Standard Mine Superfund Site
Proposed Plan for Public Comment
June 2010

Colorado Department of Public Health and Environment

Introduction

The U.S. Environmental Protection Agency (EPA), in consultation with the Colorado Department of Public Health and Environment (CDPHE) and the U.S. Forest Service (USFS), has investigated site conditions and alternatives for mitigating the effects of contaminants at the Standard Mine Superfund Site, located 5 miles west of Crested Butte, Colorado (Figure 1). EPA is the lead agency for the cleanup but is supported by CDPHE. Because the Standard Mine site is located on both USFS land and private land, the USFS is also involved as a support agency. This proposed plan describes the cleanup alternatives that were considered and summarizes the agencies' reasons for recommending the proposed remedy, which is intended to improve water quality in Elk Creek and reduce human and ecological exposure to mine waste remaining at the site. More detailed information about the Standard Mine Site is available at EPA's web site at: http://www.epa.gov/region8/superfund/co/standard/ and at the Crested Butte Old Rock Library.

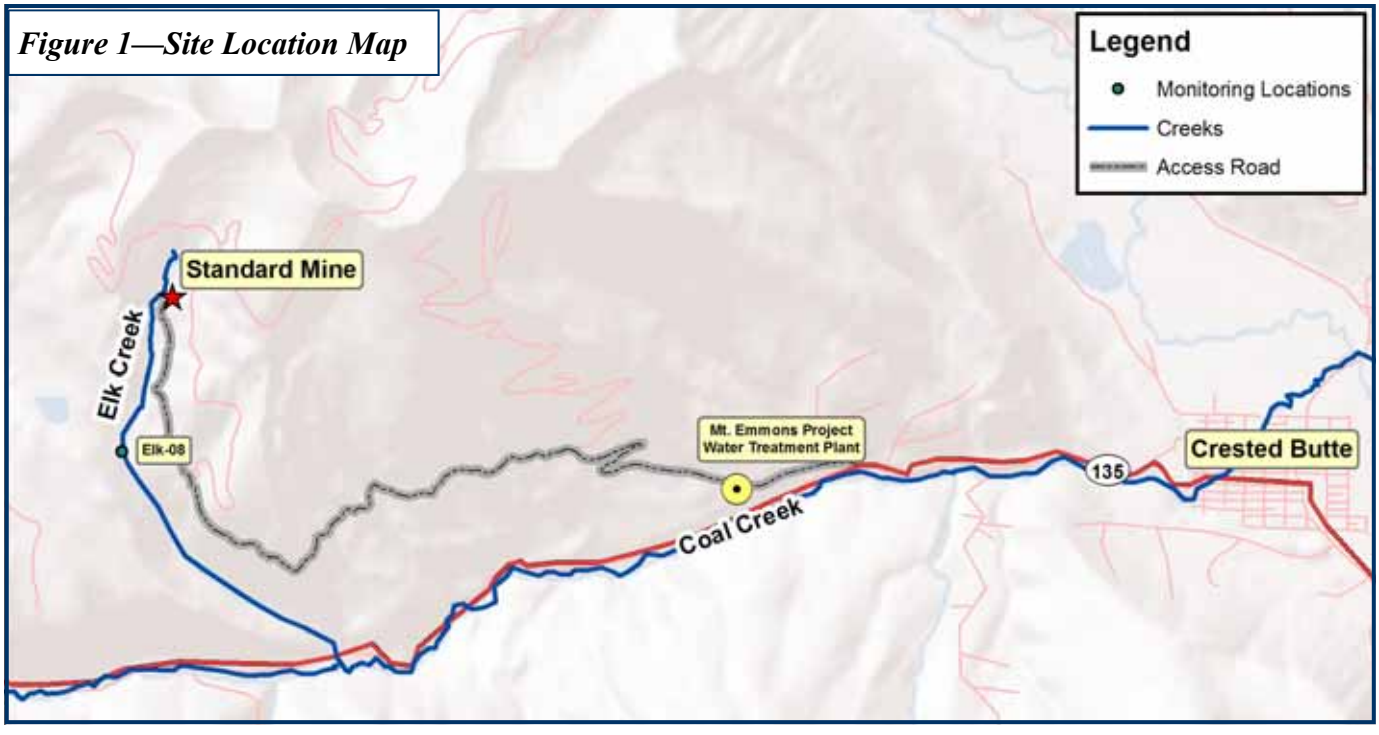
The agencies invite the public to review and comment on this proposed plan until **July 18, 2010,** and will review and consider all comments that are submitted. Based on the comments, the agencies may select the preferred cleanup alternative, modify it, select another response action, or develop other alternatives if public comment warrants or if new material is presented.

Information on how to submit your comments or questions to EPA is provided on page 12, along with details on where you can get more information and attend a public meeting.

Site Background and Setting

Standard Mine is located five miles west of Crested Butte and south of Scarp Ridge at an elevation of approximately 10,900 to 11,600 feet above mean sea level. The mine was privately owned and operated and is located on public and private land. While mining in the Ruby Mining District began in the 1880s, it wasn't until the 1950s that significant development and production took place at the Standard Mine (also known as the Micawber Mine). Standard Uranium Corporation acquired ownership of the mine in 1957 and expanded the facilities. The Standard Mine was closed in September 1960. Sporadic mining operations occurred over short periods of time between 1963 and 1966. It appears that no mining or milling activities occurred at the Standard Mine after 1974.

