



# Eagle Mine Superfund Site Operable Unit 3, North Property Proposed Cleanup Plan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY    REGION 8    JUNE 2017

## Public Review and Comment Opportunity

**The U.S. Environmental Protection Agency (EPA), in consultation with the Colorado Department of Public Health and Environment (CDPHE), invites the public to comment on this proposed cleanup plan for the Eagle Mine Superfund Site (Site), Operable Unit 3 (OU3), known as the North Property. Please see the “Mark your Calendar” section on the last page of this fact sheet for important dates about how and where to comment.**

The primary purpose of this Proposed Plan is to inform and solicit comment from the public on the EPA’s preferred cleanup alternative. The Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation Report (RI) and Feasibility Study Report (FS) and other documents contained within the OU3 Administrative Record for the Site. This Proposed Plan provides information on how to provide comments or questions to the EPA, along with details on where to get more information and when a public meeting will be held. The agencies will reply to public comments in a responsiveness summary as part of the Record of Decision (ROD).



Eagle Mine Superfund Site - Old Tailings Pile after Reclamation, 1999

## Statutory Requirement

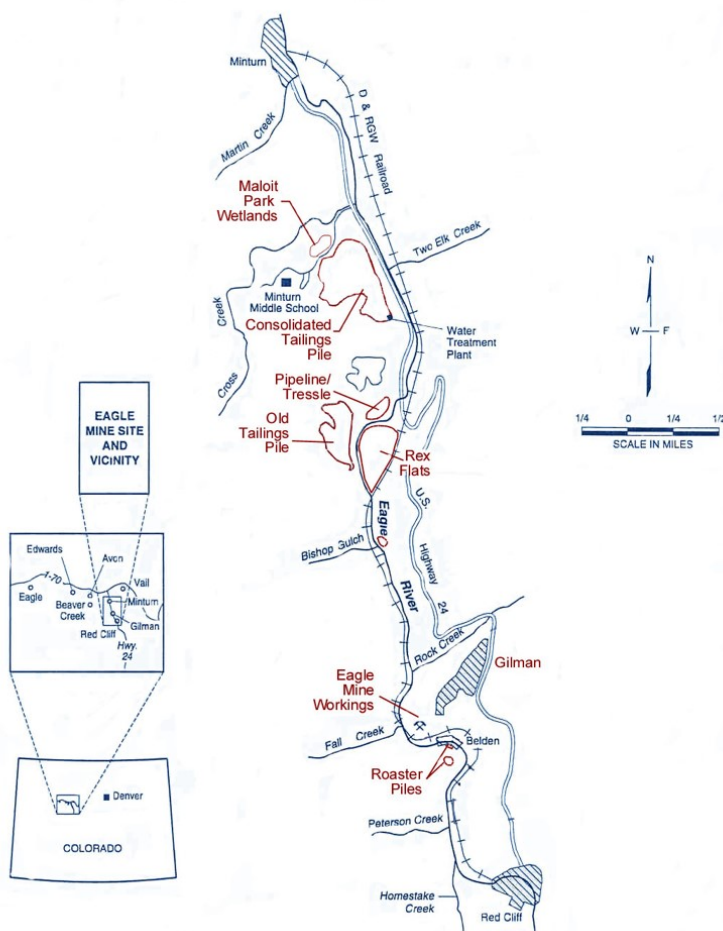
Lead agencies are required to issue the Proposed Plan under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) § 117(a) and the National Contingency Plan (NCP) § 300.430(f) (2). EPA and CDPHE have acted jointly to oversee work completed at the Site. EPA is the lead agency for the OU3 Proposed Plan.

EPA may amend and/or finalize this Proposed Plan for OU3 after reviewing and considering all information submitted during the public comment period. Also, the agencies may modify or reject the Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan. After consideration of public comments, the final remedy selected may be the preferred alternative, a combination of elements from the other alternatives evaluated, or another response action based upon information found in the FS and in the Administrative Record file.

## Site Background

The Site is a large, abandoned mining and milling facility located along the banks of the Eagle River near Minturn, Colorado. The Site comprises approximately 235 acres including the Eagle Mine workings, the former town of Gilman, former roaster pile areas, waste rock piles, the Rex Flats area, the Old Tailings Pile (OTP), the Consolidated Tailings Pile (CTP), the Maloit Park area, groundwater- and seep-collection systems, a mine-water conveyance system and a water treatment plant.

Mining began in the area in 1879. In 1905, the Pittsburg Gold and Zinc Company built a mill in Gilman to roast and separate ore. By 1916, the Empire Zinc Company of Colorado completed consolidation of the principal mines into what is known as the Eagle Mine. An underground mill was constructed and mill tailings were transported via pipeline down the valley and deposited first in the OTP, and later into what is now called the CTP. Eagle Mine closed in 1984 when electrical power to the mine was shut off and the mine workings flooded.



Eagle Mine Site and Vicinity Map

## Site Characteristics

The Eagle River and two of its principal tributaries, Cross Creek and Rock Creek, flow through the Site. The headwaters of the Eagle River originate about 15 miles above the town of Red Cliff. The Eagle River flows north-northwest through the Site and eventually joins the Colorado River at the town of Dotsero. The Eagle Mine workings were developed in the lower levels of Battle Mountain to the east of the Eagle River and south of Rock Creek. Groundwater at the Site was described in the Operable Unit 1 (OU1) ROD as

follows: Rex Flats groundwater, OTP groundwater, Maloit Park north of Cross Creek groundwater, groundwater beneath the CTP and groundwater adjacent to the Eagle River. Soil and groundwater at the Site are impacted by metals related to the Site's mining history. Contaminants of concern (COCs) at the Site are arsenic, cadmium, chromium, copper, lead, manganese and zinc.

## Scope of Site Operable Units

To better manage the Site, the EPA divided it into Operable Units. OU1 is media based and focuses on protecting surface water at the Site by reducing metals loading to the Eagle River. OU1 includes active engineered remedial features designed to capture and treat mine waste in surface water, as well as groundwater that contributes to surface water contamination. The OU1 ROD amendment activities currently being presented in a separate OU1 Proposed Plan introduce an additional remedial feature to capture groundwater which has been identified as a significant source of contamination to surface water. Site wide groundwater remains in OU1. The original OU1 remedy achieved cleanup levels that were protective for trespasser and recreational use. The ROD amendment also revises the definition of OU1 to clarify the distinction between the OUs.

