	0.1	490	0.1	1
ROBIE BURNS	MAIN	MIDDLE CATARACT CREEK	Medium-High	0.1	490	0.1	1
UNNAMED 003	MAIN	MIDDLE CATARACT CREEK	Medium-High	0.1	490	1.021472103	1
BLACK BEAR	MAIN	MIDDLE CATARACT CREEK	Medium	0.1	490	0.77	1
BOULDER CHIEF	MAIN	MIDDLE CATARACT CREEK	Medium	8	14370	1.879834268	1
CATARACT CREEK PLACER	MAIN	MIDDLE CATARACT CREEK	Medium	0.1	490	0.1	1
EVA MAY	AREA 2	MIDDLE CATARACT CREEK	Medium	0.1	490	0.015720691	1
FOURTH OF JULY	MAIN	MIDDLE CATARACT CREEK	Medium	1	160	0.722592559	1
LIZZIE OSBORNE	AREA 2	MIDDLE CATARACT CREEK	Medium	0.1	490	0.860350553	1
ROCKER WETLAND	MAIN	MIDDLE CATARACT CREEK	Medium	0.1	490	0.1	1
VERA AND MARIE	AREA 2	MIDDLE CATARACT CREEK	Medium	0.1	490	0.727439255	1
24JF0490	MAIN	UNCLE SAM GULCH	High	0.1	490	0.1	1
BASIN GOLD & SILVER	MAIN	UNCLE SAM GULCH	High	0.1	490	0.1	1
CRYSTAL	MAIN	UNCLE SAM GULCH	High	0.1	490	0.037878788	1
CRYSTAL	AREA 2	UNCLE SAM GULCH	High	15	403050	0.037878788	1
EVENING STAR	MAIN	UNCLE SAM GULCH	High	3	1710	0.1	1
GARFIELD	MAIN	UNCLE SAM GULCH	High	2	9680	0.040948362	1
SNOWBIRD	MAIN	UNCLE SAM GULCH	High	1	300	0.197906725	1
24JF0489	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.1	1
GARFIELD	EXTENSION	UNCLE SAM GULCH	Medium-High	2	3190	0.040948362	1
GOLDEN ASSETS MINE	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.3610788	1
LINCOLN	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.1	1
MAMMOTH	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.1	1
NW NE SECTION 32	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.1	1
NW SW SECTION 29	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.1	1
SAINT LAWRENCE	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.1	1
SPARKING WATER	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.18485793	1
SPARKING WATER	AREA 2	UNCLE SAM GULCH	Medium-High	0.1	490	0.18485793	1
SW NW SECTION 29	MAIN	UNCLE SAM GULCH	Medium-High	0.5	80	0.1	1
SW SE SECTION 29	MAIN	UNCLE SAM GULCH	Medium-High	0.1	490	0.028645212	1
UNCLE SAM	MAIN	UNCLE SAM GULCH	Medium-High	0.5	120	0.064995427	1
GRUB CREEK STATION	MAIN	UPPER BASIN CREEK	High	3	14520	0.056420504	1
JOSEPHINE	MAIN	UPPER BASIN CREEK	High	8	21680	0.036412352	1
MAGDELENA GROUP	MAIN	UPPER BASIN CREEK	High	3	14520	0.020878072	1
MOLLY SNOW	MAIN	UPPER BASIN CREEK	High	1	330	0.11582359	1
MORNING STAR	MAIN	UPPER BASIN CREEK	High	2	1060	0.134899686	1
NEPTUNE	MAIN	UPPER BASIN CREEK	High	2	2820	0.11582359	1
PLACER	MAIN	UPPER BASIN CREEK	High	10	80	0.1	1
SE NW SECTION 30	MAIN	UPPER BASIN CREEK	High	2	1220	0.1	1
SE SE SECTION 35	MAIN	UPPER BASIN CREEK	High	1	3330	0.021126621	1
JOSEPHINE	MINE 2	UPPER BASIN CREEK	Medium-High	0.1	490	0.036412352	1
CLEVELAND/DELBERT CLAIMS	MAIN	UPPER BASIN CREEK	Medium	0.1	490	0.1	1
DOUBLE SHAFT	MAIN	UPPER BASIN CREEK	Medium	2	380	0.014912909	1
LADY LEITH	MAIN	UPPER BASIN CREEK	Medium	0.1	3510	1.255107671	1
LADY RICKER	MAIN	UPPER CATARACT CREEK	High	1.2	620	0.1	1
NORTH ADA - PIERMONT	MAIN	UPPER CATARACT CREEK	High	6	230	0.001056331	1
OVERLAND CREEK	MAIN	UPPER CATARACT CREEK	High	2	760	1.127478028	1
SW SE SECTION 4	MAIN	UPPER CATARACT CREEK	Medium-High	1.5	570	0.1	1
CORBITT	MAIN	UPPER CATARACT CREEK	Medium	3	170	0.033119085	1
ELDORADO AND PLATEAU	MAIN	UPPER CATARACT CREEK	Medium	1	1540	0.047597033	1
NE SE SECTION 28	MAIN	UPPER CATARACT CREEK	Medium	0.1	490	0.1	1
NEAR QUARTZ CREEK	MAIN	UPPER CATARACT CREEK	Medium	0.1	490	0.1	1
SE SE SECTION 21	MAIN	UPPER CATARACT CREEK	Medium	0.1	490	0.1	1

