# APPENDIX E

## Detailed Cost Estimates

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## 1.0 INTRODUCTION

The purpose of this appendix is to compile and present costs for each of the source area removal action alternatives under evaluation in accordance with the US Environmental Protection Agency guidance "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (referenced below as EPA guidance or EPA, 2000).

Detailed cost estimates for the various removal action alternative components are provided in Tables E-15 through E-51. These individual costs are assembled to provide overall costs for each alternative for the source areas (A, D and E Panels, Pole Canyon Overburden Disposal Area [ODA] and Hoopes Spring) in Tables E-1 through E-14. Costs are provided as Present Net Worth to allow for a consistent evaluation.

The No Action alternative is considered the baseline condition, against which the other alternatives are compared. As such, even though reclamation actions and other actions that will have an environmental benefit will be implemented under the mine plan, the No Action alternative is assumed to have no associated cost.

A summary of the cost estimation approach is provided in Section 2. Section 3 provides detailed cost estimates for the various components included in the removal alternatives. These individual cost estimates are associated start dates and durations are combined into specific alternatives for each source area to provide a present value cost estimate in Section 4.

## 2.0 COST ESTIMATION AND APPROACH

Considerable work has been performed and is ongoing at the Site under the requirements of the mine plan. Much of this work is the same as, or similar to, work elements included in the removal action alternatives. As such, site-specific cost data are available for some items and these have been used whenever possible to support development of overall remedy costs.

Cost estimates are supported using local and industry standard information: in particular Heavy Construction Cost Data, 19th Annual Addition, RS Means 2005 and Environmental Remediation Cost Data-Unit Price, 10th Annual Addition, RS Means 2004, as well as costs from other similar sites in the western United States. The range of costs is within the EECA range of plus 50%, minus 30%.

There is much heavy construction equipment on-Site, which is typically committed to mining activities. However, it is noted that there is potential to use Simplot resources and materials generated during active mining and actual approach would be identified at the time of implementation.

### 2.1 Capital Costs

Capital costs are those expenditures that are required to construct a removal action. They are exclusive of costs required to operate or maintain the action throughout its lifetime. Capital costs consist primarily of expenditures initially incurred to build or install the removal action (e.g., installation of a soil cover). Capital costs include all labor, equipment, and material costs, including contractor markups such as overhead and profit, associated with activities such as mobilization/demobilization, and monitoring. Capital costs also include expenditures for professional/technical services for removal action design and construction management that are necessary to support construction of the removal action.

### 2.2 Operation and Maintenance (O&M) Cost Estimates

O&M costs are those post-construction costs necessary to ensure or verify the continued effectiveness of the removal action. These costs are estimated mostly on an annual basis but also include less frequent period maintenance activities, which may occur once every two to ten years. Such periodic costs have been annualized for presentation in the cost tables. Annual O&M costs include all labor, equipment, and material costs, including contractor markups such as overhead and profit, associated with activities such as monitoring; operating and maintaining infiltration, diversion, cover, or treatment systems; and disposal. Annual O&M costs also include expenditures for professional/technical services necessary to support O&M activities.

## 2.3 Periodic Costs

Periodic costs are those costs that occur only once every few years (e.g., equipment replacement) or expenditures that occur infrequently during the entire O&M period (e.g., replacement of major equipment items). There are not a large number of periodic costs associated with the removal action components being evaluated and therefore for simplicity these have been factored into the annual O&M costs where appropriate.

## 2.4 Contingencies

Contingencies are factored into the cost estimate for each removal alternative component to cover unknowns, unforeseen circumstances, or unanticipated conditions. The two main types of contingency are scope and bid. Scope contingency covers unknown costs due to scope changes that may occur during design. Bid contingency covers unknown costs associated with constructing or implementing a given project scope. EPA guidance estimates that scope contingencies typically range from 10 to 25 percent and that bid contingencies typically range from 10 to 20 percent.

## 2.5 Professional/Technical Services Costs

Costs associated with removal action design, construction management and technical support are estimated by applying percentages to total construction and O&M costs plus contingency. EPA guidance provides rule-of-thumb percentages for ranges of total costs and these are applied in the cost estimates.

## 2.6 Mobilization/Demobilization Costs

Consistent with EPA Guidance, mobilization/demobilization costs include: mobilization and demobilization of construction equipment and facilities; submittals/implementation plans (such as monitoring plans, construction quality control plans, construction schedules, environmental protection plans, training and medical certifications, materials handing/transportation and disposal plans, permits, site safety and health plans, sampling and analysis plans, site security plans, site work plans, storm water pollution prevention plans); temporary facilities (such as office trailers, decontamination facilities, storage facilities, security fencing, signs, roads and parking); temporary utilities; temporary relocation of roads/structures/utilities; and post construction submittals (such as O&M manuals, as-built drawings, quality assurance/quality control [QA/QC] documentation).

## 2.7 Present Value Analysis

For each alternative, a -30 to +50 percent cost estimate is developed in accordance with procedures in the EPA Guidance. Cost estimates for each alternative are based on conceptual engineering and design and are expressed in terms of 2005 dollars. This analysis is used to

evaluate the capital and O&M costs of a removal action alternative based on its present value. A present value analysis compares expenditures for various alternatives where those expenditures occur over different time periods. By discounting all costs to a common base year, the costs for different removal action alternatives can be compared based on a single cost figure for each alternative. The total present value for a single alternative is equal to the full amount of all costs incurred through the end of the first year of operation, plus the series of expenditures in following years reduced by the appropriate future value/present value discount factor. This analysis allows the comparison of removal alternative on the basis of a single cost representing an amount that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the removal action over its planned life. A discount rate of 7 percent is assumed for base calculations (EPA, 1988 and 2000). The discount rate represents the anticipated difference between the rate of inflation and investment return.

O&M of some actions would be required over the long term. For the purposes of present value estimation, actions have been extended out to year 30. It is noted that the need for long-term actions will depend on the results of monitoring and could extend beyond this time. However, because of the nature of the present value costing process, extending actions out beyond year 30 has minor effects on the present value estimates and does not affect the findings of the comparative analysis.

## 3.0 DETAILED COST ESTIMATES FOR REMOVAL ACTION COMPONENTS

This section presents details of the cost estimates for each component of the removal action alternatives.

The detailed costs shown in this section present the quantity estimates made in establishing the scope of work (areas, volumes, etc.) and the calculation from which the estimated costs were derived. The unit costs shown for each work item reflect an assessment of the labor, materials and equipment required for each identified item and include allowances for appurnatent and incidental work as well as contractor overhead and profit. Unit cost rates and associated productivity factors are based on historical factors, published industry data, information on similar work already performed at the site and /or experience on projects of a similar nature or scope.

The quantities used in assessing the scope of work are based on geographical information generated during the SI. However, uncertainties exist with respect to various aspects of the work and therefore, consistent with EPA guidance, contingency allowances have been included in the cost estimates. The contingency allowance is intended to cover unspecified, or unidentified, work required to be completed within the scope of work and not additional work beyond the established scope of work. Notwithstanding these unknowns, the accuracy of the cost estimates is anticipated to fall within the acceptable range for typical feasibility study and EECA evaluations of minus 30% to plus 50%, in accordance with EPA guidance.

The following subsections provide information about the detailed cost estimates for each removal action component. Details on quantities, unit rates and specific information sources are provided in the footnotes in the associated tables.

### 3.1 Activities Included in No Action Alternative

The No Action alternative is the “baseline” condition against which the other removal action alternatives will be compared. Various activities will be performed under the requirements of the mine plan, including:

- Maturation of reclamation at D Panel backfilled pit and external ODA;
- Completion of reclamation activities at E Panel backfilled pit (including backfilling of the E-0 pit) and external ODA;
- Completion of backfilling and reclamation of A Panel pit.

For the purposes of this EECA evaluation, these are included in the No Action alternative and are assumed to have no associated costs.

## 3.2 Storm Water Controls (Alternatives 2, 3 and 4)

Each action alternative contains the same storm water controls component. These would entail unlined diversion ditches upgradient of mine features to direct water away from ODAs and grading in some areas to improve surface flow and reduce erosion.

Based on a review of hydrological data storm water run-on control ditches have been sized to convey approximately 10 cubic feet per second of flow for the purposes of the EECA evaluation. Typical ditch dimensions of 3 feet base width, 2 to 1 side slopes and 2 foot depth are used for costing purposes. Actual sizing would be determined during removal action design.

O&M would entail establishment of vegetation and maintaining areas that become eroded.

### 3.2.1 A Panel ODA

No run-on control ditches are necessary for the A Panel external ODA because it is generally upgradient from surrounding areas and the run-on is negligible. Limited regrading may be necessary along the northern edge of the ODA, as shown in Figure 5-1 of the EECA, to control storm water flows. It is assumed for cost purposes that approximately 0.5 acres would be regraded. Table E-15 presents the detailed cost analysis for this action.

### 3.2.2 Pole Canyon ODA

Surface water run-on occurs from a 77 acre watershed to the north of the ODA. A diversion ditch can be constructed next to the northern extent of the ODA to convey surface flow to Lower Pole Canyon Creek, downgradient of the toe of the ODA. Regrading will also be necessary on the southwestern portion of the Pole Canyon ODA. This area would be regraded to improve storm water runoff and to reduce erosion. For the purposes of cost estimation it is assumed an acre would be regraded. Detailed design may indicate a larger or smaller area would need to be addressed.

The approximate layout for these two actions is shown on Figure 5-1 of the EECA report. The cost estimate is shown on Table E-16.

### 3.2.3 D Panel Backfilled Pits and External ODA

Surface runoff from upgradient of the northern portion of the backfilled pit is currently conveyed to Pole Canyon Creek via an existing diversion ditch. Run-on at the southern portion would be conveyed to Sage Creek by an additional ditch.

Currently runoff from the southeastern portion of the backfilled pits collects above the haul road and infiltrates into the D Panel external ODA. This area would be regraded to prevent water from collecting and infiltrating. For the purposes of this cost estimate, it was assumed that it would be necessary to regrade approximately three acres. During design it may be determined that a larger or smaller area would need to be addressed. The northern edge of the D Panel external ODA would also require limited regrading to prevent potential limited run-on. It is assumed for the purposes of this cost estimate that 0.5 acres would be regraded.

Figure 5-7 of the EECA report shows the general layout of these two actions. The cost estimate for this component is shown on Table E-17.

### 3.3 Soil Covers (Alternative 2)

Soil is not readily available at the Site. Sufficient topsoil is generated by ongoing mining activities to reclaim future disturbances, but there is not an excess. Therefore soil would have to be obtained from offsite.

For the purposes of cost estimation, it is assumed that soil would be quarried from a local source and transported to the Site. Local real estate prices have risen sharply in recent years and therefore it may be more difficult to find suitable sources.

The Natural Resources Conservation Service (NRCS) offices in Soda Springs, Idaho and Afton, Wyoming were both contacted to inquire about the availability of topsoil in the area. Both offices indicated there is not a good supply of topsoil in the area. To acquire the volume of topsoil necessary to cap the source areas evaluated in the EECA (as much as 1.5 million cubic yards) it would most likely be necessary to purchase the rights to mine topsoil from one or more local farmer's or rancher's property. Topsoil in the area is not very thick, usually around 12 inches and no deeper than three feet (personal communication, NRCS). This would necessitate purchasing the rights to mine a very large area.

A variety of sources were used to develop a cost estimate for offsite topsoil. Mine waste soil covers have recently been implemented at the Butte Priority Soils Operable Unit (BPSOU) in Butte, Montana. Details of actual costs are presented in the BPSOU Feasibility Study (BPSOU PRP Group, 2004). The soil covers were 18-inches thick and installed over waste rock piles. The total average cost for purchase, transport, and placement of soil was $24,000 per acre. In addition, organics were added to the soil source to provide a suitable growth medium, at an average cost of $3,400 per acre, yielding a total cost for the unvegetated soil cover of $27,400 per acre. Since the soil covers evaluated in this EECA are two feet thick, it would be appropriate to scale up the BPSOU costs by one-third resulting in a comparable cost of $36,500 per acre for the unvegetated soil cover at Smoky Canyon. A key component in the cost is the distance to the soil source and the associated transportation costs. At the BPSOU several borrow sources within 10 miles of the site were used. At Smoky Canyon, it is likely that borrow

sources would be more distant and therefore use of a higher per acre cost would be appropriate. Standard industry information (Means, 2005) reports that truck transport of soil costs approximately $0.51 per cubic yard per mile (round trip). This assumes reasonable non-interstate roadways. Costs would be higher for unpaved roads (where trip times would be longer) and lower for interstates (where trip times would be shorter). For each acre of soil cover, there are approximately 3,200 cubic yards of soil. Therefore it costs approximately $1,600 per mile of transportation for each acre of soil cover at the Smoky Canyon Site. Clearly costs for the soil covers would increase rapidly as the distance to the source increases. For example, a source only 5 miles more distant would add approximately $16,000 per acre.

The central impoundment area at the Bunker Hill Superfund Site (Kellogg, Idaho) was capped in 2000 using a low-permeability engineered cap. Over 300,000 cubic yards of vegetative growth medium were used for this project. The cost per cubic yard of vegetative growth medium, installed, was $13.60, as referenced in the 2001 Coeur d'Alene Basin (Bunker Hill OU3) Feasibility Study (URS Greiner, Inc. and CH2M Hill, 2001). Soil was transported from approximately 50 miles away primarily along Interstate roadways. This works out to a cost of approximately $43,890 per acre (assuming a two-foot-thick cap). Costs for topsoil at the Smoky Canyon Mine would be expected to be similar to costs encountered at Bunker Hill. This is due to the lack of an on-site borrow source, the magnitude of the projects, and the geographic proximity.

For Smoky Canyon, it is estimated that soil cover costs will be similar to the two costs described above (i.e., in the range of $36,500 to $44,890 per acre). For the purposes of EECA costing, a per acre cost of $40,000 is used for the 2-foot-thick cover. This equates to $30,000 per acre for the 1.5-foot-thick topsoil on the low-permeability cap and a cost of approximately $13 per cubic yard for small-scale topsoil application.

Regrading may also be necessary in some areas prior to application of the topsoil. It is assumed that the average depth regraded would be five feet.

O&M activities would entail maintenance of the vegetation and storm water controls to minimize erosion and maintain the integrity of the cover. O&M would be more intensive for the initial period, as the vegetation matures, and then the level of effort would reduce as vegetation becomes self-sustaining.

### 3.3.1 A Panel External ODA

Costs for installation of a soil cover on the A Panel external ODA are shown on Table E-18. Side slopes are adequate for installation of a soil cover with minimum grading. Although there are a few limited areas that have previously received topsoil, it is assumed for costing purposes that 24 inches of soil would need to be installed over the entire ODA.

### 3.3.2 Pole Canyon ODA

Limited regrading at the eastern toe of the ODA would be necessary to achieve less than 3 to 1 slopes needed for installation of a soil cover. Under Alternative 2, there is an additional 3 foot chert barrier and a zero-valent iron layer underlying the soil cover. The purpose of the chert layer is to provide a barrier to root penetration. The iron layer would modify the water chemistry to reduce subsequent release and transport of selenium from the overburden. Organic material would also be added to the iron layer to supplement performance until the vegetation cover matures. Table E-19 presents the cost estimate for this action.

### 3.3.3 D Panel Backfilled Pits and External ODA

The southern portion of the backfilled pit already has an adequate topsoil/chert cover. The northern portion, which was reclaimed using earlier practices, would receive a 2-foot soil cover. Although most of the area has previously received a topsoil cover, the average thickness is less than 6 inches. Therefore, it is assumed for costing purposes that 24 inches of soil would need to be installed over the entire area.

The current depth of topsoil on the D Panel external ODA varies. Additional topsoil would be added to create a uniform 24-inch cover. Although the topsoil cover currently varies, it is assumed for the purposes of this cost analysis that an additional 12 inches of topsoil would be necessary over the entire ODA to achieve a uniform 24-inch cover. Actual requirements for the pit and the external ODA would be developed during design.

The cost estimate for this component is shown on Table E-20.

## 3.4 Surface Amendment/Vegetation Modification (Alternative 3)

For the purposes of cost estimation, it is assumed that surface amendment would entail application of composted manure. Other organic materials may be available (such as biosolids). The actual amendment would be identified during remedial design.