Operable Unit 2 (OU2) is geographically based. OU2 focuses on evaluating potential human health risks at the former town of Gilman. The OU2 remedy requires yet-to-be implemented institutional controls (ICs), which are local land use regulations that are designed to limit access to Gilman. The OU2 ROD also specifies that any proposed future development in Gilman must address risk to human health and the environment.

CBS Operations Inc. (CBS) is the party conducting cleanup at OU1 and OU2.

The focus of this Proposed Plan is OU3. OU3 is media based and focuses on soil remediation to protect human health. Geographically, OU1 and OU3 overlap except for the area of Belden; Belden is in OU1 only. The OU3 remedy addresses potential land use changes by

selecting additional remedial activities to protect human health in the event that the Site is developed for residential use.

## Completed and Ongoing Remediation

EPA listed the Site on the National Priorities List of Superfund Sites in 1986. Cleanup began in 1988 under an agreement between the State of Colorado and CBS. In 1990, a water treatment plant was installed to treat contaminated water from the mine workings and the CTP. The EPA issued a ROD for OU1 in 1993, after implementation of the state-mandated cleanup. The ROD resulted in additional remediation under a cleanup agreement between EPA, the State of Colorado and the CBS, which included removal of contaminated soil in the Maloit Park wetlands.

Remediation conducted at the Site under OU1 decision documents addressed the major sources of metals contamination to the Eagle River, as roaster wastes and mill tailings were removed and placed within the CTP beneath a protective cover. Contaminated groundwater from beneath the CTP is currently collected and treated at the water treatment plant. Remediation conducted to date has resulted in significant improvement in surface water quality and reduction in risk to human health and the environment. Continued operation of OU1 remedial activities, including drawdown from the mine pool and active water treatment, is required to maintain the water quality improvements. Contaminant concentrations in surface water and groundwater have decreased, and the aquatic ecosystem is recovering.



Water Treatment Plant Operated by CBS

## Creation of OU3, the North Property

In 2004, a developer called Ginn Battle North (Ginn) purchased parts of the Site, including an area referred to as the North Property (also known as OU3). The developer approached the EPA and CDPHE with a proposal to develop the North Property into a private, residential golf course community. Because the existing OU1 remedy addressed soil contamination based upon trespasser and recreational use, an analysis was required to determine if additional actions were needed to ensure that future residents and workers at the North Property would be protected. In light of the proposed change in land use, EPA created a new operable unit, OU3, to address residential use.

In 2009, a new developer named Battle North, LLC, acquired the North Property and scaled down the original developer's proposal. Battle North elected to continue working with the EPA and CDPHE, as the original developer had, as a Bona Fide Prospective Purchaser (BFPP) and continued working on Superfund studies necessary to allow for future residential use of the North Property. The BFPP completed a Remedial Investigation (RI) Report that documented the current condition of the North Property and assessed the potential nature and extent of impacts to residents from the remaining mine-related wastes. The BFPP also completed a Human Health Risk Assessment (HHRA) and FS that evaluated remedial alternatives to reduce, mitigate and monitor impacts to the Site.

There are several components of the OU1 remedy that exist in the same geographic area as OU3. These OU1 components are the CTP and associated features; including the water treatment plant, water extraction trenches, diversion trenches, surge ponds, outfall, sludge cell, temporary cell, and the Mine Water Transport Pipeline (MWTP) and trestle. The portions of the Site in OU1 are the subject of a ROD amendment Proposed Plan currently being drafted by CDPHE.

Areas of residual contamination that will be addressed by the OU3 remediation to ensure protectiveness of human health for residential use include:

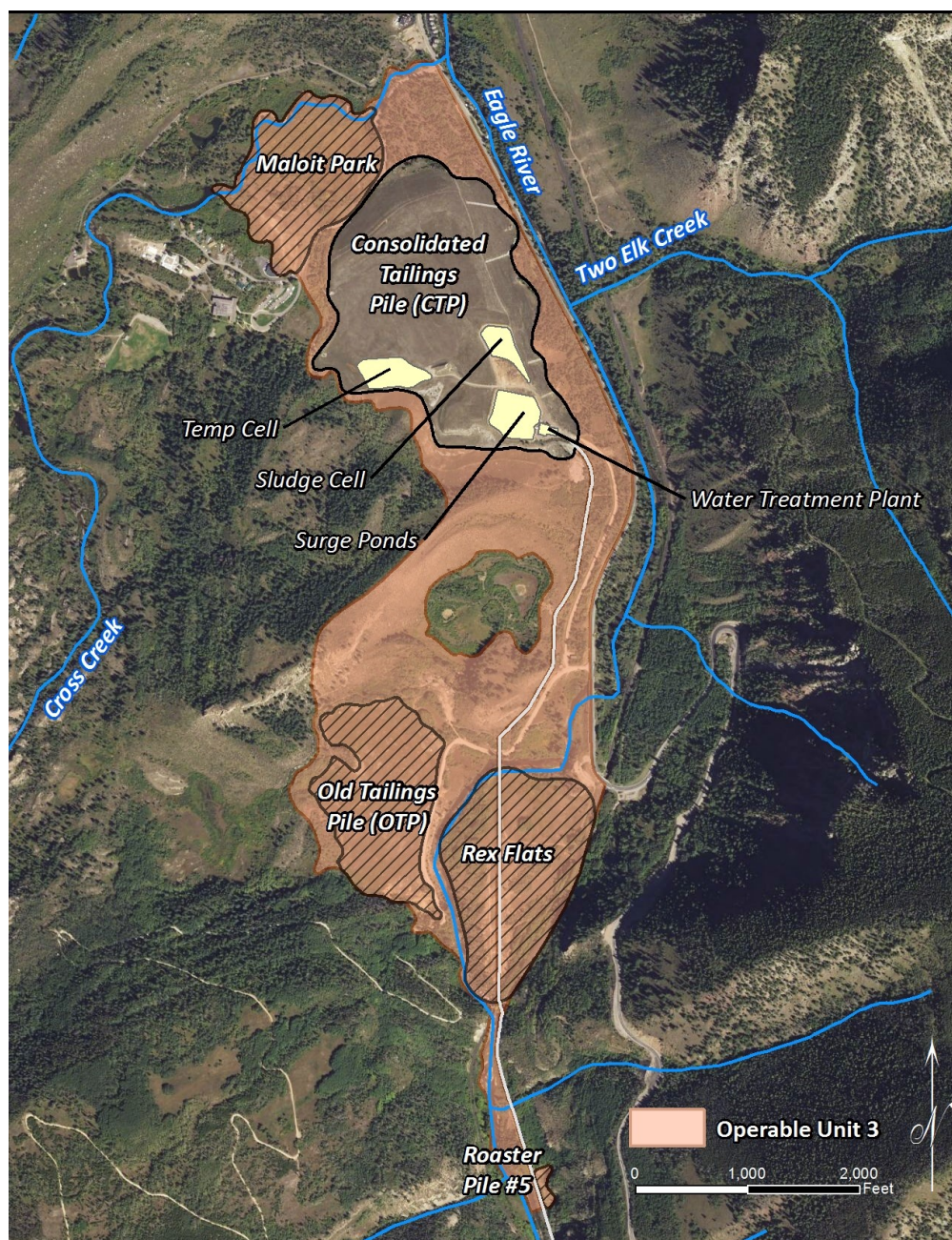
- Tailings material beneath portions of the MWTP that is located on an elevated trestle that crosses from Rex Flats to the water treatment plant;
- Former Tailings Slurry Pipeline located immediately south of the OTP that contains metals-laden sediment;
- The areas of stained boulders and tailings within the southern portions of the OTP and Rex Flats;
- Limited areas of tailings-like material located throughout the OTP and Rex Flats;
- Isolated areas of impacted waste rock and soil at Maloit Park and an area adjacent to the OTP;
- Staining remaining at Roaster Pile #5; and
- Orange stained wetland weeps/ponded water located at the OTP, Rex Flats and Maloit Park.