Figure 1—Site Location Map



Site Features

The Standard Mine site includes several areas of mining disturbance: Level 1, Level 2, Level 3, Level 4, Level 5, and Level 98 (Figure 2 and Table 1). The word "level" is not used to indicate that the areas are all part of one interconnected mine, but rather indicates different locations of mining disturbance. The underground workings of Levels 1, 2, 3, and 4 are interconnected. Levels 5 and 98 are independent. Small amounts of waste rock are located elsewhere near the site.

The mine area drains into Elk Creek, which flows through the site. Elk Creek flows southeast to Coal Creek, which flows east toward the Town of Crested Butte. The Crested Butte municipal water intake is located on Coal Creek.

Prior Cleanup Actions

The Standard Mine site was added to the National Priority List (NPL) on September 14, 2005, based on elevated concentrations of metals in site soils and in Elk Creek. Since that time, EPA has conducted several cleanup actions to stabilize the site and prevent further contamination of Elk Creek by site contaminants. These actions included:

- Treatment and discharge of water from a tailings impoundment
- Construction of a waste repository
- Excavation and transport of waste rock and tailings materials to the repository
- Revegetation of excavated areas
- Realignment of Elk Creek at Level 1

Figure 2—Standard Mine Levels

- Construction of wetlands
- Demolition and removal of mine-related structures
- Surface water controls and sediment catch basins

The actions were based on an Engineering Evaluation/ Cost Analysis (EE/CA) that was used to facilitate selection of the most appropriate means of dealing with the most urgent contaminant sources: the tailings impoundment and the large quantities of leaching waste rock at Levels 1, 2, and 3.

Nature and Extent of Contamination

Sources of Contamination

The primary contaminants of concern at the Standard Mine site are cadmium, copper, lead, manganese, and zinc.

TABLE 1
Standard Mine Level Descriptions

Level 1	Most impacted area. Consisted of a tailings impoundment, waste rock piles, a mill site, a railroad trestle, and a discharging mine. The bulk of the waste rock and tailings were removed and waste rock that remains in place was treated with lime and fertilizer, covered with native soil, and seeded. Erosion control structures minimize the flow of water through remaining waste rock and stabilize the reclaimed soils. Monitoring will take place to ensure erosion controls are functional and vegetation that was planted continues to survive. Elk Creek flows through Level 1. Water that discharged from Level 1 flowed over waste rock to Elk Creek.
Level 2	Consists of sporadic mine discharge and waste rock. Mine discharge flows over waste rock to Elk Creek. Level 2 only discharges water during spring runoff.
Level 3	Open mine workings that do not drain and associated waste rock pile located on a steep slope.
Level 4	Two twin compartment shafts and two associated waste rock piles. Waste rock remains but is isolated from significant runoff from nearby slopes.
Level 5	Consists of mine discharge and a waste rock pile. The mine discharge flows over the waste rock and into a flourishing high alpine wetland. Water quality in the wetland is degraded.
Level 98	Minimal mine discharge and large waste rock pile. The mine discharge flows over the waste rock and into a wetland.

Figure 3—Level 1 Before Cleanup

The sources of contamination are waste rock and tailings and acid rock drainage (ARD) that discharges from the mine workings. Waste rock that was deposited outside the mine workings contains elevated concentrations of metals that can be inhaled as dust or can dissolve into water that then flows into Elk Creek during rainfall events or spring run-off. Average soil metal concentrations in 2009 (after early cleanup activities were completed) were 3.67 milligrams per kilogram (mg/kg) cadmium, 111 mg/kg copper, 1010 mg/kg lead, 1620 mg/kg manganese, and 343 mg/kg zinc.

Water that enters the mine through open shafts or from surrounding groundwater becomes contaminated as it contacts metal-rich minerals within the mine workings (Figure 4). The water discharged from Level 1 is currently the largest contributor of metals to Elk Creek from the Standard Mine site.

Downstream Surface Water and Sediment

Water in Elk Creek contains elevated concentrations of metal contaminants relative to Colorado Water Quality Standards (WQS) for aquatic life (See Table 2). It is difficult to segregate naturally high metal concentrations that are expected to occur in this highly mineralized area from mining impacts because Elk Creek forms within the Standard Mine site. Even the most upstream sample location in Elk Creek contains elevated concentrations of the site contaminants.

Metal concentrations increase significantly where the Level 1 mine discharge enters Elk Creek. The concentrations slowly decrease as Elk Creek flows to the confluence with Coal Creek; however, the cadmium and zinc concentrations still exceed the acute and chronic WQS in Elk Creek immediately above the confluence. With the exception of cadmium, metal concentrations in Coal Creek immediately downstream of the Elk Creek confluence have not exceeded WQS since the removal of waste rock and tailings to the site repository. The acidity of water in Elk Creek increases where the Level 1 mine discharge enters the creek but rapidly recovers to neutral at downstream locations.

Other sources of metal contaminants contribute to increased metal concentrations in Coal Creek, including