Unit costs for compost were taken from “The Compost Connection for Western Agriculture” published in January 1999 by Cooperative Extension Washington State University Center for Sustaining Agriculture and Natural Resources. This publication included typical compost characteristics and cost for Southern Idaho.

Prior to application, a herbicide, such as Roundup UltraMax®, would be used to eliminate existing vegetation. It is assumed that a local source of manure would be readily available and that it would be transported to the Site in trucks. Amendment would be incorporated to a depth of 12 inches using a chisel plow towed behind a tractor.

Vegetation would entail seeding with a mix of species that have low selenium uptake (see Table 5-1 of the EECA report). O&M would be similar to that described above for soil covers.

### 3.4.1 A Panel ODA

Current slopes are adequate with respect to surface water runoff and slope stability. The cost estimate for this component of work is shown on Table E-21.

### 3.4.2 Pole Canyon ODA

Limited regrading at the eastern toe of the ODA would be necessary to achieve adequate slopes and for establishment of vegetation. The cost estimate for this component of work is shown on Table E-22.

### 3.4.3 D Panel Backfilled Pits and External ODA

Under Alternative 3 the northern portion of the backfilled pit and the external ODA would receive surface amendment/vegetation modification as shown in EECA Figure 5-6. The cost estimate for this component of work is shown on Table E-23.

### 3.4.4 E Panel External ODA

The non-chert portion of the external ODA would receive surface amendment/vegetation modification. The cost estimate for this component of work is shown on Table E-24.

## 3.5 Low-Permeability Cap (Alternative 4)

The low-permeability cap is assumed to consist of four layers. The bottom layer would be a six-inch-thick cushion comprised of a granular material free of large rocks or other debris that could damage the barrier layer. The second layer would comprise the barrier. The barrier layer would be a Bentofix® geosynthetic clay liner (GCL) or equivalent. Overlying the GCL would be a one-foot-thick drainage layer comprised of a high permeability material (e.g., gravel). The top layer of the cap would be a 1.5-foot-thick vegetated soil cover. A 16-oz geotextile would be placed between the top vegetated layer and the underlying drainage layer (see EECA Figure 5-3).

Prior to installation of the low-permeability cap, the backfilled pits and ODAs would be regraded to provide a smooth surface at a slope of less than 3:1 upon which to place the cap. It was assumed for costing purposes that approximately 1/3 of the total area of each backfilled pit or ODA would be regraded prior to installation of the cap. The actual area would need to be determined during design. Costs for the A Panel external ODA, the Pole Canyon ODA, the D Panel backfilled pits and external ODA, and the E Panel external ODA are presented in Tables E-25, E-26, E-27 and E-28, respectively.

O&M is assumed to be the same as described above for soil covers.

### 3.6 Storm Water Detention Basin Sediment Removal (Alternatives 3 & 4)

Sediments would be excavated using a backhoe and transported by truck within the Site. After sediments are excavated the area would be regraded to match the surrounding contours using local material as well as imported topsoil as necessary. After regrading, the area would be revegetated. Sediment depths and areas were estimated during the SI by visual inspection. Sediments would be removed after reclamation activities on upgradient features become effective. O&M would entail establishment of vegetation in the removal area.

Detention basin locations are shown on EECA Figures 5-2 and 5-8. Costs for the A Panel external ODA, the Pole Canyon ODA, the D Panel backfilled pits and external ODA, and the E Panel external ODA are presented in Tables E-29 through E-32.

| **Storm Water Detention Basin Dimensions** | | | | | |
|---|---|---|---|---|---|
| Basin Name | Length (ft) | Width (ft) | Depth (ft) | Area ($ft^2$) | Volume ($ft^3$) |
| **A Panel** | | | | | |
| AP-1 | 75 | 50 | 2 | 3750 | 7500 |
| AP-2 | 75 | 35 | 1 | 2625 | 2625 |
| AP-3 | 70 | 65 | 1 | 4550 | 4550 |
| AP-4 | 60 | 40 | 0.5 | 2400 | 1200 |
| AP-5 | 150 | 75 | 2 | 11250 | 22500 |
| AP-6 | 150 | 100 | 1 | 15000 | 15000 |
| AP-7 | 85 | 25 | 1 | 2125 | 2125 |
| AP-9A | 100 | 30 | 0.5 | 3000 | 1500 |
| | | | **A Panel Totals** | **42,075** | **54,375** |
| **Pole Canyon** | | | | | |
| DP-14 | 50 | 30 | 0.5 | 1500 | 750 |
| | | | **Pole Canyon Totals** | **1,500** | **750** |
| **D Panel** | | | | | |
| DP-1 | 75 | 50 | 2.5 | 3750 | 9375 |
| DP-2 | 200 | 100 | 1 | 20000 | 20000 |
| DP-3 | 100 | 50 | 0.5 | 5000 | 2500 |
| DP-4 | 40 | 40 | 0.5 | 1600 | 800 |
| DP-5 | 30 | 20 | 0.5 | 600 | 300 |

| Storm Water Detention Basin Dimensions | | | | | |
|---|---|---|---|---|---|
| Basin Name | Length (ft) | Width (ft) | Depth (ft) | Area ($ft^2$) | Volume ($ft^3$) |
| DP-6 | 40 | 40 | 0.5 | 1600 | 800 |
| DP-7 | 80 | 80 | 2 | 6400 | 12800 |
| DP-8 | 100 | 20 | 0.5 | 2000 | 1000 |
| DP-9 | 50 | 30 | 1 | 1500 | 1500 |
| DP-10 | 120 | 40 | 1 | 4800 | 4800 |
| DP-11 | 100 | 20 | 0.5 | 2000 | 1000 |
| DP-13 | 100 | 30 | 1 | 3000 | 3000 |
| DP-15 | 80 | 30 | 0.5 | 2400 | 1200 |
| | | | **D Panel Totals** | **43,450** | **41,475** |
| **E Panel** | | | | | |
| EP-1 | 60 | 60 | 0.5 | 3600 | 1800 |
| EP-2 | 200 | 50 | 1 | 10000 | 10000 |
| EP-6 | 60 | 60 | 0.5 | 3600 | 1800 |
| EP-7 | 60 | 40 | 0.5 | 2400 | 1200 |
| EP-9 | 100 | 50 | 1 | 5000 | 5000 |
| | | | **E Panel Totals** | **24,600** | **19,800** |

### 3.7 Storm Water Detention Basin Covering (Alternative 2)

After reclamation of upgradient areas has taken effect, storm water detention basins would no longer be required and would be covered with run-of-mine chert to prevent direct contact with sediments. The chert would not need to be screened to meet a specific size requirement since water storage capacity is not an issue. Detention basin areas were visually estimated during SI field activities and are given in the above table (Section 3.6). There are no O&M requirements associated with this action. Tables E-33 through E-36 present the estimated costs for each source area.

### 3.8 Seep Area Covering (Alternative 3)

Seep flow areas and detention ponds would be covered with run-of-mine chert. The chert would be screened to plus 4 inch, minus 2 foot to maintain void spaces (i.e., water storage capacity) within the cover. The cover would be placed at a minimum of 2-foot thickness above typical water surface levels and would need to be of adequate extent to completely wetted areas. For the purposes of the cost estimate it was assumed the average thickness of the chert layer would be 30 inches.

After installation of the chert cover, it may be necessary to increase the size of the berm around each detention pond to maintain water storage capacity. The increase in the size of the berm was estimated to be ten percent of the volume of chert placed for cost purposes. The actual increase in berm size would need to be determined during remedial design. O&M would be necessary the first few years to confirm the seep flows and pond water are fully covered. Seep areas and depths were visually estimated during SI field investigations.

**Seep Detention Basin Dimensions**

| Basin Name | Length (ft) | Width (ft) | Depth (ft) | Area ($ft^2$) | Volume ($ft^3$) |
|---|---|---|---|---|---|
| AP-2 | 75 | 35 | 1 | 2625 | 2625 |
| DP-7 | 80 | 80 | 2 | 6400 | 12800 |
| DP-10 | 120 | 40 | 1 | 4800 | 4800 |
| EP-4 | 150 | 50 | 1 | 7500 | 7500 |
| EP-5 | 100 | 50 | 0.5 | 5000 | 2500 |

### 3.8.1 A Panel External ODA

Seep AS-2 is located at the toe of the A Panel external ODA (see EECA Figure 5-2). There is currently no equipment access to this seep, therefore an access road would need to be installed (and later removed) to cover the seep flow and pond area. Seep flows for AS-2 are currently low and sporadic so water in pond AP-2 rarely accumulates. Table E-37 presents the estimated costs for seep AS-2.

### 3.8.2 Pole Canyon External ODA

There are no seeps associated with the Pole Canyon ODA.

### 3.8.3 D Panel Backfilled Pits and External ODA

Detention pond DP-10 has already been covered with chert as part of a pilot study. Seep DS-10 currently is not a discreet flow. Limited regrading would be necessary to collect the flow before covering.

Seep DS-7 and its associated pond, DP-7, would be covered. Currently DP-7 stores a large amount of water and has a depth of a few feet. Reclamation of the D Panel backfilled pits above the D Panel external ODA would be expected to greatly reduce the flow of seep DS-7; reducing the volume of water stored in DP-7.

EECA Figure 5-8 shows the locations of seeps DS-10 and DS-7 as well as their respective ponds. Table E-38 presents the estimated costs to cover DS-10, DS-7 and DP-7.

### 3.8.4 E Panel External ODA

Seep ES-5 has already been covered with chert as part of a pilot study. Pond EP-5 would be covered. Also, seep ES-4 and its respective pond, EP-4, would both be covered with chert. Seep ES-3 and its respective pond, EP-3, would receive no action because COPC levels in sediments and surface water do not exceed regulatory standards.

EECA Figure 5-8 shows the locations of the E Panel seeps. Table E-39 presents the estimated costs to cover ES-4, EP-4, and EP-5.

## 3.9 Seep Area Sediment Removal (Alternatives 2 & 4)

Once seeps have either dried up or have started treatment, sediments from the flow paths and detention basins would be removed. Sediment removal and reclamation methods would be similar to those described for detention basin sediment removal (see Section 3.6). Installation of an access road is also included for seep AS-2. Seep areas that have already been covered as part of pilot projects (i.e., DP-10 and ES-5) would not be disturbed. Seep areas and depths were visually estimated during SI field activities and are presented above in Section 3.8. EECA Figures 5-2 and 5-8 show seep area locations. Tables E-40 through E-42 present estimated costs for the A Panel external ODA, the D Panel external ODA, and the E Panel external ODA.

## 3.10 Seep Treatment (Contingency for Alternative 2)

As described above, seep flows from external ODAs are expected to reduce and possibly dry up after implementation of source control activities for Alternative 2. If seeps continue to flow, they will be treated using a bioreactor treatment system. A seep treatment pilot study, using bio-remediation, was performed by Dr. Gregg Moller of the University of Idaho (see Appendix B). Costs for seep treatment were estimated based on that pilot study. A unit cost based on seep flow rates in gallons per minute was developed. These costs were developed based on a residence time of five days, addition of 5 pounds of iron per 1,000 gallons treated, addition of 2 gallons of cheese whey per 1,000 gallons treated, and bio-rings used as packing material. Initial capital costs included material costs for underground tanks, a cheese whey automatic feed system, initial iron application, bio-rings, and installation costs (including an access road for seep AS-2). O&M costs include continued iron and cheese whey application (costs determined using the aforementioned rates of application), tank cleaning, sludge disposal (assumes 1,000 gallons of sludge, to be disposed of as non-hazardous waste in a landfill, produced per gpm per year), and system maintenance. Discussions with Star Valley Cheese in Thane, Wyoming, indicate that they generate approximately 15,000 gallons of waste whey per day and that this material would be available at no cost (just transportation) (personal communication, Star Valley Cheese).

Seep flows were conservatively estimated by taking the maximum measured seep flow at each location and reducing it by 50 percent (the approximate estimated reduction in infiltration

achieved by placing a soil cover). This is conservative because seep flows will also be reduced by installing run-on control and regrading of some areas and by the vegetation on the cover.

Seep locations are shown on EECA Figures 5-2 and 5-8. Tables E-43 through E-45 present estimated costs for seep treatment for the A Panel, D Panel, and E Panel external ODAs.

| **Seep Flow Rates** | | | | | |
|---|---|---|---|---|---|
| Seep Name | Min Flow (gpm) | Max Flow (gpm) | Average Flow (gpm) | Median Flow (gpm) | 50% Max Flow (gpm) |
| AS-2 | 0 | 1.8 | 0.45 | 0 | 0.90 |
| DS-7 | 0.84 | 5.50 | 3.50 | 3.81 | 2.75 |
| DS-10 | 0.01 | 0.01 | 0.01 | 0.01 | 0.005 |
| ES-4 | 0.45 | 4.49 | 1.6 | 0.96 | 2.24 |
| ES-5 | 2.33 | 22.44 | 8.20 | 5.83 | 11.20 |

### 3.11 Lower Pole Canyon Creek Sediment Removal (Alternatives 2, 3, & 4)

After Pole Canyon Creek source controls become effective, sediments exceeding regulatory standards would be removed from lower Pole Canyon Creek. The volume of sediments removed was estimated assuming a 1,000-foot reach of stream would be removed to a depth of 24 inches and 5-feet width. The actual extent of sediment removal would be determined by sampling during design.

Sediment removals procedures were assumed to be similar to those presented for detention basins sediments. Reclamation would include regrading the area of excavation to match natural contours using 50 percent native material from the area and 50 percent imported rock/gravel. Riparian vegetation would be planted along the restored stream channel.

O&M would be necessary to establish vegetation.

Estimated costs are presented in Table E-46.

### 3.12 In-Situ Treatment of Lower Pole Canyon Creek Flow (Alternative 2)

Flow of lower Pole Canyon Creek would be treated prior to exiting the ODA. The cost quantities for the treatment system are based on a pilot study performed by Dr. Gregg Moller of the University of Idaho. The costs assume a trench would be cut across the toe of the ODA (estimated to be cut to a depth of 10 feet, a width of five feet, and a length of 50 feet). The trench would contain a layer of zero-valent iron powder (assumed for cost purposes to be approximately one foot deep) and continually dosed with an organic amendment such as

cheese whey. The iron would need to be replaced periodically (assumed for cost purposes as yearly). It is assumed that cheese whey would be added at a rate of 10,000 gallons per day by truck (daily), based on the pilot test data. Based on a telephone conversation with Star Valley Cheese, cheese way would be obtained at no purchase cost (personal communication, Star Valley Cheese). The only cost would be transporting the cheese whey from Star Valley Cheese (Thayne, Wyoming) to the Site. The total distance hauled would be approximately 25 miles each way. Estimated costs for this action are shown on Table E-47.

### 3.13 Pole Canyon Creek Diversion (Alternatives 3 and 4)

Section 3.1 of Appendix C of the EECA presents the details of the conceptual design for the Pole Canyon Creek diversion. For the purposes of this cost estimate, quantities were estimated assuming the diversion pipeline would be a 30-inch reinforced concrete pipe installed below grade and the area of the hillside excavated to install the pipeline would become the access road for the diversion point and would remain in place to provide access for O&M.

The overall length of the pipeline was estimated using GIS (see Figure 5-5 of the EECA). The excavation quantity for the upstream settling basin was estimated using GIS by comparing the conceptual basin to existing contours. Costs were also included for a concrete inlet structure with wing-walls and a trash rack, a grouted rip-rap overflow spillway, a liner for the settling basin, and a downstream stilling basin.

O&M activities are assumed to include periodic clearing of sediment from the pipeline and upstream settling basin. It is also assumed regular inspections of the pipeline and inlet structure to confirm they are still free flowing.

Table E-49 presents the estimated costs for the Pole Canyon Creek diversion system.

### 3.14 Pole Canyon Creek Infiltration (Alternatives 3 and 4)

Section 4.1 of Appendix C of the EECA presents the details of the conceptual design for the Pole Canyon Creek infiltration basin. The general layout of the conceptual infiltration system includes an upstream settling basin, a connecting spillway, and the downstream infiltration basin. Excavation quantities were calculated for the infiltration basin based on 2004 5-foot contours from Simplot for the Smoky Canyon Mine and the conceptual basin design. It was assumed that material excavated during construction of the infiltration basin would be used for other reclamation activities including construction of the connecting spillway. Included in the cost analysis were a liner for the sides of the infiltration basin for the entire settling basin, blasting to fracture the limestone at the base of the infiltration basin, and a rip-rap flow diffuser for the spillway.