Waste area size	0.1 acre
Waste thickness	3 ft
Distance to primary road	0.1 mi
Number of mine openings per site	1

Appendix D WR2 Remedial Alternative Cost Summary, Cost Estimating Template

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 05/18/2005

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	0.0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
Site preparation and storm water control	CW-6	AC	$12,543	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	Includes long-term site surface water controls
[redacted]	CW-7	CY	$3.43	0.0	$ -	0	$ -	0	$ -	0	$ -	[redacted]	$ -	
[redacted]	CW-8	EA	$12,635	0.0	$ -	0	$ -	0	$ -	0	$ -	[redacted]	$ -	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	
Erosion control mat	CW-11	SY	$1.33	0.0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
Reclaim Access roads	CW-12	SY	$4.23	0.0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
Post-Construction Submittals	CW-13	LS	$23,976	1.0	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 136,200		$ 136,200		$ 136,200		$ 136,200		$ 136,200	
Construction Contingencies		15%			$ 20,430		$ 20,430		$ 20,430		$ 20,430		$ 20,430	10% Scope, 5% Bid
				SUBTOTAL	$ 156,630		$ 156,630		$ 156,630		$ 156,630		$ 156,630	
Project Management		8%			$ 12,530		$ 12,530		$ 12,530		$ 12,530		$ 12,530	EPA Cost Guidance
Remedial Design		15%			$ 23,495		$ 23,495		$ 23,495		$ 23,495		$ 23,495	EPA Cost Guidance
Construction Management		10%			$ 15,663		$ 15,663		$ 15,663		$ 15,663		$ 15,663	EPA Cost Guidance
				SUBTOTAL	$ 51,688		$ 51,688		$ 51,688		$ 51,688		$ 51,688	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 208,319**		**$ 208,319**		**$ 208,319**		**$ 208,319**		**$ 208,319**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	0	$ -	[redacted]	$ 100	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	0	$ -	[redacted]	$ 500	Engineering Estimate
				SUBTOTAL	$ -	SUBTOTAL	$ -		$ -		$ -		$ 600	
O&M Contingencies		25%			$ -		$ -		$ -		$ -	[redacted]	$ 150	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ -**		**$ 750**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	0	$ -	0	$ -	0	$ -	0	$ -	[redacted]	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	0	$ -	0	$ -	0	$ -	0	$ -	[redacted]	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ -		$ -		$ -		$ -	[redacted]	$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ -**		**$ -**		**$ -**		**$ -**		**$ 19,272**	

Appendix D WR2 Remedial Alternative Cost Summary, Cost Estimating Template

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR2 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, and revegetation of the disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 06/18/2005

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	$208,319	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$0	$0	$0	$0	$0	$0	$0	$0	$750	$10,714	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$0	$0	$0	$0	$0	$0	$0	$0	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$208,319		$208,319		$208,319		$208,319		$266,906	
TOTAL PRESENT VALUE OF ALTERNATIVE WR2				$208,300		$208,300		$208,300		$208,300		[redacted]	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost: every 5 years beginning in year 5