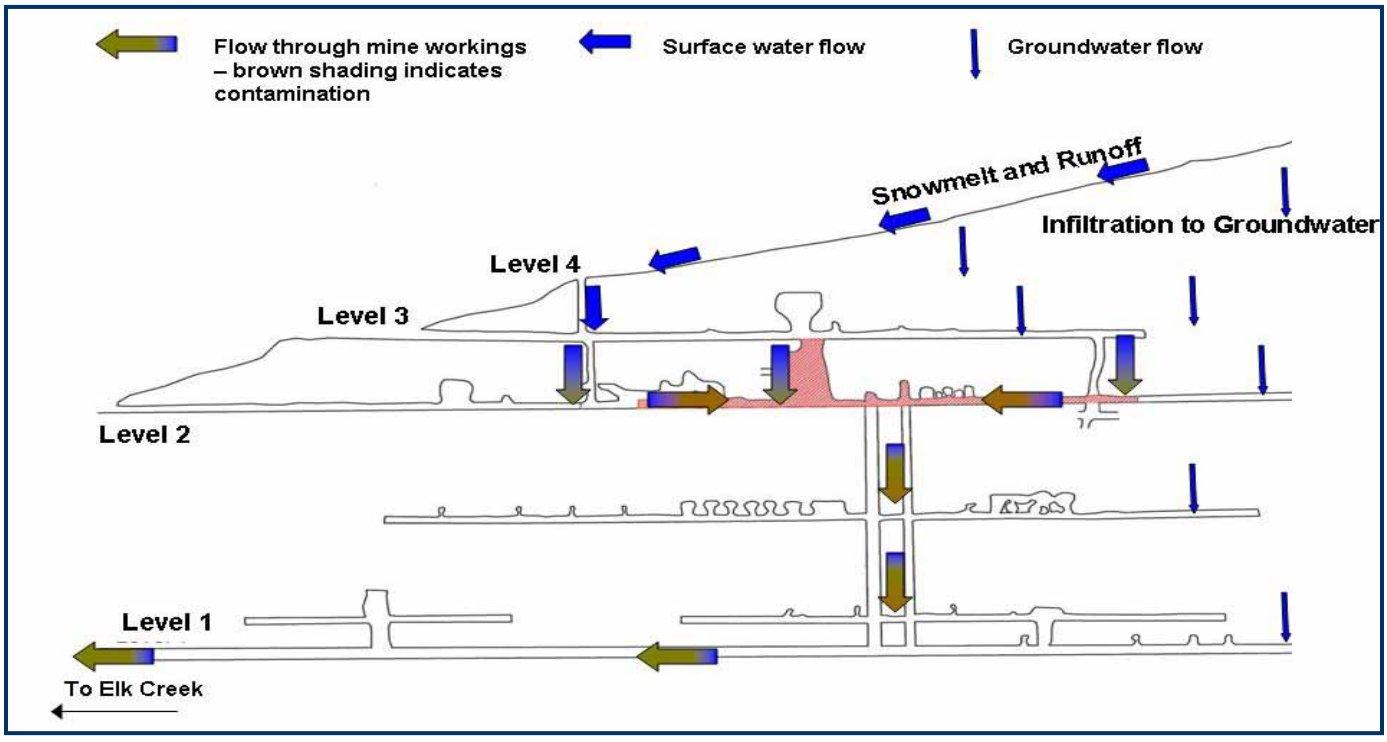


Figure 4—Water Flow Into and Through Level 1, 2, 3, and 4 Mine Workings

TABLE 2 *Metal Concentrations at Elk-08 (in micrograms per liter)*			
	Acute WQS	Chronic WQS	2008-09 Max at Elk-08
Cadmium	1.1	0.3	8.63
Copper	9	6.2	8.73
Lead	40	1.6	7.81
Manganese	2590	1430	103
Zinc	99	86	1910

Water Quality Standards (WQS) calculated at hardness = 65 milligrams calcium carbonate per liter.

an iron gossan, an iron fen, and the Mt. Emmons Project water treatment plant effluent.

There is a small amount of sediment in Elk Creek. Metal concentrations in sediment are elevated and have not decreased significantly since the completion of initial cleanup activities.

Groundwater

There are indications that shallow groundwater near the Standard Mine fault has elevated metal concentrations; however, low metal concentrations were observed in deeper groundwater. Contaminants may be present due to naturally-occurring highly mineralized rock or due to mining disturbances. Groundwater downgradient of the site has not been sampled, but there is no indication that contaminated groundwater is present to the degree that would impact downstream water uses. There are no drinking water wells currently located at or near the site; therefore, there is no complete ground water exposure pathway at the site at this time. The nearest well is located greater than 4 miles away and was sampled in 1999 and found to be clean.

Summary of Site Risks

The Standard Mine site and the Elk Creek drainage are used primarily for recreation. No future change in site use is anticipated.

Human Health Risks

A Baseline Human Health Risk Assessment was performed to evaluate risks to people that visit the Standard Mine and the Elk Creek drainage. Recreational uses evaluated in the risk assessment included ATV riding, hiking, camping, and fishing. The evaluation concluded that risks for adults from exposure to site contaminants are below a level of concern, both before and after the early cleanup actions. For site conditions prior to cleanup activity, non-cancer risks for the child ATV rider were considered above the level of concern for exposure to manganese. Since the completion of the early cleanup activities, risks for children are now below a level of concern for all site contaminants.

Ecological Risks

A Baseline Ecological Risk Assessment was performed to evaluate risks to other living things such as fish, insects, birds, animals, soil and sediment organisms, and plants. The evaluation concluded that:

- Water in Elk Creek is toxic to fish, primarily due to elevated concentrations of cadmium, lead, and zinc. Previous site cleanup actions taken by EPA at the site have decreased fish toxicity, but metal concentrations and fish toxicity are still elevated.
- Water that flows from Elk Creek into Coal Creek impacts Coal Creek water quality but does not significantly affect fish residing in Coal Creek.
- Sediments in Elk Creek are likely to have adverse effects on organisms residing in the sediment. Sediment quality in Elk Creek appears to be improving slowly due to the beneficial effects of early cleanup activities. Sediment in Coal Creek is of lesser concern.
- Plants and soil organisms may be impacted by high concentrations of metals in site soils. Cleanup actions taken by EPA to date have decreased the level of mine waste contamination in localized areas, and this has decreased the predicted risk to plants and soil invertebrates in these areas; however, soil concentrations in the area remain higher than background.
- Risks to wildlife from site-related contaminants are likely minimal.