The quantities presented for the construction of the infiltration system are only estimates for the maximum size infiltration basin that could be potentially constructed at the upstream toe of the Pole Canyon ODA.

O&M activities are assumed to include yearly clearing of sediment from the infiltration basin and upstream settling basin. It is also assumed periodic erosion damage would occur during major flows.

Table E-48 presents the cost estimate for the Pole Canyon Creek infiltration system.

### 3.15 Hoopes Spring – Source Control Effectiveness Monitoring/Develop Site-Specific Standard

Development of a Site-specific standard would entail development and implementation of a monitoring plan. The work will include water quality testing and in-situ and laboratory toxicity testing and will be conducted over multiple years (see Appendix F for details).

### 3.16 Hoopes Spring Treatment

Costs for a treatment system were based on actual costs from the Wharf treatment plant in Lead, SD (see Appendix B), scaled up on a gallons per minute basis. This approach provides a supportable total cost estimate for a treatment system (i.e., including all unit processes, controls and O&M requirements). Discussions with personnel involved at the project indicate that "sliming" of the downstream creeks (due to biological material in the treatment plant effluent) is an issue. In addition, there can be relatively high ammonia levels in the effluent during certain operating conditions. Because it would not be acceptable for a treatment system to replace selenium with other contaminants that could affect to the Hoopes Spring and downstream habitat, the cost estimate includes unit processes after the biological treatment system to remove biological demanding material and ammonia.

Finally, costs were also added to account for the need to develop additional infrastructure for plant operation (i.e., an access road and power) required because the setting is remote.

## 4.0 PRESENT VALUE CALCULATIONS

This section provides a description of key assumptions made in development of present value costs for the source area alternatives presented in Tables E-1 through E-14. The detailed cost estimates shown in Tables E-15 through E-51 are assembled into removal action alternatives, per Section 5 of the EECA report. The estimated timing and duration of each action (both construction and O&M) are also used to provide a present value of each action. These are summed to provide a single present value estimate for each source area alternative.

The following subsections provide a description of principal timing and sequencing assumptions used in generating the present value estimates.

### 4.1 Storm Water Controls

Storm water controls are relatively simple features such as diversion ditches and regrading of relatively small areas. As such, these actions would be completed in the first year of remedial action. It is assumed that O&M would be required for 5 years, primarily entailing establishing and maintaining vegetation and stabilizing areas that are compromised by higher than expected runoff flows.

### 4.2 Soil Covers

Source areas are relatively large and covers would require a considerable quantity of top soil to be purchased and installed. It is assumed that 10 years will be required to install soil covers over A Panel External ODA, Pole Canyon ODA, D Panel backfilled pit (northern portion) and external ODA. In reality, the work would be sequenced to move from one area to another, however, to make the present value estimates consistent and comparable, it was assumed that each cover would be constructed from the start of year zero to the start of year 9.

Once seeded (year 9), it was assumed that it would take 3 years for the vegetative cover to become fully effective. At that time other related actions, such as covering of downgradient storm water detention basins could occur (see below). It is assumed that more intensive O&M of the cover would be required during the initial period while the vegetation was becoming established. After this time, the level of effort would be expected to reduce and at some point the vegetative cover would become completely self-sustaining and no additional O&M would be required. For the purposes of cost estimation this is estimated to occur by year 30.

### 4.3 Surface Amendment

Because of the large surface area of source areas, multiple sources of organic amendment would likely be needed. It is assumed that it would take 10 years to amend and reseed all required source areas. As described above for soil covers, although in reality, amendment

would be sequenced from one source area to another, for the purposes of costing it was assumed that each area would begin amendment in year zero and end in year nine. Once seeded, it was assumed that it would take five years for the vegetative cover to become fully effective. This timeframe is slightly longer than for the soil cover option (see above), because amended overburden material would be a lower quality growth medium than top soil. The same O&M assumptions were made as for soil covers, above.

### 4.4 Low-Permeability Caps

Installation of low permeability caps would entail greater effort than simple soil covers. It is assumed that it would take 10 years to install caps. The caps would become effective immediately. The same O&M assumptions were made for the cap (i.e., establishment of vegetation) as described above for soil covers.

### 4.5 Storm Water Detention Basin Sediment Removal

Storm water detention basin sediment removal would occur once upgradient surface control activities were effective and any input of mining materials to the basins was mitigated. The removal action would be relatively straight-forward and could be completed in one construction season. Minor O&M activities associated with establishment of vegetation on the excavated areas are assumed to occur for a period of 5 years after the removals.

### 4.6 Storm Water Detention Basin Covering

Storm water detention basin sediment removal would occur once any input of mining materials to the basins was mitigated. For the purposes of cost estimation, it was assumed that this would occur five years after source controls became effective (either establishment of vegetation for soil covers and amendment alternatives, or when the low-permeability cap was installed under Alternative 4). The covering would be relatively straight-forward and could be completed in one construction season. No O&M would be required.

### 4.7 Seep Area Covering

Seeps would be monitored to assess the effectiveness of upgradient source areas. If seeps continued to flow after source controls are effective, then the seep areas would be covered either at that time or near the time when active mining ceases. For the purposes of cost estimation it is assumed that covering would occur five years after source controls were effective (either establishment of vegetation for soil covers and amendment alternatives, or when the low-permeability cap was installed under Alternative 4). The scale of the action is relatively small and could be completed in one year. O&M is predicted to be required for 5 years after construction to verify that all seep areas are adequately covered and that vegetation has not penetrated the cover. As seep flows decrease due to source control actions, it is anticipated that O&M will no longer be necessary.

### 4.8 Seep Area Sediment Removal

Sediment would be removed once seeps had dried up due to the effect of source control activities or if seep treatment was implemented. Sediment removal is straight forward and would be completed in one construction season. Minor O&M activities are assumed for 5 years after removal, associated with establishment of vegetation.

### 4.9 Seep Treatment

Seep treatment is a contingency action, to be implemented if source control actions do not result in elimination of seep flows. For Alternative 2, it is assumed that vegetated soil covers would become effective three years after seeding. Seeps would be monitored for an additional five years after this and if flow continues, the seep flow would be treated. For costing purposes, it is assumed that seep treatment will be required for the duration of the O&M period (to year 30).

### 4.10 Pole Canyon Creek Sediment Removal

Sediment would be removed from lower Pole Canyon Creek once creek flows downgradient of the ODA meet water quality standards. The timing of this action varies for each alternative, depending on when source control actions become effective (see above). Minor O&M activities related to revegetation and channel stabilization are estimated to be required for 5 years after sediment removal.

### 4.11 Pole Canyon Creek Diversion

Diversion of Pole Canyon Creek flow around the ODA is estimated to take 2 years to construct. O&M of the diversion would be required over the long term.

### 4.12 Pole Canyon Creek Infiltration

Construction of an infiltration system for upper Pole Canyon Creek flow is relatively straight-forward and could be completed within one construction season. O&M would be required over the long term.

### 4.13 Hoopes Spring

Monitoring and development of a Site-specific standard for Hoopes Spring is anticipated to take 3 years to complete. Subsequent monitoring of Hoopes Spring to assess the performance of the overall remedy would be required over the long term.

Testing and construction of a treatment plant for Hoopes Spring flow is estimated to require 6 years (4 years for pilot-scale treatability testing and design and 2 years for construction). O&M of the treatment plant would be required over the long term.

## 5.0 REFERENCES

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# TABLES

## TABLE E-1

## PRESENT VALUE OF A PANEL EXTERNAL ODA ALTERNATIVE 2

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-15 | 0 | 0 | $11,735 | $11,735 |
| Soil Cover | Table E-18 | 0 | 9 | $6,072,281 | $4,563,460 |
| Storm Water Detention Basin Covering | Table E-33 | 17 | 17 | $68,840 | $21,793 |
| Seep Treatement | Table E-43 | 17 | 17 | $83,139 | $26,320 |
| Seep Area Sediment Removal | Table E-40 | 18 | 18 | $50,435 | $14,922 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$4,638,230** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-15 | 1 | 5 | $675 | $2,768 |
| Initial Cover | Table E-18 | 9 | 14 | $56,025 | $155,423 |
| Subsequent Cover | Table E-18 | 15 | 29 | $11,205 | $39,578 |
| Storm Water Detention Basin Covering | Table E-33 | 17 | 17 | $0 | $0 |
| Seep Treatment | Table E-43 | 18 | 29 | $48,000 | $120,694 |
| Seep Area Sediment Removal | Table E-40 | 19 | 24 | $350 | $494 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$318,956** |

| **A PANEL ALTERNATIVE 2 NET PRESENT VALUE** | **$4,957,186** |
|---|---|

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-2

## PRESENT VALUE OF A PANEL EXTERNAL ODA ALTERNATIVE 3

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-15 | 0 | 0 | $11,735 | $11,735 |
| Surface Amendment | Table E-21 | 0 | 9 | $413,931 | $311,079 |
| Storm Water Detention Basin Sediment Removal | Table E-29 | 19 | 19 | $114,486 | $31,656 |
| Cover Seep Areas | Table E-37 | 19 | 19 | $54,418 | $15,047 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$369,518** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-15 | 1 | 5 | $675 | $2,768 |
| Initial Surface Amendment | Table E-21 | 10 | 15 | $79,063 | $204,984 |
| Subsequent Surface Amendment | Table E-21 | 16 | 29 | $10,375 | $32,886 |
| Storm Water Detention Basin Sediment Removal | Table E-29 | 20 | 25 | $700 | $923 |
| Cover Seep Areas | Table E-37 | 20 | 25 | $140 | $185 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$241,745** |

**A PANEL ALTERNATIVE 3 NET PRESENT VALUE $611,263**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-3

## PRESENT VALUE OF A PANEL EXTERNAL ODA ALTERNATIVE 4

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-15 | 0 | 0 | $11,735 | $11,735 |
| Low Permeability Cap | Table E-25 | 0 | 9 | $12,602,207 | $9,470,852 |
| Storm Water Detention Basin Sediment Removal | Table E-29 | 14 | 14 | $114,486 | $44,400 |
| Seep Area Sediment Removal | Table E-40 | 14 | 14 | $50,435 | $19,560 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$9,546,546** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-15 | 1 | 5 | $675 | $2,768 |
| Initial Low Permeability Cap | Table E-25 | 10 | 15 | $53,950 | $139,875 |
| Subsequent Low Permeability Cap | Table E-25 | 16 | 29 | $10,790 | $34,202 |
| Storm Water Detention Basin Sediment Removal | Table E-29 | 15 | 20 | $700 | $1,294 |
| Seep Area Sediment Removal | Table E-40 | 15 | 20 | $350 | $647 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$178,785** |

**A PANEL ALTERNATIVE 3 NET PRESENT VALUE $9,725,331**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-4

## PRESENT VALUE OF POLE CANYON ODA ALTERNATIVE 2

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-16 | 0 | 0 | $69,464 | $69,464 |
| Cover | Table E-19 | 0 | 9 | $19,686,003 | $14,794,489 |
| In-Situ Treatment Infiltration Trench | Table E-47 | 0 | 0 | $107,112 | $107,112 |
| Storm Water Detention Basin Covering | Table E-34 | 17 | 17 | $6,884 | $2,179 |
| Lower Pole Canyon Creek Sediment Removal | Table E-46 | 1 | 1 | $55,010 | $51,411 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$15,024,655** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-16 | 1 | 10 | $675 | $4,741 |
| Initial Cover | Table E-19 | 10 | 15 | $81,000 | $210,007 |
| Subsequent Cover | Table E-19 | 16 | 29 | $16,200 | $51,350 |
| In-Situ Treatment Infiltration Trench | Table E-47 | 0 | 29 | $726,250 | $9,642,911 |
| Storm Water Detention Basin Covering | Table E-34 | 17 | 17 | $0 | $0 |
| Lower Pole Canyon Creek Sediment Removal | Table E-46 | 2 | 6 | $4,200 | $16,094 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$9,925,103** |

**POLE CANYON ODA ALTERNATIVE 2 NET PRESENT VALUE $24,949,759**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-5

## PRESENT VALUE OF POLE CANYON ODA ALTERNATIVE 3

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-16 | 0 | 0 | $69,464 | $69,464 |
| Surface Amendment | Table E-22 | 0 | 9 | $977,130 | $734,336 |
| Infiltration of Pole Canyon Creek Flow | Table E-48 | 0 | 0 | $811,870 | $811,870 |
| Diversion of Pole Canyon Creek Flow | Table E-49 | 0 | 1 | $1,808,522 | $1,749,365 |
| Storm Water Detention Basin Sediment Removal | Table E-30 | 19 | 19 | $2,148 | $594 |
| Lower Pole Canyon Creek Sediment Removal | Table E-46 | 5 | 5 | $55,010 | $39,221 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$3,404,850** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-16 | 1 | 5 | $675 | $2,768 |
| Initial Surface Amendment | Table E-22 | 10 | 15 | $113,500 | $294,269 |
| Subsequent Surface Amendment | Table E-22 | 16 | 29 | $15,000 | $47,546 |
| Infiltration of Pole Canyon Creek Flow | Table E-48 | 1 | 29 | $33,750 | $414,371 |
| Diversion of Pole Canyon Creek Flow | Table E-49 | 2 | 29 | $37,500 | $425,366 |
| Storm Water Detention Basin Sediment Removal | Table E-30 | 19 | 24 | $140 | $197 |
| Lower Pole Canyon Creek Sediment Removal | Table E-46 | 6 | 10 | $4,200 | $12,278 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$1,196,797** |

**A PANEL ALTERNATIVE 3 NET PRESENT VALUE $4,601,647**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-6

## PRESENT VALUE OF POLE CANYON ODA ALTERNATIVE 4

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-16 | 0 | 0 | $69,464 | $69,464 |
| Low Permability Cap | Table E-26 | 0 | 9 | $18,412,800 | $13,837,647 |
| Infiltration of Pole Canyon Creek Flow | Table E-48 | 0 | 0 | $811,870 | $811,870 |
| Diversion of Pole Canyon Creek Flow | Table E-49 | 0 | 1 | $1,808,522 | $1,749,365 |
| Storm Water Detention Basin Sediment Removal | Table E-30 | 14 | 14 | $2,148 | $833 |
| Lower Pole Canyon Creek Sediment Removal | Table E-46 | 14 | 14 | $55,010 | $21,334 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$16,490,513** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-16 | 1 | 5 | $675 | $2,768 |
| Initial Low Permeability Cap | Table E-26 | 10 | 15 | $78,000 | $202,229 |
| Subsequent Low Permeability Cap | Table E-26 | 16 | 29 | $15,600 | $49,448 |
| Infiltration of Pole Canyon Creek Flow | Table E-48 | 1 | 29 | $33,750 | $414,371 |
| Diversion of Pole Canyon Creek Flow | Table E-49 | 2 | 29 | $37,500 | $425,366 |
| Storm Water Detention Basin Sediment Removal | Table E-30 | 15 | 20 | $140 | $259 |
| Lower Pole Canyon Creek Sediment Removal | Table E-46 | 14 | 19 | $4,200 | $8,307 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$1,102,749** |

**A PANEL ALTERNATIVE 3 NET PRESENT VALUE $17,593,262**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-7

## PRESENT VALUE OF D PANEL ALTERNATIVE 2

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-17 | 0 | 0 | $100,611 | $100,611 |
| Soil Cover | Table E-20 | 0 | 9 | $18,342,260 | $13,784,634 |
| Storm Water Detention Basin Covering | Table E-35 | 17 | 17 | $68,840 | $21,793 |
| Seep Treatement | Table E-44 | 17 | 17 | $143,191 | $45,331 |
| Seep Area Sediment Removal | Table E-41 | 17 | 17 | $28,368 | $8,981 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$13,961,349** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-17 | 1 | 10 | $675 | $4,741 |
| Initial Cover | Table E-20 | 10 | 15 | $172,125 | $446,265 |
| Subsequent Cover | Table E-20 | 16 | 29 | $34,425 | $109,119 |
| Storm Water Detention Basin Covering | Table E-35 | 18 | 18 | $0 | $0 |
| Seep Treatment | Table E-44 | 18 | 29 | $48,000 | $120,694 |
| Seep Area Sediment Removal | Table E-41 | 18 | 23 | $700 | $1,056 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$681,875** |

