

**Draft Environmental Impact
Statement for the Proposed
Amendment to Permits 00030 and
00030A for the Continental Mine:
Expansion of the Yankee Doodle
Tailings Impoundment and
Associated Facilities**

March 2019

**CONTINENTAL MINE
MONTANA RESOURCES, LLP
SILVER BOW COUNTY, MONTANA**



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March 22, 2019

RE: Notice of release and public comment period for the Draft Environmental Impact Statement for Montana Resources, LLC's amendment application for expansion of the existing Yankee Doodle Tailings Impoundment.

Dear Interested Party:

The Montana Department of Environmental Quality (DEQ) has released a Draft Environmental Impact Statement (EIS) for Montana Resources, LLC's (Montana Resources) amendment application. The amendment application affects multiple operating permits held by Montana Resources. Approval of the amendment application would allow Montana Resources to raise the western embankment of the existing Yankee Doodle Tailings Impoundment (YDTI) to an elevation of 6450 feet, extend the northern boundary of the impoundment, and add other facilities to support this impoundment project. The Montana Resources' Yankee Doodle Tailings Impoundment is located adjacent to and northeast of Butte, Montana.

Montana Resources applied to DEQ for an amendment on October 6, 2017, under the Metal Mine Reclamation Act, Section 82-4-301, *et seq.*, Montana Code Annotated (MCA). Pursuant to Section 82-4-337, MCA, DEQ determined that Montana Resources' amendment application was complete and compliant and, on August 31, 2018, issued Montana Resources a draft amendment approval. Electronic copies of the applications may be viewed by visiting the website (<http://deq.mt.gov/Land/hardrock>).

The Montana Environmental Policy Act (MEPA), Section 75-1-201, *et seq.*, MCA, requires the preparation of an environmental impact statement for state actions that may significantly affect the quality of the human environment. The EIS must include a detailed statement on the environmental impact of the proposed action, alternatives to the proposed action, and a no action alternative. DEQ analyzed several alternatives: a No Action Alternative, a Proposed Action Alternative based on Montana Resources' application submitted to DEQ, and three additional alternatives.

DEQ has identified the West Embankment Drain (WED) Pumpback Elimination at Closure Alternative as the agency's preferred alternative. This alternative incorporates all the features in the Proposed Action Alternative except for it would eliminate pumping the potentially poor-quality seepage water collected in the WED extraction pond back to the tailing pond for approximately 20 years post-closure. WED Pumpback Elimination at Closure Alternative seepage would be diverted to the Continental Pit for storage or to the Horseshoe Bend Treatment Plant for treatment and discharge under the Superfund remedy.

DEQ's Preferred Alternative presents a different scenario for YDTI water management at closure, which necessitates recognition of U.S. Environmental Protection Agency's authority over long-term water management and treatment at the site under the Butte Mine Flooding Operable Unit. Discussions and coordination with all parties in the 2002 Butte Mine Flooding Operable Unit Consent Decree would be needed to review the options and feasibility for handling and treating this water, the potential use of existing or upgraded facilities and infrastructure (e.g. Horseshoe Bend Treatment Plant), and to amend their agreement accordingly.

The Draft EIS is available for public comment from March 22, 2019 – April 22, 2019. All comments submitted to DEQ will become part of the public record for this project and are available for public review, along with the name(s) of the commenter(s). The Draft EIS has been posted on DEQ's website at (<http://deq.mt.gov/Public/eis>).

Digital copies of the Draft EIS may be requested by contacting Craig Jones at (406) 444-0514.

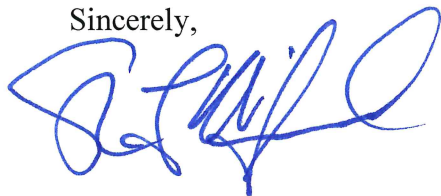
An open house and public meeting will be held to provide the public with information on the proposed project and to provide an opportunity for the public to submit written and/or oral comments. The meeting will be held on Wednesday, April 10 from 5:30-8:30 pm at the Clarion Inn Copper King, 4655 Harrison Avenue, in Butte. The open house portion of the meeting will be held from 5:30 – 6:30 pm. Then, from 6:30 – 8:30 pm, the public will have an opportunity to provide oral and/or written testimony on the Draft EIS.

Written comments may be submitted at the public meeting. In addition, comments may be submitted via electronic mail at DEQMTResourcesMEPA@mt.gov, or postal mail at:

Craig Jones
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59601

Comments on the Draft EIS must be received on or before Monday, April 22, 2019.

Sincerely,



Shaun McGrath
Director
Department of Environmental Quality

EXECUTIVE SUMMARY

This Executive Summary provides an overview of the draft Environmental Impact Statement (EIS) for the proposed amendment to Montana Resources, LLP (MR) Operating Permits 00030 and 00030A related to the expansion of the Yankee Doodle Tailings Impoundment (YDTI) and changes to associated facilities. The EIS describes the resources potentially affected by the proposed amendment activities. This summary does not provide all the information contained in the EIS. If more detailed information is desired, please refer to the EIS and the reports and other sources referenced within.

This EIS presents descriptions of the Proposed Action and alternatives, including the No Action Alternative and other alternatives described in Chapter 2; descriptions of the affected environment for all potentially affected resources (Chapter 3); an analysis of the impacts of the alternatives (Chapters 3 and 4); and a summary and comparison of the alternatives in Chapter 5.

PURPOSE AND NEED

DEQ's purpose and need in conducting the environmental review is to act upon MR's application to amend Operating Permits Nos. 00030 and 00030A to expand the capacity of the YDTI. The proposed amendment would raise the elevation of the YDTI West Embankment from 6,405 feet to 6,450 feet, to match the presently permitted elevations of the East-West and the North-South embankments. The proposed amendment would allow for increased tailings storage and a commensurate extension of the northern boundary of the tailings pond, a new rock disposal site, expand an existing rock disposal site, provide for construction of a closure spillway and new soil stockpiles, and revise the operation, reclamation, and closure phases of the impoundment. The proposed amendment would allow for an additional 9 years of operation of the mine at current production levels. However, continued operations under the proposed amendment would be limited by production rates and the capacity of the YDTI, and should DEQ approve the amendment, it would not specify a duration for operations.

DEQ will decide which alternative should be approved in DEQ's Record of Decision (ROD) based on information provided in the amendment application, the analysis in the EIS, and the substantive provisions of the Montana Metal Mine Reclamation Act (MMRA) (Section 82-4-301, *et seq.*, Montana Code Annotated (MCA). DEQ's ROD would be published no sooner than 15 days after publication of the final EIS. The final EIS will include comments received on the draft EIS and the agency's responses to substantive comments.

The Montana Environmental Policy Act (MEPA) (Section 75-1-201, *et seq.*, MCA, requires an environmental review of actions taken by the State of Montana that may significantly affect the quality of the human environment. This EIS was prepared to satisfy this MEPA requirement. Prior to beginning its environmental review under MEPA, DEQ reviewed MR's amendment application and determined that it was complete and complied with the MMRA and issued a

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draft permit amendment. Issuance of the draft permit amendment as a final permit amendment is the proposed state action subject to this environmental review under Section 82-4-337(1)(f), MCA.

PROJECT LOCATION AND HISTORY

MR operates an open pit copper-molybdenum mine adjacent to the city of Butte, Montana in Silver Bow County (**Figure ES-1**). The Continental Mine produces copper sulfide concentrate, molybdenum disulfide concentrate, and copper precipitate (cement copper) for sale in the United States and world markets. MR operates the Continental Mine under Operating Permits 00030, 00030A, 00041, and 00108. The Continental Pit, the site of active mine operations, is currently permitted to produce ore in excess of 20 years; however, ore reserves may exceed those reported in MR's Operations Plan (February 2018).

Mine Site History

The area surrounding Butte has been actively mined for generations. Gold placer mining was conducted in the Upper Clark Fork area in the 1860s and 1870s and included the development of mining camps along Silver Bow Creek. Hard rock mining for silver ore began in the 1870s, resulting in a more permanent settlement of the area.

Extensive polymetallic underground mines were developed beneath Butte through the first half of the 20th century and open pit mining began at the Berkeley Pit in 1955. Construction of the YDTI began in 1963, utilizing waste rock from the Berkeley Pit. In 1977 Atlantic Richfield Company (AR) purchased the mine through a merger with the Anaconda Company. Mining activity in the Berkeley Pit was reduced in the early 1980s due to low metal prices, ultimately ending in April 1982. District dewatering pumps were turned off, allowing the underground mines and the Berkeley Pit to gradually fill with water from the bedrock and alluvial aquifers and site runoff once mining operations ceased.

Montana Resources, Inc. (MRI) purchased the property from the Anaconda Company, a wholly owned subsidiary of Atlantic Richfield, and began mining the East Berkeley (Continental) Pit in 1986. Mining permits were transferred from MRI to Montana Resources, LLP, a general partnership (MR) in 1989. Waste rock from the Continental Pit was used to continue construction of the YDTI. MR suspended mining operations from 2000 to 2003 due to high electricity prices; however, mining and processing operations recommenced in 2003 (Montana Resources 2018a).

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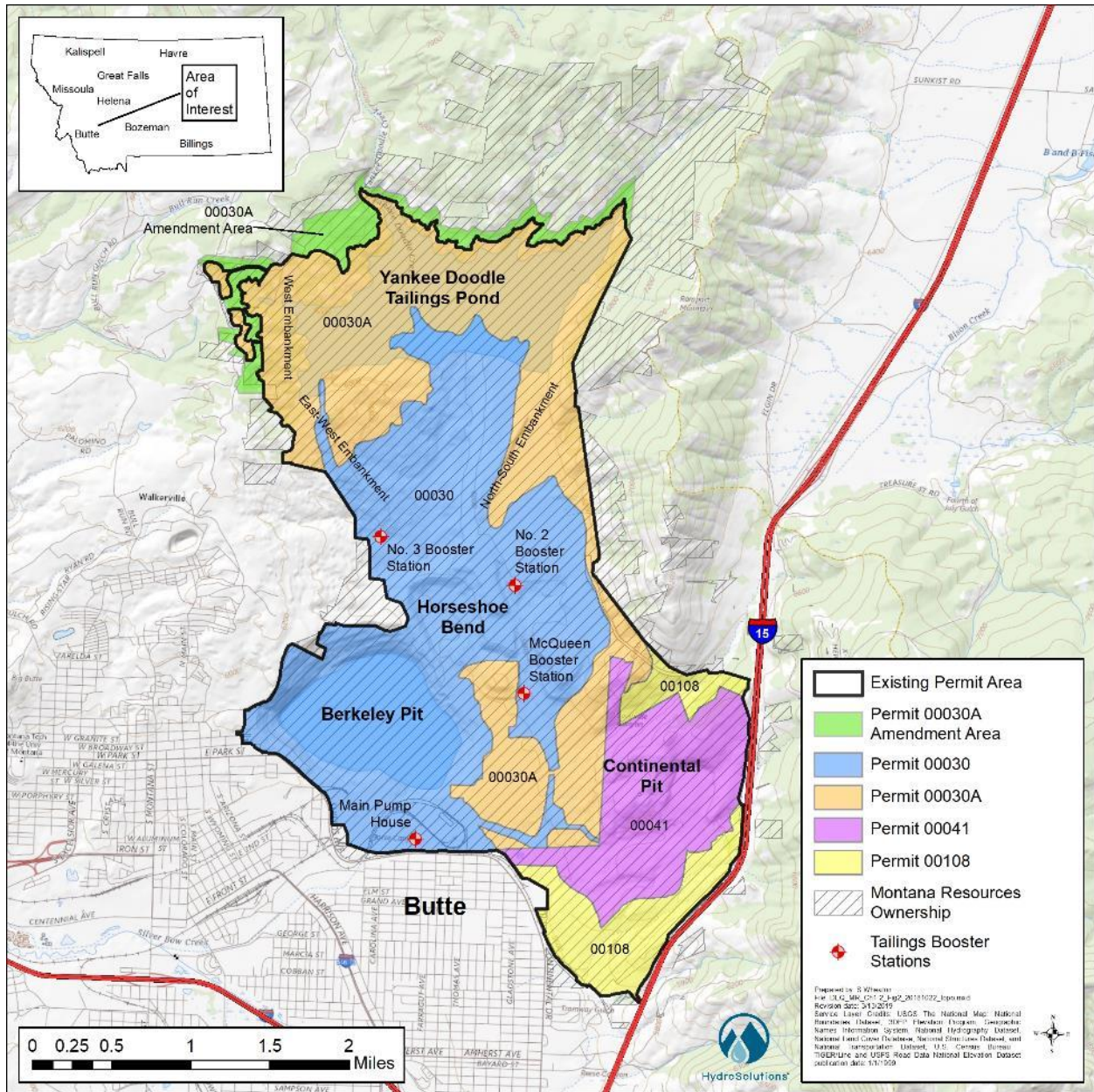


Figure ES-1. Location of the Montana Resources Continental Mine showing permit area boundaries.

NO ACTION ALTERNATIVE

MEPA requires an analysis of the No Action Alternative for all environmental reviews that include an alternatives analysis. The No Action Alternative provides a comparison of environmental conditions without the proposal and establishes a baseline for evaluating the Proposed Action and the other alternatives. MEPA requires the consideration of the No Action Alternative, even if it fails to meet the purpose and need or would not be able to satisfy environmental permitting standards.