The completion of the waste rock removal reduced the human health risk below a level of concern and risks to wildlife are minimal; therefore, the purpose for cleaning up the site is to reduce the risks to aquatic life in Elk and Coal Creeks and site vegetation and soil organisms from site contaminants.

Remedial Action Objectives

Remedial action objectives (RAOs) are goals developed by EPA to protect human health and the environment. EPA considers current and future uses of the site when determining RAOs. Based on the evaluation of site conditions and the evaluation of risk to human

Figure 5—Colorado Division of Wildlife personnel conducting a fish inventory in Coal Creek

and ecological receptors, the following RAOs were developed to focus efforts in developing remedial action alternatives for the feasibility study.

Surface Water RAOs

1. Reduce in-stream metal concentrations and sediment loading to the extent practicable in Elk Creek to lessen water quality impacts and maximize reasonably attainable water uses in Elk Creek.
2. Reduce in-stream metal concentrations and sediment loading to the extent practicable in Coal Creek to lessen water quality impacts and maximize reasonably attainable water uses in Coal Creek.
3. Ensure that in-stream metal concentrations attributable to contamination from Elk Creek do not exceed drinking water standards at Crested Butte's drinking water intake on Coal Creek.

Soil and Waste Rock/Tailings RAOs

1. Control and/or reduce run-on and runoff from tailings/waste rock piles to minimize generation of contaminated runoff and groundwater and to reduce sediment loading of streams.
2. Reduce human exposure to dust and ecological impacts from impacted soils and waste rock by maintaining the vegetative cover over limestone-amended soils and waste rock.

Ground Water RAO

1. Reduce water flow through mine workings and contaminated soils to reduce metal loading to Elk Creek.

Remedial Action Alternatives

EPA considered a wide range of alternatives to reduce site risks and meet the RAOs. Many of the alternatives were eliminated early in the process due to high costs, low effectiveness or difficulty of implementation. The 11 remaining remedial alternatives were evaluated more thoroughly to identify the advantages and disadvantages of each alternative relative to the other alternatives using the nine EPA evaluation criteria (see inset on page 7). The 11 alternatives were considered to be a toolbox from which the preferred alternative would be chosen. The water treatment alternatives (Alternatives 3 and 4) would address water as it exits the mine. The source control alternatives (Alternatives 5 through 10) would either reduce the flow of water into or out of the Level 1 to 3 mine workings or would reduce the load of contaminants added to the mine water. The soil treatment alternative (Alternative 11) would address the waste rock and discharges from the mine workings at Levels 5 and 98.

Alternative 1 No Action

This alternative leaves the site in its current condition with no ongoing treatment or monitoring. This alternative must be considered and was used as a point of comparison for the other alternatives.

Alternative 2 Institutional Controls

Institutional controls include land use restrictions or fencing and signage to prevent site uses that increase exposure to site contaminants.

Approximate Cost Minimal

Alternative 3 Passive Water Treatment

A system that uses natural biological processes such as bacterial sulfate reduction rather than chemicals to remove contaminants from the water could be installed to treat the water that discharges from the mine workings. The system would be designed to enhance natural biological processes and operate unmanned for long portions of the year when the site is inaccessible. Water would be discharged to Elk Creek after treatment. The system would reduce metal concentrations in discharged water and be capable of operating unmanned during much of the year. Long-term annual maintenance including the disposal of treatment sludge would be required.

Approximate Cost $1,696,000-$5,473,000

Alternative 4 Water Treatment at the Mt. Emmons Project Water Treatment Plant (WTP)

Mine discharge water could be piped to the Mt. Emmons Project WTP for treatment. Treated water would be directed to the facility discharge point along Coal Creek. This alternative would allow the use of an existing facility for water treatment, but would be dependent upon a private party for ongoing implementation. There are substantial administrative hurdles that must be overcome to allow EPA and CDPHE to enter an agreement for private water treatment under this alternative.

Approximate Cost $3,138,900+

Alternative 5 Bulkhead in Level 1

A concrete bulkhead could be installed in Level 1 to stop or control the flow of water out of the mine. The bulkhead would be installed with a valve and could be operated as an impermeable bulkhead (valve kept closed) (Alternative 5A) or a flow-through bulkhead (Alternative 5B). An impermeable bulkhead would stop the flow of contaminated water from Level 1 but water may find alternate flow paths out of the mine as it backs up behind the bulkhead. A flow-through bulkhead could be used to control the Level 1 mine discharge so water could be released to Elk Creek during spring runoff when the impacts would be lower than during other months or could be used to regulate the flow of water to a passive treatment system so the system could be designed for a low flow rate rather than be designed to accommodate the high flow during spring runoff and operate at a fraction of capacity during other times of the year.

Approximate Cost $2,213,000

Alternative 6 Surface Water Diversions

Ditches could be installed to direct water away from the vicinity of the mine workings and thus reduce infiltration of the water into the mine workings. This would reduce the amount of water that becomes contaminated; however, the percentage decrease in water flow into the mine is unknown. This would not eliminate the flow of groundwater into the mine.