**D PANEL ALTERNATIVE 2 NET PRESENT VALUE $14,643,224**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-8

## PRESENT VALUE OF D PANEL ALTERNATIVE 3

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-17 | 0 | 0 | $100,611 | $100,611 |
| Surface Amendment | Table E-23 | 0 | 9 | $1,232,587 | $926,318 |
| Storm Water Detention Basin Sediment Removal | Table E-31 | 19 | 19 | $87,132 | $24,093 |
| Cover Seep Areas | Table E-38 | 19 | 19 | $19,516 | $5,396 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$1,056,418** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-17 | 1 | 10 | $675 | $4,741 |
| Initial Surface Amendment | Table E-23 | 10 | 15 | $240,313 | $623,054 |
| Subsequent Surface Amendment | Table E-23 | 16 | 29 | $31,875 | $101,036 |
| Storm Water Detention Basin Sediment Removal | Table E-31 | 19 | 24 | $700 | $987 |
| Cover Seep Areas | Table E-38 | 20 | 25 | $140 | $185 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$730,003** |

**D PANEL ALTERNATIVE 3 NET PRESENT VALUE $1,786,420**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-9

## PRESENT VALUE OF D PANEL ALTERNATIVE 4

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-17 | 0 | 0 | $100,611 | $100,611 |
| Low Permeability Cap | Table E-27 | 0 | 9 | $38,717,625 | $29,097,195 |
| Storm Water Detention Basin Sediment Removal | Table E-31 | 14 | 14 | $87,132 | $33,791 |
| Seep Area Sediment Removal | Table E-41 | 14 | 14 | $28,368 | $11,002 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$29,242,598** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-17 | 1 | 5 | $675 | $2,768 |
| Initial Low Permeability Cap | Table E-27 | 14 | 19 | $165,750 | $327,844 |
| Subsequent Low Permeability Cap | Table E-27 | 20 | 29 | $33,150 | $64,380 |
| Storm Water Detention Basin Sediment Removal | Table E-31 | 15 | 20 | $700 | $1,294 |
| Seep Area Sediment Removal | Table E-41 | 15 | 20 | $700 | $1,294 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$397,580** |

**D PANEL ALTERNATIVE 4 NET PRESENT VALUE $29,640,178**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-10

## PRESENT VALUE OF E PANEL EXTERNAL ODA ALTERNATIVE 2

| Item | Notes | Start Year (1) | End Year (2) | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Storm Water Controls | Table E-36 | 0 | 0 | $41,304 | $41,304 |
| Seep Treatement | Table E-45 | 9 | 9 | $523,388 | $284,689 |
| Seep Area Sediment Removal | Table E-42 | 9 | 9 | $23,404 | $12,730 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$338,723** |
| **Annual O&M Costs** | | | | | |
| Storm Water Controls | Table E-36 | 1 | 9 | $0 | $0 |
| Seep Treatment | Table E-45 | 10 | 29 | $213,000 | $1,227,400 |
| Seep Area Sediment Removal | Table E-42 | 10 | 15 | $700 | $1,815 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$1,229,215** |

| | |
|---|---|
| **E PANEL ALTERNATIVE 2 NET PRESENT VALUE** | **$1,567,938** |

Notes

7.0% Interest Rate used for Present Value Calculatons

(1) Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

(2) End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-11

## PRESENT VALUE OF E PANEL EXTERNAL ODA ALTERNATIVE 3

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Surface Amendment | Table E-24 | 0 | 9 | $290,021 | $217,957 |
| Storm Water Detention Basin Sediment Removal | Table E-32 | 19 | 19 | $44,073 | $12,186 |
| Cover Seep Areas | Table E-39 | 19 | 19 | $29,275 | $8,095 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$238,238** |
| **Annual O&M Costs** | | | | | |
| Initial Surface Amendment | Table E-24 | 10 | 15 | $57,500 | $149,079 |
| Subsequent Surface Amendment | Table E-24 | 16 | 29 | $7,500 | $23,773 |
| Storm Water Detention Basin Sediment Removal | Table E-32 | 19 | 24 | $700 | $987 |
| Cover Seep Areas | Table E-39 | 19 | 24 | $140 | $197 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$174,037** |

**E PANEL ALTERNATIVE 3 NET PRESENT VALUE $412,275**

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-12

## PRESENT VALUE OF E PANEL EXTERNAL ODA ALTERNATIVE 4

| Item | Notes | Start Year [1] | End Year [2] | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Low Permeability Cap | Table E-28 | 0 | 9 | $9,399,905 | $7,064,247 |
| Storm Water Detention Basin Sediment Removal | Table E-32 | 14 | 14 | $44,073 | $17,092 |
| Seep Area Sediment Removal | Table E-42 | 14 | 14 | $23,404 | $9,077 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$7,090,415** |
| **Annual O&M Costs** | | | | | |
| Initial Low Permeability Cap | Table E-28 | 10 | 15 | $39,000 | $101,115 |
| Subsequent Low Permeability Cap | Table E-32 | 16 | 29 | $7,800 | $24,724 |
| Storm Water Detention Basin Sediment Removal | Table E-32 | 15 | 29 | $700 | $2,473 |
| Seep Area Sediment Removal | Table E-42 | 15 | 20 | $700 | $1,294 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$129,605** |

| **E PANEL ALTERNATIVE 4 NET PRESENT VALUE** | **$7,220,021** |
|---|---|

Notes

7.0% Interest Rate used for Present Value Calculatons

[1] Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

[2] End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-13

## PRESENT VALUE OF HOOPES SPRING ALTERNATIVE 2

| Item | Notes | Start Year (1) | End Year (2) | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Monitor Source Controls/Develop Site Standard | Table E-50 | 0 | 2 | $500,000 | $468,003 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$468,003** |
| **Annual O&M Costs** | | | | | |
| Monitor Water Quality | Table E-50 | 3 | 29 | $2,600 | $27,221 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$27,221** |

**HOOPES SPRINGS ALTERNATIVE 2 NET PRESENT VALUE $495,224**

Notes

7.0% Interest Rate used for Present Value Calculatons

(1) Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

(2) End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

## TABLE E-14

## PRESENT VALUE OF HOOPES SPRING ALTERNATIVE 3

| Item | Notes | Start Year (1) | End Year (2) | Cost | Present Value |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Treatment | Table E-51 | 0 | 5 | $35,159,231 | $29,886,504 |
| **PRESENT VALUE OF CAPITAL COSTS** | | | | | **$29,886,504** |
| **Annual O&M Costs** | | | | | |
| Treatment | Table E-51 | 6 | 29 | $1,383,375 | $11,312,517 |
| **PRESENT VALUE OF O&M COSTS** | | | | | **$11,312,517** |

**HOOPES SPRINGS ALTERNATIVE 2 NET PRESENT VALUE $41,199,020**

Notes

7.0% Interest Rate used for Present Value Calculatons

(1) Start Year is the year during which the capital construction or the O&M activities begin. Costs are assumed to be incurred on the first day of the year indicated.

(2) End Year is the year during which the capital construction or the O&M activities are completed. Costs are assumed to be incurred on the first day of the year indicated.

**TABLE E-15**

**COSTS FOR STORM WATER CONTROLS - A PANEL EXTERNAL ODA**
**(ALTERNATIVES 2 THROUGH 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Regrade North Edge of ODA | a,b | 0.5 | Acres | $9,500 | $4,750 |
| Revegetation of SW area of Pole | b,c | 0.5 | Acres | $1,400 | $700 |
| **Direct Construction Subtotal** | | | | | **$5,450** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | d | 5% | LS | | $273 |
| Water/Sediment Control | d | 5% | LS | | $273 |
| **Indirect Construction Subtotal** | | | | | **$545** |
| **Construction Subtotal** | | | | | **$5,995** |
| Contingency (20% scope + 15% bid) | e | 35% | | | $2,098 |
| **Subtotal** | | | | | **$8,093** |
| Remedial Design | e | 20% | | | $1,619 |
| Project/Construction Management | e | 25% | | | $2,023 |
| **TOTAL CAPITAL COSTS** | | | | | **$11,735** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | f | 1 | LS | $500 | $500 |
| Contingency (20% scope + 15% bid) | e | 35% | | | $175 |
| **TOTAL ANNUAL O & M COSTS** | | | | | **$675** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means, 2005 assuming a 2.5 foot average depth of excavation using a D-8 size or larger dozer.

b Area estimated from GIS (see EECA Figure 5-1)

c Costs from Means, 2005. Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

d Based on professional judgement and similar projects

e Percentages from EPA Guidance (EPA 2000).

f Minor erosion damage repair and limited reseeding would be covered by O&M

**TABLE E-16**

**COSTS FOR STORM WATER CONTROLS - POLE CANYON ODA**
**(ALTERNATIVES 2 THROUGH 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Diversion Ditch | a,b,c | 4,800 | lf | 2.45 | $11,760 |
| Regrade SW area of Pole | d,e | 1 | Acres | $19,100 | $19,100 |
| Revegetation of SW area of Pole | e,f | 1 | Acres | $1,400 | $1,400 |
| **Direct Construction Subtotal** | | | | | **$32,260** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | g | 5% | LS | | $1,613 |
| Water/Sediment Control | g | 5% | LS | | $1,613 |
| **Indirect Construction Subtotal** | | | | | **$3,226** |
| **Construction Subtotal** | | | | | **$35,486** |
| Contingency (20% scope + 15% bid) | h | 35% | | | $12,420 |
| **Subtotal** | | | | | **$47,906** |
| Remedial Design | h | 20% | | | $9,581 |
| Project/Construction Management | h | 25% | | | $11,977 |
| **TOTAL CAPITAL COSTS** | | | | | **$69,464** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | i | 1 | LS | $500 | $500 |
| Contingency (20% scope + 15% bid) | h | 35% | | | $175 |
| **TOTAL ANNUAL O & M COSTS** | | | | | **$675** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Length from GIS (see EECA Figure 5-1)
b Assumes ditch size of 3 ft base, 2:1 slopes, 2 ft deep installed on a 3:1 slope with a dozer
c Costs from Means (Means, 2005). Includes clearing area, installing ditch, revegetation
d Cost from Means, 2005 assuming a 5 foot average depth of excavation using a D-8 size or larger dozer.
e Area estimated from GIS (see EECA Figure 5-1)
f Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.
g Based on professional judgement and similar projects
h Percentages from EPA Guidance (EPA 2000).
i Minor erosion damage repair and limited reseeding would be covered by O&M

**TABLE E-17**

**COSTS FOR STORM WATER CONTROLS - D PANEL**
**(ALTERNATIVES 2 THROUGH 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Diversion Ditch | a,b, c | 3,500 | lf | 2.45 | $8,575 |
| Regrade North edge of External ODA | d,e | 0.5 | Acres | $9,500 | $4,750 |
| Revegetation of North edge of External ODA | e,f | 0.5 | Acres | $1,400 | $700 |
| Regrade SE area of Backfilled Pit | d,e | 3 | Acres | $9,500 | $28,500 |
| Revegetation of SE area of Backfilled Pit | e,f | 3 | Acres | $1,400 | $4,200 |
| **Direct Construction Subtotal** | | | | | **$46,725** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | g | 5% | LS | | $2,336 |
| Water/Sediment Control | g | 5% | LS | | $2,336 |
| **Indirect Construction Subtotal** | | | | | **$4,673** |
| **Construction Subtotal** | | | | | **$51,398** |
| Contingency (20% scope + 15% bid) | h | 35% | | | $17,989 |
| **Subtotal** | | | | | **$69,387** |
| Remedial Design | h | 20% | | | $13,877 |
| Project/Construction Management | h | 25% | | | $17,347 |
| **TOTAL CAPITAL COSTS** | | | | | **$100,611** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | i | 1 | LS | $500 | $500 |
| Contingency (20% scope + 15% bid) | h | 35% | | | $175 |
| **TOTAL ANNUAL O & M COSTS** | | | | | **$675** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Length from GIS (see EECA Figure 5-1)
b Assumes ditch size of 3 ft base, 2:1 slopes, 2 ft deep installed on a 3:1 slope with a dozer
c Costs from Means (Means, 2005). Includes clearing area, installing ditch, revegetation
d Cost from Means (Means, 2005) assuming a 2.5 foot average depth of excavation using a D-8 size or larger dozer.
e Area estimated from GIS includes northern portion of backfilled pit and external ODA (see EECA Figure 5-7)
f Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.
g Based on professional judgement and similar projects
h Percentages from EPA Guidance (EPA 2000).
i Minor erosion damage repair and limited reseeding would be covered by O&M

**TABLE E-18**

**SOIL COVER - A PANEL EXTERNAL ODA (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Soil Cover Installation | a,b | 83 | Acres | $40,000 | $3,320,000 |
| Soil Cover Revegetation | a,c | 83 | Acres | $1,400 | $116,200 |
| **Direct Construction Subtotal** | | | | | **$3,436,200** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | d | 5% | | | $171,810 |
| Water/Sediment Control | d | 5% | | | $171,810 |
| **Indirect Construction Subtotal** | | | | | **$343,620** |
| **Construction Subtotal** | | | | | **$3,779,820** |
| Contingency (10% scope + 25% bid) | e | 35% | | | $1,322,937 |
| **Subtotal** | | | | | **$5,102,757** |
| Remedial Design | e | 8% | | | $408,221 |
| Project/Construction Management | e | 11% | | | $561,303 |
| **TOTAL CAPITAL COSTS** | | | | | **$6,072,281** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | f | 83 | Acres | $500 | $41,500 |
| Contingency (10% scope + 25% bid) | e | 35% | | | $14,525 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$56,025** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | g | 83 | Acres | $100 | $8,300 |
| Contingency (10% scope + 25% bid) | e | 35% | | | $2,905 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$11,205** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Total area calculated in GIS using 2004 area of disturbance (see EECA Figure 1-3)

b See Section 3.3 of the Appendix E text.

c Costs from Means (Means 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

d Based on professional judgement and similar projects

e Percentages from EPA Guidance (EPA 2000). Scope is relatively well defined, bid is uncertain due to topsoil availablity issues.

f Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs

g Assumes after vegetation growth is established, O&M will be significantly reduced

**TABLE E-19**

**SOIL COVER POLE CANYON ODA (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Regrade | a,b | 12 | Acres | $19,100 | $229,200 |
| Chert Installation | c,d,e | 120 | Acres | $33,150 | $3,978,000 |
| Soil Cover Installation | c,f | 120 | Acres | $40,000 | $4,800,000 |
| Composted Manure | c,g | 120 | Acres | $1,090 | $130,800 |
| Turn in Manure (12") | c,h | 120 | Acres | $100 | $12,000 |
| Iron Layer Installation | c,i | 120 | Acres | $16,770 | $2,012,400 |
| Soil Cover Revegetation | c,j | 120 | Acres | $1,400 | $168,000 |
| **Direct Construction Subtotal** | | | | | **$11,330,400** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | k | 5% | | | $566,520 |
| Water/Sediment Control | k | 5% | | | $566,520 |
| **Indirect Construction Subtotal** | | | | | **$1,133,040** |
| **Construction Subtotal** | | | | | **$12,463,440** |
| Contingency (10% scope + 25% bid) | l | 35% | | | $4,362,204 |
| **Subtotal** | | | | | **$16,825,644** |
| Remedial Design | l | 6% | | | $1,009,539 |
| Project/Construction Management | l | 11% | | | $1,850,821 |
| **TOTAL CAPITAL COSTS** | | | | | **$19,686,003** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | m | 120 | Acres | $500 | $60,000 |
| Contingency (10% scope + 25% bid) | l | 35% | | | $21,000 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$81,000** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | n | 120 | Acres | $100 | $12,000 |
| Contingency (10% scope + 25% bid) | l | 35% | | | $4,200 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$16,200** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming a five foot average depth of excavation using a D-8 or larger dozer.

b Area regraded is estimated to be 10% of total area

c Total area calculated in GIS using 2004 area of disturbance (see EECA Figure 1-3)

d Chert assumed to be from mining operations and does not include a material cost

e Costs from Means (Means, 2005). Includes loading, hauling, and spreading

f See Section 3.3 of the Appendix E text.

g Assumes 2 cy manure/ton and a 40 ton/acre application rate. Manure cost from the "Compost Connection" increased due to remote location of mine.