Appendix D WR3 Remedial Alternative Cost Summary, Cost Estimating Template

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 05/18/2005

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	-
Site preparation and storm water control	CW-6	AC	$12,543	0.0	$ -	0.0	$ -	0.0	$ 156,789	0.0	$ 7,526	0.0	$ 123,550	Includes long-term site surface water controls
[redacted]	CW-7	CY	$3.43	0	$ -	0	$ -	0	$ 103,758	0	$ 4,980	1	$ 3,021	
[redacted]	CW-8	EA	$11,957	2	$ -	0	$ -	11	$ 71,742	0	$ 71,742	1	$ 59,785	
Waste amendments (lime and organic material)	CW-9	SY	$17.32	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	-
Place 18" coversoil on wastes	CW-14	AC	$42,562	0.0	$ -	0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	Includes purchase and delivery of fill from offsite
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.0	$ -	0.0	$ -	0.0	$ 500	0.0	$ 500	0.0	$ -	-
Erosion control mat	CW-11	SY	$1.33	0	$ -	0	$ -	0	$ 500	0	$ -	0	$ -	-
Reclaim Access roads	CW-12	SY	$4.25	0	$ -	0.0	$ -	0	$ -	0	$ -	0	$ -	-
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 136,200		$ 136,200		$ 469,489		$ 220,949		$ 322,556	
Construction Contingencies		15%			$ 20,430		$ 20,430		$ 70,423		$ 33,142		$ 48,383	10% Scope, 5% Bid
				SUBTOTAL	$ 156,630		$ 156,630		$ 539,913		$ 254,091		$ 370,940	
Project Management		8%			$ 12,530		$ 12,530		$ 43,193		$ 20,327		$ 29,675	EPA Cost Guidance
Remedial Design		15%			$ 23,495		$ 23,495		$ 80,987		$ 38,114		$ 55,641	EPA Cost Guidance
Construction Management		10%			$ 15,663		$ 15,663		$ 53,991		$ 25,409		$ 37,094	EPA Cost Guidance
				SUBTOTAL	$ 51,688		$ 51,688		$ 178,171		$ 83,850		$ 122,410	
Institutional Controls for Mine Waste Areas		ls	$ 400.00	2	$ 800	0	$ -	11	$ 4,400	0	$ -	0	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 209,119**		**$ 208,319**		**$ 722,484**		**$ 337,941**		**$ 493,350**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	Engineering Estimate
				SUBTOTAL	$ -	SUBTOTAL	$ -		$ -		$ -		$ -	
O&M Contingencies		25%			$ -		$ -		$ -		$ -		$ -	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	1	$ 14,267	0	$ -	1	$ 14,267	1	$ 14,267	1	$ 14,267	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	1	$ 1,150	0	$ -	1	$ 1,150	1	$ 1,150	1	$ 1,150	Cost divided equally amoung categories
Contingencies		25%			$ 3,854		$ -		$ 3,854		$ 3,854		$ 3,854	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ 19,272**		**$ -**		**$ 19,272**		**$ 19,272**		**$ 19,272**	

Appendix D WR3 Remedial Alternative Cost Summary, Cost Estimating Template

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR3 consists of consolidation of wastes into smaller areas, grading of wastes to provide positive drainage away from wastes and reduce slopes, closure of open mine adits (non flowing), construction of surface water run-on controls, amending wastes in place to provide acid buffering and organic enhancement, construction of an 18-inch thick soil cover over the waste areas, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003

Checked By: K. Zambrano
Date: 05/18/2005

PRESENT VALUE ANALYSIS:

			Very Low Sites		Low Sites		Medium Sites		Medium-High Sites		High Sites		
COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	TOTAL COST/YR	PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$209,119	$209,119	$208,319	$208,319	$722,484	$722,484	$337,941	$337,941	$493,350	$493,350	Capital (one-time) cost
Annual O&M Cost	1 - 200	14.2857	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$19,272	$47,873	$0	$0	$19,272	$47,873	$19,272	$47,873	$19,272	$47,873	Periodic cost, every 5 years beginning in year 5
				$256,992		$208,319		$770,357		$385,814		$541,223	
TOTAL PRESENT VALUE OF ALTERNATIVE WR3				$257,000		$208,300		$770,400		$385,800		[redacted]	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Appendix D WR4 Remedial Alternative Cost Summary, Cost Estimating Template

Site:
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: Buz Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 05/18/2005