Approximate Cost $2,033,400

Alternative 7 Flowable Fill and Foam in Level 3

This alternative involves the use of foam to seal off the shafts from Level 4 to Level 3 and from Level 3 to Level 2 and thus prevent the flow of water to deeper levels of the mine where it becomes more contaminated. Flowable fill and other materials would be used to seal the floor of Level 3 to reduce the flow of water between Level 3 and 2 and to reduce contact between the water in Level 3 and metal-laden material inside the Level 3 workings. This alternative is relatively permanent and requires less maintenance than a treatment system. Water would still enter the mine at Levels 1 and 2.

Figure 6—Muck Pile and Water in Level 3 Tunnel

Approximate Cost $2,185,100

Alternative 8 Horizontal Wells in Level 3

Wells would be drilled into the sidewalls of Level 3 from inside the workings, and a collection system would be installed to drain the water before it enters the mine and becomes contaminated. This would reduce flow into the mine more than Alternative 6, but the degree of flow reduction is uncertain.

Approximate Cost $2,558,300

Alternative 9 Surficial Wells

Vertical or horizontal wells could be installed to intercept water before it enters the mine workings. Water would be drained or pumped from the wells and directed away from areas where it would be likely to enter the mine workings. The success of this alternative would depend on intercepting fractures in the bedrock that transport the water. A pump system would be required for vertical wells. The degree to which the flow of water into the mine workings would be reduced is unknown.

Approximate Cost $1,475,600—$2,119,600

Alternative 10 Contaminant Control at Level 2

The source materials within Level 2, including raw ore, mineralized zones, and other mining waste, would be

sealed off to reduce contact with water that flows through the mine. Level 2 has only been accessed via a raise to Level 3, and much of the Level is unexplored in recent years. The cost of this alternative is dependent upon factors such as the possibility of new source areas being identified when the Level is opened and investigated more fully. These factors could increase the cost significantly.

Approximate Cost $8,275,500

Alternative 11 Soil Amendment/Revegetation

This alternative involves treating the waste rock at Levels 5 and 98 so it can support vegetation, thus reducing exposure of humans, birds, and mammals to site contaminants. The water that discharges from the mine workings over the waste rock piles would be redirected around the waste rock to prevent leaching of contaminants from the piles. This alternative is relatively inexpensive and easy to implement.

Approximate Cost $418,100

Comparison of Alternatives

The alternatives were compared against each other using nine evaluation criteria developed by EPA (see inset). The comparison against each criterion is provided in the following paragraphs and on Table 3.

Overall Protection of Human Health and the Environment

Alternatives 3 and 4 ranked high because of the significant reduction in metal loading from Level 1 to Elk Creek. Alternative 7 ranked high because it offers some protection to both surface water and groundwater, but ranked lower than Alternatives 3 and 4 because groundwater that enters the workings below Level 3 would still become contaminated. Alternative 5A would reduce metal loading from Level 1 to Elk Creek to a greater extent than water treatment, but it was ranked lower due to the potential negative impact to groundwater. Alternatives 8 and 9 would provide less protection to Elk Creek than Alternative 7 because these alternatives won't improve the water quality of the Level 1 discharge. Alternative 11 primarily addresses soil RAOs across a small portion of the site, therefore it is ranked low. The effectiveness of Alternatives 6 and 10 is unknown; therefore they are ranked lower than the other alternatives. Alternative 5B by itself would not reduce the flow of contaminants to Elk Creek and was therefore considered less protective. Alternative 1 would be the least protective remedy. Alternative 2 would be more protective than Alternative 1, but less protective than the other remedies because it does not reduce metals loading to local groundwater and Elk Creek.

Compliance with ARARs

This section generally describes how the various alternatives meet several of the key ARARs. A more detailed discussion of how the individual alternatives comply with all ARARs is given in the Feasibility Study which can be found on the Standard Mine website listed at the end of this document. Alternatives 3, 4, 5A, and 7 were ranked high for compliance with ARARs. Alternative 5A would eliminate the Level 1 discharge and would therefore provide the greatest likelihood that WQS would be met in Elk Creek. Alternative 4 would also provide a high degree of certainty that WQS would be met in Elk Creek; however, it would

EPA EVALUATION CRITERIA

Overall Protection of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets federal and state environmental statues, regulations and other requirements or if a waiver is justified.

Long-term Effectiveness considers the ability to maintain protection of human health and the environment over time.

Reduction in Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates the use of treatment to reduce the harmful effects of site contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including the relative availability of goods and services.

Cost includes estimated capital and annual operation and maintenance costs. Cost is calculated as the present worth cost, which is the total cost of an alternative over time in terms of today's dollars. Feasibility study cost estimates are expected to be within the range of +50 to –30 percent.

State Acceptance considers whether the State of Colorado agrees with EPA's analyses and the preferred alternative.

Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments provided to this proposed plan are an important indicator of community acceptance.

slightly increase the metals loading to Coal Creek. Alternative 3 ranked high because it would significantly reduce metal loading from Level 1 to Elk Creek. Alternative 7 ranked high because it is likely to reduce the quantity and improve the quality of discharge from the Level 1 mine workings more than any of the source control alternatives. Alternatives 6, 8, 9, 10 and 11 ranked moderate for compliance with ARARs. Alternatives 8 and 9 are not expected to improve water quality in Elk Creek to the extent of Alternatives 3, 4, 5A, and 7, but are expected to maintain or improve groundwater quality. Alternative 6 was ranked lower than Alternatives 8 and 9 because it only intercepts surface water and near-surface groundwater and is not expected to comply with either surface water or groundwater ARARs. Alternative 10 is moderately compliant because metal concentrations in the resulting Level 2 discharge could remain high and limit the ability to meet WQS in Elk Creek. Alternative 11 would moderately improve surface water, but the contribution toward meeting surface water and groundwater ARARs is less than the other alternatives. Alternative 5B would be operated to provide the best opportunity to meet WQS in Elk Creek, but there is no assurance that controlled discharge from the bulkhead without subsequent water treatment would allow WQS to be met. Alternative 2 would meet the requirement for an environmental covenant when waste is left in place, but would not improve the likelihood of meeting surface water and groundwater ARARs. Alternative 1 would not comply with ARARs.