h Assumes 4 mph w/a 30 ft chisel plow, 70% efficiency and 300 hp tractor to pull plow (tractor cost from Means, 2005).

i Iron cost from www.zerovalentiron.com, assumes 8+ ton/acre. Spreading cost from Means, 2005 (cost to spread crushed limestone)

j Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

k Based on professional judgement and similar projects

l Percentages from EPA Guidance (EPA 2000). Scope is relatively well defined, bid is uncertain due to topsoil availablity issues.

m Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs

n Assumes after vegetation growth is established, O&M will be significantly reduced

**TABLE E-20**

**SOIL COVER - D PANEL PIT AND EXTERNAL ODA (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Soil Cover Installation | a,b | 255 | Acres | $40,000 | $10,200,000 |
| Soil Cover Revegetation | a,c | 255 | Acres | $1,400 | $357,000 |
| **Direct Construction Subtotal** | | | | | **$10,557,000** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | d | 5% | | | $527,850 |
| Water/Sediment Control | d | 5% | | | $527,850 |
| **Indirect Construction Subtotal** | | | | | **$1,055,700** |
| **Construction Subtotal** | | | | | **$11,612,700** |
| Contingency (10% scope + 25% bid) | e | 35% | | | $4,064,445 |
| **Subtotal** | | | | | **$15,677,145** |
| Remedial Design | e | 6% | | | $940,629 |
| Project/Construction Management | e | 11% | | | $1,724,486 |
| **TOTAL CAPITAL COSTS** | | | | | **$18,342,260** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | f | 255 | Acres | $500 | $127,500 |
| Contingency (10% scope + 25% bid) | e | 35% | | | $44,625 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$172,125** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | g | 255 | Acres | $100 | $25,500 |
| Contingency (10% scope + 25% bid) | e | 35% | | | $8,925 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$34,425** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Total area includes the northern portion of the backiflled pit and the external ODA. Calculated in GIS using 2004 area of disturbance (see EECA Figure 5-6)

b See Section 3.3 of the Appendix E text.

c Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

d Based on professional judgement and similar projects

e Percentages from EPA Guidance (EPA 2000). Scope is relatively well defined, bid is uncertain due to topsoil availablity issues.

f Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs

g Assumes after vegetation growth is established, O&M will be significantly reduced

**TABLE E-21**

**A PANEL EXTERNAL ODA SURFACE AMENDMENT AND VEGETATION MODIFICATION (ALTERNATIVE 3)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Herbicide | a,b | 83 | Acres | $200 | $16,600 |
| Composted Manure | a,c | 83 | Acres | $1,090 | $90,470 |
| Turn in Manure (12") | a,d | 83 | Acres | $100 | $8,300 |
| Revegetation | a,e | 83 | Acres | $1,400 | $116,200 |
| **Direct Construction Subtotal** | | | | | **$231,570** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | f | 5% | | | $11,579 |
| Water/Sediment Control | f | 5% | | | $11,579 |
| **Indirect Construction Subtotal** | | | | | **$23,157** |
| **Construction Subtotal** | | | | | **$254,727** |
| Contingency (10% scope +15% bid) | g | 25% | | | $63,682 |
| **Subtotal** | | | | | **$318,409** |
| Remedial Design | g | 12% | | | $38,209 |
| Project/Construction Management | g | 18% | | | $57,314 |
| **TOTAL CAPITAL COSTS** | | | | | **$413,931** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | h | 83 | Acres | $750 | $62,250 |
| Monitoring | i | 1 | LS | $1,000 | $1,000 |
| Contingency (10% scope +15% bid) | g | 25% | | | $15,813 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$79,063** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | j | 83 | Acres | $100 | $8,300 |
| Contingency (10% scope +15% bid) | g | 25% | | | $2,075 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$10,375** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Total area calculated in GIS using 2004 area of disturbance (see EECA Figure 1-3)

b Herbicide cost assumes 5 gal/acre application of Roundup UltraMax®

c Assumes 2 cy manure/ton and a 40 ton/acre application rate. Manure cost from the "Compost Connection" increased due to remote location of mine.

d Assumes 4 mph w/a 30 ft chisel plow, 70% efficiency and 300 hp tractor to pull plow (tractor cost from Means, 2005).

e Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

f Based on professional judgement and similar projects

g Percentages from EPA Guidance. Scope and Bid both considered to be relatively certain.

h Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs

i Average value assuming one event after construction is completed and one event after five years @ $2500/event

j Assumes after vegetation growth is established, O&M will be significantly reduced.

**TABLE E-22**

**POLE CANYON ODA SURFACE AMENDMENT AND VEGETATION MODIFICATION (ALTERNATIVE 3)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Regrade | a,b | 12 | Acres | $19,100 | $229,200 |
| Herbicide | c,d | 120 | Acres | $200 | $24,000 |
| Composted Manure | c,e | 120 | Acres | $1,090 | $130,800 |
| Turn in Manure (12") | c,f | 120 | Acres | $100 | $12,000 |
| Revegetation | c,g | 120 | Acres | $1,400 | $168,000 |
| **Direct Construction Subtotal** | | | | | **$564,000** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $28,200 |
| Water/Sediment Control | h | 5% | | | $28,200 |
| **Indirect Construction Subtotal** | | | | | **$56,400** |
| **Construction Subtotal** | | | | | **$620,400** |
| Contingency (10% scope +15% bid) | i | 25% | | | $155,100 |
| **Subtotal** | | | | | **$775,500** |
| Remedial Design | i | 12% | | | $93,060 |
| Project/Construction Management | i | 14% | | | $108,570 |
| **TOTAL CAPITAL COSTS** | | | | | **$977,130** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | j | 120 | Acres | $750 | $90,000 |
| Monitoring | k | 1 | LS | $1,000 | $1,000 |
| Contingency (10% scope +15% bid) | i | 25% | | | $22,500 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$113,500** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | l | 120 | Acres | $100 | $12,000 |
| Contingency (10% scope +15% bid) | i | 25% | | | $3,000 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$15,000** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means, 2005 assuming a 5 foot average depth of excavation using a D-8 size or larger dozer.

b Area regraded is estimated to be 10% of total area

c Total area calculated in GIS using 2004 area of disturbance (see EECA Figure 1-3)

d Herbicide cost assumes 5 gal/acre application of Roundup UltraMax®

e Assumes 2 cy manure/ton and a 40 ton/acre application rate. Manure cost from the "Compost Connection" increased due to remote location of mine.

f Assumes 4 mph w/a 30 ft chisel plow, 70% efficiency and 300 hp tractor to pull plow (tractor cost from Means, 2005).

g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope and Bid both considered to be relatively certain.

j Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs

k Average value assuming one event after construction is completed and one event after five years @ $2500/event

l Assumes after vegetation growth is established, O&M will be significantly reduced.

**TABLE E-23**

**D PANEL BACKFILLED PITS AND EXTERNAL ODA SURFACE AMENDMENT AND VEGETATION MODIFICATION**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Herbicide | a,b | 255 | Acres | $200 | $51,000 |
| Composted Manure | a,c | 255 | Acres | $1,090 | $277,950 |
| Turn in Manure (12") | a,d | 255 | Acres | $100 | $25,500 |
| Revegetation | a,e | 255 | Acres | $1,400 | $357,000 |
| **Direct Construction Subtotal** | | | | | **$711,450** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | f | 5% | | | $35,573 |
| Water/Sediment Control | f | 5% | | | $35,573 |
| **Indirect Construction Subtotal** | | | | | **$71,145** |
| **Construction Subtotal** | | | | | **$782,595** |
| Contingency (10% scope +15% bid) | g | 25% | | | $195,649 |
| **Subtotal** | | | | | **$978,244** |
| Remedial Design | g | 12% | | | $117,389 |
| Project/Construction Management | g | 14% | | | $136,954 |
| **TOTAL CAPITAL COSTS** | | | | | **$1,232,587** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | h | 255 | Acres | $750 | $191,250 |
| Monitoring | i | 1 | LS | $1,000 | $1,000 |
| Contingency (10% scope +15% bid) | g | 25% | | | $48,063 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$240,313** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | j | 255 | Acres | $100 | $25,500 |
| Contingency (10% scope +15% bid) | g | 25% | | | $6,375 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$31,875** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Total area includes the northern portion of the backiflled pit and the external ODA. Calculated in GIS using 2004 area of disturbance (see EECA Figure 5-6)

b Herbicide cost assumes 5 gal/acre application of Roundup UltraMax®

c Assumes 2 cy manure/ton and a 40 ton/acre application rate. Manure cost from the "Compost Connection" increased due to remote location of mine.

d Assumes 4 mph w/a 30 ft chisel plow, 70% efficiency and 300 hp tractor to pull plow (tractor cost from Means, 2005).

e Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

f Based on professional judgement and similar projects

g Percentages from EPA Guidance. Scope and bid are relatively well defined.

h Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs

i Average value assuming one event after construction is completed and one event after five years @ $2500/event

j Assumes after vegetation growth is established, O&M will be significantly reduced.

**TABLE E-24**

**E PANEL EXTERNAL ODA SURFACE AMENDMENT AND VEGETATION MODIFICATION (ALTERNATIVE 3)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Herbicide | a,b | 60 | Acres | $200 | $12,000 |
| Composted Manure | a,c | 60 | Acres | $1,090 | $65,400 |
| Turn in Manure (12") | a,d | 60 | Acres | $100 | $6,000 |
| Revegetation | a,e | 60 | Acres | $1,400 | $84,000 |
| **Direct Construction Subtotal** | | | | | **$167,400** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | f | 5% | | | $8,370 |
| Water/Sediment Control | f | 5% | | | $8,370 |
| **Indirect Construction Subtotal** | | | | | **$16,740** |
| **Construction Subtotal** | | | | | **$184,140** |
| Contingency (10% scope +15% bid) | g | 25% | | | $46,035 |
| **Subtotal** | | | | | **$230,175** |
| Remedial Design | g | 12% | | | $27,621 |
| Project/Construction Management | g | 14% | | | $32,225 |
| **TOTAL CAPITAL COSTS** | | | | | **$290,021** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | h | 60 | Acres | $750 | $45,000 |
| Monitoring | i | 1 | LS | $1,000 | $1,000 |
| Contingency (10% scope +15% bid) | g | 25% | | | $11,500 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$57,500** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | j | 60 | Acres | $100 | $6,000 |
| Contingency (10% scope +15% bid) | g | 25% | | | $1,500 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$7,500** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Total area calculated in GIS using 2004 area of disturbance. Includes the hot starts and southern portion of the ODA (see EECA Figure 5-6)

b Herbicide cost assumes 5 gal/acre application of Roundup UltraMax®

c Assumes 2 cy manure/ton and a 40 ton/acre application rate. Manure cost from the "Compost Connection" increased due to remote location of mine.

d Assumes 4 mph w/a 30 ft chisel plow, 70% efficiency and 300 hp tractor to pull plow (tractor cost from Means, 2005).

e Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

f Based on professional judgement and similar projects

g Percentages from EPA Guidance. Scope and bid are relatively well defined.

h Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs

i Average value assuming one event after construction is completed and one event after five years @ $2500/event

j Assumes after vegetation growth is established, O&M will be significantly reduced.

**TABLE E-25**

**LOW-PERMABILITY CAP FOR A PANEL EXTERNAL ODA (ALTERNATIVE 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Regrade | a,b | 8 | Acres | $9,500 | $78,850 |
| Topsoil | c,d | 83 | Acres | $30,000 | $2,490,000 |
| Drainage Layer | c,e | 83 | Acres | $24,300 | $2,016,900 |
| 16 oz Geotextile | c,f | 83 | Acres | $11,600 | $962,800 |
| GCL | c,f | 83 | Acres | $16,500 | $1,369,500 |
| Cushion Layer | c,e | 83 | Acres | $6,000 | $498,000 |
| Revegetation | c,g | 83 | Acres | $1,400 | $116,200 |
| **Direct Construction Subtotal** | | | | | **$7,532,250** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $376,613 |
| Water/Sediment Control | h | 5% | | | $376,613 |
| **Indirect Construction Subtotal** | | | | | **$753,225** |
| **Construction Subtotal** | | | | | **$8,285,475** |
| Contingency (10% scope + 20% bid) | i | 30% | | | $2,485,643 |
| **Subtotal** | | | | | **$10,771,118** |
| Remedial Design | i | 6% | | | $646,267 |
| Project/Construction Management | i | 11% | | | $1,184,823 |
| **TOTAL CAPITAL COSTS** | | | | | **$12,602,207** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | j | 83 | Acres | $500 | $41,500 |
| Contingency (10% scope + 20% bid) | i | 30% | | | $12,450 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$53,950** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | k | 83 | Acres | $100 | $8,300 |
| Contingency (5% scope + 5% bid) | i | 30% | | | $2,490 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$10,790** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means, 2005 assuming a 2.5 foot average depth of excavation using a D-8 size or larger dozer.
b Area regraded is estimated to be 10% of total area
c Total area calculated in GIS using 2004 area of disturbance (see EECA Figure 1-3)
d See Section 3.3 of the Appendix E text.
e Cost from Coeur d'Alene Basin OU3 Feasibility Study (URS 2001). Cost assumes the use of a local native material.
f Cost from Means (Means, 2004) and includes installation.
g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.
h Based on professional judgement and similar projects
i Percentages from EPA Guidance.
j Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs
k Assumes after vegetation growth is established, O&M will be significantly reduced.

**TABLE E-26**

**LOW-PERMABILITY CAP FOR POLE CANYON ODA (ALTERNATIVE 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Regrade | a,b | 12 | Acres | $19,100 | $229,200 |
| Topsoil | c,d | 120 | Acres | $30,000 | $3,600,000 |
| Drainage Layer | c,e | 120 | Acres | $24,300 | $2,916,000 |
| 16 oz Geotextile | c,f | 120 | Acres | $11,600 | $1,392,000 |
| GCL | c,f | 120 | Acres | $16,500 | $1,980,000 |
| Cushion Layer | c,e | 120 | Acres | $6,000 | $720,000 |
| Revegetation | c,g | 120 | Acres | $1,400 | $168,000 |
| **Direct Construction Subtotal** | | | | | **$11,005,200** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $550,260 |
| Water/Sediment Control | h | 5% | | | $550,260 |
| **Indirect Construction Subtotal** | | | | | **$1,100,520** |
| **Construction Subtotal** | | | | | **$12,105,720** |
| Contingency (10% scope + 20% bid) | i | 30% | | | $3,631,716 |
| **Subtotal** | | | | | **$15,737,436** |
| Remedial Design | i | 6% | | | $944,246 |
| Project/Construction Management | i | 11% | | | $1,731,118 |
| **TOTAL CAPITAL COSTS** | | | | | **$18,412,800** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | j | 120 | Acres | $500 | $60,000 |
| Contingency (10% scope + 20% bid) | i | 30% | | | $18,000 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$78,000** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | k | 120 | Acres | $100 | $12,000 |
| Contingency (10% scope + 20% bid) | i | 30% | | | $3,600 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$15,600** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means, 2005 assuming a 5 foot average depth of excavation using a D-8 size or larger dozer.
b Area regraded is estimated to be 10% of total area
c Total area calculated in GIS using 2004 area of disturbance (see EECA Figure 1-3)
d See Section 3.3 of the Appendix E text.
e Cost from Coeur d'Alene Basin OU3 Feasibility Study (URS 2001). Cost assumes the use of a local native material.
f Cost from Means (Means, 2004) and includes installation.
g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.
h Based on professional judgement and similar projects
i Percentages from EPA Guidance.
j Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs
k Assumes after vegetation growth is established, O&M will be significantly reduced.