## Summary of North Property Risks

The BFPP finalized an RI in 2006 and an HHRA in 2007 with oversight by EPA and CDPHE. The RI affirmed that the COCs for OU3 include: arsenic, cadmium, chromium, copper, lead, manganese and zinc. Overall, the soil, tailings and boulders pose the greatest risk to human health for future residential use of the North Property. The HHRA screened five abiotic media (surface soil, subsurface soil, sediment, groundwater and surface water) for contaminants of potential concern in a baseline screening process. Metals exceeding screening levels in this baseline assessment were carried to a second, more extensive risk assessment. This assessment found that the major contributors to non-cancer risk are arsenic, iron, lead and manganese. The major contributor to cancer risk is arsenic. The HHRA identified that the potentially complete exposure pathway for residents and workers is via ingestion or dermal contact with surface soil.

The goals of the existing remedies for OU1 and OU2





were to conduct cleanup activities at the Site to reduce metals migration from the Site to the Eagle River and to implement land use controls to reduce human exposure to on-site metals in the historic town of Gilman, respectively. EPA's analysis of the HHRA for OU3 confirms that unacceptable risk to human health and the environment remains from metals contamination in soils under the current recreational use, due to the lack of Institutional Controls (ICs), and proposed future residential land uses. The BFPP will conduct additional environmental cleanup activities to prepare the

North Property if residential use occurs in the future.

## Remedial Action Objectives

According to the NCP, the goal of the remedy selection process is *"to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste."*

Remedial Action Objectives (RAOs) are general but site-specific and define what should be accomplished

by the OU3 remedy. The RAOs include consideration of the environmental media of concern, COCs, contaminant migration, potential human exposure pathways and more. EPA, with agreement from CDPHE, set the following RAOs for OU3:

- RAO 1: Prevent exposure to contaminants in surface soils at OU3 above levels that are acceptable for current and future land use; and
- RAO 2: Avoid or minimize adverse impacts to the existing engineered remedial features on the North Property.

The HHRA also identified Preliminary Remediation Goals (PRGs) for metals in soil in the event of future residential use. The HHRA advised that the future residents have the highest risk of exposure due to factors such as amount of time spent on-site and activities undertaken on-site. Therefore, EPA, with agreement by CDPHE, developed the following PRGs for metals in soils to be fully protective of future residents:

Contaminant of Concern	Soil Remedial Goal (mg/kg)
Arsenic	40
Cadmium	37
Chromium	210
Copper	3,100
Lead	400
Manganese	1,800
Zinc	23,000

## Description of Alternatives

The FS considered a combination of alternatives including, but not limited to, soil exposure barrier and grading, engineered cap/soil exposure barrier and grading, demolition of the Former Tailings Slurry Pipeline, wetlands mitigation, and ICs and monitoring. The following alternatives are comprised either solely, or in some combination of, the general response actions and technologies identified, screened and retained in the FS. A brief description of each alternative follows.

### Alternative 1: No Action

This alternative was included to represent a baseline condition from which to compare the other remedial action alternatives. The No Action alternative assumes that Site reuse would occur without additional remedial actions being taken and without ICs.

Estimated Cost: \$0

### Alternative 2: ICs and Monitoring

This remedial action alternative involves implementing ICs on the North Property including a combination (known as layering) of governmental controls, proprietary controls and informational devices. The ICs can include zoning restrictions regarding land use and development, environmental covenants or notices of environmental use restrictions, and easements for monitoring. The ICs would require compliance with access and use restrictions by the current and future property owners and will be enforceable by local and/or state agencies.