Long-Term Effectiveness

Alternative 5A ranked highest because it is reliable in the long-term with minimal O&M requirements to maintain effectiveness. Alternative 7 ranked high because it provides a reliable seal between Level 3 and the lower mine workings with minimal O&M requirements to maintain effectiveness. Alternative 5B ranked high because the reliability of the bulkhead itself is high, the need for continued operation and maintenance is low, and the permanence of a bulkhead is high. Alternatives 3, 4, 6, 8, 9, and 11 rated moderate for long-term effectiveness. The ongoing passive water treatment pilot study at the site and pilot studies conducted elsewhere indicate that passive treatment systems can operate reliably with moderate operation and maintenance. Alternative 6 would provide a reliable means of surface water control, and maintenance requirements are low to moderate. The effectiveness of Alternative 11 depends on the maintenance of a vegetative cover over the waste rock which requires ongoing monitoring to assure survival of the vegetation. Alternative 4 has uncertain long-term effectiveness due to the uncertainties regarding the ability to maintain an agreement with the Mt. Emmons Project owners/operators. Alternatives 8 and 9 would be reliable but the overall effectiveness is uncertain. Alternatives 1 and 10 are expected to be the least reliable; Alternative 10 because of high operation and maintenance requirements, and Alternative 1 because it is not effective in reducing contamination at the site.

Reduction of Toxicity, Mobility, and Volume through Treatment

Alternatives 3 and 4 would be the most effective at reducing the toxicity, mobility, and volume of contaminants through treatment at an on-site passive treatment system or the Mt. Emmons Project WTP. Alternative 11 also was ranked high because it would reduce the toxicity, mobility, and volume of contaminants from the Level 98 waste rock through treatment of the waste rock and establishment of a vegetative cover. Alternatives 5A, 6, 7, 8, 9, and 10 were ranked moderate for this criterion. Alternative 5A would be highly effective at reducing the mobility of contaminants off-site but would not reduce the toxicity or volume of contaminants through treatment. Alternatives 6, 7, 8, 9, and 10 would reduce the volume and possibly the toxicity of contaminated mine discharge, but would not reduce the mobility of the contaminants, nor would these alternatives include treatment of contaminated groundwater or mine discharge. Alternatives 1, 2, and 5B would not reduce the toxicity, mobility, or volume of contaminated materials at the site

Short-Term Effectiveness

Alternative 4 ranked the highest for short-term effectiveness because of the short time to achieve the RAOs, relatively safe work environment, and minimal environmental impacts. Alternative 3 is safe to construct, and time to achieve RAO's is short to moderate. Other environmental impacts should be minimal; therefore, this alternative ranked high as well. Alternatives 5A, 6, 7, 8, 9, 10, and 11 were ranked as moderate for short-term effectiveness. Alternative 5A ranked high for achieving surface water RAOs immediately; however, it is not anticipated to achieve groundwater RAOs, and worker protectiveness is difficult during construction. Therefore this alternative was ranked moderate. The period of time to achieve RAOs is difficult to estimate for Alternatives 6, 8, and 9. Alternative 11 only addresses RAOs related to the waste rock piles. Alternatives 7, 8, and 10 would be constructed in potentially hazardous working conditions within the mine workings. Alternative 5B would be constructed in potentially hazardous working conditions, and the time and ability to achieve RAOs would depend on treating the discharge. Alter-

TABLE 3 Comparison of Alternatives

Evaluation Criterion	Alternative												Notes About Rankings
	1	2	3	4	5A	5B	6	7	8	9	10	11	
Overall Protection of Human Health and the Environment	○	○	●	●	●	○	○	●	◉	◉	○	○	Water treatment alternatives (3 and 4) and the most effective source control alternatives (5A and 7) are most likely to protect groundwater and surface water quality.
Applicable or Relevant and Appropriate Requirements (ARARs)	○	○	●	●	●	○	◉	●	◉	◉	◉	◉	Water treatment alternatives (3 and 4) and the most effective source control alternatives (5A and 7) provide greatest likelihood of meeting WQS at Elk-08. Alternative 2 is needed to meet state Environmental Covenant requirement.
Long-Term Effectiveness	○	○	◉	◉	●	●	◉	●	◉	◉	○	◉	Source controls (5 and 7) offer protection with least requirement for long-term maintenance. Alternatives 6, 8, 9, and 10 provide uncertain protection and leave residual risk.
Reduction of Toxicity, Mobility, and Volume through Treatment	○	○	●	●	◉	○	◉	◉	◉	◉	◉	●	Reduction in contaminant mobility is achieved through water or soil treatment (3, 4, 11) and minimizing interaction between source materials and water (7).
Short-Term Effectiveness	○	○	●	●	◉	○	◉	◉	◉	◉	◉	◉	Treatment alternatives (3, 4, and 11) should achieve RAOs most quickly.
Implementability	●	●	◉	○	◉	◉	◉	◉	◉	◉	○	●	Actions within the mine are more difficult to implement than other actions. Treatment at Mt. Emmons facility not feasible due to need for agreement between agencies and a private facility.
Cost	●	●	◉	◉	◉	◉	◉	◉	◉	● ◉	○	●	Cost of Alternative 3 will depend on system sizing. Cost of Alternative 9 depends on whether horizontal or vertical wells are installed.
State Acceptance	○	●	◉	○	◉	●	◉	●	◉	◉	○	●	The state prefers alternatives with the least long-term operations and maintenance requirements.
Community Acceptance													To be identified during public comment period.