**TABLE E-27**

**LOW-PERMABILITY CAP FOR D PANEL BACKFILLED PIT AND EXTERNAL ODA (ALTERNATIVE 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Regrade | a,b | 26 | Acres | $9,500 | $242,250 |
| Topsoil | c,d | 255 | Acres | $30,000 | $7,650,000 |
| Drainage Layer | c,e | 255 | Acres | $24,300 | $6,196,500 |
| 16 oz Geotextile | c,f | 255 | Acres | $11,600 | $2,958,000 |
| GCL | c,f | 255 | Acres | $16,500 | $4,207,500 |
| Cushion Layer | c,e | 255 | Acres | $6,000 | $1,530,000 |
| Revegetation | c,g | 255 | Acres | $1,400 | $357,000 |
| **Direct Construction Subtotal** | | | | | **$23,141,250** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $1,157,063 |
| Water/Sediment Control | h | 5% | | | $1,157,063 |
| **Indirect Construction Subtotal** | | | | | **$2,314,125** |
| **Construction Subtotal** | | | | | **$25,455,375** |
| Contingency (10% scope + 20% bid) | i | 30% | | | $7,636,613 |
| **Subtotal** | | | | | **$33,091,988** |
| Remedial Design | i | 6% | | | $1,985,519 |
| Project/Construction Management | i | 11% | | | $3,640,119 |
| **TOTAL CAPITAL COSTS** | | | | | **$38,717,625** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | j | 255 | Acres | $500 | $127,500 |
| Contingency (10% scope + 20% bid) | i | 30% | | | $38,250 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$165,750** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | k | 255 | Acres | $100 | $25,500 |
| Contingency (10% scope + 20% bid) | i | 30% | | | $7,650 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$33,150** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means, 2005 assuming a 2.5 foot average depth of excavation using a D-8 size or larger dozer.
b Area regraded is estimated to be 10% of total area
c Total area calculated in GIS using 2004 area of disturbance (see EECA Figure 1-3)
d See Section 3.3 of the Appendix E text.
e Cost from Coeur d'Alene Basin OU3 Feasibility Study (URS 2001). Cost assumes the use of a local native material.
f Cost from Means (Means, 2004) and includes installation.
g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.
h Based on professional judgement and similar projects
i Percentages from EPA Guidance.
j Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs
k Assumes after vegetation growth is established, O&M will be significantly reduced.

**TABLE E-28**

**LOW-PERMABILITY CAP FOR E PANEL EXTERNAL ODA (ALTERNATIVE 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Topsoil | a,b | 60 | Acres | $30,000 | $1,800,000 |
| Drainage Layer | a,c | 60 | Acres | $24,300 | $1,458,000 |
| 16 oz Geotextile | a,d | 60 | Acres | $11,600 | $696,000 |
| GCL | a,d | 60 | Acres | $16,500 | $990,000 |
| Cushion Layer | a,c | 60 | Acres | $6,000 | $360,000 |
| Revegetation | a,e | 60 | Acres | $1,400 | $84,000 |
| **Direct Construction Subtotal** | | | | | **$5,388,000** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | f | 5% | | | $269,400 |
| Water/Sediment Control | f | 5% | | | $269,400 |
| **Indirect Construction Subtotal** | | | | | **$538,800** |
| **Construction Subtotal** | | | | | **$5,926,800** |
| Contingency (10% scope + 20% bid) | g | 30% | | | $1,778,040 |
| **Subtotal** | | | | | **$7,704,840** |
| Remedial Design | g | 8% | | | $616,387 |
| Project/Construction Management | g | 14% | | | $1,078,678 |
| **TOTAL CAPITAL COSTS** | | | | | **$9,399,905** |
| **Annual O&M Costs** | | | | | |
| Initial O&M Costs | h | 60 | Acres | $500 | $30,000 |
| Contingency (10% scope + 20% bid) | g | 30% | | | $9,000 |
| **TOTAL INITIAL ANNUAL O&M COSTS** | | | | | **$39,000** |
| **Annual O&M Costs** | | | | | |
| O&M Costs After Vegetation Matures | i | 60 | Acres | $100 | $6,000 |
| Contingency (10% scope + 20% bid) | g | 30% | | | $1,800 |
| **TOTAL SUBSEQUENT ANNUAL O&M COSTS** | | | | | **$7,800** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Total area calculated in GIS using 2004 area of disturbance. Includes the hot starts and southern portion of the ODA (see EECA Figure 5-6)

b See Section 3.3 of the Appendix E text.

c Cost from Coeur d'Alene Basin OU3 Feasibility Study (URS 2001). Cost assumes the use of a local native material.

d Cost from Means (Means, 2004) and includes installation.

e Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

f Based on professional judgement and similar projects

g Percentages from EPA Guidance.

h Cost from Butte Priority Soils Operable Unit Feasibility study (BPSOU PRP, 2004), based on actual costs

i Assumes after vegetation growth is established, O&M will be significantly reduced.

**TABLE E-29**

**STORM WATER DETENTION BASIN SEDIMENT REMOVAL - A PANEL (ALTERNATIVES 3 AND 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation | a,b | 2,000 | CY | $7 | $14,000 |
| Transportation | c,b | 2,000 | CY | $11 | $22,000 |
| Topsoil | d,e | 1,000 | CY | $13 | $13,000 |
| Regrade | b,f | 1.0 | Acre | $870 | $870 |
| Revegetation | b,g | 1.0 | Acres | $1,400 | $1,400 |
| **Direct Construction Subtotal** | | | | | **$51,270** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $2,564 |
| Water/Sediment Control | h | 5% | | | $2,564 |
| **Indirect Construction Subtotal** | | | | | **$5,127** |
| **Construction Subtotal** | | | | | **$56,397** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $22,559 |
| **Subtotal** | | | | | **$78,956** |
| Remedial Design | i | 20% | | | $15,791 |
| Project/Construction Management | i | 25% | | | $19,739 |
| **TOTAL CAPITAL COSTS** | | | | | **$114,486** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | LS | $500 | $500 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $200 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$700** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming 1/2 cy backhoe loading trucks, increased 25% due to dispersed nature of ponds and potentially difficult access.

b Volume based on visual estimates of sediment area and depth performed by field personnel during the Site Investigation

c Cost from Means (Means, 2005) assuming 12 cy end dump truck and one trip per hour (long loading time)

d See Section 3.3 of the Appendix E text.

e Assumes 50% of fill/regrade material will come from native soil in vicinity of pond and 50% will be imported topsoil.

f Cost from Means (Means, 2005) assuming shallow depth grading on a slope.

g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope relatively uncertain because field estimates were visual estimates.

j Assumes limited erosion damage repair or reseeding necessary.

**TABLE E-30**

**STORM WATER DETENTION BASIN SEDIMENT REMOVAL - POLE CANYON ODA (ALTERNATIVES 3 AND 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation | a,b | 30 | CY | $7 | $210 |
| Transportation | c,b | 30 | CY | $11 | $330 |
| Topsoil | d,e | 15 | CY | $13 | $195 |
| Regrade | b,f | 0.1 | Acre | $870 | $87 |
| Revegetation | b,g | 0.1 | Acres | $1,400 | $140 |
| **Direct Construction Subtotal** | | | | | **$962** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $48 |
| Water/Sediment Control | h | 5% | | | $48 |
| **Indirect Construction Subtotal** | | | | | **$96** |
| **Construction Subtotal** | | | | | **$1,058** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $423 |
| **Subtotal** | | | | | **$1,481** |
| Remedial Design | i | 20% | | | $296 |
| Project/Construction Management | i | 25% | | | $370 |
| **TOTAL CAPITAL COSTS** | | | | | **$2,148** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | Acres | $100 | $100 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $40 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$140** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming 1/2 cy backhoe loading trucks, increased 25% due to dispersed nature of ponds and potentially difficult access.

b Volume based on visual estimates of sediment area and depth performed by field personnel during the Site Investigation

c Cost from Means (Means, 2005) assuming 12 cy end dump truck and one trip per hour (long loading time)

d See Section 3.3 of the Appendix E text.

e Assumes 50% of fill/regrade material will come from native soil in vicinity of pond and 50% will be imported topsoil.

f Cost from Means (Means, 2005) assuming shallow depth grading on a slope.

g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope relatively uncertain because field estimates were visual estimates.

j Assumes limited erosion damage repair or reseeding necessary.

**TABLE E-31**

**STORM WATER DETENTION BASIN SEDIMENT REMOVAL - D PANEL (ALTERNATIVES 3 AND 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation | a,b | 1,500 | CY | $7 | $10,500 |
| Transportation | c,b | 1,500 | CY | $11 | $16,500 |
| Topsoil | d,e | 750 | CY | $13 | $9,750 |
| Regrade | b,f | 1.0 | Acre | $870 | $870 |
| Revegetation | b,g | 1.0 | Acres | $1,400 | $1,400 |
| **Direct Construction Subtotal** | | | | | **$39,020** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $1,951 |
| Water/Sediment Control | h | 5% | | | $1,951 |
| **Indirect Construction Subtotal** | | | | | **$3,902** |
| **Construction Subtotal** | | | | | **$42,922** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $17,169 |
| **Subtotal** | | | | | **$60,091** |
| Remedial Design | i | 20% | | | $12,018 |
| Project/Construction Management | i | 25% | | | $15,023 |
| **TOTAL CAPITAL COSTS** | | | | | **$87,132** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | LS | $500 | $500 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $200 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$700** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming 1/2 cy backhoe loading trucks, increased 25% due to dispersed nature of ponds and potentially difficult access.

b Volume based on visual estimates of sediment area and depth performed by field personnel during the Site Investigation

c Cost from Means (Means, 2005) assuming 12 cy end dump truck and one trip per hour (long loading time)

d See Section 3.3 of the Appendix E text.

e Assumes 50% of fill/regrade material will come from native soil in vicinity of pond and 50% will be imported topsoil.

f Cost from Means (Means, 2005) assuming shallow depth grading on a slope.

g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope relatively uncertain because field estimates were visual estimates.

j Assumes limited erosion damage repair or reseeding necessary.

**TABLE E-32**

**STORM WATER DETENTION BASIN SEDIMENT REMOVAL - E PANEL (ALTERNATIVES 3 AND 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation | a,b | 750 | CY | $7 | $5,250 |
| Transportation | c,b | 750 | CY | $11 | $8,250 |
| Topsoil | d,e | 375 | CY | $13 | $4,875 |
| Regrade | b,f | 0.6 | Acre | $870 | $522 |
| Revegetation | b,g | 0.6 | Acres | $1,400 | $840 |
| **Direct Construction Subtotal** | | | | | **$19,737** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $987 |
| Water/Sediment Control | h | 5% | | | $987 |
| **Indirect Construction Subtotal** | | | | | **$1,974** |
| **Construction Subtotal** | | | | | **$21,711** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $8,684 |
| **Subtotal** | | | | | **$30,395** |
| Remedial Design | i | 20% | | | $6,079 |
| Project/Construction Management | i | 25% | | | $7,599 |
| **TOTAL CAPITAL COSTS** | | | | | **$44,073** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | LS | $500 | $500 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $200 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$700** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming 1/2 cy backhoe loading trucks, increased 25% due to dispersed nature of ponds and potentially difficult access.
b Volume based on visual estimates of sediment area and depth performed by field personnel during the Site Investigation
c Cost from Means (Means, 2005) assuming 12 cy end dump truck and one trip per hour (long loading time)
d See Section 3.3 of the Appendix E text.
e Assumes 50% of fill/regrade material will come from native soil in vicinity of pond and 50% will be imported topsoil.
f Cost from Means (Means, 2005) assuming shallow depth grading on a slope.
g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.
h Based on professional judgement and similar projects
i Percentages from EPA Guidance. Scope relatively uncertain because field estimates were visual estimates.
j Assumes limited erosion damage repair or reseeding necessary.

**TABLE E-33**

**STORM WATER DETENTION BASIN COVERING - A PANEL (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Load Chert | a,b,c | 4,000 | CY | $2 | $8,000 |
| Transport Chert | a,b,d | 4,000 | CY | $5 | $20,000 |
| Spread Chert | a,e | 1.0 | Acres | $5,200 | $5,200 |
| **Direct Construction Subtotal** | | | | | **$33,200** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | f | 5% | | | $1,660 |
| Water/Sediment Control | f | 5% | | | $1,660 |
| **Indirect Construction Subtotal** | | | | | **$3,320** |
| **Construction Subtotal** | | | | | **$36,520** |
| Contingency (15% scope +15% bid) | g | 30% | | | $10,956 |
| **Subtotal** | | | | | **$47,476** |
| Remedial Design | g | 20% | | | $9,495 |
| Project/Construction Management | g | 25% | | | $11,869 |
| **TOTAL CAPITAL COSTS** | | | | | **$68,840** |
| **Annual O&M Costs** | | | | | |
| None | | 0 | LS | $0 | $0 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$0** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Sediment area visually estimated by field personnel during the Site Investigation
b Chert fill volume calculated by multiplying area by average depth of 2.5 ft.
c Cost from Means (Means, 2005) and assumes 1 1/2 cy excavator loading trucks from a stockpile
d Cost from Means (Means, 2005) and assumes 12 cy end dump and 1 mile round trip
e Cost from Means (Means, 2005) and assumes spread using dozer
f Based on professional judgement and similar projects
g Percentages from EPA Guidance.

**TABLE E-34**

**STORM WATER DETENTION BASIN COVERING - POLE CANYON ODA (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Load Chert | a,b,c | 400 | CY | $2 | $800 |
| Transport Chert | a,b,d | 400 | CY | $5 | $2,000 |
| Spread Chert | a,e | 0.1 | Acres | $5,200 | $520 |
| **Direct Construction Subtotal** | | | | | **$3,320** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | f | 5% | | | $166 |
| Water/Sediment Control | f | 5% | | | $166 |
| **Indirect Construction Subtotal** | | | | | **$332** |
| **Construction Subtotal** | | | | | **$3,652** |
| Contingency (15% scope +15% bid) | g | 30% | | | $1,096 |
| **Subtotal** | | | | | **$4,748** |
| Remedial Design | g | 20% | | | $950 |
| Project/Construction Management | g | 25% | | | $1,187 |
| **TOTAL CAPITAL COSTS** | | | | | **$6,884** |
| **Annual O&M Costs** | | | | | |
| None | | 0 | LS | $0 | $0 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$0** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Sediment area visually estimated by field personnel during the Site Investigation

b Chert fill volume calculated by multiplying area by average depth of 2.5 ft.

c Cost from Means (Means, 2005) and assumes 1 1/2 cy excavator loading trucks from a stockpile

d Cost from Means (Means, 2005) and assumes 12 cy end dump and 1 mile round trip

e Cost from Means (Means, 2005) and assumes spread using dozer

f Based on professional judgement and similar projects

g Percentages from EPA Guidance.

**TABLE E-35**

**STORM WATER DETENTION BASIN COVERING - D PANEL (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Load Chert | a,b,c | 4,000 | CY | $2 | $8,000 |
| Transport Chert | a,b,d | 4,000 | CY | $5 | $20,000 |
| Spread Chert | a,e | 1.0 | Acres | $5,200 | $5,200 |
| **Direct Construction Subtotal** | | | | | **$33,200** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | f | 5% | | | $1,660 |
| Water/Sediment Control | f | 5% | | | $1,660 |
| **Indirect Construction Subtotal** | | | | | **$3,320** |
| **Construction Subtotal** | | | | | **$36,520** |
| Contingency (15% scope +15% bid) | g | 30% | | | $10,956 |
| **Subtotal** | | | | | **$47,476** |
| Remedial Design | g | 20% | | | $9,495 |
| Project/Construction Management | g | 25% | | | $11,869 |
| **TOTAL CAPITAL COSTS** | | | | | **$68,840** |
| **Annual O&M Costs** | | | | | |
| None | | 0 | LS | $0 | $0 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$0** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Sediment area visually estimated by field personnel during the Site Investigation
b Chert fill volume calculated by multiplying area by average depth of 2.5 ft.
c Cost from Means (Means, 2005) and assumes 1 1/2 cy excavator loading trucks from a stockpile
d Cost from Means (Means, 2005) and assumes 12 cy end dump and 1 mile round trip
e Cost from Means (Means, 2005) and assumes spread using dozer
f Based on professional judgement and similar projects
g Percentages from EPA Guidance.