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Under the No Action Alternative, MR would continue to operate under its existing operating permits. The tailings storage capacity in the YDTI would remain unchanged, the northern boundary of the YDTI would not be expanded, disturbed acreage would not be increased, and revisions to the existing reclamation and closure plans would not be necessary. Tailings storage capacity would allow mining operations to continue through 2022, and mining would be limited to the current permits which include Operating Permits 00030, 00030A, 00041, and 00108, along with associated amendments, modifications, and revisions. A summary of all operating permits and components can be found in Montana Resources Continental Mine Operations Plan dated February 2017 and revised February 2018 (Montana Resources 2018a).

PROPOSED ACTION: ON SITE TAILINGS AND WATER CONTAINMENT

The Proposed Action would raise the West Embankment to match the presently permitted elevations of the East-West and North-South embankments. It would also extend the northern boundary of the impoundment, which would allow continued tailings deposition and extend operations at the Continental Mine. The West Embankment would be raised 45 feet from an elevation of 6,405 feet to 6,450 feet. As the pond fills to the increased capacity, it would extend the northern boundary of the tailings pond to an elevation of approximately 6,428 feet. A gravity controlled subsurface seepage collection drain, known as the West Embankment Drain (WED), would intercept seepage before it migrates west of the impoundment.

The proposed amendment would increase the total area of Permit 00030A by approximately 237 acres, but only 99 of these acres would be disturbed to accommodate the West Embankment raise and YDTI expansion. Disturbed areas would include increased tailings storage, construction, topsoil storage, roads, and monitoring wells. Although the proposed amendment would affect mine facilities that are located within Operating Permit 00030, it would not authorize the disturbance of any additional land under Operating Permit 00030. Other associated facilities are proposed and would include additional non-ore storage area developed in an existing rock disposal site (RDS), a new RDS, stockpile areas for soil and alluvium, access roads, and long-term monitoring sites within Operating Permits 00030 and 00030A. A closure spillway has been conceptually designed to provide a system for releasing water from the tailings impoundment to the Continental Pit, subject to the Butte Mine Flooding Operable Unit (BMFOU) requirements.

To achieve the geotechnical objectives for beach development, enhance embankment stability, and limit the potential for internal erosion, the practice of inundating the tailings beach with water to manage wind-blown dust would be phased out. The potential for tailings dusting would be managed using multiple discharge points or by other means to wet the beach by recycling water within the mine area during critical periods.

During operations, the impoundment receives tailings suspended in water and as the tailings particles settle out, the remaining water clarifies and forms the supernatant pond. The term supernatant refers to the liquid lying above a solid residue after settling, in this case the water

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in the tailings pond sitting above the tailings solids. Closure would include dewatering of the impoundment via seepage to the WED and Horseshoe Bend, as well as through evaporation. The tailings beach or dry area and a Transition Zone would be incrementally exposed by dewatering as the size of the supernatant pond is reduced. The tailings beach would remain dry and the Transition Zone would retain water, but it would dry out as the pond edge recedes. The reclamation of the beach and Transition Zone would include the incremental capping and revegetation as the areas become accessible and stable for truck traffic. Final reclamation would include a partial wet closure with a reclaimed beach and Transition Zone, and a pond volume of approximately 1,000 acre-feet.

The Transition Zone would comprise tailings slimes deposited under the pond's surface, rather than the coarser materials found in the exposed beach tailings. Slimes are composed of finer silt and clay particles while the beach comprises sand like particles. As the dewatering transitions, the slimes closest to the supernatant pond would remain saturated with water due to their inherent moisture holding capacity while the slimes nearest the beach would "crust" over as they dry. The beach, Transition Zone, and water level would be monitored monthly to assess the potential to disperse dust, and if dust is detected, MR would be required to implement its dust control plan.

As areas become accessible during reclamation, further mitigations would include the placement of a 6-inch thick rockfill cap over areas to facilitate equipment operation, placement of capping material and revegetating the Transition Zone. Other areas could be controlled by maintaining and using rubber wheeled equipment to apply dust suppressant as needed.

Long-term dust control would be achieved during closure through reclamation of the tailings beach and Transition Zone by capping with a 28-inch thick amended alluvial cap and following the revegetation plan.

OTHER ALTERNATIVES EVALUATED

DEQ evaluated three additional alternatives focused on the reclamation timing and attributes. These alternatives are conceptual in nature and were designed to minimize environmental impacts and to address issues identified during scoping and interagency consultation.

The other alternatives evaluated include mitigations developed to address specific environmental impacts and to avoid, minimize, rectify, or eliminate these impacts during the three stages of the Proposed Action - construction, operation, and reclamation. Mitigations focused on reducing the time before reclamation activities can begin and the total time for reclamation completion. Section 2.4 describes the alternatives in greater detail and **Table 2.4-1** summarizes each alternative and describes how the alternative would affect aspects of the Proposed Action.

The three alternatives evaluated in addition to the No Action and the Proposed Action are:

- The Accelerated Drawdown Alternative,

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- The Elimination of the West Embankment Drain Pumpback (WED) at Closure Alternative, and
- The Alternative Capping Methods Alternative.

ADDITIONAL PLANNING AND COORDINATION

In 1982, the US Environmental Protection Agency (USEPA) proposed that Silver Bow Creek be added to the National Priority List (NPL), and it was listed as a Superfund site in 1983. The Butte Area was added to the Silver Bow Creek site in 1987 (USEPA 2018a). A total of four contiguous areas in the upper Clark Fork River Basin have been designated as Superfund sites by the USEPA pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (1980). These sites are the Silver Bow Creek/Butte Area Site, the Anaconda Smelter Site, the Milltown Reservoir/Clark Fork River Site, and the Montana Pole Treating Plant Site. The Silver Bow Creek/Butte Area Superfund Site is currently further separated into seven Operable Units (OUs).

For general context, the USEPA regulates how responsible parties manage waters that enter and may eventually leave the Berkeley Pit and maintaining ground water levels in and around the BMFOU to ensure that mine-affected waters are managed and treated, if necessary, to meet water quality standards before they are discharged. The monitoring and management of ground water in the BMFOU, including the Continental Mine site, and perpetual treatment of waters that leave the mine site (whether from the Berkeley Pit, Continental Pit, or the Horseshoe Bend) are regulated by USEPA under Superfund. DEQ's Hard Rock Mining Bureau consults and coordinates with EPA, but the MMRA operating permits do not address water management that falls under Superfund. In 2002, a Consent Decree was finalized that clarified responsibilities for the water monitoring and management among the court-identified responsible parties (AR and the MR Group) with oversight by USEPA (Consent Decree for the Butte Mine Flooding Site 2002).

EPA and DEQ were co-plaintiffs in the 2002 Consent Decree and work together in the regulation of the Butte Area Superfund site. Therefore, MR's proposed amendment and the action alternatives will be evaluated for consistency with existing agreements and regulatory stipulations under Superfund and the Consent Decree.

ISSUES OF CONCERN

DEQ collected comments on the Proposed Action and the issues to be considered through the public scoping meeting, letters, and emails. All comments were reviewed to identify specific issues or concerns. The primary issues of concern related to the Proposed Action include:

- Water management;
- Air quality;
- Reclamation schedule;
- Stability of the YDTI;
- Life of the mine and socioeconomic effects; and

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- Implications for BMFOU.

These issues have been evaluated in detail to address impacts to resources and to help determine reasonable alternatives for the permit amendment, including the Proposed Action.

Some of the mitigation measures proposed are outside DEQ's authority to impose under the MMRA. Therefore, DEQ's ability to require such measures may be limited. In these situations, applicants have the discretion to decide whether or not to employ mitigating measures.

ALTERNATIVES CONSIDERED AND DISMISSED

Under MEPA, a reasonable alternative is one that is practical, technically possible, and economically feasible. In addition, any alternative under consideration must be able to meet the purpose and need of the Proposed Action. During scoping, alternatives to the Proposed Action were suggested and discussed by agency representatives and MR as required by Section 75-1-201(1)((B)(IV)(C)(II), MCA. Some were eliminated from further analysis. Each alternative and the reason for dismissal is described in Section 2.6. The alternatives dismissed include:

1. Dry closure of YDTI through upstream diversions for tributaries;
2. Off-site tailings storage;
3. Tailings storage in Berkeley Pit;
4. Alternative tailings management strategies; and
5. Alternative post-closure topography.

Each of these alternatives or alternative components was considered and eliminated from detailed study for a variety of reasons including operational feasibility, an increase in environmental impacts, or failure to meet the purpose and need of the project.

SUMMARY OF IMPACTS

This EIS discloses and analyzes the environmental consequences that may result from selection and implementation of the Proposed Action and alternatives described in Chapter 2. The more substantive consequences are presented in **Tables ES-1, ES-2, and ES-3** below. Detailed resource impacts analyses are provided in Chapter 3 (primary impacts) and Chapter 4 (cumulative and secondary impacts).

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The following tables summarize the substantive impacts identified in Chapters 3 and 4 of the DEIS for each of the alternatives. This is meant to facilitate a comparison based on the impacts most likely to occur or those that would have the potential to affect some aspect of the human environment in a substantial way. The full discussion of all potential impacts is contained in Chapters 3 and 4 in the resource-specific subsections.

Table ES-1 Summary of the Primary Impacts of the No Action, Proposed Action, and other Alternatives organized by Resource Area.					
	No Action	Proposed Action	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback at Closure	Alternative Capping Methods
Geology and Minerals	No impacts.	Disturbance to the geology of the West Embankment area would occur. Supernatant pond area would increase to the north. Drainages entering the pond would be impacted by sediment and pond water.	The impacts to the geology resources under this alternative would be identical to the Proposed Action, except for the potential reduction in time for reclamation.	The impacts to the geology resources under this alternative would be identical to the Proposed Action, except for the timing of the reclamation.	The impacts to the geology resources under this alternative would be identical to the Proposed Action, except for the potential reduction in time for reclamation.
Geotechnical Stability	No impacts.	A slight decrease in the calculated Factor of Safety values as a result of increasing the height of the West Embankment by 45 feet and from increasing the storage of tailings materials and process water.	Primary impacts would be identical to the Proposed Action. Reduction in the impounded water volume may relieve weight on the embankment.	Primary impacts would be identical to the Proposed Action. Reduction in the impounded water volume may relieve weight on the embankment.	Primary impacts would be identical to the Proposed Action
Soils and Reclamation	No impacts.	Impacts to the native soils include soil salvage and stockpiling ahead of construction and tailings inundation. The disturbed area within Operating Permit 00030A would increase by about 99 acres to accommodate increased tailings storage, West Embankment construction, topsoil storage, roads, and monitoring wells. Associated facilities, including a new RDS, an addition to an existing RDS, soil and alluvium stockpiles, access roads, and long-term monitoring sites are proposed within existing disturbed areas. Reclamation of the YDTI would be essentially the same as previously permitted. The reclamation plan includes grading, capping, and revegetation of the embankment and beach; and wet closure of the open water component with a pond volume smaller than the operation condition; and grading, capping, and revegetation of associated facilities.	The soils and the reclamation methods and procedures under this alternative are identical to the Proposed Action, except for the timing of the reclamation.	The soils and the reclamation methods and procedures under this alternative are identical to the Proposed Action, except for the timing of the reclamation.	This alternative would not allow for even placement of the alluvial material; material would segregate during the discharge process. Methods to prevent segregation of alluvial material would need to be developed to make this a viable alternative with respect to its potential impacts on soil resources and reclamation success.

Table ES-1 Summary of the Primary Impacts of the No Action, Proposed Action, and other Alternatives organized by Resource Area.					
	No Action	Proposed Action	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback at Closure	Alternative Capping Methods
Surface and Ground Water	No impacts to ground water are anticipated. Water balance modeling indicates following completion of mining operations, the supernatant pond volume will reach an equilibrium volume about seven years later than under the Proposed Action. The supernatant pond water's chemical composition is forecast to be similar to local surface runoff within about 20 years of closure.	No impacts to ground water are anticipated because of natural conditions and engineered mitigation measures, primarily the WED, which are intended to maintain hydrodynamic containment of YDTI seepage. The pumpback of WED seepage to the supernatant pond is predicted to occur for 20 years until the saturated elevation within the facility is below the invert elevation of the WED. Under average climate conditions, the supernatant pond will reach an equilibrium volume of approximately 1,000 acre-feet. MR will maintain alkaline conditions in the YDTI pond during operations and with the addition of lime following closure, if needed.	Drawdown of the supernatant pond to the equilibrium volume would occur over about 1 to 16 years (Table 2.5-2) as opposed to over 30 years in the Proposed Action and No Action alternatives. Pumpback of seepage collected in the WED would cease sooner because the pond would be rapidly drawn below the critical level, potentially reducing or eliminating the need for lime to maintain alkaline pond conditions.	This alternative would reduce impacts in the same manner as the Accelerated Drawdown at Closure alternative, except pond drawdown would take longer. Eliminating the WED pumpback would potentially result in reaching the equilibrium pond volume (1,000 acre-feet) 7 years sooner than under the Proposed Action.	No impacts to ground water quality are anticipated. Water for milling and slurry transport would be sourced from the supernatant pond, so a closed loop system would be maintained, which would result in a similar supernatant pond drawdown profile as under the Proposed Action. The additional capping proposed could theoretically reduce or stop tailings acidification that may occur under other alternatives, although MR has already committed under the Proposed Action to maintain alkaline pond conditions using lime if needed.
Vegetation and Wetlands	No Impacts	Conversion of up to approximately 99 acres of forested and shrublands to open water for the duration of the project due to inundation.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.
Wildlife	No Impacts	Habitat loss (especially deciduous forest) associated with the 99 additional acres inundated.	Primary impacts would be similar to the Proposed Action; possibly of shorter duration.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action; possibly of shorter duration.
Aquatics	No impacts	Loss of short sections (<0.1 mile each) of lower channel for three tributary streams. Possible reduction in habitat for fish in Yankee Doodle Creek. Loss of instream habitat for macroinvertebrates for the duration of the project.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.
Cultural Resources	No Impacts	No impacts to significant cultural resources	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.
Socioeconomics	No Impacts	Beneficial impact of jobs and tax revenue for longer duration	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.
Land Use	No Impacts	Temporary change of land use for 99 additional acres that are new disturbance until reclamation is completed.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.	Primary impacts would be identical to the Proposed Action.