CAPITAL COSTS

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Contractor Work Plans	CW-1	LS	$23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	1	$ 23,996	Cost divided equally amoung categories
Temporary Facilities	CW-2	LS	$76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	1	$ 76,998	Cost divided equally amoung categories
Equipment Mobilization and Demobilization	CW-3	LS	$9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	1	$ 9,431	Cost divided equally amoung categories
Personal Protective Equipment	CW-4	LS	$1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	1	$ 1,800	Cost divided equally amoung categories
Access roads	CW-5	SY	$4.75	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
Site preparation and storm water control	CW-6	AC	$12,543	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	Includes long-term site surface water controls
Excavate mine waste	CW-15	CY	$4.64	0	$ -	0	$ -	0	$ -	0	$ -		$ -	
Transport mine waste		CY-MI	$ 0.60	0	$ -	0	$ -	0	$ -	0	$ -		$ -	EPA Cost Estimate
Spread and compact mine waste	CW-16	CY	$ 0.81	0	$ -	0	$ -	0	$ -	0	$ -		$ -	
Luttrell Repository disposal		CY	$ 5.00	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	EPA Cost Estimate
Revegetation	CW-8	EA	$11,957	0	$ -	0	$ -	0	$ -	0	$ -		$ -	
6" coversoil on excavated areas	CW-14	AC	$22,270	0.0	$ -	0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	Includes purchase and delivery of fill from offsite
Organic amendment	CW-17	SY	$0.62	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	
Fertilize, seed and mulch	CW-10	AC	$2,626.51	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	0.0	$ -	
Erosion control mat	CW-11	SY	$1.33	0	$ -	0	$ -	0	$ 500	0	$ -	0	$ -	
Reclaim Access roads	CW-12	SY	$4.23	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	
Post-Construction Submittals	CW-13	LS	$23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	1	$ 23,976	Cost divided equally amoung categories
				SUBTOTAL	$ 136,200		$ 136,200		$ 137,700		$ 137,200		$ 136,200	
Construction Contingencies		15%			$ 20,430		$ 20,430		$ 20,655		$ 20,580		$ 20,430	10% Scope, 5% Bid
				SUBTOTAL	$ 156,630		$ 156,630		$ 158,355		$ 157,780		$ 156,630	
Project Management		8%			$ 12,530		$ 12,530		$ 12,668		$ 12,622		$ 12,530	EPA Cost Guidance
Remedial Design		15%			$ 23,495		$ 23,495		$ 23,753		$ 23,667		$ 23,495	EPA Cost Guidance
Construction Management		10%			$ 15,663		$ 15,663		$ 15,836		$ 15,778		$ 15,663	EPA Cost Guidance
				SUBTOTAL	$ 51,688		$ 51,688		$ 52,257		$ 52,068		$ 51,688	
Institutional Controls for Mine Waste Areas		lc	$ 400.00	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 208,319**		**$ 208,319**		**$ 210,613**		**$ 209,848**		**$ 208,319**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Site Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	0	$ -		$ -	4 hours per site by local technician
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	0	$ -		$ -	Engineering Estimate
				SUBTOTAL	$ -	SUBTOTAL	$ -		$ -		$ -		$ -	
O&M Contingencies		25%			$ -		$ -		$ -		$ -		$ -	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

ANNUAL O&M COSTS (EPA Years 0-10)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	0	$ -		$ -	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	0	$ -	0	$ -	0	$ -	0	$ -		$ -	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	0	$ -		$ -	Engineering Estimate
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
O&M Contingencies		25%			$ -		$ -		$ -		$ -		$ -	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

ANNUAL O&M COSTS (State of Montana years 11-200)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
Luttrell Repository Inspections		hr	$ 25.00	0	$ -	0	$ -	0	$ -	0	$ -		$ -	4 hours per month by local technician
Luttrell Leachate Treatment		gal	$ 0.31	0	$ -	0	$ -	0	$ -	0	$ -		$ -	EPA Cost Estimate
Materials and Supplies		ls	$ 500.00	0	$ -	0	$ -	0	$ -	0	$ -		$ -	Engineering Estimate
				SUBTOTAL	$ -		$ -		$ -		$ -		$ -	
O&M Contingencies		25%			$ -		$ -		$ -		$ -		$ -	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

Appendix D WR4 Remedial Alternative Cost Summary, Cost Estimating Template

Site:
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative WR4 consists of excavation of mine site wastes, transport and disposal of wastes at the Luttrell Repository, grading of excavated areas to provide positive drainage, closure of open mine adits (non flowing), construction of surface water run-on controls, placement of a 6-inch thick soil cover over the previous location of waste, and revegetation of the cover and disturbed areas. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: Buz Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 05/18/2005

PERIODIC COSTS (EPA)

Description	Work-sheet	Unit	Unit Cost	Very Low Sites Qty	Very Low Sites Cost	Low Sites Qty	Low Sites Cost	Medium Sites Qty	Medium Sites Cost	Medium-High Sites Qty	Medium-High Sites Cost	High Sites Qty	High Sites Cost	Notes
5-Year Review	CW-22	LS	$14,267	0	$ -	0	$ -	0	$ -	0	$ -	[redacted]	$ -	Cost divided equally amoung categories
IC Plan Review Review/Update	CW-23	LS	$1,150	0	$ -	0	$ -	1	$ -	1	$ -	[redacted]	$ -	Cost divided equally amoung categories
Contingencies		25%			$ -		$ -		$ -		$ -	[redacted]	$ -	10% Scope, 15% Bid
TOTAL PERIODIC COST					**$ -**		**$ -**		**$ -**		**$ -**		**$ -**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	DISCOUNT FACTOR (7%)	Very Low Sites TOTAL COST/YR	Very Low Sites PRESENT VALUE	Low Sites TOTAL COST/YR	Low Sites PRESENT VALUE	Medium Sites TOTAL COST/YR	Medium Sites PRESENT VALUE	Medium-High Sites TOTAL COST/YR	Medium-High Sites PRESENT VALUE	High Sites TOTAL COST/YR	High Sites PRESENT VALUE	NOTES
Capital Cost	0	1.0000	$208,319	$208,319	$208,319	$208,319	$210,613	$210,613	$209,848	$209,848	$208,319	$208,319	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	14.2857	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Annual cost, years 1 through 200
Annual Luttrell O&M Cost (EPA)	1 - 10	7.0236	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Annual cost, years 1 through 10
Annual Luttrell O&M Cost (Montana)	11 - 200	7.2621	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Annual cost, years 11 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	2.4841	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	Periodic cost, every 5 years beginning in year 5
				$208,319		$208,319		$210,613		$209,848		$208,319	
TOTAL PRESENT VALUE OF ALTERNATIVE WR4				$208,300		$208,300		$210,600		$209,800		[redacted]	