**TABLE E-36**

**STORM WATER DETENTION BASIN COVERING - E PANEL (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Load Chert | a,b,c | 2,400 | CY | $2 | $4,800 |
| Transport Chert | a,b,d | 2,400 | CY | $5 | $12,000 |
| Spread Chert | a,e | 0.6 | Acres | $5,200 | $3,120 |
| **Direct Construction Subtotal** | | | | | **$19,920** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | f | 5% | | | $996 |
| Water/Sediment Control | f | 5% | | | $996 |
| **Indirect Construction Subtotal** | | | | | **$1,992** |
| **Construction Subtotal** | | | | | **$21,912** |
| Contingency (15% scope +15% bid) | g | 30% | | | $6,574 |
| **Subtotal** | | | | | **$28,486** |
| Remedial Design | g | 20% | | | $5,697 |
| Project/Construction Management | g | 25% | | | $7,121 |
| **TOTAL CAPITAL COSTS** | | | | | **$41,304** |
| **Annual O&M Costs** | | | | | |
| None | | 0 | LS | $0 | $0 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$0** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Sediment area visually estimated by field personnel during the Site Investigation
b Chert fill volume calculated by multiplying area by average depth of 2.5 ft.
c Cost from Means (Means, 2005) and assumes 1 1/2 cy excavator loading trucks from a stockpile
d Cost from Means (Means, 2005) and assumes 12 cy end dump and 1 mile round trip
e Cost from Means (Means, 2005) and assumes spread using dozer
f Based on professional judgement and similar projects
g Percentages from EPA Guidance.

**TABLE E-37**

**SEEP FLOW AREA AND DETENTION POND COVER - A PANEL ODA (ALTERNATIVE 3)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Load Chert | a,b,c | 500 | CY | $2 | $1,000 |
| Transport Chert | a,b,d | 500 | CY | $5 | $2,500 |
| Spread Chert | a,e | 0.1 | Acres | $5,200 | $520 |
| Increase Berm Size | f,g | 50 | CY | $7 | $350 |
| Install/Remove Access Road | h | 2,500 | LF | $8 | $20,000 |
| **Direct Construction Subtotal** | | | | | **$24,370** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | i | 5% | | | $1,219 |
| Water/Sediment Control | i | 5% | | | $1,219 |
| **Indirect Construction Subtotal** | | | | | **$2,437** |
| **Construction Subtotal** | | | | | **$26,807** |
| Contingency (25% scope + 15% bid) | j | 40% | | | $10,723 |
| **Subtotal** | | | | | **$37,530** |
| Remedial Design | j | 20% | | | $7,506 |
| Project/Construction Management | j | 25% | | | $9,382 |
| **TOTAL CAPITAL COSTS** | | | | | **$54,418** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | k | 1 | LS | $100 | $100 |
| Contingency (25% scope + 15% bid) | j | 40% | | | $40 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$140** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Sediment area visually estimated by field personnel during the Site Investigation

b Volumes calculated by multiplying area by average depth of 3 ft.

c Cost from Means (Means, 2005) and assumes 1 1/2 cy excavator loading trucks from a stockpile

d Cost from Means (Means, 2005) and assumes 12 cy end dump and 1 mile round trip

e Cost from Means (Means, 2005) and assumes spread using dozer

f Berm increase volume estimated to be 10% of pond volume

g Cost from Means (Means, 2005), assumes use of native material, includes hauling, spreading, and compaction costs

h Assumes 16' wide access road, removed after seep area is successfully reclaimed. Costs calculated with Means, 2005

i Based on professional judgement and similar projects

j Percentages from EPA Guidance. Scope percentage is high due to uncertainty in necessity for berm size increases and depth of chert in ponds.

k Assumes yearly inspection of seep/pond area for first five years to confirm area is completely covered and there is no overflow

**TABLE E-38**

**SEEP FLOW AREA AND DETENTION POND COVER - DS-7 AND DS-10 (ALTERNATIVE 3)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Load Chert | a,b,c | 1,000 | CY | $2 | $2,000 |
| Transport Chert | a,b,d | 1,000 | CY | $5 | $5,000 |
| Spread Chert | a,e | 0.2 | Acres | $5,200 | $1,040 |
| Increase Berm Size | f,g | 100 | CY | $7 | $700 |
| **Direct Construction Subtotal** | | | | | **$8,740** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $437 |
| Water/Sediment Control | h | 5% | | | $437 |
| **Indirect Construction Subtotal** | | | | | **$874** |
| **Construction Subtotal** | | | | | **$9,614** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $3,846 |
| **Subtotal** | | | | | **$13,460** |
| Remedial Design | i | 20% | | | $2,692 |
| Project/Construction Management | i | 25% | | | $3,365 |
| **TOTAL CAPITAL COSTS** | | | | | **$19,516** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | LS | $100 | $100 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $40 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$140** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Sediment area visually estimated by field personnel during the Site Investigation

b Volumes calculated by multiplying area by average depth of 3 ft.

c Cost from Means (Means, 2005) and assumes 1 1/2 cy excavator loading trucks from a stockpile

d Cost from Means (Means, 2005) and assumes 12 cy end dump and 1 mile round trip

e Cost from Means (Means, 2005) and assumes spread using dozer

f Berm increase volume estimated to be 10% of pond volume

g Cost from Means (Means, 2005), assumes use of native material, includes hauling, spreading, and compaction costs

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope percentage is high due to uncertainty in necessity for berm size increases and depth of chert in ponds.

j Assumes yearly inspection of seep/pond area for first five years to confirm area is completely covered and there is no overflow

**TABLE E-39**

**SEEP FLOW AREA AND DETENTION POND COVER - ES-4 AND ES-5 (ALTERNATIVE 3)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Load Chert | a,b,c | 1,500 | CY | $2 | $3,000 |
| Transport Chert | a,b,d | 1,500 | CY | $5 | $7,500 |
| Spread Chert | a,e | 0.3 | Acres | $5,200 | $1,560 |
| Increase Berm Size | f,g | 150 | CY | $7 | $1,050 |
| **Direct Construction Subtotal** | | | | | **$13,110** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $656 |
| Water/Sediment Control | h | 5% | | | $656 |
| **Indirect Construction Subtotal** | | | | | **$1,311** |
| **Construction Subtotal** | | | | | **$14,421** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $5,768 |
| **Subtotal** | | | | | **$20,189** |
| Remedial Design | i | 20% | | | $4,038 |
| Project/Construction Management | i | 25% | | | $5,047 |
| **TOTAL CAPITAL COSTS** | | | | | **$29,275** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | LS | $100 | $100 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $40 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$140** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Sediment area visually estimated by field personnel during the Site Investigation

b Volumes calculated by multiplying area by average depth of 3 ft.

c Cost from Means (Means, 2005) and assumes 1 1/2 cy excavator loading trucks from a stockpile

d Cost from Means (Means, 2005) and assumes 12 cy end dump and 1 mile round trip

e Cost from Means (Means, 2005) and assumes spread using dozer

f Berm increase volume estimated to be 10% of pond volume

g Cost from Means (Means, 2005), assumes use of native material, includes hauling, spreading, and compaction costs

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope percentage is high due to uncertainty in necessity for berm size increases and depth of chert in ponds.

j Assumes yearly inspection of seep/pond area for first five years to confirm area is completely covered and there is no overflow

**TABLE E-40**

**SEEP FLOW AREA AND DETENTION POND SEDIMENT REMOVAL - A PANEL ODA (ALTERNATIVES 2 & 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation | a,b | 100 | CY | $7 | $700 |
| Transportation | c,b | 100 | CY | $11 | $1,100 |
| Topsoil | d,e | 50 | CY | $13 | $650 |
| Regrade | b,f | 0.1 | Acre | $870 | $52 |
| Revegetation | b,g | 0.1 | Acres | $1,400 | $84 |
| Install/Remove Access Road | h | 2,500 | LF | $8 | $20,000 |
| **Direct Construction Subtotal** | | | | | **$22,586** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | i | 5% | | | $1,129 |
| Water/Sediment Control | i | 5% | | | $1,129 |
| **Indirect Construction Subtotal** | | | | | **$2,259** |
| **Construction Subtotal** | | | | | **$24,845** |
| Contingency (25% scope + 15% bid) | j | 40% | | | $9,938 |
| **Subtotal** | | | | | **$34,783** |
| Remedial Design | j | 20% | | | $6,957 |
| Project/Construction Management | j | 25% | | | $8,696 |
| **TOTAL CAPITAL COSTS** | | | | | **$50,435** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | k | 1 | LS | $250 | $250 |
| Contingency (25% scope + 15% bid) | j | 40% | | | $100 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$350** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming 1/2 cy backhoe loading trucks, increased 25% due to dispersed nature of ponds and potential difficult access.
b Volume based on visual estimates of sediment area and depth performed by field personnel during the Site Investigation
c Cost from Means (Means, 2005) assuming 12 cy end dump truck and one trip per hour (long loading time)
d See Section 3.3 of the Appendix E text.
e Assumes 50% of fill/regrade material will come from native soil in vicinity of pond and 50% will be imported topsoil.
f Cost from Means (Means, 2005) assuming shallow depth grading on a slope.
g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.
h Assumes 16' wide access road, removed after seep area is successfully reclaimed. Costs calculated with Means, 2005
i Based on professional judgement and similar projects
j Percentages from EPA Guidance. Scope relatively uncertain because field estimates were visual estimates.
k Assumes limited erosion damage repair or reseeding necessary.

**TABLE E-41**

**SEEP FLOW AREA AND DETENTION POND SEDIMENT REMOVAL - DS-7 AND DS-10 (ALTERNATIVES 2 & 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation | a,b | 500 | CY | $7 | $3,500 |
| Transportation | c,b | 500 | CY | $11 | $5,500 |
| Topsoil | d,e | 250 | CY | $13 | $3,250 |
| Regrade | b,f | 0.2 | Acre | $870 | $174 |
| Revegetation | b,g | 0.2 | Acres | $1,400 | $280 |
| **Direct Construction Subtotal** | | | | | **$12,704** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $635 |
| Water/Sediment Control | h | 5% | | | $635 |
| **Indirect Construction Subtotal** | | | | | **$1,270** |
| **Construction Subtotal** | | | | | **$13,974** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $5,590 |
| **Subtotal** | | | | | **$19,564** |
| Remedial Design | i | 20% | | | $3,913 |
| Project/Construction Management | i | 25% | | | $4,891 |
| **TOTAL CAPITAL COSTS** | | | | | **$28,368** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | LS | $500 | $500 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $200 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$700** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming 1/2 cy backhoe loading trucks, increased 25% due to dispersed nature of ponds and potential difficult access.

b Volume based on visual estimates of sediment area and depth performed by field personnel during the Site Investigation

c Cost from Means (Means, 2005) assuming 12 cy end dump truck and one trip per hour (long loading time)

d See Section 3.3 of the Appendix E text.

e Assumes 50% of fill/regrade material will come from native soil in vicinity of pond and 50% will be imported topsoil.

f Cost from Means (Means, 2005) assuming shallow depth grading on a slope.

g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope relatively uncertain because field estimates were visual estimates.

j Assumes limited erosion damage repair or reseeding necessary.

**TABLE E-42**

**SEEP FLOW AREA AND DETENTION POND SEDIMENT REMOVAL - ES-4 AND ES-5 (ALTERNATIVEA 2 & 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation | a,b | 400 | CY | $7 | $2,800 |
| Transportation | c,b | 400 | CY | $11 | $4,400 |
| Topsoil | d,e | 200 | CY | $13 | $2,600 |
| Regrade | b,f | 0.3 | Acre | $870 | $261 |
| Revegetation | b,g | 0.3 | Acres | $1,400 | $420 |
| **Direct Construction Subtotal** | | | | | **$10,481** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $524 |
| Water/Sediment Control | h | 5% | | | $524 |
| **Indirect Construction Subtotal** | | | | | **$1,048** |
| **Construction Subtotal** | | | | | **$11,529** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $4,612 |
| **Subtotal** | | | | | **$16,141** |
| Remedial Design | i | 20% | | | $3,228 |
| Project/Construction Management | i | 25% | | | $4,035 |
| **TOTAL CAPITAL COSTS** | | | | | **$23,404** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | LS | $500 | $500 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $200 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$700** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming 1/2 cy backhoe loading trucks, increased 25% due to dispersed nature of ponds and potential difficult access.

b Volume based on visual estimates of sediment area and depth performed by field personnel during the Site Investigation

c Cost from Means (Means, 2005) assuming 12 cy end dump truck and one trip per hour (long loading time)

d See Section 3.3 of the Appendix E text.

e Assumes 50% of fill/regrade material will come from native soil in vicinity of pond and 50% will be imported topsoil.

f Cost from Means (Means, 2005) assuming shallow depth grading on a slope.

g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed.

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope relatively uncertain because field estimates were visual estimates.

j Assumes limited erosion damage repair or reseeding necessary.

**TABLE E-43**

**OPTIONAL SEEP TREATMENT - SEEP AP-2 (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Subsurface Tank | a,b | 1 | GPM | $7,500 | $7,500 |
| Zero-Valent Iron | a,c | 1 | GPM | $1,700 | $1,700 |
| Cheese Whey Feed System | a,d | 1 | GPM | $1,200 | $1,200 |
| Bio-Rings | a,e | 1 | GPM | $5,350 | $5,350 |
| Fence Installation | f | 600 | LF | $15 | $9,000 |
| Install Access Road | g | 2500 | LF | $4 | $10,000 |
| **Subtotal** | | | | | **$34,750** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $1,738 |
| Water/Sediment Control | h | 5% | | | $1,738 |
| **Subtotal** | | | | | **$3,475** |
| **Construction Subtotal** | | | | | **$38,225** |
| Contingency (25% Scope + 25% Bid) | i | 50% | | | $19,113 |
| **Total Construction** | | | | | **$57,338** |
| Remedial Design | i | 20% | | | $11,468 |
| Project/Construction Management | i | 25% | | | $14,334 |
| **TOTAL CAPITAL COSTS** | | | | | **$83,139** |
| **Annual O&M Costs** | | | | | |
| Iron/Cheese Whey Addition | j | 1 | GPM | $3,500 | $3,500 |
| Sludge Disposal | k | 1 | GPM | $2,500 | $2,500 |
| Cleaning/Maintenance | l | 1 | GPM | $4,000 | $4,000 |
| Monitoring Costs | m | 4 | Event | $500 | $2,000 |
| Contingency (25% Scope + 25% Bid) | i | 50% | | | $6,000 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$18,000** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Flow rate estimated by reducing max measured by 50% (estimated effectiveness of source controls - see cost text Section 3.10)

b Cost from Means, 2004. Cost scaled based on 30,000 gal fiberglass double walled tank (may require smaller or multiple), cost includes subsurface installation

c Cost from www.zerovalentiron.com, assumes initially 1% of tank volume contains iron

d Cost from Means, 2004. Chemical feed system up to 7 gpm

e Price quote from Jaeger Products, Inc.

f Cost from Means, 2005 for wood fence, Length assumes 200' x 100' enclosed area per seep area

g Assumes 16' wide access road, becomes permanent to access treatment system for O&M. Costs calcualted with Means, 2005

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. High scope and bid due to uncertainty in future seep flows and uncertainty in actual quantities of materials to be used for treatment.

j Includes cheese whey addition, iron addition, cleaning, and maintenance

k Sludge disposal (non-hazardous waste) - Assumes 1000 gal sludge produced/gpm/year. $2/gal disposal and $0.5/gal transport

l Assumes ~10% of construction costs

m Assumes mine can sample or can be sampled during other sampling (only costs for lab/collection included)

**TABLE E-44**

**OPTIONAL SEEP TREATMENT - SEEPS DS-7 AND DS-10 (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Subsurface Tank | a,b | 3 | GPM | $7,500 | $22,500 |
| Zero-Valent Iron | a,c | 3 | GPM | $1,700 | $5,100 |
| Cheese Whey Feed System | a,d | 3 | GPM | $1,200 | $3,600 |
| Bio-Rings | a,e | 3 | GPM | $5,350 | $16,050 |
| Fence Installation | f | 1200 | LF | $15 | $18,000 |
| **Subtotal** | | | | | **$65,250** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | g | 5% | | | $3,263 |
| Water/Sediment Control | g | 5% | | | $3,263 |
| **Subtotal** | | | | | **$6,525** |
| **Construction Subtotal** | | | | | **$71,775** |
| Contingency (25% Scope + 25% Bid) | h | 50% | | | $35,888 |
| **Total Construction** | | | | | **$107,663** |
| Remedial Design | h | 15% | | | $16,149 |
| Project/Construction Management | h | 18% | | | $19,379 |
| **TOTAL CAPITAL COSTS** | | | | | **$143,191** |
| **Annual O&M Costs** | | | | | |
| Iron/Cheese Whey Addition | i | 3 | GPM | $3,500 | $10,500 |
| Sludge Disposal | j | 3 | GPM | $2,500 | $7,500 |
| Cleaning/Maintenance | k | 3 | GPM | $4,000 | $12,000 |
| Monitoring Costs | l | 4 | Event | $500 | $2,000 |
| Contingency (25% Scope + 25% Bid) | h | 50% | | | $16,000 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$48,000** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Flow rate estimated by reducing max measured by 50% (estimated effectiveness of source controls - see cost text Section 3.10)

b Cost from Means, 2004. Cost scaled based on 30,000 gal fiberglass double walled tank (may require smaller or or multiple), cost includes subsurface installation

c Cost from www.zerovalentiron.com, assumes initially 1% of tank volume contains iron

d Cost from Means, 2004. Chemical feed system up to 7 gpm

e Price quote from Jaeger Products, Inc.