○ Low Ranking ◉ Moderate Ranking ● High Ranking

natives 1 and 2 would not be effective in the short-term, nor would they lessen the environmental impacts caused by contaminants at the site. Therefore, these are ranked the lowest in short-term effectiveness.

Implementability

Alternatives 1 and 2 are the easiest to implement because no construction or operation and maintenance (O&M) is needed. Alternative 11 would be easily constructed and has low O&M requirements. Alternatives 3, 5, 6, 7, 8, and 9 are moderately implementable. Alternatives 6 and 9 would be constructed fairly easily but may have moderate O&M requirements. Alternative 3 would be moderately challenging to implement and would require specialized labor to construct. Alternatives 5A, 5B, 7, 8, and 10 involve work inside the mine workings and require specialized construction equipment and contractors. Construction is slow and difficult and O&M activities within the mine workings are difficult. Construction of Alternative 10 would be particularly difficult because Level 2 is less accessible than the other Levels and the tasks required for Alternative 10 are difficult. Alternative 4 requires obtaining and maintaining an agreement with the owners/ operators of the Mt. Emmons Project WTP for treatment of the Level 1 discharge. This presents numerous administrative challenges that have been determined by EPA management to be prohibitive; therefore the implementability of this alternative is ranked the lowest.

Cost

Alternatives 1, 2, 9 (horizontal wells), and 11 have estimated costs less than $2 million. Alternatives 3, 4, 5, 6, 7, 8, 9 (vertical wells) have costs between $2 million to $5 million. Alternative 10 is the most expensive with cost greater than $5 million.

State Acceptance

The State of Colorado concurs with the elements of the preferred alternative.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the Record of Decision.

EPA's Preferred Alternative

Based on the evaluation provided above, EPA, CDPHE, and the USFS have proposed a preferred alternative. The preferred alternative consists of two phases, with monitoring performed after the first phase to determine the success of the remedy and to determine the need for Phase 2.

The rationale used in selecting the preferred remedy and a description of the phased approach that would be used to implement the remedy are described below.

PHASE 1 – SOURCE CONTROL

Phase 1 includes Alternative 2 – Institutional Controls, Alternative 7 – Flowable Fill and Foam in Level 3, Alternative 5 – Flow-Through Bulkhead, and Alternative 11 – Soil Amendment and Revegetation at Levels 5 and 98.

Institutional controls were selected because environmental covenants are required when contaminated materials are left in place. Environmental covenants are used to limit the use of property where waste is left in place or when engineered features or structures require protection. Often these include limiting the use of contaminated ground water, restricting excavation, and limiting the ways in which contaminated property may be used in the future (i.e. residential or commercial use). Site access controls such as fencing and signs also could be used to limit human contact with site contaminants or treatment systems.

A **flow-through bulkhead** was selected to ensure that water behind an existing blockage is not released suddenly and to allow water to be released to Elk Creek when it is either least likely to impact downstream waters or able to be treated in a small sized passive treatment system.

Flowable Fill and Foam in Level 3 was selected because of the source control alternatives it is the most likely to be successful for a limited amount of money. This alternative prevents water that enters the mine at Level 3 and above from contacting the contaminated materials located between Levels 3 and 1 thus reducing the loading of contaminants to Elk Creek.

Soil amendment and revegetation at Levels 5 and 98 would minimize the impacts of waste rock and mine discharges at these locations.

PHASE 1 MONITORING

Water quality and flow monitoring will be performed after the completion of Phase 1 in order to determine the degree of water quality improvements in Elk Creek,

determine progress toward meeting Water Quality Standards (WQS), and to characterize changes in the discharge flow rates and chemistry from Level 1 and Level 3 to determine if Phase 2 is needed. Monitoring will likely continue for 2-3 years once Phase 1 is complete.

Elk Creek Water Quality

Surface water quality in Elk Creek will be sampled at least twice yearly to determine progress toward meeting WQS at Elk-08 (See Figure 1).

Mine Discharge

Phase 1 is expected to alter the flow rate and chemistry of the Level 1 mine discharge. The flume that currently measures the flow rate of water discharging at Level 1 will be maintained and monitored on a regular basis. The water will be sampled at the same time as Elk Creek to characterize any changes in water chemistry. A flume will be installed at Level 3 and the flow and chemistry of the discharge from the Level 3 workings will be monitored to determine if the water requires treatment.

Vegetation

Vegetation monitoring will be conducted to ensure revegetation of waste rock and tailings is successful. Monitoring will measure progress toward establishing a successful vegetation cover over the waste.

Pilot Passive Treatment System

The pilot-scale passive treatment system that has been operating at the site since 2007 will be maintained and monitored until a determination is made regarding whether Phase 2 is necessary. This operation will provide valuable data about the long-term effectiveness of the system in reducing contaminant concentrations and help address state concerns about operation and maintenance.