Estimated Cost: \$2,190,000 (Time: 30 years)

### Alternative 3: Soil Exposure Barrier/Site Grading

This remedial action alternative consists of the installation of a soil barrier with a minimum thickness of three feet over areas that exceed PRGs to prevent exposure to contaminants in soil above levels protective of residential use. At this Site, a three-foot depth is presumed to be protective of most residential uses. After placement of the barrier, the area would be graded to manage water drainage around impacted materials and prevent ponding on-site. Soil cover greater than three feet thick may be placed in some areas to achieve positive drainage. Site grading would include construction and/or reconstruction of the OTP north and south surface water diversion ditches to direct surface water run-on around contaminated zones and into the Eagle River. The purpose of this remedial action alternative is to provide a protective layer of soil between human Site users and impacted materials and to protect the environment by reducing surface water contact with impacted materials left in place. This alternative could include cover and grade alone or excavate, cover and grade, which would include the excavation of impacted soil, tailings and boulders until soil samples indicate PRGs are achieved or to a maximum

depth of three feet, whichever occurs first. The excavated areas would then be covered with clean soil backfill to provide a protective layer. The depth of excavation may be less than three feet in areas where bedrock or shallow groundwater is encountered. The excavated material will be transported to an onsite waste repository designed and operated in compliance with state regulations pertaining to solid waste disposal sites and facilities, and with Resource Conservation and Recovery Act (RCRA) Subtitle C and D regulations, where relevant and appropriate. The disposal site may be the CTP pending agreement between the BFPP and CBS.

Estimated Cost: \$7,210,656 (Time: Construction period)

#### **Alternative 4: Soil Exposure Barrier/Site Grading/ICs and Monitoring**

This remedial action alternative consists of the installation of a soil barrier with a minimum thickness of three feet over areas that exceed PRGs to prevent exposure to contaminants in soil above levels protective of residential use. At this Site, a three-foot depth is presumed to be protective of most residential uses. After placement of the barrier, the Site would be graded to manage water drainage around impacted materials and prevent ponding on-site. This remedial action alternative also involves implementing ICs on the North Property including a combination (known as layering) of governmental controls, proprietary controls, and informational devices. The ICs can include zoning restrictions regarding land use and development, environmental covenants or notices of environmental use restrictions, and easements for monitoring. The ICs would require compliance with access and use restrictions by the current and future property owners and will be enforceable by local and/or state agencies.

Estimated Cost: \$7,732,502 (Time: 30 years)

#### **Alternative 5: Demolition of Structures**

This remedial action alternative involves demolition of the Former Tailings Slurry Pipeline south of the OTP. Tailings present in the Former Tailings Slurry Pipeline will be transported to an onsite waste repository

designed and operated in compliance with state regulations pertaining to solid waste disposal sites and facilities, and with RCRA Subtitle C and D regulations, where relevant and appropriate. The disposal site may be the CTP pending agreement between the BFPP and CBS.

Estimated Cost: \$1,696,189

### **Superfund Evaluation Criteria for Alternatives**

#### Threshold Criteria

- Overall protection to human health and the environment: Addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated or reduced.
- Compliance with applicable or relevant and appropriate requirements (ARARs): Addresses whether or not a remedy will meet all federal and state environmental laws or regulations.

#### Primary Balancing Criteria

- Long-term effectiveness and permanence: Refers to the ability of a remedy to provide reliable protection of human health and the environment over time.
- Reduction of toxicity, mobility or volume of contaminants through treatment: Refers to the preference for a remedy that reduces health hazards, the movement of contaminants or the quantity of contaminants at the site through treatment or destruction.
- Short-term effectiveness: Addresses the period of time needed to complete the remedy and any adverse impacts during construction and operation.
- Implementability: Refers to the technical and administrative feasibility of a remedy.
- Cost: Evaluates the estimated capital, operation and maintenance costs.

#### Modifying Criteria

- Supporting agency acceptance: Indicates whether the supporting agency agrees with, opposes or has no comment.
- Community acceptance: Includes determining which components interested person in the community support, have reservations about or oppose.

## Evaluation of Alternatives

A future change in land use to residential would necessitate additional remediation to meet standards protective of residential uses. The reasonable anticipation of this land use change triggered the development of this Proposed Plan. If the land use changes to residential, the EPA's Preferred Alternative for OU3 is a combination of the above remedial alternatives as they apply to the areas at OU3 proposed for development.

A more detailed discussion of each area and the alternatives selected for each is presented on the following pages.

### Maloit Park

Maloit Park is located adjacent to the CTP to the north and is topographically lower than the CTP. Surface water which supports wetlands located throughout Maloit Park is supplied to the area by Cross Creek, seasonal snowmelt, discharges from the up gradient diversion trench (UGDT) and CTP surface water diversion ditches, and groundwater that seeps from the CTP. Water is transported from the CTP surface water diversion ditches under Maloit Park Road via a culvert to a man-made basin located on the southern side of Maloit Park. Water from the UGDT is also piped beneath Maloit Park Road but discharges to the northwest of the man-made basin directly to the Maloit Park wetlands.

Mine waste was not placed at Maloit Park, but the area was historically impacted by releases from the CTP. Additionally, groundwater beneath the CTP that is impacted from the historical deposition of wet tailings at that location flows toward Maloit Park; this groundwater is included in the scope of OU1. Maloit Park has also been impacted by wind dispersion of the tailings at the CTP. Soils in the areas of Maloit Park, which contained elevated metals levels, were removed by CBS and placed into the CTP, and clean soil was placed at Maloit Park. However, isolated areas of impacted soil remain. Groundwater extraction trenches are currently present along portions of the north and east sides of the CTP. These trenches were not designed to collect all groundwater flowing from the

CTP, and a portion of metals impacted groundwater from the CTP flows past the trenches and into Maloit Park/Cross Creek and the Eagle River. Impacted groundwater, containing dissolved zinc and manganese at levels over the groundwater and surface water standards specified in the OU1 ROD, exists in Maloit Park south of Cross Creek and is included in the scope of OU1.