Notes:
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1 - 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Appendix D AD2 Remedial Alternative Cost Summary, Cost Estimating Template

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.

Prepared By: B. Cotton
Date: January 20, 2003

Checked By: K. Zambrano
Date: 05/18/05

CAPITAL COSTS:

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mine Adit Remedial Construction			6		$ -	$ -	There are no construction costs for this alternative.
	SUBTOTAL					$ -	
Construction Contingencies				0%		$ -	
	SUBTOTAL					$ -	
Project Management				0%		$ -	
Remedial Design				0%		$ -	
Construction Management				0%		$ -	
	SUBTOTAL					$ -	
Institutional Controls for Adit Areas			6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS						**$ 2,400**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections and Sampling			0	hr	$ 25.00	$ -	4 hr/site; once/yr by local technician
Laboratory (3 samples per site per year)			0	each	$ 250.00	$ -	Engineering Estimate
Materials and Supplies (per year)			0	ls	$ 500.00	$ -	Engineering Estimate
	SUBTOTAL					$ -	
O&M Contingencies				25%		$ -	10% Scope, 15% Bid
TOTAL YEARLY O&M COST						**$ -**	

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	0		$71,335	$ -	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	0		$5,751	$ -	Cost of entire review
Contingencies				25%		$ -	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$ -**	

Appendix D AD2 Remedial Alternative Cost Summary, Cost Estimating Template

Site:	**Basin Mining Area OU2**	**Description:** Under the alternative AD2 there are no remedial construction costs. Institutional controls are provided to limit access to contaminated discharge. Site inspections, soil and surface water sampling are conducted on an annual basis. Five-year reviews and updates to the institutional control plan are conducted until the site is deleted.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		**Date:** 05/18/05
Date:	**January 2003**		

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$2,400	1.0000	$2,400	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$0	14.2857	$0	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$0	2.4841	$0	Periodic cost, every 5 years beginning in year 5
				$2,400	
TOTAL PRESENT VALUE OF ALTERNATIVE AD2				$2,400	

Notes:

- There are no capital costs associated with this alternative.
- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Appendix D AD3 Remedial Alternative Cost Summary, Cost Estimating Template

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 05/18/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Roads	CW-5	-	SY	$4.75	$ -	To adit site.
Site Preparation and Storm Water Control	CW-6	0.00	AC	$3,022	$ -	
[illegible]	CW-24	[illegible]	LF	$6,347	$ -	20% of the length of all adits grouted.
[illegible]	CW-25	[illegible]	AC	$9,120	$ -	
Fertilize, seed and mulch	CW-10	0.00	AC	$2,626.51	$ -	
Erosion control mat	CW-11	0	SY	$1.33	$ -	Used on 10% of area.
Reclaim Access roads	CW-12	-	SY	$4.23	$ -	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 649,565	
Construction Contingencies			15%		$ 97,435	10% Scope, 5% Bid
SUBTOTAL					$ 747,000	
Project Management			8%		$ 59,760	EPA Cost Guidance
Remedial Design			15%		$ 112,050	EPA Cost Guidance
Construction Management			10%		$ 74,700	EPA Cost Guidance
SUBTOTAL					$ 246,510	
Institutional Controls for Adit Areas		6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 995,910**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (State of Montana)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		0	hr	$ 25.00	$ -	2 hr/site; once/yr by local technician
Materials and Supplies (per year)		0	ls	$ 500.00	$ -	Engineering Estimate
SUBTOTAL					$ -	
O&M Contingencies			25%		$ -	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					$ -	

Appendix D AD3 Remedial Alternative Cost Summary, Cost Estimating Template

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD3 consists of the construction of surface water run-on controls to limit infiltration and subsurface grouting to reduce ground water discharge to flowing adits. Annual maintenance will be provided for the constructed controls. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		**Checked By:** K. Zambrano
Base Year:	**2003**		**Date:** 05/18/05
Date:	**January 2003**		