Table ES-1					
Summary of the Primary Impacts of the No Action, Proposed Action, and other Alternatives organized by Resource Area.					
	No Action	Proposed Action	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback at Closure	Alternative Capping Methods
Visual Resources	No significant impacts	No significant impacts	No significant impacts	No significant impacts	No significant impacts
Noise	No Impacts	Increase noise levels at residences in the West Ridge area.	Primary impacts would be identical to the Proposed Action	Primary impacts would be identical to the Proposed Action	Primary impacts would be identical to the Proposed Action
Air Quality	Minor primary impacts meeting ambient air quality standards	Minor primary impacts with no increase in ambient air impacts, but the potential for long term impacts is increased with respect to the No Action	Minor primary impacts with no increase in ambient air impacts, but the potential long-term impacts are decreased in comparison to Proposed Action, due to reduced reclamation timeline	Minor primary impacts with no increase in ambient air impacts, but the potential long-term impacts are decreased in comparison to Proposed Action	Minor primary impacts with no increase in ambient air impacts, but the potential short-term impacts are decreased in comparison to Proposed Action

The following table is a summary of the secondary impacts discussions in Section 4.5. Please see the resource specific subsections for more details on the rationale for these impacts.

Table ES-2					
Summary of the Secondary Impacts of the No Action, Proposed Action, and other Alternatives organized by Resource Area.					
	No Action	Proposed Action	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback at Closure	Alternative Capping Methods
Geology and Minerals	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts
Geotechnical Stability	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts
Soils and Reclamation	No Secondary Impacts	Secondary impacts similar to impacts associated with the No Action Alternative except for potential erosion due to the addition of 85.4 acres of soil salvaged.	Secondary impacts of this Alternative are similar to the Proposed Action except that topsoil would spend less time in a stockpile prior to placement and revegetation.	Secondary impacts of this Alternative are similar to the Proposed Action except that topsoil would spend less time in a stockpile prior to placement and revegetation.	Secondary impacts similar to the Proposed Action. The potential for reducing wind erosion would be possible. The addition of extra water to move the capping materials into place may have the opposite effect of speeding the reclamation effort and slow the reclamation process due to the extra water being added.
Surface and Ground Water	No Secondary Impacts	No Secondary Impacts	Management of water pumped from the YDTI under this alternative may lead to secondary impacts. If water drawn from the YDTI is stored in the Continental Pit, the estimated time for the Continental Pit to reach its critical level could change from 137 to 110 years. Additionally, the reclamation timeframe for the YDTI would be reduced under this alternative.	If WED pumpback water is diverted and stored in the Continental Pit under this alternative, the timeframe for the Continental Pit to reach its critical level would be reduced, although less so compared to the Accelerated Drawdown at Closure alternative because a smaller volume of YDTI water would ultimately be stored. To preclude acidification of the Continental Pit lake, WED seepage would be amended with lime to neutralize acidity. The reclamation timeframe for the YDTI	No Secondary Impacts

Table ES-2					
Summary of the Secondary Impacts of the No Action, Proposed Action, and other Alternatives organized by Resource Area.					
	No Action	Proposed Action	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback at Closure	Alternative Capping Methods
				would also be reduced under this alternative.	
Vegetation and Wetlands	No Secondary Impacts	Changes to vegetation in areas inundated or adjacent to the inundated areas due to soil moisture and changing conditions.	Secondary impacts would be similar to the Proposed Action. Time to total reclamation may be reduced by as much as 20 to 30 years if the tailings consolidate as modeled. This would allow more rapid reseeding and replanting which may be substantial in terms of vegetation succession, overall land appearance, and wildlife use.	Secondary impacts would be similar to the Proposed Action. Time to total reclamation may be reduced by as much as 7 years if the tailings dry sooner and allow more rapid reseeding and replanting.	Secondary impacts would be similar to the Proposed Action. Time to total reclamation may be reduced if the tailings dry sooner and allow more rapid reseeding and replanting.
Wildlife	No Secondary Impacts	Temporary reduced carrying capacity for some wildlife species. Disturbance from elevated noise levels.	Secondary impacts would be similar to the Proposed Action. However, this alternative may allow these land uses to be achieved as much as two to three decades sooner, which may be substantial in terms of vegetation succession, overall land appearance, and wildlife use.	Secondary impacts would be similar to the Proposed Action.	Secondary impacts would be similar to the Proposed Action.
Aquatics	No Secondary Impacts	Changes in the tributary channel conditions adjacent to inundated area.	Secondary impacts would be identical to the Proposed Action.	Secondary impacts would be identical to the Proposed Action.	Secondary impacts would be identical to the Proposed Action.
Cultural Resources	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts	No Secondary Impacts
Socioeconomics	No Secondary Impacts	Beneficial effect from MR jobs and tax revenue for longer duration	Secondary impacts would be similar to the Proposed Action.	Secondary impacts would be similar to the Proposed Action.	Secondary impacts would be similar to the Proposed Action.
Land Use	No Secondary Impacts	Negligible effects from vegetation shifts	Secondary impacts would be identical to the Proposed Action. However, this alternative may allow post-closure land uses to be achieved as much as 20 to 30 years sooner, which may be substantial in terms of vegetation succession, overall land appearance, and wildlife use.	Secondary impacts would be identical to the Proposed Action.	Secondary impacts would be identical to the Proposed Action.
Visual Resources	No Secondary Impacts	No significant impacts	No significant impacts	No significant impacts	No significant impacts
Noise	No Secondary Impacts	Wildlife avoidance of area, including winter habitats.	Secondary impacts would be identical to the Proposed Action	Secondary impacts would be identical to the Proposed Action	Secondary impacts would be identical to the Proposed Action
Air Quality	Minor secondary impacts	Minor secondary impacts with an increase in potential for long term secondary impacts with respect to the No Action	Minor secondary impacts with a decrease in potential long term secondary impacts with respect to the Proposed Action	Minor secondary impacts with a decrease in potential long term secondary impacts with respect to the Proposed Action	Minor secondary impacts with a decrease in potential short term secondary impacts with respect to the Proposed Action

The following table is a summary of the cumulative impacts discussions in Section 4.2. Please see the resource specific subsections for more details on the rationale for these impacts.

Table ES-3 Summary of the Cumulative Impacts of the No Action, Proposed Action, and other Alternatives organized by Resource Area.					
	No Action	Proposed Action	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback at Closure	Alternative Capping Methods
Geology and Minerals	No cumulative impacts	Continued mining would remove the minerals available in and around the Continental Mine. The cumulative impact to minerals and geology when combined with the past and future activity in the area would be measurable, but these impacts would not be considered adverse as the removal of minerals is part of the purpose and need of the Proposed Action.	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action
Geotechnical Stability	No cumulative impacts	A slight decrease in the calculated Factor of Safety values as a result of increasing the height of embankment by 45 feet and from increasing the storage of tailings materials and process water.	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action
Soils and Reclamation	No cumulative impacts	No cumulative impacts to soil and reclamation.	The only change to soil and reclamation would be in the timing compared to the Proposed Action. No cumulative impacts to soil and reclamation.	The only change to soil and reclamation would be in the timing compared to the Proposed Action. No cumulative impacts to soil and reclamation.	The only change to soil and reclamation would be in the timing compared to the Proposed Action. No cumulative impacts to soil and reclamation.
Surface and Ground Water	There would be no cumulative impacts to ground water. During operations, a Superfund-managed pilot-scale treatment test at HsB Water Treatment Plant will require pumpback of minimally treated Horseshoe Bend seepage into the supernatant pond. This may lead to temporary increases in TDS, sulfate, and other constituents in the supernatant pond. Following closure, cumulative impacts to the BMFOU would increase because the YDTI supernatant pond and Horseshoe Bend seepage would no longer be managed in a closed loop by MR.	There would be no cumulative impacts to ground water due to proposed strategies for hydrodynamic containment. During operations, cumulative effects would be the same as for the No Action Alternative, including the effect of the Superfund pilot-scale treatment project. Closure-related cumulative effects to the BMFOU would be deferred by about 9 years compared to the No Action Alternative because mine operations would keep Horseshoe Bend seepage in a closed loop during the extended life of the mine. After closure, cumulative	Cumulative impacts would be similar to those anticipated for the Proposed Action except that they will differ during the accelerated drawdown period. During this time, excess water could potentially be stored in the Continental Pit, or a BMFOU treatment facility would directly receive water from the supernatant pond, which would result in a large volume of water and chemical load requiring treatment sooner compared to the No Action and Proposed Action alternatives.	Cumulative effects would be similar to those anticipated for the Accelerated Drawdown at Closure Alternative except that potential BMFOU facilities would receive WED seepage flow, at a lower rate than the Accelerated Drawdown scenario, and for a longer period of time.	Cumulative impacts associated with the Alternative Capping Methods Alternative would be the same as under the Proposed Action. No makeup water from outside the YDTI system would be required to process and transport the cap material slurry. Therefore, no changes to post-closure water management would be required.

Table ES-3					
Summary of the Cumulative Impacts of the No Action, Proposed Action, and other Alternatives organized by Resource Area.					
	No Action	Proposed Action	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback at Closure	Alternative Capping Methods
	Rather, the seepage would become the responsibility of the BMFOU to manage, resulting in increased water volume and chemical constituent loading to the BMFOU.	effects would be the same as under the No Action alternative, with the addition of the possibility that water from the YDTI could end up in the Continental Pit via a proposed emergency spillway.			
Vegetation and Wetlands	No cumulative impacts	Minor changes in vegetation composition and mosaic in the context of the surrounding mined area. Cumulative impacts would be negligible.	Cumulative impacts would be similar to the Proposed Action	Cumulative impacts would be similar to the Proposed Action	Cumulative impacts would be similar to the Proposed Action
Wildlife	No cumulative impacts	Minor additional cumulative habitat losses if additional residential development in cumulative effects area	Cumulative impacts would be similar to the Proposed Action	Cumulative impacts would be similar to the Proposed Action	Cumulative impacts would be similar to the Proposed Action
Aquatics	No cumulative impacts	Minor additional changes to aquatic habitat in the mouths of the tributary streams. In the context of the Silver Bow Creek watershed, these impacts are negligible.	Cumulative impacts would be similar to the Proposed Action	Cumulative impacts would be similar to the Proposed Action	Cumulative impacts would be similar to the Proposed Action
Cultural Resources	No cumulative impacts	No cumulative impacts	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action
Socioeconomics	No cumulative impacts	No cumulative impacts	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action
Land Use	No cumulative impacts	No cumulative impacts	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action
Visual Resources	No cumulative impacts	No cumulative impacts	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action
Noise	No cumulative impacts	No cumulative impacts	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action	Cumulative impacts would be identical to the Proposed Action
Air Quality	Minor cumulative impacts	Minor cumulative impacts with an increase in potential for cumulative impacts with respect to the No Action	Minor cumulative impacts with a decrease in potential for cumulative impacts with respect to the Proposed Action	Minor cumulative impacts with a decrease in potential for cumulative impacts with respect to the Proposed Action	Minor cumulative impacts with a decrease in potential for cumulative impacts with respect to the Proposed Action

PREFERRED ALTERNATIVE

ARM 17.4.617(9) requires an agency to state a preferred alternative in the draft EIS, if one has been identified, and to give its reason for the preference. DEQ has identified the West Embankment Drain (WED) Pumpback Elimination at Closure Alternative as the agency's preferred alternative.

Under the Proposed Action, the impoundment seepage captured by the WED would be pumped back into the impoundment after mining ceases (closure). It is estimated that this would occur for approximately 20 years, or until the tailings pond level decreases to the point that the West Embankment Drain no longer captures impoundment seepage. Pumping the impoundment seepage captured by the WED back into the impoundment would maintain a closed loop so that water only permanently exits the facility through evaporation or through seepage at Horseshoe Bend, where it is captured and treated under the Superfund remedy. Because the impoundment seepage captured by the WED is anticipated to be acidic with elevated ion and metal concentrations, the seepage would be treated with lime to limit the acidification of the remnant tailings pond. When the WED ceases to capture impoundment seepage, it would be grouted to prevent continued discharge. The rate of reclaiming the surface of the impoundment is contingent upon safe access to dry tailings, which relies on draining the tailings pond to a steady state ("equilibrium").