### **The Preferred Alternative for Maloit Park is Alternative 4 (Soil Exposure Barrier/Site Grading/ICs and Monitoring).**

Alternative 4:

- will be effective on a short-term basis for meeting the RAOs and will provide a permanent method for long-term effectiveness for containment of the COCs and mitigation of exposure.
- will not reduce the toxicity, mobility or volume of COCs through active treatment, but will reduce toxicity to humans by eliminating exposure to COCs above PRGs.
- will be highly implementable. Materials and equipment necessary for implementation of this alternative are readily available, can be delivered to the Site and can be installed using common construction techniques.
- will comply with ARARs because it will prevent human exposure to impacted materials and the graded soil exposure barrier will prevent surface water from contacting impacted materials. ICs and monitoring will be implemented to assure continued compliance with ARARs.
- will be protective of human health and the environment because it meets both RAOs set forth in this Proposed Plan by eliminating the exposure pathway via soil barrier and avoiding the existing remedial features during construction.

Alternative 1 (No Action) will not meet the RAOs set forth in this plan and is therefore not protective of human health and the environment. Alternative 3 (Soil Exposure Barrier/Site Grading) is not as effective in maintaining protection of human health and the environment as Alternative 4 because it does not create enforceable documents requiring compliance with



ICs. Alternative 5 includes the demolition of structures and does not apply so it was not evaluated for Maloit Park.

Soils contaminated in exceedance of PRGs will either be covered with a protective three-foot barrier of clean soil or excavated until either the PRGs are met or to a depth of three feet, whichever occurs first. In the case of excavation, a soil exposure barrier will be placed in the excavation to return the area to its pre-existing grade. The excavated material will be transported to an onsite waste repository designed and operated in compliance with state regulations pertaining to solid waste disposal sites and facilities, and with RCRA Subtitle C and D regulations, where relevant and appropriate. The disposal site may be the CTP pending agreement between the BFPP and CBS. During the remedial construction effort, vegetation which has been established over zones of contamination will be removed to provide access to the impacted materials. New vegetation will be seeded and monitored until it is established. If wetlands must be impacted to implement the preferred remedy, the appropriate mitigation measure will be selected and undertaken. Decision criteria is specified in the FS. Existing groundwater monitoring wells affected by the preferred remedy will be properly abandoned and, as necessary, replaced so as to provide equivalent monitoring of groundwater quality and performance of the OUI remedy.

### **Old Tailings Pile**

The OTP consists of mine tailings that were historically discharged from the Eagle Mine by gravity flow for disposal from about 1929 to 1946. The OTP is located



Old Tailings Pile

south of the CTP and lies opposite and across the Eagle River from Rex Flats. This area includes both the current and former Sump #3 areas. Bolts Ditch is located on the north side of the OTP and was historically used to convey water from Cross Creek to Bolts Lake. Another ditch is located along the southern perimeter of the OTP and was constructed as a temporary diversion during the initial Superfund remedial action. This ditch is known as the southern diversion ditch, and reduces surface water runoff onto the OTP from adjacent slopes. An earthen berm on the west side of the OTP directs surface water runoff into Bolts Ditch. The berm has not been maintained. Spring runoff overtops the diversion berm during periods of peak runoff and flows onto the OTP.

### **The Preferred Alternative for the OTP is Alternative 4 (Soil Exposure Barrier/Site Grading/ICs and Monitoring) and Alternative 5 (Demolition of Structures (Former Tailings Slurry Pipeline).**

#### **Alternative 4:**

- will be effective on a short-term basis for meeting the RAOs and will provide a permanent method for long-term effectiveness for containment of the COCs and mitigation of exposure.
- will not reduce the toxicity, mobility or volume of COCs through active treatment, but will reduce toxicity to humans by eliminating exposure to COCs above PRGs.
- will be highly implementable. Materials and equipment necessary for implementation of this alternative are readily available, can be delivered to the Site and can be installed using common construction techniques.
- will comply with ARARs because it will prevent human exposure to impacted materials and the graded soil exposure barrier will prevent surface water from contacting impacted materials. ICs and monitoring will be implemented to assure continued compliance with ARARs.
- will be protective of human health and the environment because it meets both RAOs set forth in this plan by eliminating the exposure pathway via soil barrier and avoiding the existing remedial features during construction.

Evaluation of Alternatives—EPA Nine Criteria								
	1	2	3	4	5	6	7	
Overall protection of human health and environment	•	•	/	O	/	O	O	Alt 4 at Maloit Park, OTP, Rex Flats, Roaster Pile #5 and for Management of Contaminated Wetlands meet both RAOs by eliminating exposure pathway via soil exposure barrier and avoiding existing remedial features during construction; Alt 5 at OTP meets both RAOs by eliminating exposure to COCs above PRGs through the removal of contaminated tailings in the Former Tailings Slurry Pipeline and avoiding the existing remedial features during construction.
Compliance with ARARs	•	/	/	O	/	O	O	Alt 4 at Maloit Park, OTP, Rex Flats, Roaster Pile #5 and for Management of Contaminated Wetlands will comply with ARARs by preventing exposure to impacted materials and requiring ICs and monitoring to assure continued compliance with ARARs; Alt 5 at OTP will comply with ARARs because it will prevent human exposure to impacted material in the Former Tailings Slurry Pipeline.
Long-term effectiveness and permanence	•	•	/	O	/	O	O	Alt 4 at Maloit Park, OTP, Rex Flats, Roaster Pile #5 and for Management of Contaminated Wetlands will provide a permanent method for containment of the COCs and mitigation of exposure; Alt 5 at OTP will provide removal of any metals contaminated material remaining in the Former Tailings Slurry Pipeline
Satisfy the preference for treatment that reduces toxicity, mobility or volume of waste as a principal element	•	•	/	O	/	O	O	Alt 4 at Maloit Park, OTP, Rex Flats, Roaster Pile #5 and for Management of Contaminated Wetlands will not reduce the toxicity, mobility or volume of COCs through active treatment but the soil barrier and grading will limit surface water infiltration thereby reducing mobility of COCs through impacted materials and will reduce the toxicity to humans by eliminating exposure to COCs above PRGs; Alt 5 at OTP will reduce toxicity to humans by eliminating exposure to COCs above PRGs
Short-term effectiveness	•	/	O	O	/	O	O	Alt 4 at Maloit Park, OTP, Rex Flats, Roaster Pile #5 and for Management of Contaminated Wetlands; Alt 5 at OTP will be effective on a short-term basis for meeting the RAOs.
Implementability	O	O	O	O	/	O	O	Alt 4 at Maloit Park, OTP, Rex Flats, Roaster Pile #5 and for Management of Contaminated Wetlands; Alt 5 at OTP will be highly implementable. Materials and equipment necessary for implementation of the alternatives are readily available, can be delivered to the Site and can be installed using common construction techniques.
Cost-effectiveness	O	O	O	/	/	/	/	Estimated Capital and O&M costs: Alt 1 - \$0; Alt 2 - \$2,190,000; Alt 3 - \$7,210,656; Alt 4 - \$7,732,502; Alt 5 - \$1,696,189.
State acceptance	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Community acceptance	TBD	TBD	TBD	TBD	TBD	TBD	TBD	