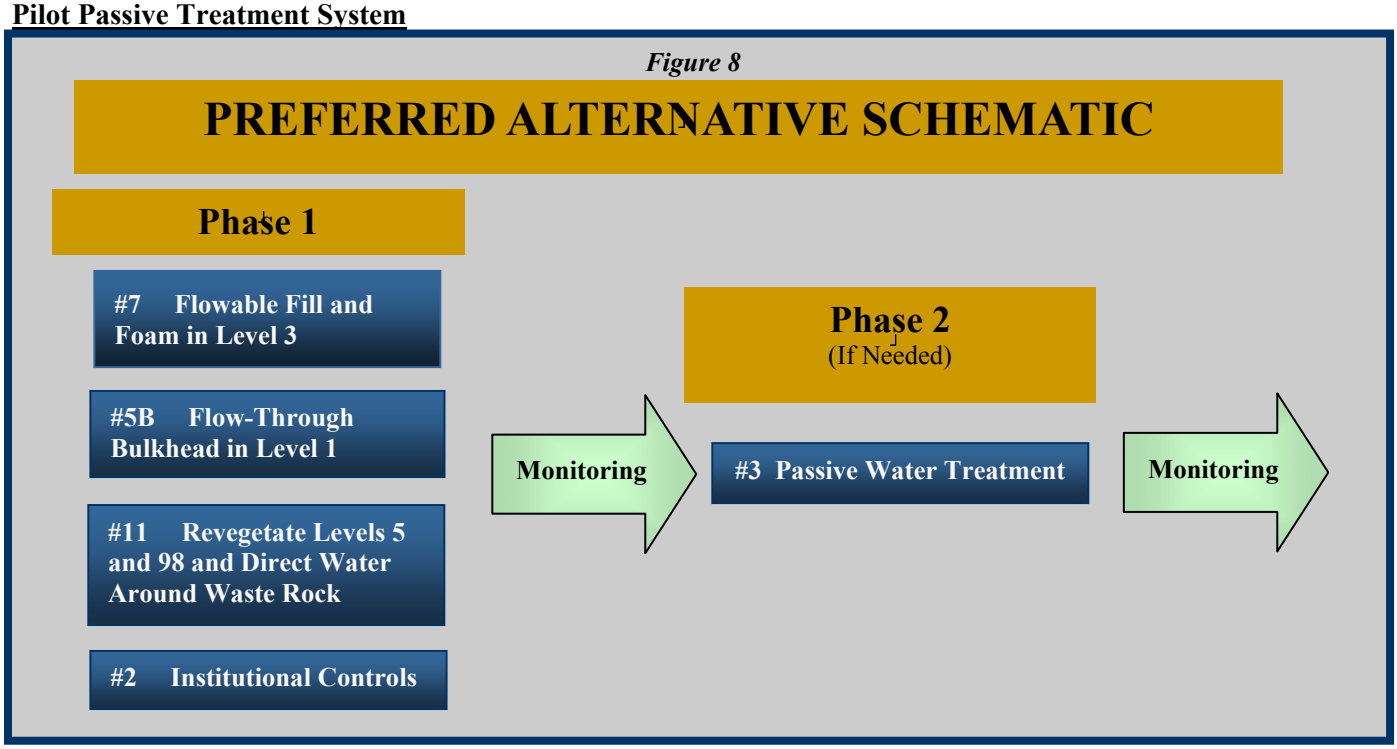
PHASE 2 – WATER TREATMENT

Phase 2 includes Alternative 3 – Passive Water Treatment and will only be implemented if needed to improve water quality in Elk Creek such that WQS can be attained at Elk-08.

If the results of monitoring indicate that Phase 1 does not adequately improve water quality in Elk Creek, a **passive treatment system** (Alternative 3) will be installed at Level 1 to treat the Level 1 mine discharge and, if necessary, the Level 3 mine discharge. The passive system will be designed using data gathered during Phase 1 monitoring. Because the design of a passive treatment system to treat post-Phase 1 mine discharge water flow and chemistry is dependent on the post-Phase 1 monitoring, a specific design flow rate, configuration, and costs are not presented here.

A diagram showing the phased approach to the preferred cleanup alternative is shown on Figure 8 below.

Figure 8



Opportunities for Public Involvement

Public Meeting

EPA will provide a short presentation about the proposed plans for the Standard Mine cleanup at a public meeting in June, 2010. It's a great opportunity to learn more about the details.

Standard Mine Superfund Site
Public Comment Meeting

Wednesday, June 30, 2010
6:30 to 8:30 pm
Crested Butte Town Hall
308 3rd Street
Crested Butte, CO

If you like, you can provide your comment orally at the public meeting, and the meeting stenographer will record it.

Contacts

If you have questions, please feel free to contact:

Christina Progess, Project Manager
U.S. EPA, Region 8
1595 Wynkoop Street
Denver, CO 80202
303-312-6009
progess.christina@epa.gov

Pat Courtney, Community Involvement Coordinator
U.S. EPA, Region 8
1595 Wynkoop Street
Denver, CO 80202
303-312-6631
courtney.patricia@epa.gov

Written Comments and Extensions

The public comment period runs from **June 18, 2010 to July 18, 2010** and may be extended 30 days with a formal request to EPA. You can submit a comment in writing (by mail, email, or at the public meeting). The mailing address for written comments is:

Pat Courtney, Community Involvement Coordinator
Office of Communications & Public Involvement
U.S. EPA, Region 8—8OC
1595 Wynkoop Street
Denver, CO 80202
courtney.patricia@epa.gov

Documents—The Remedial Investigation Report and Feasibility Study Report are available for viewing at EPA's website or at one of the document repositories listed below.

www.epa.gov/region8/superfund/co/standard/

EPA Superfund Records Center
1595 Wynkoop Street
Denver, CO 80202
(303) 312-6473

Crested Butte Old Rock Library
782 Elk Avenue
Crested Butte, CO 81224
(970) 349-6535