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
5-Year Review	CW-22	LS	0		$71,335	$ -	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	0		$5,751	$ -	Cost of entire review
Contingencies				25%		$ -	10% Scope, 15% Bid
TOTAL PERIODIC COST						$ -	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$995,910	1.0000	$995,910	Capital (one-time) cost
Annual Site O&M Cost	1 - 200	$0	14.2857	$0	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$0	2.4841	$0	Periodic cost, every 5 years beginning in year 5
				$995,910	
TOTAL PRESENT VALUE OF ALTERNATIVE AD3				$995,900	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
5 - 200	2.484149478	Periodic cost, every 5 years beginning in year 5

Appendix D AD4 Remedial Alternative Cost Summary, Cost Estimating Template

Site: Basin Mining Area OU2
Location: Jefferson County, Montana
Phase: Feasibility Study (-30% to +50%)
Base Year: 2003
Date: January 2003

Description: Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.

Prepared By: B. Cotton
Date: January 20, 2003
Checked By: K. Zambrano
Date: 05/18/05

CAPITAL COSTS:

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Contractor Work Plans	CW-1	1	LS	$119,978	$ 119,978	
Temporary Facilities	CW-2	1	LS	$384,992	$ 384,992	
Equipment Mobilization and Demobilization	CW-3	1	LS	$15,718	$ 15,718	
Personal Protective Equipment	CW-4	1	LS	$8,998	$ 8,998	
Access Road	CW-5	-	SY	$4.75	$ -	To treatment site.
[redacted]	CW-26	[redacted]	GPM	$21,386	$ -	Based on cost to treat 5 gpm
Reclaim Access roads	CW-12	-	SY	$4.23	$ -	
Post-Construction Submittals	CW-13	1	LS	$119,879	$ 119,879	
SUBTOTAL					$ 649,565	
Mobilization/Demobilization, Bonding, and Insurance			8%		$ 51,965	
Construction Contingencies			15%		$ 97,435	10% Scope, 5% Bid
SUBTOTAL					$ 798,965	
Project Management			8%		$ 63,917	EPA Cost Guidance
Remedial Design			15%		$ 119,845	EPA Cost Guidance
Construction Management			10%		$ 79,896	EPA Cost Guidance
SUBTOTAL					$ 263,658	
Institutional Controls for Adit Areas		6	ls	$ 400.00	$ 2,400	4 hours per property @ $100/hr legal fees
TOTAL CAPITAL COSTS					**$ 1,065,023**	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS (EPA Years 0-10; State of Montana years 11-30)

DESCRIPTION	WORKSHEET	QTY	UNIT	UNIT COST	TOTAL	NOTES
Site Inspections		96	hr	$ 25.00	$ 2,400	8 hrs per month by local technician
Site Maintenance		1	ls	$ 1,000.00	$ 1,000	
Remove FWS Spent Substrate, Disposal at Luttrell Repos.		179	cy	$ 15.00	$ 2,688	Assume 1/15th of material spent (15 yr life)
Remove SF Spent Substrate, Disposal at Luttrell Repos.		179	cy	$ 15.00	$ 2,688	Assume 1/15th of material spent (15 yr life)
Remove ALD Spent Substrate, Disposal at Luttrell Repos.		179	cy	$ 15.00	$ 2,688	Assume 1/15th of material spent (15 yr life)
Replace FWS Substrate (1/15 per year)		179	cy	$ 22.63	$ 4,055	
Replace SF Substrate (1/15 per year)		179	cy	$ 34.27	$ 6,141	
Replace ALD Substrate (1/15 per year)		179	cy	$ 70.54	$ 12,642	
Sample Analysis		4	ea	$ 250.00	$ 1,000	quarterly sampling
SUBTOTAL					$ 35,304	
O&M Contingencies			25%		$ 8,826	10% Scope, 15% Bid
TOTAL YEARLY O&M COST					**$ 44,130**	

Appendix D AD4 Remedial Alternative Cost Summary, Cost Estimating Template

Site:	**Basin Mining Area OU2**	**Description:** Alternative AD4 consists of the construction of a wetland treatment system at each mine site with a flowing adit. Annual maintenance will be provided for the wetlands. Every 5 years a five-year review report will be completed and the institution control plan updated.	**Prepared By:** B. Cotton
Location:	**Jefferson County, Montana**		**Date:** January 20, 2003
Phase:	**Feasibility Study (-30% to +50%)**		
Base Year:	**2003**		**Checked By:** K. Zambrano
Date:	**January 2003**		**Date:** 05/18/05