Table of Alternatives

°= meets criteria

/ = somewhat meets criteria

• = does not meet criteria

#### Alternative 5:

- is effective on a short-term basis for meeting the RAOs and will provide long-term effectiveness through removal of any metals contaminated tailings material remaining in the Former Tailings Slurry Pipeline.
- will not reduce the toxicity, mobility or volume of COCs through active treatment, but will reduce toxicity to humans by eliminating exposure to COCs above PRGs.
- will be highly implementable. Materials and equipment necessary for implementation of this alternative are readily available, can be delivered to the Site and can be installed using common construction techniques.
- will comply with ARARs because it will prevent human exposure to impacted materials in the Former Tailings Slurry Pipeline.
- will be protective of human health and the environment because it meets both RAOs set forth in this plan by eliminating exposure to COCs above PRGs through the removal of contaminated tailings in the Former Tailings Slurry Pipeline and avoiding the existing remedial features during construction.

Alternative 1 (No Action) will not meet the RAOs set forth in this plan and is therefore not protective of human health and the environment. Alternative 3 (Soil Exposure Barrier/Site Grading) is not as effective in maintaining protection of human health and the environment as Alternative 4 because it does not create enforceable documents requiring compliance with ICs.

Implementation of the preferred remedy will have no long term adverse impacts upon the existing remedial features of OU1 at the OTP. Soils contaminated in exceedance of PRGs will either be covered with a protective three-foot barrier of clean soil or excavated until either the PRGs are met or to a depth of three feet, whichever occurs first. In the case of excavation, a soil exposure barrier will be placed in the excavation to return the area to its pre-existing grade. The excavated material will be transported to an onsite waste repository designed and operated in compliance with

state regulations pertaining to solid waste disposal sites and facilities, and with RCRA Subtitle C and D regulations, where relevant and appropriate. The disposal site may be the CTP pending agreement between the BFPP and CBS. If excavation is part of the selected remedy, vegetation which has been established over zones of contamination will be removed to provide access to the impacted materials, but new vegetation will be seeded and monitored until it is established. Surface water runoff to the OTP from up gradient will be directed into Bolts Ditch by constructing a berm along the western side of the OTP. Additionally, the north and south diversion ditches will be reconstructed to remove contaminated materials used in their construction and integrate and improve the effectiveness in directing surface water flows around the OTP.

The Former Tailings Slurry Pipeline, which is located adjacent to the OTP, will be demolished and transported to an onsite waste repository designed and operated in compliance with state regulations pertaining to solid waste disposal sites and facilities, and with RCRA Subtitle C and D regulations, where relevant and appropriate. The disposal site may be the CTP pending agreement between the BFPP and CBS. If wetlands must be impacted to implement the preferred remedy, the appropriate mitigation measure will be selected and undertaken. Decision criteria are specified in the FS. If contaminated wetlands are not restored in place, clean soil backfill will be placed to achieve positive drainage. Existing groundwater monitoring wells affected by the preferred remedy will be properly abandoned and, as necessary, replaced so as to provide equivalent monitoring of groundwater quality and performance of the OU1 remedy.

#### **Rex Flats**

Rex Flats is located south of the CTP, opposite and across the Eagle River from the OTP. Rex Flats is situated between the railroad line and the Eagle River. Mine tailings were historically discharged by gravity flow into Rex Flats for disposal from about 1929 to 1931 and again from 1941 to 1946. When the OTP and Rex Flats reached their capacity for tailing disposal, a pipeline was constructed across Rex Flats to transport tailings from the underground mill at Belden to the

CTP. To maintain grade across Rex Flats, the pipeline was supported on a trestle.

**The Preferred Alternative for Rex Flats is Alternative 4 (Soil Exposure Barrier/Site Grading/ICs and Monitoring).**



Eagle River adjacent to Rex Flats

**Alternative 4:**

- will be effective on a short-term basis for meeting the RAOs and will provide a permanent method for long-term effectiveness for containment of the COCs and mitigation of exposure.
- will not reduce the toxicity, mobility or volume of COCs through active treatment, but will reduce toxicity to humans by eliminating exposure to COCs above PRGs.
- will be highly implementable. Materials and equipment necessary for implementation of this alternative are readily available, can be delivered to the Site and can be installed using common construction techniques.
- will comply with ARARs because it will prevent human exposure to impacted materials and the graded soil exposure barrier will prevent surface water from contacting impacted materials. ICs and monitoring will be implemented to assure continued compliance with ARARs.
- will be protective of human health and the environment because it meets both RAOs set forth in this plan by eliminating the exposure pathway via soil barrier and avoiding the existing remedial features during construction.

Alternative 1 (No Action) will not meet the RAOs set forth in this plan and is therefore not protective of human health and the environment. Alternative 3 (Soil Exposure Barrier/Site Grading) is not as effective in maintaining protection of human health and the environment as Alternative 4 because it does not create enforceable documents requiring compliance with ICs. Alternative 5 includes the demolition of structures and does not apply so it was not evaluated for Rex Flats.

Implementation of the preferred remedy will have no long term adverse impacts upon the existing remedial features of OU1 at Rex Flats. Soils contaminated in exceedance of PRGs will either be covered with a protective three-foot barrier of clean soil or excavated until either the PRGs are met or to a depth of three feet, whichever occurs first. In the case of excavation, a soil exposure barrier will be placed in the excavation to return the area to its pre-existing grade. The excavated material will be transported to an onsite waste repository designed and operated in compliance with state regulations pertaining to solid waste disposal sites and facilities, and with RCRA Subtitle C and D regulations, where relevant and appropriate. The disposal site may be the CTP pending agreement between the BFPP and CBS. If excavation is part of the selected remedy, vegetation which has been established over zones of contamination will be removed to provide access to the impacted materials, but new vegetation will be seeded and monitored until it is established.