Under the WED Pumpback Elimination at Closure alternative, the impoundment seepage captured by the WED would be diverted to the Continental Pit for storage (i.e. within the previously approved closure pit lake) or to the Horseshoe Bend Treatment Plant for treatment and discharge under the Superfund remedy. If the WED effluent is routed to the Continental Pit for storage, it would first be treated, if necessary, to eliminate acidity and maintain alkaline conditions in the Continental Pit lake. This would eliminate the need to maintain pumpback systems for decades post-closure, and the need to lime the impoundment seepage captured by the WED to mitigate acidification of the tailings pond. Furthermore, water balance modeling indicates that draining the tailings pond to a steady state would be accelerated by approximately 7 years by eliminating the return of tailing seepage back to the pond. As a result, the schedule for reclaiming the exposed tailings surfaces would be accelerated. Finally, the WED would not be grouted at some point after cessation of tailings disposal in the impoundment, but would be allowed to continue to function as a drain. This would maintain a more robust groundwater divide between the tailings impoundment and groundwater resources to the west of the West Ridge. For these reasons, the WED Pumpback Elimination at Closure alternative was selected as the agency's preferred alternative.

DEQ's review of an application for an operating permit amendment is governed by Section 82-4-337, MCA. That law requires DEQ to make an initial determination as to whether the permit amendment application contains all necessary information and whether the proposed amendment satisfies the substantive requirements of the MMRA.

Executive Summary

DEQ determined that MR's permit amendment application was complete and compliant on August 31, 2018 and issued a draft permit amendment. The analysis contained in this Draft EIS does not change DEQ's determination that the proposal contained in the permit amendment application, which is the Proposed Action, complies with the substantive requirements of the MMRA. Unless the analysis set forth in the Final EIS reaches a contrary determination, DEQ will be required to select the Proposed Action even though DEQ believes that there is environmental benefit to the WED Pumpback Elimination at Closure Alternative. However, if after the public comment period, DEQ still prefers the WED Pumpback Elimination at Closure alternative, the applicant and BMFOU parties could voluntarily agree to the alternative.

The WED Pumpback Elimination at Closure Alternative presents a different scenario for YDTI water management at closure, which necessitates recognition of USEPA's authority over long-term water management and treatment at the site under the BMFOU. Discussions and coordination with all parties in the 2002 BMFOU Consent Decree would be needed to review the options and feasibility for handling and treating this water, the potential use of existing or upgraded facilities and infrastructure (e.g. HsB Water Treatment Plant), and to amend the agreement accordingly.

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1 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

This draft environmental impact statement (EIS) was prepared for the proposed permit amendments submitted by Montana Resources, LLP (MR) for the Continental Mine in Silver Bow County, Montana. On October 6, 2017, MR submitted an application to amend Operating Permit 00030 (Amendment 3) and Operating Permit 00030A (Amendment 10) to the Montana Department of Environmental Quality (DEQ). The amendments address proposed changes to the Yankee Doodle Tailings Impoundment (YDTI) at the Continental Mine in Butte, Montana.

DEQ prepared this draft EIS to present the analysis of possible environmental consequences of five alternatives: the No Action Alternative, the Proposed Action: On-Site Tailings Storage and Water Containment, the Accelerated Drawdown at Closure Alternative, the Elimination of West Embankment Drain Pumpback at Closure Alternative, and the Alternative Capping Methods Alternative. The five alternatives are described in detail in Chapter 2.

1.2 PURPOSE AND NEED

DEQ's purpose and need in conducting the environmental review is to act upon MR's application to amend Operating Permits Nos. 00030 and 00030A to expand the capacity of the YDTI. The proposed amendment would raise the elevation of the YDTI West Embankment from the 6,405 feet to 6,450 feet, to match the presently permitted elevations of the East-West and the North-South Embankments. The proposed amendment would allow for increased tailings storage and a commensurate extension of the northern boundary of the tailings pond, a new rock disposal site, expand an existing rock disposal site, provide for construction of a closure spillway and new soil stockpiles, and revise the operation, reclamation, and closure phases of the impoundment. The proposed amendment would allow for an additional 9 years of operation of the mine at current production levels. However, continued operations under the proposed amendment would be limited by production rates and the capacity of the YDTI, and should DEQ approve the amendment, it would not specify a duration for operations. DEQ's action on the proposed amendments would be governed by the substantive provisions of the MMRA.

The proposed amendment would increase the total area of Permit 00030A by approximately 237 acres, but only 99 of these acres would be disturbed to accommodate the West Embankment raise and YDTI expansion. Although the proposed amendment would affect mine facilities that are located within Operating Permit 00030, it would not authorize the disturbance of any additional land under Operating Permit 00030.

The Montana Environmental Policy Act (MEPA) (Section 75-1-201, *et seq.*, Montana Code Annotated (MCA), requires an environmental review of actions taken by the State of Montana that may significantly affect the quality of the human environment. This EIS was prepared to satisfy this MEPA requirement. Prior to beginning its environmental review under MEPA, DEQ reviewed MR's amendment application and determined that it was complete and complied

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with the Metal Mine Reclamation Act (MMRA), Section 82-4-301, *et seq.*, MCA, and issued a draft permit amendment on August 31, 2018. Issuance of the draft permit amendment as a final permit amendment is the proposed state action subject to this environmental review under Section 82-4-337(1)(f), MCA.

DEQ will decide which alternative should be approved in DEQ's Record of Decision (ROD) based on information provided in the amendment application, the analysis in the EIS, and the substantive provisions of the MMRA. DEQ's ROD would be published no sooner than 15 days after publication of the final EIS. The final EIS will include comments received on the draft EIS and the agency's responses to substantive comments.

1.3 PROJECT LOCATION AND HISTORY

MR operates an open pit copper-molybdenum mine adjacent to the city of Butte, Montana in Silver Bow County (**Figure 1.3-1**). The Continental Mine produces copper sulfide concentrate, molybdenum disulfide concentrate, and copper precipitate (cement copper) for sale in the United States and world markets. MR operates the Continental Mine under Operating Permits 00030, 00030A, 00041, and 00108. The Continental Pit, the site of active mine operations, is currently permitted to produce ore for in excess of 20 years; however, ore reserves may exceed those reported in MR's Operations Plan (February 2018).

This section is a summary of information on the project location, mine site history, and current operations provided in the amendment application, which is available online at <http://deq.mt.gov/land/hardrock>.

1.3.1 Mine Site History

The area surrounding Butte has been actively mined for generations. Gold placer mining was conducted in the Upper Clark Fork area in the 1860s and 1870s and included the development of mining camps along Silver Bow Creek. Hard rock mining for silver ore began in the 1870s, resulting in a more permanent settlement of the area. Marcus Daly developed the Anaconda Copper Mining Company (ACM), organized the ACM properties with the assets of the Standard Oil Company in 1899, and included other mine properties owned by Augustus Heinze in 1906 and W. A. Clark in 1910. Extensive polymetallic underground mines were developed beneath Butte through the first half of the 20th century and by 1950, the ACM controlled all mining operations in Butte (Montana Resources 2018a).

ACM began open pit mining at the Berkeley Pit in 1955. Construction of the YDTI began in 1963, utilizing waste rock from the Berkeley Pit. The ACM sold all its corporate assets to the Atlantic Richfield Company (AR) in 1977. In 1980, AR suspended all smelting activities in Anaconda and Great Falls (Montana Resources 2018a).

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Mining activity in the Berkeley Pit was reduced in the early 1980s due to low metal prices, ultimately ending in April 1982. District dewatering pumps were turned off, allowing the underground mines and the Berkeley Pit to gradually fill with water from the bedrock and alluvial aquifers and site runoff once mining operations ceased.

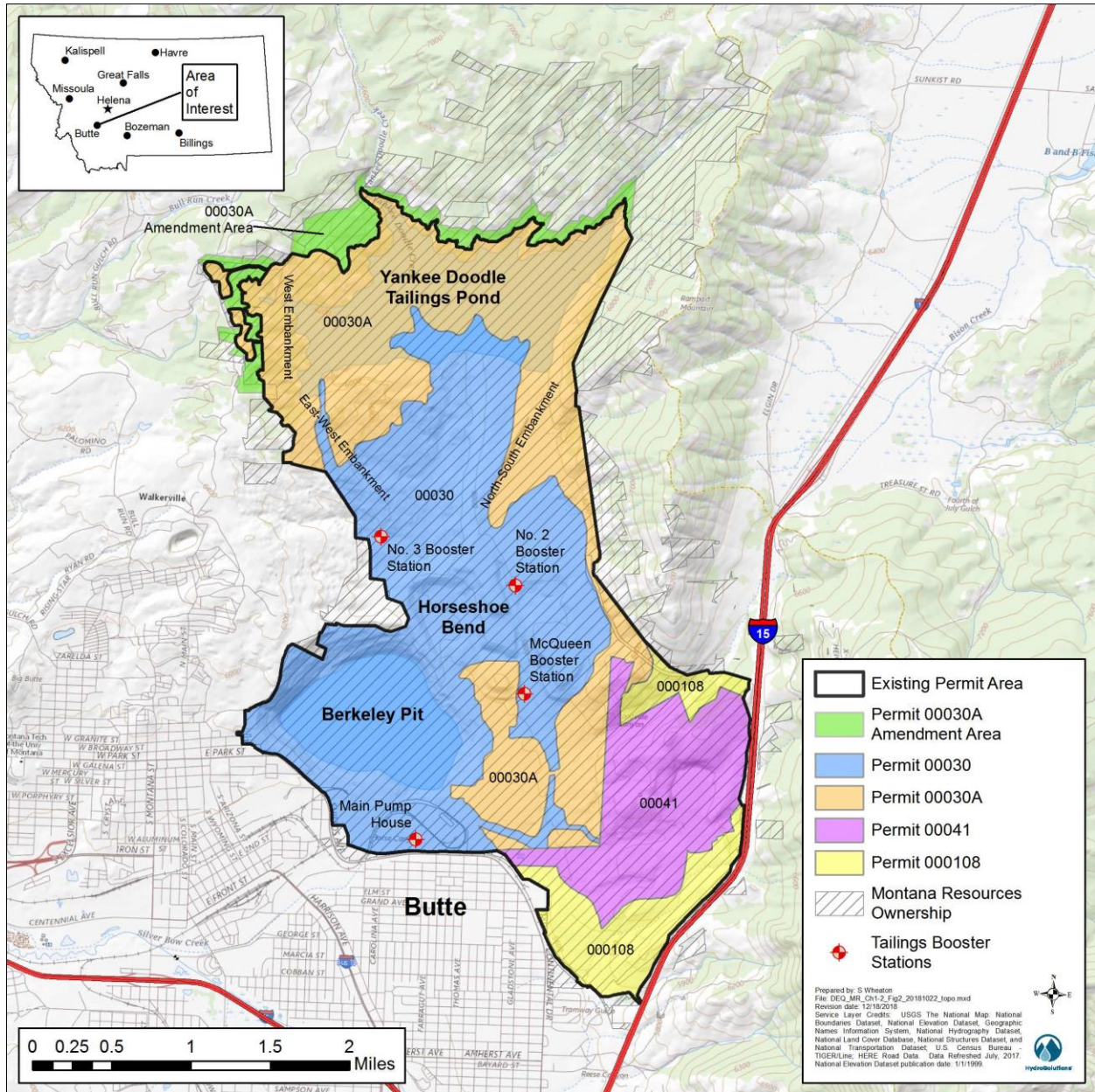


Figure 1.3-1. Project Location and internal permit boundaries for the Montana Resources Amendment Application.

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Montana Resources, Inc. (MRI) purchased the property from the ACM and began mining the East Berkeley (Continental) Pit in 1986. Mining permits were transferred from MRI to Montana Resources, LLP, a general partnership (MR) in 1989. Waste rock from the Continental Pit was used to continue construction of the YDTI. MR ceased to operate the leach dump pads in 1999 but then resumed limited leaching in 2004, with gradually increasing volume and leaching of dumps by September 2012. MR suspended mining operations from 2000 to 2003 due to high electricity prices; however, mining and processing operations recommenced in 2003 (Montana Resources 2018a).

1.3.2 Current Operations

On October 6, 2017, MR submitted an application to amend Operating Permits 00030 and 00030A. The proposed amendment would raise the elevation of the YDTI West Embankment from the 6,405 feet to 6,450 feet, to match the presently permitted elevations of the East-West and the North-South Embankments. The amendment would allow for increased tailings storage and a commensurate extension of the northern boundary of the tailings pond, a new rock disposal site, expansion of an existing rock disposal site, provide for construction of a closure spillway and new soil stockpiles, and revise the operation, reclamation, and closure phases of the impoundment. The proposed amendment would allow for an additional 9 years of operation of the mine at current production levels.

The land covered by Operating Permits 00030 and 00030A includes portions of: Section 1, T3N R8W, Section 6, T3N R7W, Section 36, T4N R8W, Section 31, T4N R7W, Section 30, T4N R7W, Section 29, T4N R7W, and Section 32, T4N R7W. The current facilities and land ownership boundaries are shown on **Figure 1.3-1**.

The proposed amendment would increase the total area of Permit 00030A by approximately 237 acres, but only 99 of these acres would be disturbed to accommodate the West Embankment raise and YDTI expansion. Although the proposed amendment would affect mine facilities that are located within Operating Permit 00030, it would not authorize the disturbance of any additional land under Operating Permit 00030.