PERIODIC COSTS (EPA)

DESCRIPTION		WORKSHEET	QTY	UNIT	UNIT COST		TOTAL	NOTES
5-Year Review	CW-22	LS	0		$71,335	$	-	Cost of entire review
IC Plan Review Review/Update	CW-23	LS	0		$5,751	$	-	Cost of entire review
Contingencies				25%		$	-	10% Scope, 15% Bid
TOTAL PERIODIC COST						**$**	-	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR(S)	TOTAL COST/YR:	DISCOUNT FACTOR (7%)	PRESENT VALUE:	NOTES
Capital Cost	0	$1,065,023	1.0000	$1,065,023	Capital (one-time) cost
Annual Site O&M Cost (EPA)	1 - 10	$44,130	7.0236	$309,950	Annual cost, years 1 through 200
Annual Site O&M Cost (Montana)	11 - 200	$44,130	7.2621	$320,476	Annual cost, years 1 through 200
Five-Year Review Report/IC Plan Review/Update Cost	5 - 200	$0	2.4841	$0	Periodic cost, every 5 years beginning in year 5
				$1,695,449	
TOTAL PRESENT VALUE OF ALTERNATIVE AD4				$1,695,400	

Notes:

- Total annual expenditure is the total cost per year with no discounting.
- Present value (PV) is the total cost per year including a 7% discount factor for that year.
- Total present value is rounded to the nearest $100.
- Minimum item cost = $500.
- Percentages used for indirect costs are based on guidance from Section 5.0 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
- Total costs presented on this table are rounded to the nearest $100.
- Discount factor is the sum of the present values of the years in which the cost will be incurred. Values were truncated to three significant figures and summed.

Abbreviations:

EA	each
QTY	quantity
LS	lump sum

Intervals	Discount Factor	Note
1- 200	14.28569531	Annual Cost, every year
1 - 10	7.023581541	Annual cost, every year for years 1 through 10
11 - 200	7.262113771	Annual cost, every year for years 11 through 200
5 - 200	2.4841494784	Periodic cost, every 5 years beginning in year 5

Appendix D Quantity Template

CDM

Basin Mining Area OU2 | By: | B. Cotton | 6/5/2003

Feasibility Study 3282.945.FSZ.RPT2Z | Ck. By:

Quantity Estimate - Adit Alternatives | Estimated Adit Length = Waste Volume * 27/68