Existing groundwater monitoring wells affected by the preferred remedy will be properly abandoned and, as necessary, replaced so as to provide equivalent monitoring of groundwater quality and performance of the OU1 remedy. If wetlands must be impacted to implement the preferred remedy, the appropriate mitigation measure will be selected and undertaken. Decision criteria are specified in the FS. If contaminated wetlands are not restored in place, clean soil backfill will be placed to achieve positive drainage.



### **Roaster Pile #5**

The former Roaster Pile #5 area consists of impacted soils from the storage of roaster wastes. These materials were stored south of Rex Flats near the southern end of the North Property and east of the Eagle River, just north of the intersection of Bishop Gulch and the Eagle River.

### **The Preferred Alternative for the Roaster Pile #5 is Alternative 4 (Soil Exposure Barrier/Site Grading/ICs and Monitoring).**

#### **Alternative 4:**

- will be effective on a short-term basis for meeting the RAOs and will provide a permanent method for long-term effectiveness for containment of the COCs and mitigation of exposure.
- will not reduce the toxicity, mobility or volume of COCs through active treatment, but will reduce toxicity to humans by eliminating exposure to COCs above PRGs.
- will be highly implementable. Materials and equipment necessary for implementation of this alternative are readily available, can be delivered to the Site and can be installed using common construction techniques.
- will comply with ARARs because it will prevent human exposure to impacted materials and the graded soil exposure barrier will prevent surface water from contacting impacted materials. ICs and monitoring will be implemented to assure continued compliance with ARARs.
- will be protective of human health and the environment because it meets both RAOs set forth in this plan by eliminating the exposure pathway via soil barrier and avoiding the existing remedial features during construction.

Alternative 1 (No Action) will not meet the RAOs set forth in this plan and is therefore not protective of human health and the environment. Alternative 3 (Soil Exposure Barrier/Site Grading) is not as effective in maintaining protection of human health and the environment as Alternative 4 because it does not create enforceable documents requiring compliance with ICs. Alternative 5 includes the demolition of

structures and does not apply so it was not evaluated for Roaster Pile #5.

Implementation of the preferred remedy will have no long term adverse impacts upon the existing remedial features of OU1 at Roaster Pile #5 because there are none in the area. Soils contaminated in exceedance of PRGs will either be covered with a protective three-foot barrier of clean soil or excavated until either the PRGs are met or to a depth of three feet, whichever occurs first. In the case of excavation, a soil exposure barrier will be placed in the excavation to return the area to its pre-existing grade. The excavated material will be transported to an onsite waste repository designed and operated in compliance with state regulations pertaining to solid waste disposal sites and facilities, and with RCRA Subtitle C and D regulations, where relevant and appropriate. The disposal site may be the CTP pending agreement between the BFPP and CBS.

### **Management of Contaminated Wetlands**

The BFPP prepared a wetlands delineation in 2010-2011 that identified approximately 68 acres of wetlands on the North Property. The BFPP then performed a wetland-by-wetland assessment of (1) whether contaminated soils were present or likely present in the wetlands above remediation goals, and (2) whether wetlands would become re-contaminated following any excavation of impacted soils. Up to 106,000 cubic yards of impacted soil above remediation goals are located in wetlands across the North Property. The BFPP will update the wetlands delineation and assessment during Remedial Design (RD). The EPA, with agreement from CDPHE, will make remedial decisions regarding specific wetlands during the RD process. Criteria for decision making are specified in the FS. The alternatives evaluated for the management of contaminated wetlands are the same as remedial alternatives developed for areas where COCs exceed remediation goals in non-wetlands areas, with the nuance that a wetland may be restored in the area of excavation rather than the placement of clean backfill.

## **The Preferred Alternative for the Management of Contaminated Wetlands is Alternative 4 (Soil Exposure Barrier/Site Grading/ICs and Monitoring).**

### **Alternative 4:**

- will be effective on a short-term basis for meeting the RAOs and will provide a permanent method for long-term effectiveness for containment of the COCs and mitigation of exposure.
- will not reduce the toxicity, mobility or volume of COCs through active treatment, but will reduce toxicity to humans by eliminating exposure to COCs above PRGs.
- will be highly implementable. Materials and equipment necessary for implementation of this alternative are readily available, can be delivered to the Site and can be installed using common construction techniques.
- will comply with ARARs because it will prevent human exposure to impacted materials. ICs and monitoring will be implemented to assure continued compliance with ARARs.
- will be protective of human health and the environment because it meets both RAOs set forth in this plan by eliminating the exposure pathway via soil barrier and avoiding the existing remedial features during construction.

Alternative 1 (No Action) will not meet the RAOs set forth in this plan and is therefore not protective of human health and the environment. Alternative 3 (Soil Exposure Barrier/Site Grading) is not as effective in maintaining protection of human health and the environment as Alternative 4 because it does not create enforceable documents requiring compliance with ICs. Alternative 5 includes the demolition of structures and does not apply so it was not evaluated for the management of contaminated wetlands.

Contaminated wetland areas requiring excavation will either be restored in place, covered with a soil exposure barrier back to original grade and reconstructed elsewhere on-site, or mitigated through an alternative mitigation measure such as purchasing credits in a wetland bank, depending upon the characteristics of

each individual wetland area.

The decision of which technique is appropriate for each wetland is dependent upon the specific factors pertaining to each wetland, including hydrology, presence or absence of contaminated groundwater, proximity to other wetland areas, plant species and soil classification. Final designs for wetland restoration/relocation or mitigation of each individual wetland area would be developed during the remedial design phase.