1.3.3 Superfund and the Butte Mine Flooding Operable Unit

The following sections describe some of the regulatory actions and documents that have affected management of the Butte Mine Flooding Operable Unit (BMFOU) since its establishment in the 1980s. These actions reflect changes in conditions at the site, changes in regulations, and updates to models used to evaluate the site. These materials are intended to provide context for the actions and alternatives evaluated in this EIS. This EIS does not attempt to describe all aspects of the management of the BMFOU, the interagency planning and management commitments, or the complex history and development of the Butte Mining Complex. The references section of the EIS includes bibliographic information for cited documents should the reader wish to examine the primary sources.

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For general context, the U.S. Environmental Protection Agency (USEPA) regulates the waters that enter and may eventually leave the Berkeley Pit and requires control of ground water levels in and around the BMFOU to ensure that mine-affected waters are managed and treated, if necessary, to meet water quality standards before they are discharged. The monitoring and management of ground water in the BMFOU, including the Continental Mine site, and perpetual treatment of waters that leave the mine site (whether from the Berkeley or Continental pits or the Horseshoe Bend) are regulated by the USEPA under Superfund. DEQ's Hard Rock Mining Bureau consults and coordinates with USEPA, but the MMRA operating permits do not address water management that falls under Superfund. In 2002, a Consent Decree was finalized that clarified responsibility for the water monitoring and management to the court-identified responsible parties (AR and the MR Group) with oversight by USEPA (Consent Decree for the Butte Mine Flooding Site 2002). Section 1.3.3.1 provides more detail on the Consent Decree.

In 1982, the USEPA proposed that Silver Bow Creek be added to the National Priority List (NPL), and it was listed as a Superfund site in 1983. The Butte Area was added to the Silver Bow Creek site in 1987 (USEPA 2018a). A total of four contiguous areas in the upper Clark Fork River Basin have been designated as Superfund sites by the USEPA pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (1980). These sites are the Silver Bow Creek/Butte Area Site, the Anaconda Smelter Site, the Milltown Reservoir/Clark Fork River Site, and the Montana Pole Treating Plant Site. The Silver Bow Creek/Butte Area Superfund Site is currently further separated into seven Operable Units (OUs). Details on the OUs most relevant to the proposed amendment are provided below.

- The BMFOU includes most of MR's mine permit area (**Figure 1.3-2**). The boundaries of the BMFOU are the Continental Divide to the east, Silver Bow Creek to the south, Missoula Gulch to the west, and the Yankee Doodle Creek and Moulton Reservoir watersheds to the north (USEPA 2018a). Descriptions of features within the BMFOU are provided in the following section.
- Butte Priority Soils OU (BPSOU) is a five square mile area that includes the town of Walkerville, along with the part of the Butte Hill that is north of Silver Bow Creek, west of the Berkeley Pit, and east of Big Butte. It also includes a section of land extending south from Silver Bow Creek to Timber Butte. The BPSOU includes residential yards, mine dumps, contaminated railroad beds, and stormwater drainages on the Butte Hill and in Walkerville.
- The Butte Active Mine Area OU (BAMAOU) is contained within the BMFOU and the boundary is established to coincide with the operating permit area for the mine operations. USEPA has deferred authority for mine permitting decisions, such as this amendment, to DEQ (USEPA and DEQ 2001).

The Berkeley Pit is filling with water originating from: the surrounding bedrock aquifer, which includes several thousand miles of flooded underground mine workings; the surrounding

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alluvial aquifer; and additional surface inflows. The Horseshoe Bend area is a discharge point where several million gallons per day of contaminated alluvial ground water surfaces at the base of the tailings impoundment. This discharge historically flowed to the Berkeley Pit, but USEPA ordered the capture and use of Horseshoe Bend flow in the mining operation from April 15, 1996 until July 1, 2000, when the mining operation was suspended (USEPA and DEQ 2002).

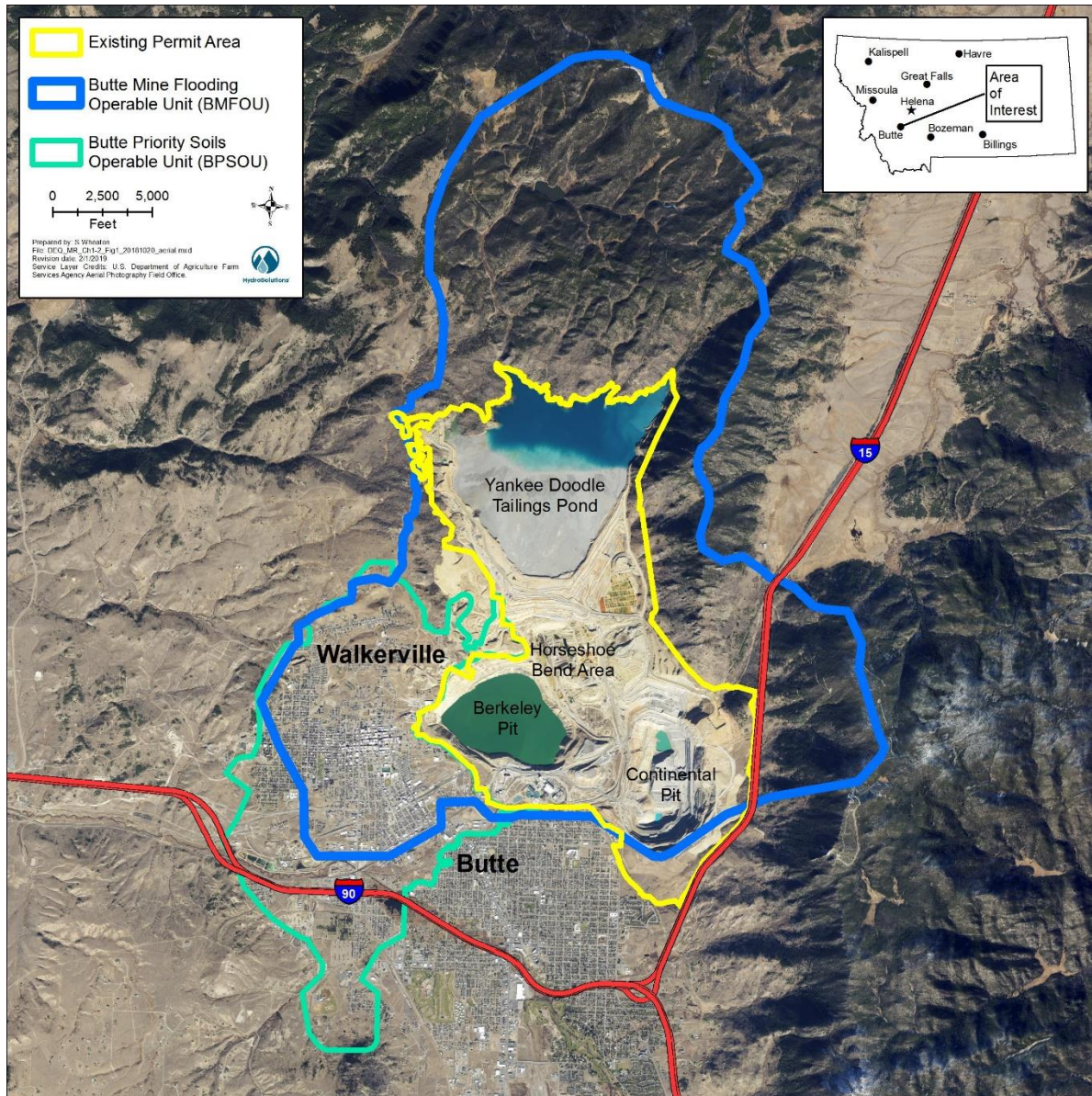


Figure 1.3-2. Montana Resources Continental Mine Permit boundary and the Butte Mine Flooding Operable Unit boundary.

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Following the suspension of mining, the Horseshoe Bend flow was no longer treated and integrated into the tailings circuit, so the contaminated Horseshoe Bend water was directed back to the Berkeley Pit. Under the requirements in the 1994 ROD, this triggered the final design process for a Water Treatment Plant at Horseshoe Bend (the HsB Water Treatment Plant), which was approved by USEPA in 2002. The HsB Water Treatment Plant is a lime precipitation high density sludge (HDS) Water Treatment Plant capable of treating average flows of 5 million gallons per day (MGD) and peak flows of 7 MGD. It was designed to be capable of treating Horseshoe Bend water, Continental Pit, and Berkeley Pit water when it becomes necessary.

1.3.3.1 2002 Consent Decree

A consent decree is a legal document, approved by a judge, that formalizes an agreement reached between USEPA and Potentially Responsible Parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a Superfund site; cease or correct actions or processes that are polluting the environment; or otherwise comply with USEPA initiated regulatory enforcement actions to resolve the contamination at the Superfund site involved. In 2002 a consent decree formalized and described the actions that DEQ, representing the State of Montana, and USEPA have agreed that the PRPs (identified in the 2002 Consent Decree as AR and the MR Group) will take in the BMFOU.

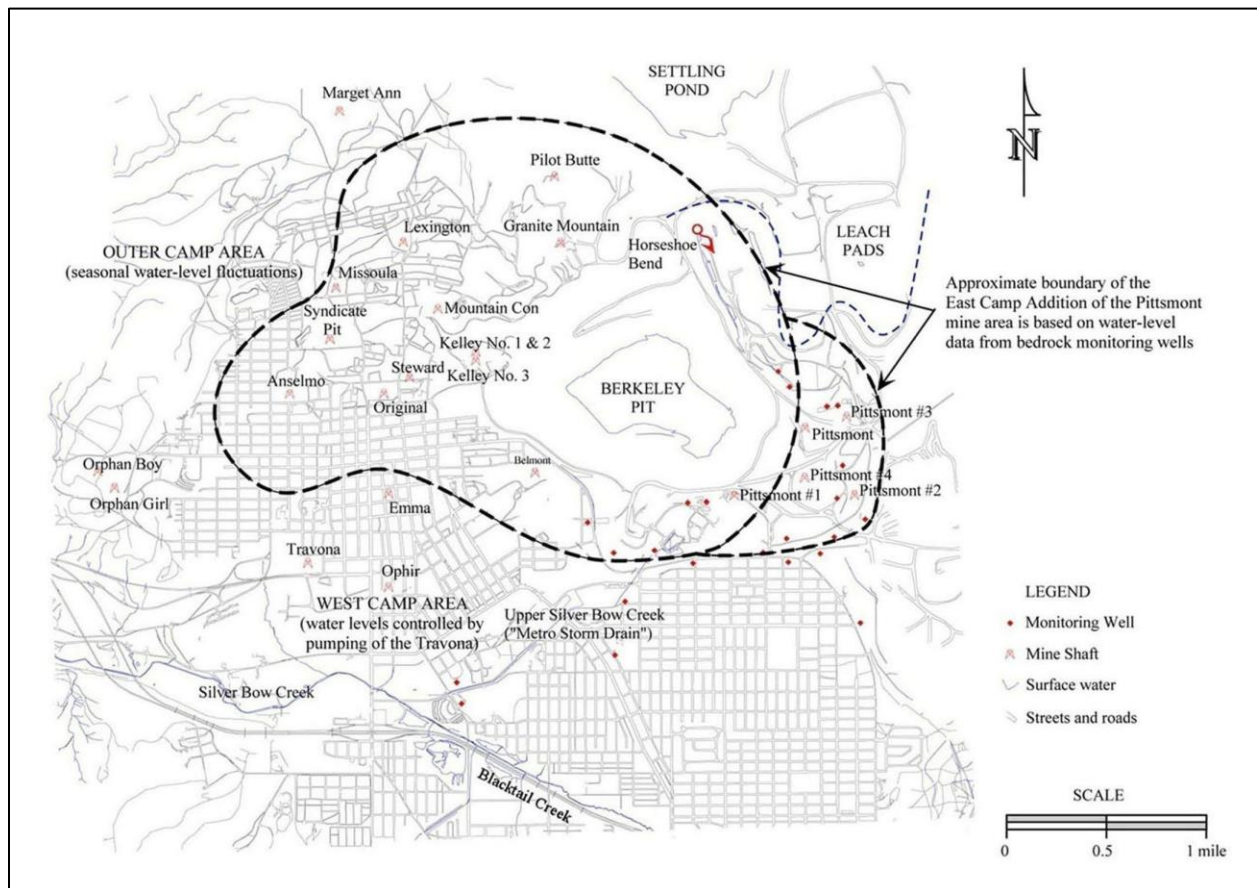
As described in the 2002 Consent Decree, the BMFOU site consists of:

- The waters within the Berkeley Pit;
- The underground mine workings hydraulically connected to the Berkeley Pit;
- The alluvial aquifer near the Berkeley Pit which drains into the Berkeley Pit;
- The bedrock aquifers, including the bedrock aquifer water in and near the Continental Pit;
- Other contributing sources of inflow to the Berkeley Pit/East Camp system, including surface runoff, leach pad, and stormwater that enters the Berkeley Pit from the BPSOU; tailings slurry circuit overflows; and Horseshoe Bend surface water flows;
- The Travona/West Camp ground water system, unless that ground water discharge becomes part of the BPSOU response actions upon approval by EPA, in consultation with the state; and
- The surface area designated for the potential development of a sludge repository.