f Cost from Means, 2005 for wood fence, Length assumes 200' x 100' enclosed area per seep area

g Based on professional judgement and similar projects

h Percentages from EPA Guidance. High scope and bid due to uncertainty in future seep flows and uncertainty in actual quantities of materials to be used for treatment.

i Includes cheese whey addition, iron addition, cleaning, and maintenance

j Sludge disposal (non-hazardous waste) - Assumes 1000 gal sludge produced/gpm/year. $2/gal disposal and $0.5/gal transport

k Assumes ~10% of construction costs

l Assumes mine can sample or can be sampled during other sampling (only costs for lab/collection included)

**TABLE E-45**

**OPTIONAL SEEP TREATMENT - SEEPS ES-4 AND ES-5 (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Subsurface Tank | a,b | 14 | GPM | $7,500 | $105,000 |
| Zero-Valent Iron | a,c | 14 | GPM | $1,700 | $23,800 |
| Cheese Whey Feed System | a,d | 14 | GPM | $1,200 | $16,800 |
| Bio-Rings | a,e | 14 | GPM | $5,350 | $74,900 |
| Fence Installation | f | 1200 | LF | $15 | $18,000 |
| **Subtotal** | | | | | **$238,500** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | g | 5% | | | $11,925 |
| Water/Sediment Control | g | 5% | | | $11,925 |
| **Subtotal** | | | | | **$23,850** |
| **Construction Subtotal** | | | | | **$262,350** |
| Contingency (25% Scope + 25% Bid) | h | 50% | | | $131,175 |
| **Total Construction** | | | | | **$393,525** |
| Remedial Design | h | 15% | | | $59,029 |
| Project/Construction Management | h | 18% | | | $70,835 |
| **TOTAL CAPITAL COSTS** | | | | | **$523,388** |
| **Annual O&M Costs** | | | | | |
| Iron/Cheese Whey Addition | i | 14 | GPM | $3,500 | $49,000 |
| Sludge Disposal | j | 14 | GPM | $2,500 | $35,000 |
| Cleaning/Maintenance | k | 14 | GPM | $4,000 | $56,000 |
| Monitoring Costs | l | 4 | Event | $500 | $2,000 |
| Contingency (25% Scope + 25% Bid) | h | 50% | | | $71,000 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$213,000** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Flow rate estimated by reducing max measured by 50% (estimated effectiveness of source controls - see cost text Section 3.10)

b Cost from Means, 2004. Cost scaled based on 30,000 gal fiberglass double walled tank (may require smaller or or multiple), cost includes subsurface installation

c Cost from www.zerovalentiron.com, assumes initially 1% of tank volume contains iron

d Cost from Means, 2004. Chemical feed system up to 7 gpm

e Price quote from Jaeger Products, Inc.

f Cost from Means, 2005 for wood fence, Length assumes 200' x 100' enclosed area per seep area

g Based on professional judgement and similar projects

h Percentages from EPA Guidance. High scope and bid due to uncertainty in future seep flows and uncertainty in actual quantities of materials to be used for treatment.

i Includes cheese whey addition, iron addition, cleaning, and maintenance

j Sludge disposal (non-hazardous waste) - Assumes 1000 gal sludge produced/gpm/year. $2/gal disposal and $0.5/gal transport

k Assumes ~10% of construction costs

l Assumes mine can sample or can be sampled during other sampling (only costs for lab/collection included)

**TABLE E-46**

**LOWER POLE CANYON CREEK SEDIMENT REMOVAL (ALTERNATIVES 2, 3 AND 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation | a,b | 1,000 | CY | $7 | $7,000 |
| Transportation | c,b | 1,000 | CY | $11 | $11,000 |
| Gravel\Rock | d,e | 500 | CY | $8 | $3,750 |
| Regrade | b,f | 0.5 | Acre | $870 | $435 |
| Riparian/Floodplain Revegetation | b,g | 0.5 | Acre | $4,900 | $2,450 |
| **Direct Construction Subtotal** | | | | | **$24,635** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $1,232 |
| Water/Sediment Control | h | 5% | | | $1,232 |
| **Indirect Construction Subtotal** | | | | | **$2,464** |
| **Construction Subtotal** | | | | | **$27,099** |
| Contingency (25% scope + 15% bid) | i | 40% | | | $10,839 |
| **Subtotal** | | | | | **$37,938** |
| Remedial Design | i | 20% | | | $7,588 |
| Project/Construction Management | i | 25% | | | $9,484 |
| **TOTAL CAPITAL COSTS** | | | | | **$55,010** |
| **Annual O&M Costs** | | | | | |
| O&M Costs (Years 1 through 9) | j | 1 | LS | $1,000 | $1,000 |
| Monitoring Costs | k | 4 | Event | $500 | $2,000 |
| Contingency (25% scope + 15% bid) | i | 40% | | | $1,200 |
| **TOTAL ANNUAL O&M COSTS (Years 1 through 9)** | | | | | **$4,200** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means (Means, 2005) assuming 1/2 cy backhoe loading trucks, increased 25% due to dispersed nature of ponds and potential difficult access.

b Quantity based on estimate of 1000 foot reach, 5 feet wide, and two feet deep

c Cost from Means (Means, 2005) assuming 12 cy end dump truck and one trip per hour (long loading time)

d Cost from Coeur d'Alene Basin OU3 Feasibility Study (URS, 2001). Cost assumes the use of a local native material.

e Assumes 50% of fill/regrade material will come from native soil in vicinity of pond and 50% will be imported gravel/rock

f Cost from Means (Means, 2005) assuming shallow depth grading on a slope.

g Cost from Coeur d'Alene Basin OU3 Feasibility Study (URS, 2001).

h Based on professional judgement and similar projects

i Percentages from EPA Guidance. Scope relatively uncertain because volume estimates will change based on sampling results

j Assumes limited erosion damage repair or reseeding necessary.

k Assumes mine can sample or can be sampled during other sampling (only costs for lab/collection included)

**TABLE E-47**

**POLE CANYON ODA IN-SITU CREEK TREATMENT (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Trench Excavation | a | 100 | CY | $7 | $700 |
| Iron Addition | b | 40,000 | LB | $1 | $40,000 |
| **Direct Construction Subtotal** | | | | | **$40,700** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | c | 5% | | | $2,035 |
| Water/Sediment Control | c | 5% | | | $2,035 |
| **Indirect Construction Subtotal** | | | | | **$4,070** |
| **Construction Subtotal** | | | | | **$44,770** |
| Contingency (50% scope + 15% bid) | c | 65% | | | $29,101 |
| **Subtotal** | | | | | **$73,871** |
| Remedial Design | c | 20% | | | $14,774 |
| Project/Construction Management | c | 25% | | | $18,468 |
| **TOTAL CAPITAL COSTS** | | | | | **$107,112** |
| **Annual O&M Costs** | | | | | |
| Cheese Whey Addition | d | 365 | Day | $1,000 | $365,000 |
| Zero-Valent Iron Addition | e | 1 | Year | $50,000 | $50,000 |
| Contingency (50% scope + 25% bid) | c | 75% | | | $311,250 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$726,250** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Cost from Means for 50' x 5' x 10' trench

b Cost assumes 1 ft depth iron, 160 lb/cf apparent density, cost from www.zerovalentiron.com reduced to account for large volume

c Percentages from EPA Guidance. Scope is highly uncertain due to unknown future flow rate and lack of treatability data.

d Cost assumes constant application of cheese whey at 10,000 gpd (based on Moller testing) @ $0.1/gal (haul cost only)

e Cost assumes all iron will have to be replaced yearly, includes cost for removal and disposal of old iron

**TABLE E-48**

**POLE CANYON CREEK INFILTRATION ABOVE ODA (ALTERNATIVES 3 AND 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavation/Haul | a,b | 50,000 | CY | $4 | $192,500 |
| Blasting | c | 10,000 | CY | $6 | $55,000 |
| Construct Spillway | d | 10,000 | CY | $4 | $40,000 |
| Liner Installation | e | 5,000 | SY | $24 | $120,000 |
| Rip-Rap Armor | f | 500 | SY | $50 | $25,000 |
| Revegetation | g | 1 | Acre | $1,400 | $1,400 |
| **Direct Construction Subtotal** | | | | | **$433,900** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | h | 5% | | | $21,695 |
| Water/Sediment Control | h | 5% | | | $21,695 |
| **Indirect Construction Subtotal** | | | | | **$43,390** |
| **Construction Subtotal** | | | | | **$477,290** |
| Contingency (20% scope + 15% bid) | i | 35% | | | $167,052 |
| **Subtotal** | | | | | **$644,342** |
| Remedial Design | i | 12% | | | $77,321 |
| Project/Construction Management | i | 14% | | | $90,208 |
| **TOTAL CAPITAL COSTS** | | | | | **$811,870** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | j | 1 | LS | $25,000 | $25,000 |
| Contingency (20% scope + 15% bid) | i | 35% | | | $8,750 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$33,750** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Volume calculated in GIS assuming 0.5 acre base, 2:1 slopes, and 20 foot depth (includes regrading surrounding slope to maintain 2:1)

b Cost from Means (Means, 2005) assuming use of 2 cy excavator and 34 cy off road haul truck with most material being used in immediate area for other reclamation work

c Cost from Means (Means, 2005), volume assumes 0.5 acres and 4 ft depth

d Costs from Means (Means, 2005). Assumes material from excavation will be used, includes compaction and grading

e Liner cost includes subgrade prep, HDPE liner, 6" cover, and grading. Area calculated using GIS (see EECA Figure 5-5)

f Grouted rip-rap, price from Means (Means, 2005), reduced to account for abundance of chert

g Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed. Area an estimate based on GIS coverage

h Based on professional judgement and similar projects

i Percentages from EPA Guidance.

j Assumes basins will need to be cleaned every year

**TABLE E-49**

**POLE CANYON CREEK DIVERSION AROUND ODA (ALTERNATIVES 3 AND 4)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Excavate/Haul | a,b | 10,000 | CY | $4 | $40,000 |
| Liner Installation | c | 3,000 | SY | $24 | $72,000 |
| Rip-Rap Armor | d | 100 | SY | $50 | $5,000 |
| Reinforced Concrete Pipe (incl. installation) | e | 9,500 | LF | $73 | $693,500 |
| Headwall with Wingwalls | f | 1 | EA | $2,700 | $2,700 |
| Energy Dissipation Structure | g | 20 | CFS | $2,800 | $56,000 |
| Revegetation | h | 1 | Acre | $1,400 | $700 |
| **Direct Construction Subtotal** | | | | | **$869,900** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | i | 5% | | | $43,495 |
| Water/Sediment Control | i | 5% | | | $43,495 |
| **Indirect Construction Subtotal** | | | | | **$86,990** |
| **Construction Subtotal** | | | | | **$956,890** |
| Contingency (25% scope + 25% bid) | j | 50% | | | $478,445 |
| **Subtotal** | | | | | **$1,435,335** |
| Remedial Design | j | 12% | | | $172,240 |
| Project/Construction Management | j | 14% | | | $200,947 |
| **TOTAL CAPITAL COSTS** | | | | | **$1,808,522** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | k | 1 | LS | $25,000 | $25,000 |
| Contingency (25% scope + 25% bid) | j | 50% | | | $12,500 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$37,500** |

Notes

Unless identified separately burden and profits are included in unit costs.

a Volume calculated in GIS (see EECA Figure 5-5) assuming 0.5 acre base, 2:1 slopes, and 20 foot depth

b Cost from Means (Means, 2005) assuming use of 2 cy excavator and 34 cy off road haul truck with most material being used in immediate area for other reclamation work

c Liner cost includes subgrade prep, HDPE liner, 6" cover, and grading. Area calculated using GIS (see EECA Figure 5-5)

d Grouted rip-rap, price from Means (Means, 2005), reduced to account for abundance of chert

e Cost from Means (Means, 2005) for 30" Class III RCP. Labor/equip costs increased 50% due to no current access and steep slopes. Length calculated using GIS

f Cost from Means (Means, 2005) and includes installation.

g Unit cost based on Texas Water Development Board standard unit costs for stilling basins

h Costs from Means (Means, 2004). Assumes drill seeding, fertilizer application, and a mulch layer over the seed. Area an estimate based on GIS coverage

i Based on professional judgement and similar projects

j Percentages from EPA Guidance.

k Assumes pipe would need to be periodically cleaned, upstream basin would need to be periodically cleaned, and pipe would need periodic maintenance

**TABLE E-50**

**HOOPES SPRING - MONITOR SOURCE CONTROL EFFECTIVENESS/SITE-SPECIFIC STANDARD (ALTERNATIVE 2)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Develop Site Specific Standard | | 1 | EA | $500,000 | $500,000 |
| **Subtotal** | | | | | **$500,000** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | | 0% | | | $0 |
| Water/Sediment Control | | 0% | | | $0 |
| **Subtotal** | | | | | **$0** |
| **Construction Subtotal** | | | | | **$500,000** |
| Contingency | | 0% | | | $0 |
| **Total Construction** | | | | | **$500,000** |
| Remedial Design | | 0% | | | $0 |
| Project/Construction Management | | 0% | | | $0 |
| **TOTAL CAPITAL COSTS** | | | | | **$500,000** |
| **Annual O&M Costs** | | | | | |
| Long Term Water Quality Monitoring | c | 4 | Event | $500 | $2,000 |
| Contingency (15% scope + 15% bid) | b | 30% | | | $600 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$2,600** |

Notes

Unless otherwise noted, contractor overhead and profit included in unit costs.

a Estimate based on sampling costs from previous projects.

b Percentages from EPA Guidance.

c Assumes after site specific standard is implemented, only water quality will be monitored

**TABLE E-51**

**TREATMENT OF HOOPES SPRING FLOW (ALTERNATIVE 3)**

| Item | Notes | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **Capital Costs** | | | | | |
| Direct Construction | | | | | |
| Biological Treatment | a | 3100 | GPM | $5,775 | $17,902,500 |
| Improve Access Road | b | 2 | mi | $50,000 | $100,000 |
| Install Power | c | 21000 | lf | $10 | $210,000 |
| **Subtotal** | | | | | **$18,212,500** |
| Indirect Construction | | | | | |
| Mobilization/Demobilization | d | 5% | | | $910,625 |
| Water/Sediment Control | d | 5% | | | $910,625 |
| **Subtotal** | | | | | **$1,821,250** |
| **Construction Subtotal** | | | | | **$20,033,750** |
| Contingency (25% Scope + 25% Bid) | e | 50% | | | $10,016,875 |
| **Total Construction** | | | | | **$30,050,625** |
| Remedial Design | e | 6% | | | $1,803,038 |
| Project/Construction Management | e | 11% | | | $3,305,569 |
| **TOTAL CAPITAL COSTS** | | | | | **$35,159,231** |
| **Annual O&M Costs** | | | | | |
| O&M Costs | a | 3,100 | GPM | $298 | $922,250 |
| Contingency (25% Scope + 25% Bid) | e | 50% | | | $461,125 |
| **TOTAL ANNUAL O&M COSTS** | | | | | **$1,383,375** |

Notes

Unless otherwise noted, contractor overhead and profit included in unit costs.

a Cost estimate based on actual capital and O&M costs for the Wharf treatment plant in Lead, SD (see Appendix B) scaled up on a per GPM basis

b Based on Means (Means, 2005). Assumes existing road from Crow Creek will be improved. Includes widening and addition of gravel.

c Cost based on professional judgement. Assumes power would be extended from existing line at the mill.

d Based on professional judgement and similar projects

e Percentages from EPA Guidance. Future Hoopes Spring flows are unknown and it is unknown if it is accurate to directly scale the Wharf Plant Costs