## **Preferred Alternative Summary & Benefits**

### **Statutory Determinations**

Based on information currently available, the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives, with respect to the balancing and modifying criteria. The EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA § 121(b): (1) protect human health and the environment; (2) comply with ARARs; (3) be cost-effective; (4) utilize permanent solutions to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element. The Preferred Alternative can change in response to public comment or new information.

As described, the Preferred Alternative for OU3 is a combination of four alternatives combined as appropriate on the North Property. Implementing the Preferred Alternative for OU3, in addition to the existing OU1 remedy, will increase overall protectiveness of human health and the environment and will provide protection from COCs, preparing the North Property for residential use. The estimated cost for the combination preferred remedy for OU3 is \$9,428,691.

Specifically, the protectiveness provided by the OU3 Preferred Alternative includes the following:

1. Installing a soil exposure barrier to eliminate the

human exposure pathway to elevated metals. The barrier will consist of a minimum three-foot thick soil cover over areas that exceed PRGs to prevent exposure to contaminants in soil above levels protective of residential use. At this Site, a three-foot depth is presumed to be protective of most residential uses. After placement of the barrier, the Site would be graded to manage water drainage around impacted materials and prevent ponding on-site. Contaminated soils, boulders and debris from the OTP, Rex Flats, Maloit Park and Roaster Pile #5 will be removed and transported to an onsite waste repository designed and operated in compliance with state regulations pertaining to solid waste disposal sites and facilities, and with RCRA Subtitle C and D regulations, where relevant and appropriate. The disposal site may be the CTP pending agreement between the BFPP and CBS. Areas selected for excavation will be filled to their pre-existing grade with a soil exposure barrier, covered with topsoil and seeded with native grasses.

2. Reconstructing the northern and southern diversion ditches and Bolts Ditch diversion berm at the west end of the OTP. This will reduce the flow of surface water runoff into the OTP and reduce surface water infiltration through impacted materials, facilitating the additional soil remediation selected in this remedy.

3. Continuing environmental monitoring of the OUI remedy will assess impacts to groundwater and surface waters in the Eagle River and/or Cross Creek. The ICs will also be protective of human health and the environment by employing environmental covenants or notices of environmental use restrictions to prevent land uses and other actions which may cause exposures to the impacted materials remaining at the Site. Operations, maintenance and monitoring responsibilities for remedial features will be allocated between the BFPP and CBS during enforceable agreement negotiations with the BFPP, CBS, the EPA and CDPHE.

4. Providing that contaminated wetlands be remediated and restored in place, reconstructed elsewhere on-site or mitigated off-site.

5. Applying the Preferred Alternative to address additional areas of contamination, which may be identified during the North Property remediation.

## *Glossary*

**ARARs**—applicable or relevant and appropriate requirements

**BFPP**—Bona Fide Prospective Purchaser

**OU**—Operable Unit

**CDPHE**—Colorado Department of Public Health and Environment

**COCs**—Contaminants of Concern

**CTP**—Consolidated Tailings Pile  
Engineered Cover

**EPA**—U.S. Environmental Protection Agency

**HHRA**—Human Health Risk Assessment

**ICs**—Institutional Controls

**MWTP**—Mine Water Transport Pipeline

**NTP**—New Tailings Pile

**Ore**—a naturally occurring mineral from which a valuable constituent is extracted (as metal) for which it is mined and worked

**PRP**—Potentially Responsible Party

**RAOs**—Remedial Action Objectives

**ROD**—Record of Decision

**RGs**—Remediation Goals

**RI**—Remedial Investigation

**Roaster Wastes**—wastes containing highly leachable metals due to milling process

**Sludge Disposal Cell**—repository for sludge created by water treatment process

**Slurry**—a fluid mixture of a pulverized solid and liquid (crushed ore and water)

**Tailings**—residue separated during the ore extraction process

**UGDT**—Up gradient diversion trench

**Waste Rock**—rock that is non-mineralized

## Contacts

**For more information, please feel free to contact one of the following representatives or visit one of the following Web sites:**

Jennifer Chergo  
Office of Communication & Public Involvement  
U.S. Environmental Protection Agency  
1595 Wynkoop Street  
Denver, CO 80202  
303-312-6601 / 1-800-227-8917  
chergo.jennifer@epa.gov

Jamie Miller  
Project Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street  
Denver, CO 80202  
303-312-6519 / 1-800-227-8917  
miller.jamie@epa.gov

Warren Smith  
Community Involvement Leader

<https://www.epa.gov/superfund/eagle-mine>

<https://www.colorado.gov/pacific/cdphe/eagle-mine>

Colorado Department of Public Health and Environment  
4300 Cherry Creek Drive South  
Denver, CO 80246  
303-692-3373  
1-888-569-1831, ext. 3373  
warren.smith@state.co.us

Wendy Naugle  
On-Site Coordinator  
Colorado Department of Public Health and Environment  
4300 Cherry Creek Drive South  
Denver, CO 80246  
303-692-3394  
1-888-569-1831, ext. 3394  
wendy.naugle@state.co.us

**Or, visit one of the Eagle Mine Superfund Site Information Repositories at the following locations:**

Colorado Department of Public Health and the Environment Records Center  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530  
303-692-3311  
1-888-569-1831, ext. 3331

Minturn Town Hall  
P.O. Box 309  
302 Pine Street  
Minturn, CO 81645

U.S. Environmental Protection Agency  
Region 8 , Records Center  
1595 Wynkoop Street  
Denver, CO 80202  
Records may be viewed by appointment only -  
call 303-312-6601



# **Mark Your Calendar**

## **Public Comment Meeting:**

**Tuesday, July 25, 5:30-8:30 pm**  
Colorado Mountain College  
150 Miller Ranch Road  
Edwards, CO 81932

**Public Comment Period: June 28- August 11, 2017 (45 days)**

### ***How to submit public comments:***

EPA and CDPHE will consider all formal relevant comments prior to making a final decision. You may submit formal written or oral comments during the public meeting or by submitting written comments via email or regular mail postmarked by August 11, 2017 to :

Jamie Miller, Project Manager  
U.S. Environmental Protection Agency  
1595 Wynkoop Street  
Denver, CO 80202  
[miller.jamie@epa.gov](mailto:miller.jamie@epa.gov)