Presently, because all bedrock ground water in the East Camp area flows toward the Berkeley Pit, and because the Travona/West Camp removal action controls releases from that system, contaminated mine water is being contained in the East and West camps. The East Camp is largely encompassed within the southern portion of the BMFOU. The West Camp area is to the southwest of the Berkeley Pit (**Figure 1.3-3**). However, if ground water levels continue to rise beyond critical elevation levels, the hydraulic gradient could change,

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and contaminated water could flow out of the East and West Camps into the surrounding alluvial ground water and eventually to Silver Bow Creek. To prevent this from occurring, USEPA and DEQ determined that the water levels in the BMFOU boundary must not rise above the critical water level (CWL) of 5,410 feet for the East Camp and 5,435 feet for the West Camp.



Source: 2011 BMFOU report (MBMG 2012)

Figure 1.3-3 Approximate location of the East and West Camp Areas in relation to the Town of Butte, Montana.

1.3.3.2 2002 Explanation of Significant Differences

Also in 2002, the USEPA and DEQ evaluated the actions prescribed in a 1994 Record of Decision (ROD) for the BMFOU and updated the ROD where significant differences were identified. The significant differences were caused by new standards, changes in existing permits, or transfers of responsibility among the Operable Units (USEPA and DEQ 2002). The remedy (remedial actions) selected in the 1994 Record of Decision (ROD) (USEPA 1994), as amended by the 2002 Explanation of Significant Differences (ESD), included the following components:

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- Control of inflow from Horseshoe Bend with exceptions for short-term flows to the Berkeley Pit;
- Routing of stormwater runoff from upper areas of BPSOU to the Berkeley Pit;
- Treatment of surface water and ground water from Horseshoe Bend and Continental Pit at the HsB Water Treatment Plant and the potential use of water in the mining process or discharge to Silver Bow Creek;
- Allowance for placement of HsB Water Treatment Plant sludges in the Berkeley Pit;
- Treatment of West Camp water in the Butte Treatment Lagoons under BPSOU activities; and
- If water is discharged to Silver Bow Creek after treatment at the HsB Water Treatment Plant (instead of being used in active mining operations), it must meet all applicable surface water discharge standards identified in the ROD and ESD.

In addition to the changes in how water is managed in the area, the ESD included these changes:

- The Upgradient Bypass condition in the 1994 ROD was modified to accommodate potential wet closure of Yankee Doodle Tailings Pond;
- Authority for the management and reclamation of the sludge repository was transferred from the DEQ mine permit to Superfund through the BMFOU; and
- Complete transfer of authority for Yankee Doodle Tailings Pond dam stability monitoring to DEQ via the MMRA permitting process (USEPA and DEQ 2002).

The interaction between the BPSOU and the BMFOU was also further defined to state that the storm water runoff from certain areas within the BPSOU boundaries would be routed under USEPA Superfund orders and directions to the Berkeley Pit. The treatment of this storm water becomes a responsibility transferred to the BMFOU after it enters the Berkeley Pit.

The West Camp water is treated at the BPSOU Lower Area One treatment lagoon system (Butte Treatment Lagoons). The treatment of this water is a responsibility that was transferred to the BPSOU activities during treatability studies but has since been returned to the BMFOU.

Other changes in responsibility and water management established that Continental Pit water that would accumulate post-mining would be treated in the HsB Water Treatment Plant, and allowed HsB Water Treatment Plant sludges to be placed in the Berkeley Pit without offsetting water withdrawals.

EPA issued a decision document (Response Decision Deferral Document, USEPA and DEQ, 2001) with the concurrence of DEQ which adjusted boundaries between USEPA's BMFOU and the BAMAOU and announced USEPA's intent to refrain from taking Superfund action at the BAMAOU and to defer to State mine permit actions (like this amendment) for environmental cleanup of that area. USEPA reserved the right to exercise CERCLA authority at the site should

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the reclamation plan not be implemented by MR and/or enforced by DEQ, or the bonding proves inadequate to cover the cost of reclamation required by the permit.

1.3.3.3 Integration of the Proposed Amendments

The background information on the history and current regulatory context is necessary for evaluation of the proposed amendment and any alternatives or stipulations. DEQ examines amendment applications for consistency and compliance with the MMRA (Section 82-4-301, *et seq.*, MCA), the Montana Water Quality Act (Section 75-5-101, *et seq.*, MCA), the Clean Air Act of Montana (Section 75-2-101, *et seq.*, MCA), and other relevant legislation and regulations. In addition, the Superfund status of the BMFOU and DEQ's position as a party in the 2002 Consent Decree requires that any actions proposed at the Continental Mine must be consistent with the 2002 Consent Decree and other decision documents that direct management within the BMFOU. Furthermore, actions that have the potential to affect conditions at facilities within the BMFOU such as the Horseshoe Bend area or the Berkeley Pit must be coordinated with EPA.

1.4 SCOPE OF THE DOCUMENT

The geographic scope of this EIS covers the lands within the Continental Mine permit boundaries that may be affected by an alternative being analyzed, with a focus on those lands within the permits to be amended, 00030 and 00030A (**Figure 1.3-1**). The EIS will only disclose potential impacts within the state of Montana as required by MEPA (75-1-201(2)(a), MCA). Five alternatives are described and evaluated in detail in this EIS. Chapter 2 describes the No Action Alternative, the Proposed Action: On-Site Tailings Storage and Water Containment, the Accelerated Drawdown at Closure Alternative, the Elimination of West Embankment Drain at Closure Alternative, and the Alternative Capping Methods Alternative. The action alternatives include additional mitigation measures developed by DEQ. The five alternatives are described in detail in Chapter 2.

Chapter 3 describes the existing environment and environmental consequences to the resource areas from implementation of the alternatives. Resource areas discussed in detail include: geology and minerals, geotechnical engineering, soils and reclamation, surface and ground water, vegetation, wildlife, aquatics, cultural resources, socioeconomics, land use, visuals, noise, and air quality. Chapter 4 describes the cumulative, unavoidable, irreversible, irretrievable, and secondary impacts that may occur under the alternatives. Chapter 5 provides a comparison of alternatives, Chapter 6 documents agency consultation and coordination, and Chapter 7 lists the preparers. Chapter 8 contains the glossary and acronym list and Chapter 9 lists the references cited in the EIS.

1.5 AGENCY ROLES AND RESPONSIBILITIES

DEQ is responsible for administrating the MMRA and the administrative rules adopted to implement the MMRA. DEQ is responsible for issuing and amending operating permits under the MMRA. **Table 1.5-1** lists the regulatory authority and permits issued by DEQ and EPA.

Table 1.5-1. Regulatory Authority and Responsibilities of the DEQ and USEPA related to the Montana Resources Permit Amendment.

Regulatory Authority	Purpose
Department of Environmental Quality	
Metal Mine Reclamation Act (Section 82-4-301, <i>et seq.</i> , MCA)	MMRA regulates the mining of ore or rock in the state to provide adequate environmental protection. Mining must comply with state environmental laws and administrative rules. Approval may include stipulations for mine operation and reclamation. A sufficient reclamation bond must be posted with the state before an operating permit or operating permit amendment is issued.
MEPA Analysis of Impacts (75-1-102, MCA)	To disclose possible impacts to the human environment.
Montana Water Quality Act, (75-2-101, <i>et seq.</i> , MCA), Montana Pollutant Discharge Elimination System (MPDES) for Active Mine Area	To establish effluent limits, treatment standards, and other requirements for point source discharges to state waters, including ground water for active mine areas. Discharges to waters may not violate water quality standards.
Clean Air Act of Montana, (75-5-101, <i>et seq.</i> , MCA)	To control particulate emissions of more than 25 tons per year.
US Environmental Protection Agency	
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund (42 U.S.C. §§9601-9675)	Allows USEPA to clean up contaminated sites. It also forces the parties responsible for the contamination to either perform cleanups or reimburse the government for EPA-led cleanup work. When there is no viable responsible party, Superfund gives USEPA the funds and authority to clean up contaminated sites.
National Priorities List (subset of Superfund sites)	Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening.

1.5.1 Metal Mine Reclamation Act

DEQ's hard-rock mine permitting and amendment process is governed by the MMRA. MMRA requires review of each application in stages: a deficiency review, a completeness and compliance determination that may lead to issuance of a draft permit or draft permit

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amendment, and a decision. DEQ regulates the mining of all ore, rock, or substances except oil, gas, bentonite, clay, coal, sand, gravel, peat, soil materials and uranium under the MMRA. DEQ is required to issue timely and complete operating permit decisions for mining and reclamation of hard rock operations. In addition, the permitting process ensures appropriate public involvement through compliance with MEPA.

Once DEQ receives an operating permit amendment application, the agency reviews it for completeness and compliance under the MMRA. DEQ may request additional information or modification of the application in order to deem it complete or ensure compliance with mine reclamation, water quality, and air quality regulations. After the mine operator responds to any deficiencies and DEQ has determined the application to be complete and compliant under the MMRA, DEQ issues a draft operating permit amendment. This is the point in the process where review under MEPA begins. Issuance of the draft permit amendment as a final permit amendment is the state action subject to MEPA. DEQ has one year within which to conduct the environmental review. The MMRA provides the substantive requirements governing DEQ's action on permit and permit amendment applications. MEPA is procedural. The purpose of requiring an environmental review under MEPA is to assist the legislature in determining whether laws are adequate to address impacts to Montana's environment and to inform the public and public officials of potential impacts resulting from decisions made by state agencies (Section 75-1-102(1), MCA).

DEQ reviews all amendment applications for completeness and compliance with 82-4-337 (amendments to a permit) and 82-4-336 (reclamation plan), MCA, and the rules implementing that section and all information necessary to initiate processing. As part of this review, DEQ reviews the materials submitted for any deficiencies corresponding to requirements under Administrative Rules of the State of Montana (ARM) Title 17 Chapter 24, Subchapter 1. Deficiency notices are submitted to the proponent and specify what information is missing or incomplete.

An application is considered complete and compliant once all deficiencies have been addressed and DEQ determines the substantive provisions of the MMRA are met. DEQ determines the appropriate level of environmental review under MEPA, either an Environmental Assessment (EA) or an EIS. An EIS is required where DEQ determines that the application involves a major action significantly affecting the environment (ARM 17.4.608). Alternatively, DEQ may prepare an EA to determine whether preparation of an EIS is required. In addition, ARM 17.4.617(9) permits DEQ to identify the agency's preferred alternative in an EIS, if any, and the reasons for the preference. Upon completion of the environmental review, DEQ issues a Record of Decision document.

1.5.2 Montana Resources Continental Mine: YDTI Amendment

DEQ received an amendment application from MR on October 6, 2017. After several reviews and deficiency responses that addressed DEQ concerns, DEQ determined the application was

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complete and complied with the requirements of the MMRA. On August 31, 2018, DEQ issued a draft permit amendment. The draft permit triggered the MEPA process. Issuance of the draft permit amendment as a final permit amendment is the proposed state action subject to an environmental review under MEPA.

The purpose of MR's proposed amendment is to increase the capacity of the YDTI by raising the elevation of the West Embankment to match the presently permitted elevations of the other two embankments and extending the northern boundary of the impoundment. The proposed elevation raise is supported by a Design Document that contains statutory requirements detailed in Section 82-4-376, *et seq.*, MCA. Changes to MR's operating permits that would result from this proposed amendment are described under the Proposed Action in Chapter 2.

1.5.3 Other Agency Roles

1.5.3.1 US Environmental Protection Agency (Superfund)

As noted earlier, the Silver Bow Creek area was added to the National Priority List in 1982, and it was listed as a Superfund site in 1983. The Butte Area was added to Silver Bow Creek site in 1987. From 1988 to 2005, USEPA completed several removal actions to clean up areas around former smelter sites, mine waste dumps, railroad beds, stream banks and channels, and residential yards to address immediate human health and environmental risks (USEPA 2018a).

Removal and cleanup actions have been completed to address immediate threats to human health and the environment in Butte. Cleanup, operation and maintenance, sampling, and monitoring actions are ongoing. Throughout the Superfund cleanup in Butte, USEPA has completed four, Five-Year Reviews to determine how the remedy is working and if it remains protective of human health and the environment (USEPA 2018a). The last Five-Year Review was completed in 2016. USEPA is the lead agency for overseeing and enforcing the cleanup at the Butte Area Superfund Site with the exception of the Streamside Tailings Operable Unit (SSTOU) (USEPA 2016). DEQ is the support agency representing the State of Montana for all OUs except the SSTOU, where it is the lead agency. USEPA is responsible for conducting the site-wide Five Year Review which compares monitoring results with the remedy prescriptions and assesses efficacy. PRPs finance and implement cleanup at the Site, with the exception of the SSTOU where DEQ is implementing the remedy using funds provided by the PRP. DEQ reviews the Five Year Reviews and provides input to EPA.

EPA and DEQ published an Explanation of Significant Differences for the BMFOU ROD that modified some aspects of the ROD but retained other aspects and CERCLA requirements. USEPA and DEQ were co-plaintiffs in the 2002 Consent Decree and work together in the regulation of the Butte Area Superfund site. Therefore, MR's proposed amendment and the action alternatives will be evaluated for consistency with existing agreements and regulatory stipulations under Superfund and the Consent Decree.