SubArea	Adit Site	Waste Size (acres)	Waste Volume (cy)	Estimated Adit Length (ft)	Estimated Adit Flow (gpm)	Distance from Adit to Nearest Primary Road (mi) - (Assumed Access Road Construction Distance)	Haul Distance to Luttrell Repository (miles)
JACK CREEK	BULLION MINE	0.10	46550.00	18483	9.00	0.50	12.00
JACK CREEK	BULLION SMELTER	0.10	2712.00	1077	0.10	0.37	11.87
JACK CREEK	MORNING	0.10	484.00	192	0.10	0.04	11.54
JACK CREEK	RTI RECON: P	0.75	288.64	115	1.00	0.50	12.00
JACK CREEK	SMELTER CREEK ADIT	1.00	291.19	116	1.00	0.50	12.00
JACK CREEK	VINDICATOR	12.00	58080.00	23061	7.00	0.03	11.53
Subtotal	6	14.05	108405.83	43043.49	18.20	1.95	
LOWER CATARACT CREEK	CARTWRIGHT CABINS 2	1.00	4840.00	1922	2.00	0.40	16.30
LOWER CATARACT CREEK	NEW COTTAGE	2.00	7422.03	2947	0.10	0.50	16.40
LOWER CATARACT CREEK	PHANTOM	0.25	246.35	98	1.00	0.04	15.94
LOWER CATARACT CREEK	REDWING	1.00	4840.00	1922	0.10	0.50	16.40
LOWER CATARACT CREEK	SEATTLE	6.00	3277.35	1301	0.10	0.50	16.40
LOWER CATARACT CREEK	SYLVAN	2.00	1538.80	611	0.13	0.53	16.43
LOWER CATARACT CREEK	VOGEL	2.00	395.12	157	0.50	0.50	16.40
LOWER CATARACT CREEK	WALDY	0.25	1210.00	480	2.00	0.04	15.94
Subtotal	8	14.50	23769.65	9437.95	5.93	3.02	
MIDDLE CATARACT CREEK	ALPINE	1.00	677.77	269	0.00	0.21	12.41
MIDDLE CATARACT CREEK	VERA AND MARIE	4.00	178.17	71	0.00	0.23	12.43
MIDDLE CATARACT CREEK	ADA	2.00	4083.99	1622	1.50	1.99	14.19
MIDDLE CATARACT CREEK	APOLLO	2.00	4802.39	1907	0.70	0.07	12.27
MIDDLE CATARACT CREEK	BLACK BEAR	0.10	484.00	192		0.77	12.97
MIDDLE CATARACT CREEK	BLACK BEAR	3.00	15.51	6	0.10	0.77	12.97
MIDDLE CATARACT CREEK	BLUE DIAMOND / OCCIDE	3.50	1695.09	673	1.00	0.21	12.41
MIDDLE CATARACT CREEK	BOULDER CHIEF	8.00	14365.91	5704	0.10	1.88	14.08
MIDDLE CATARACT CREEK	CATARACT	5.00	1847.58	734	3.00	0.03	12.23
MIDDLE CATARACT CREEK	CRACKER	1.00	169.96	67	6.00	0.43	12.63
MIDDLE CATARACT CREEK	EVA MAY	4.00	139990.00	55584	3.00	0.09	12.29
MIDDLE CATARACT CREEK	GRAY LEAD	0.10	484.00	192	3.00	1.32	13.52
MIDDLE CATARACT CREEK	HATTIE FERGUSON	2.00	2608.36	1036	2.00	0.00	12.20
MIDDLE CATARACT CREEK	IDA M.	0.10	484.00	192	2.00	0.11	12.31
MIDDLE CATARACT CREEK	MIDDLE SNOWDRIFT CRE	5.00	231.68	92	0.10	0.50	12.70
MIDDLE CATARACT CREEK	MORNING MARIE	1.50	108.60	43	0.50	0.12	12.32
MIDDLE CATARACT CREEK	MOUNTAIN CHIEF	0.10	484.00	192	0.50	0.50	12.70
MIDDLE CATARACT CREEK	NE NW SECTION 17	3.00	514.57	204	0.10	0.50	12.70
MIDDLE CATARACT CREEK	NE SE SECTION 14	0.50	471.24	187	10.00	0.88	13.08
MIDDLE CATARACT CREEK	ROCKER	1.00	1481.53	588	0.50	1.67	13.87
MIDDLE CATARACT CREEK	ROCKER EXTENSION	0.25	620.56	246	1.50	0.50	12.70
MIDDLE CATARACT CREEK	SIRIUS	3.00	3030.09	1203	0.30	1.58	13.78
MIDDLE CATARACT CREEK	UNNAMED 002	1.00	251.87	100	0.50	1.53	13.73
MIDDLE CATARACT CREEK	UNNAMED 004	1.00	758.01	301	0.40	1.39	13.59
Subtotal	24	52.15	179838.90	71406.62	36.80	17.29	
UNCLE SAM GULCH	CRYSTAL	15.00	403050.00	160035	50.00	0.04	12.24
UNCLE SAM GULCH	GARFIELD	2.00	9680.00	3844	1.00	0.04	12.24
UNCLE SAM GULCH	SNOWBIRD	1.00	296.95	118	0.50	0.20	12.40
Subtotal	3	18.00	413026.95	163995.99	51.50	0.28	
UPPER BASIN CREEK	BUCKEYE MINE	0.10	26880.00	10673	0.10	0.04	7.94
UPPER BASIN CREEK	ENTERPRISE MINE	0.10	22930.00	9105	0.50	0.50	8.40
UPPER BASIN CREEK	JOSEPHINE	8.00	21680.00	8608	1.00	0.04	7.94
UPPER BASIN CREEK	LADY LEITH	0.10	484.00	192	7.00	1.26	9.16
UPPER BASIN CREEK	MORNING STAR	2.00	1057.14	420	0.09	0.13	8.03
UPPER BASIN CREEK	SE NW SECTION 30	2.00	1218.04	484	0.10	0.50	8.40
Subtotal	6	12.30	74249.18	29481.29	8.79	2.46	
UPPER CATARACT CREEK	CRESCENT	4.00	4604.50	1828	3.00	0.08	5.68
UPPER CATARACT CREEK	ELDORADO AND PLATEA	1.00	1535.23	610	0.20	0.05	5.65
UPPER CATARACT CREEK	LADY RICKER	1.20	617.65	245	0.70	0.50	6.10
UPPER CATARACT CREEK	QUARTZ CREEK	0.25	69.81	28	0.10	0.44	6.04
UPPER CATARACT CREEK	SW SE SECTION 4	1.50	562.07	223	1.00	0.50	6.10
Subtotal	5	7.95	7389.26	2933.97	5.00	1.57	
TOTAL # of ADITS	52						

Default Values

Waste Area Size	0.1	acre
Distance to Primary Road	0.5	mi
Average Waste Rock Thickness	3	ft