1.5.3.2 Independent Review Panel

The Independent Review Panel (IRP) consists of three engineers or specialists as required by 82-4-377, MCA. The IRP is tasked with reviewing the design documents for the YDTI including the proposed changes to the West Embankment and increased operating capacity. The IRP reviewed these documents and assessed the completeness and scientific rigor of aspects including, but not limited to, the geotechnical investigations of the site, any models used to evaluate the designs, demonstration that the expansion of the facility meets the minimum requirements for a new tailings facility (82-4-376(2)(i), MCA) or that it does not reduce the tailings storage facility's original design factors of safety and seismic event design criteria, and several analyses of the site's performance under flooding and site stressors. The design documents must also be certified by an engineer of record (EOR) (82-4-375, MCA) and are submitted to DEQ as part of the amendment review process. More details on the roles of the IRP and the EOR are provided in Chapter 2, Section 2.2.

1.6 PUBLIC INVOLVEMENT

MEPA provides two opportunities for public review and comment on an EIS. The first opportunity occurs at the initiation of a project during scoping and the second opportunity occurs after the environmental analysis is made available in the draft document. The purpose of scoping is to gather input from the public, agencies, and organizations on the issues of concern and potential alternatives that would meet the purpose and need for a project.

1.6.1 Scoping

The scoping period for the MR YDTI EIS began on September 14, 2018 and ended on October 15, 2018. DEQ published legal notice of the scoping period and meeting in the *Montana Standard* on September 16, 23, 30, and October 7 and 14, 2018. The legal notice was also published on DEQ's website beginning on September 12, 2018.

DEQ held a public scoping meeting and open house in Butte, Montana on October 4, 2018. Approximately 100 people attended the meeting. DEQ provided a court reporter for transcribing oral comments during the meeting and accepted written comments at the meeting, as well as comments submitted via email and postal mail prior to the deadline. The transcript of the meeting and written comments are included in the Administrative Record for the project.

1.6.2 Scoping Comments

DEQ collected written comments on the Proposed Action and the issues to be considered through the public scoping meeting, letters, and emails. All comments were reviewed to identify specific issues or concerns. Each substantive comment was categorized based on the topic or topics it discussed. During the development of alternatives considered in the EIS, DEQ will take into consideration the issues brought forward in these comments.

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DEQ received 22 written comments during the scoping period in addition to the 10 comments made verbally by individuals at the October 4, 2018 scoping meeting. Some commenters submitted multiple comment documents. Comments and concerns expressed included:

- Socioeconomic effects of the MR mine operation;
- Air and water quality concerns;
- Stability of geologic faults underlying the mine; and
- Stability of the embankment system.

1.7 ISSUES OF CONCERN

The primary issues of concern related to the Proposed Action include:

- Water management;
- Air quality;
- Reclamation schedule;
- Stability of the YDTI;
- Life of the mine and socioeconomic effects; and
- Implications for the BMFOU.

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2 DESCRIPTION OF ALTERNATIVES

This chapter describes the alternatives evaluated in the environmental review, the alternatives screening process, and rationale for alternatives considered but not analyzed in detail.

2.1 DEVELOPMENT OF ALTERNATIVES

To be considered for further analysis, each potential alternative had to meet the purpose and need of increasing the storage capacity of the tailings impoundment. An alternative must be reasonable, in that the alternative is achievable under current technology and is economically feasible as determined solely by the economic viability for similar projects having similar conditions and physical locations and determined without regard to the economic strength of the specific project sponsor (75-1-201, (1)(b)(iv)(C)(I), MCA). "Alternatives" may include design parameters, mitigation, or controls other than those incorporated into a Proposed Action by an applicant or by DEQ prior to preparation of an EA or draft EIS (ARM 17.4.603(2)(a)(ii)). An alternatives analysis under MEPA does not include an analysis of alternatives to the proposed project itself (75-1-220(1), MCA).

MEPA requires the analysis of the Proposed Action, reasonable alternatives to the Proposed Action, and the No Action alternative. During the course of the environmental analysis, DEQ considered and dismissed several alternatives that either had greater impacts to the human environment than the Proposed Action, would not meet the purpose and need, or did not meet the criteria for reasonableness. These alternatives are summarized in Section 2.8, Alternatives Considered but Dismissed from Further Analysis.

2.1.1 Elevations and Datums

In order to maintain consistency with the proposed amendment application materials, maps and figures related to the Continental Mine presented in this EIS reference the site coordinate system known as the Anaconda Mine Grid established by the ACM in 1957. The Anaconda Mine Grid is based on a vertical datum established in 1915. Elevations in this EIS are generally stated in Anaconda Mine Grid coordinates with respect to the ACM Vertical Datum, which is typically 52.6 feet higher than the U.S. Geological Survey (USGS) datum (slight variations in the elevation correction factor occur around the mine). Information on areas outside of the mine boundary or provided by sources other than MR are presented in the USGS datum or elevation above mean sea level (AMSL).

2.2 DESIGN DOCUMENTS, INDEPENDENT REVIEW PROCESS, AND ENGINEER OF RECORD

In accordance with 82-4-377, MCA, an IRP is contracted with the operator or permit applicant to review 1) the design document, 2) the underlying analysis, 3) assumptions for consistency, and 4) assess the practicable application of current technology in the proposed design of a mine tailings storage facility. The panel submits its review and any recommended modifications to the operator or permit applicant and DEQ. The panel's determination is conclusive. The EOR is

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required to modify the design document to address the recommendations of the panel and certify the completed design document.

Section 82-4-376, MCA, describes the design document requirements for an operator proposing to expand an existing tailings storage facility and is the governing legislation for preparation of the expansion design. The requirements include:

“An evaluation indicating that the proposed tailings storage facility will be designed, operated, monitored, and closed using the most applicable, appropriate, and current technologies and techniques practicable given site-specific conditions and concerns.”

The MMRA further defines the word “practicable” to mean the following:

“Available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of the overall project purposes.” (82-4-303(25), MCA)

The alternative assessment completed by Knight Piesold on MR’s behalf fulfills the requirements of the legislation by comparing the alternatives for continued tailings storage in order to provide a transparent rationale for the selection of certain alternatives (Knight Piesold 2017a).

An application for a permit or a permit amendment for a new tailings storage facility or expansion of an existing tailings storage facility must include the designation of an EOR and contact information. As described in 82-4-375, MCA, the responsibilities of the EOR include the following:

- 1) Review the design and other documents pertaining to the tailings storage facility;
- 2) Certify and seal designs or other documents pertaining to the tailings storage facility submitted to DEQ;
- 3) Complete an annual inspection of the tailings storage facility;
- 4) Notify the operator when credible evidence indicates the tailings storage facility is not performing as intended; and
- 5) Immediately notify the operator and DEQ when credible evidence indicates that the tailings storage facility presents an imminent threat or a high potential for imminent threat to human health or the environment.

The responsibility of the IRP is to provide an evaluation indicating whether the proposed YDTI expansion is designed, and will be operated, monitored, and closed, using the most applicable, appropriate, and current technologies and techniques practicable, given site-specific conditions and concerns. The IRP determined that the design document for expansion of the YDTI addresses all MCA requirements. Based on the selection of appropriate parameters and sound technical evaluations, the IRP accepted the adequacy of the design (Montana Resources, LLP 2017).

2.3 NO ACTION ALTERNATIVE

MEPA requires an analysis of the No Action Alternative. The No Action Alternative provides a comparison of environmental conditions without the proposal and establishes a baseline for evaluating the Proposed Action and the other alternatives. MEPA requires the consideration of the No Action Alternative, even if it fails to meet the purpose and need or would not be able to satisfy environmental permitting standards.

2.3.1 Introduction to the Alternative

Under the No Action Alternative, MR would continue to operate under its existing operating permits. The tailings storage capacity in the YDTI would remain unchanged, the northern boundary of the YDTI would not be expanded, disturbed acreage would not be increased, and revisions to the existing reclamation and closure plans would not be necessary. MR mining operations would continue through 2022 and be limited to the current permits which include Operating Permits 00030, 00030A, 00041, and 00108, along with associated amendments, modifications, and revisions. A summary of all operating permits and components can be found in Montana Resources Continental Mine Operations Plan dated February 2017 and revised February 2018 (Montana Resources 2018a).

2.3.2 Permit Boundary and Disturbed Area Description

The permit boundary for currently permitted Operating Permits 00030 and 00030A, along with the area that would be added to Permit 00030A under the Proposed Action, is shown on **Figure 1.3-1**. Under the No Action Alternative, no acreage would be disturbed outside of the current permitted design area. The height of the West Embankment would remain at 6,405 feet, the northern boundary of the YDTI would not be expanded, and disturbed acreage would not be increased. Distribution of currently permitted acreage is shown in **Table 2.3-1** (Montana Resources 2018b).

**Table 2.3-1
Acreages Associated with MR Operations – Currently Permitted Design**

Location	Area (Acres) ^a
N-S and E-W Embankments	
Reclaimed Slope (2.7H:1V)	209
Reclaimed Slope (2H:1V)	64
West Embankment	
Reclaimed Slope (3H:1V)	118 ^g
Reclaimed Slope (2.5H:1V)	8 ^g
Slope above Precipitation Plant (Riprap)	14
Reclaimed Crest	166
Reclaimed Beach	
At Closure ^b	806
At Pond Equilibrium ^c	1,305
Transition Zone ^d	

**Table 2.3-1
Acreages Associated with MR Operations – Currently Permitted Design**

Location	Area (Acres)^a
At Closure ^b	232
At Pond Equilibrium ^c	122
Pond	
At Closure ^b	560
At Pond Equilibrium ^c	171
SUB-TOTAL YDTI AT CLOSURE	2,177
Associated Facilities	
North RDS ^e	
Reclaimed Slopes	-
Reclaimed Top/Benches	-
Great Northern RDS	133
Reclaimed Slopes	
Reclaimed Top/Benches	
New Reclamation Material Stockpiles	
Soil	27
Alluvium (temporary) ^f	
SUB-TOTAL ASSOCIATED FACILITIES	160

Source: (Montana Resources 2018b, Knight Piesold 2019a, Knight Piesold 2019b)

^aAreas are plan areas, not sloped areas; totals are ±1 acre due to rounding. Numbers in this table are estimates based on the most recent 2018 KP Water Balance and 2019 KP Surface Modeling Tables.

^bClosure for the currently permitted design is 2022 and 2031 for the 6,450 design.

^cEquilibrium in the current permit is assumed at a pond volume of about 500 acre-feet. However, to facilitate comparison with the proposed amendment, acreages are provided for an approximate 1,000 acre-feet pond. Both the currently permitted design and the 6,450 design assume a freshwater input of 1 MGD.

^dThe Transition Zone is assumed to be about 800 feet wide along the beach and pond boundary.

^eThe North RDS covers about 92 acres of the embankment, primarily the previously permitted face of the North-South Embankment.

^fTemporary alluvium stockpiles are within the footprints of the North and Great Northern RDS.

^gIncludes areas disturbed by construction of the starter dike and WED.

2.3.3 YDTI West Embankment and Water Management

The elevation of the West Embankment would remain at 6,405 feet and not be raised to the proposed elevation of 6,450 feet to match the presently permitted elevations of the East-West and North-South Embankments. Storage capacity of the YDTI would not be increased beyond the currently approved conditions, which would likely support continued mining operations until closure in 2022.

Water management would be expected to continue as permitted. MR monitors surface water quality at several sites within and adjacent to the mine. The locations of monitoring sites are

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shown on **Figure 2.3-1**. The Berkeley Pit and Horseshoe Bend area monitoring sites are sampled as part of the BMFOU. The monitoring program continuously evolves with changes in the operation and site conditions. MR annual reports for the mining permits present current surface water monitoring locations and sampling results. The ground water monitoring data are included in monthly BMFOU reports. Yankee Doodle, Dixie, and Silver Bow creeks drain directly into the YDTI supernatant pond. The term supernatant refers to the liquid lying above a solid residue after settling, in this case the water in the tailings pond sitting above the tailings solids. Drainages along the east side of the permit area (e.g., Woodville Gulch and Horse Canyon) drain westward into rock disposal sites (RDS), the Continental Pit, YDTI, or the Clearwater Ditch. The Clearwater Ditch begins on the west side of Interstate-15 and extends along the east and south sides of the project site. It collects runoff from RDSs located along the east side of the permit area and the Hillcrest dump to the south, transporting it to a collection pond near the Butte Concentrator where it is used for makeup water needs.

The west side of the permit area is located near the drainage divide separating the mine area from Bull Run Creek and Oro Fino Gulch, where surface water flows west. Any ephemeral surface water that flows east from this divide into the mine area is redirected by the West Embankment of the YDTI or enters the YDTI.

Ground water in much of the mine area is dominated by flow toward, and into, the Berkeley Pit. Ground water occurs in three general units: alluvium, weathered bedrock, and competent bedrock. The weathered bedrock zone generally acts as a confining layer between the alluvium and competent bedrock in parts of the permit area and has similar appearance and hydrologic properties as the overlying alluvium/colluvium in other areas (i.e., peripheral to the YDTI). There is a large ground water cone of depression surrounding the Berkeley Pit.

The WED is a subsurface aggregate drain, designed to intercept seepage migrating west from the YDTI above an elevation of 6,350 feet (Knight Piesold 2017b). The WED has been constructed as approved by DEQ in Amendment 9 to Operating Permit 00030A (February 2015). The WED is constructed along the upstream toe of the West Embankment and drains by gravity to the south to a permanent Extraction Pond. Additional details about the function of the WED and seepage pumpback systems are described in Section 2.4.3. The majority of water input into YDTI originates from tailings slurry, which enters the YDTI at a rate of approximately 22 million gallons per day. The current gains and losses of water to the YDTI from the water balance model are shown in **Table 2.3-2** and would continue under the No Action Alternative.

Under the No Action Alternative, the tailings pond would not exceed the operational elevation of 6,360 feet and would not have the potential to impact ground water gradients to the west. The WED would still effectively capture seepage moving west from the YDTI pond, but at a lesser flow than what is anticipated for increasing pond elevations as part of the Proposed Action.

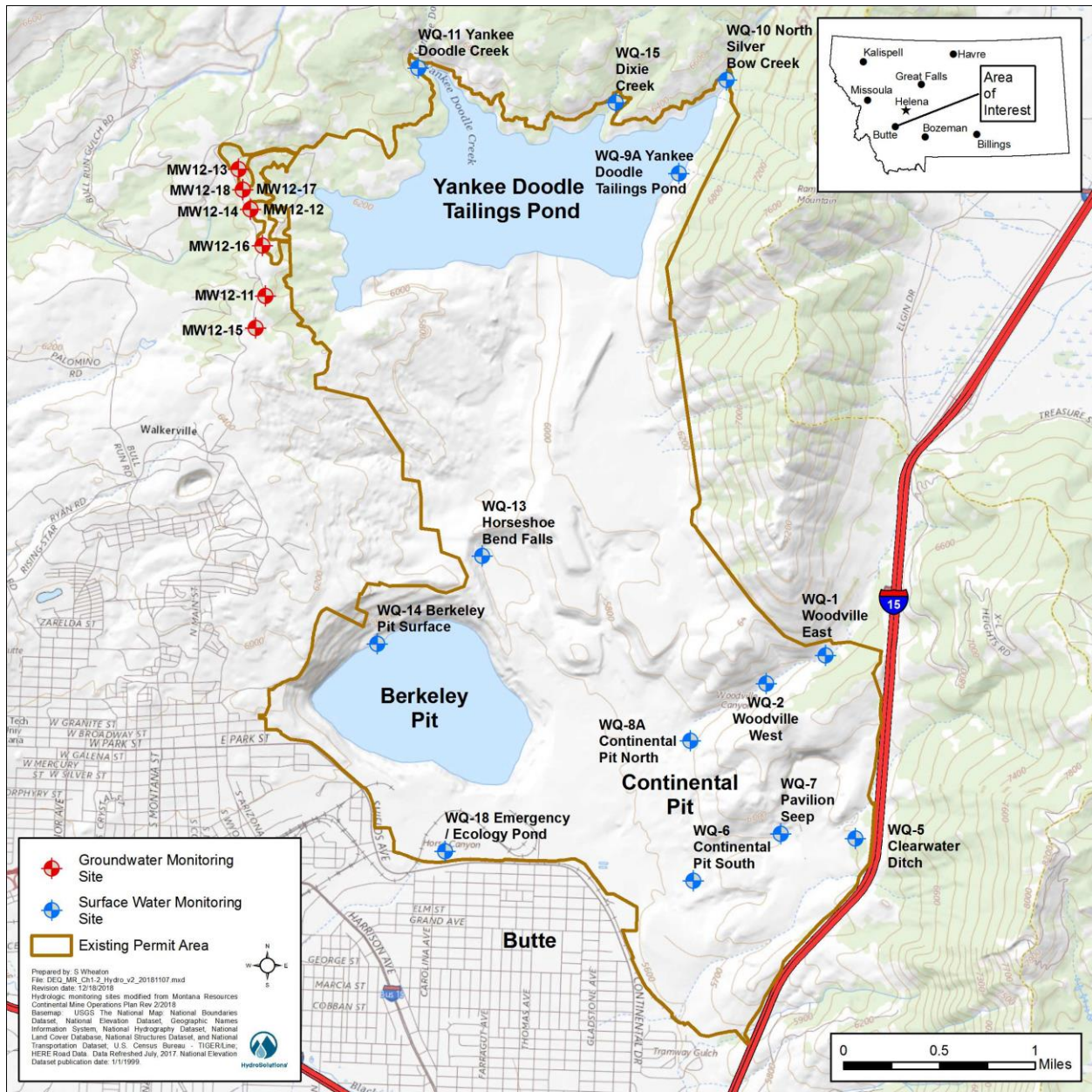


Figure 2.3-1. Current hydrologic monitoring sites, Yankee Doodle Tailings Impoundment and Continental Mine Operations.

**Table 2.3-2.
Gains and losses of water to the YDTI**

Source	Average Flow Contribution for 2007-2012 (MGD)	Water Quality Model Assumption
<i>2007 to 2012 Gains (26.45MGD)</i>		
Rainfall on Pool	0.62	Assumed equal to 1 mg/L for major ions
Runoff from Beach	0.14	Assumed 50 % of concentration in tailings slurry to account for partial dilution by rainfall. Only applies to operational period. For post-closure two contact water scenarios (Worst and Probable Case) were simulated.
Runoff to Tailings from Upgradient Watershed	0.70	Based on average water quality at surface water (SW) stations for upper Silver Bow, Yankee Doodle, and Dixie Creek.
Water in Tailings Slurry	21.59	Determined using solver routine in Excel to generate best fit to pool chemistry.
Water Pumped from Horseshoe Bend Area	0.00	Measured during times when Horseshoe Bend was pumped to YDTI.
West Embankment Drain	0.00	8 components of flow each have distinct water quality. No flow from WED in calibration period as West Embankment not yet constructed.
Makeup Water	3.36	Silver Lake water source.
<i>2007 to 2012 Losses (26.47 MGD)</i>		
Pool Evaporation	1.25	No effect on chemical load but increases concentration.
Water Lost to Void Space	4.40	Concentration assumed to be same as previous time step in model.
Seepage Loss	4.34	Concentration assumed to be same as previous time step in model.
Water Reclaimed for Processing in Mill	16.44	Concentration assumed to be same as previous time step in model.
<i>Pool</i>		
Pool	Average 2007-2012 20,950 ac ft	Model prediction compared to pond water quality measurements for calibration period.

Source: (Schafer Limited LLC 2018)

Notes: Gains and losses of water for the YDTI based on the water balance model completed by Knight Piesold 2017.

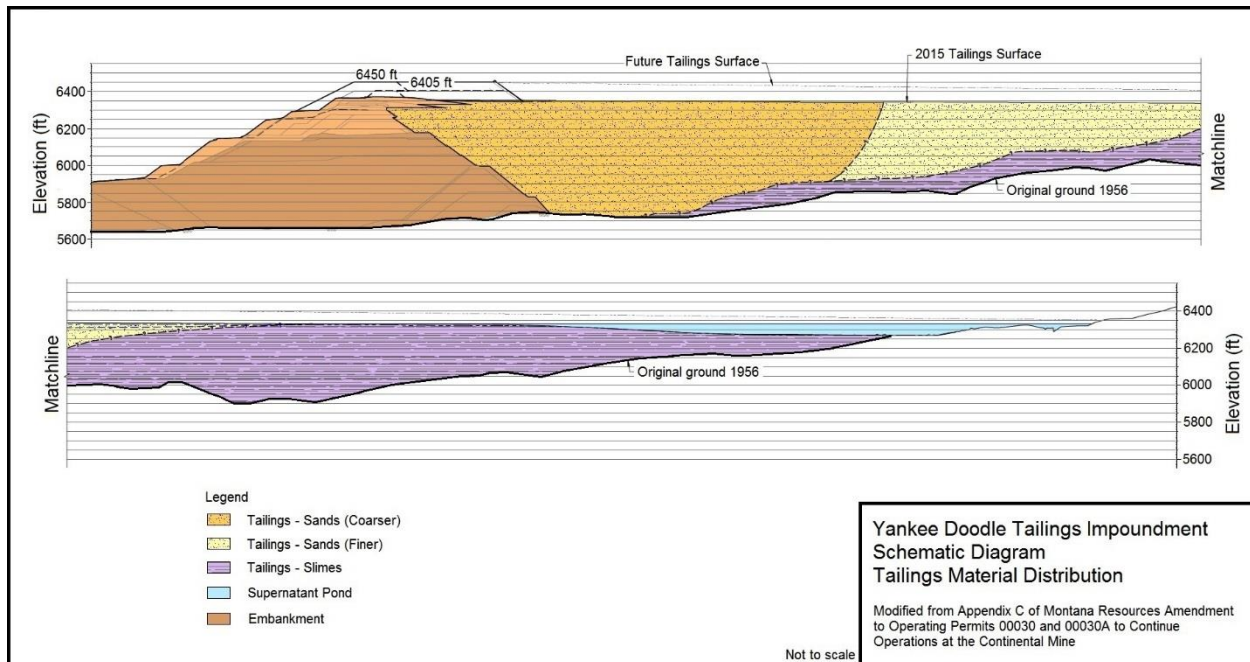
MGD Million gallons per day

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As described in detail in Appendix C of the Amendment Application (Montana Resources 2018b) (Schafer Limited LLC 2018), surface runoff from the tailings would continue to flow into the YDTI pool due to the northward sloping tailings beach. Seepage of process solution or excess meteoric water would flow downward and toward the south, driven by the draining effect of the embankment rockfill and the underlying natural topography. Near the embankment, excess water contained in tailings deposited on the beach would drain downward through a saturated zone within the tailings, through predominantly unsaturated embankment rockfill, and into a saturated zone in the lower portion of the embankment. The current distribution of tailings in the YDTI is shown on **Figure 2.3-2**. The seepage would then move to the Horseshoe Bend area in a series of prominent springs which surface near the Precipitation Plant. In tailings located further from the embankment, water would drain preferentially to the south toward the embankment within the tailings because of the low permeability slimes that occur at the base of the tailings and limit seepage to the foundation. Ground water movement in the shallow fractured bedrock and colluvium in the tailings foundation is also to the south toward Horseshoe Bend Springs. The WED may intercept a portion (about 20 percent) of the tailings seepage.

The primary water supply to the Butte Concentrator is reclaim water from the YDTI supernatant pond which is conveyed either directly to the Butte Concentrator or to a process water reservoir for storage prior to use. Flows from Continental Pit dewatering, YDTI seepage collected at Horseshoe Bend (post treatment in the HsB Water Treatment Plant), and surface runoff from catchments downstream of the YDTI also discharge into the Butte Concentrator process water reservoir. A potable water supply from Butte's municipal water supply and a freshwater makeup supply from Silver Lake are also used in the Butte Concentrator to meet specific processing water quality requirements.

The primary water consumptions in order of usage would continue to include: 1) water stored in pore spaces within the tailings mass, 2) evaporation from ponded water surfaces, 3) site dust control, 4) HsB Water Treatment Plant sludge discharge to the Berkeley Pit, and 5) water in concentrate shipped off site.



(Schafer Limited LLC 2018)

Figure 2.3-2. YDTI tailings material distribution.

2.3.4 Associated Mine Facilities, Materials, and Personnel

Under the No Action Alternative, no changes would occur to the associated facilities permitted under Operating Permits 00030, 00030A, 00041, and 00108. Access roads and pit haul roads would continue to be maintained for safe conditions. Haul truck traffic would continue to occur 7 days per week, 24 hours per day, 365 days per year.

Salvage of material for mine reclamation, including alluvium, leached cap overburden, and soil, has been contemporaneous with mining and would continue as those materials are encountered until mining ceases. Some alluvium is suitable for use as surface or sub-surface reclamation material, and some leached cap material is suitable for use as subsoil reclamation material. Existing stockpiles and capping materials to be salvaged from the mine would be utilized to meet the anticipated volume goals of capping for reclamation at the end of mining operations. Although most alluvium and leached cap to be mined in the near term in the Continental Pit would continue to be used for existing permitted embankment construction, reserves of alluvium in the Central Zone (including the McQueen alluvium borrow area) would need to be characterized and selectively excavated in order to be available for reclamation. This alluvium reserve is abundant and would be adequate for reclamation of mine components. A detailed discussion of capping materials is presented in the Mine Operations Plan (Montana Resources 2018a).

Salvage of topsoil and subsoil has been limited within the mine boundary because most of the active mine area was developed prior to soil salvage guidelines and regulations. Therefore,

recently salvaged soils and potential future salvage targets are generally limited to areas surrounding the YDTI. Soils and alluvium salvaged since 1972 from existing disturbances (pits, leach pads, waste rock dumps, YDTI, and other mine support facilities) have been used for concurrent reclamation or have been stockpiled at selected locations around the mine site.

Workforce levels would be expected to remain the same and operations would continue into approximately 2022. Although ore reserves would support operations beyond 2022, the mine life would not be extended because additional tailings storage capacity in the YDTI would not be available. Although MR's workforce may fluctuate on a seasonal and annual basis, the operation has typically employed between 350 and 400 employees and on-site contractors since 2010.

2.3.5 Reclamation and Revegetation

The following information about the existing reclamation plan for the current permitted mine operations is summarized from Knight Piesold Reclamation Overview document (Knight Piesold 2018b) and from MR Operations Plan (Montana Resources 2018a).

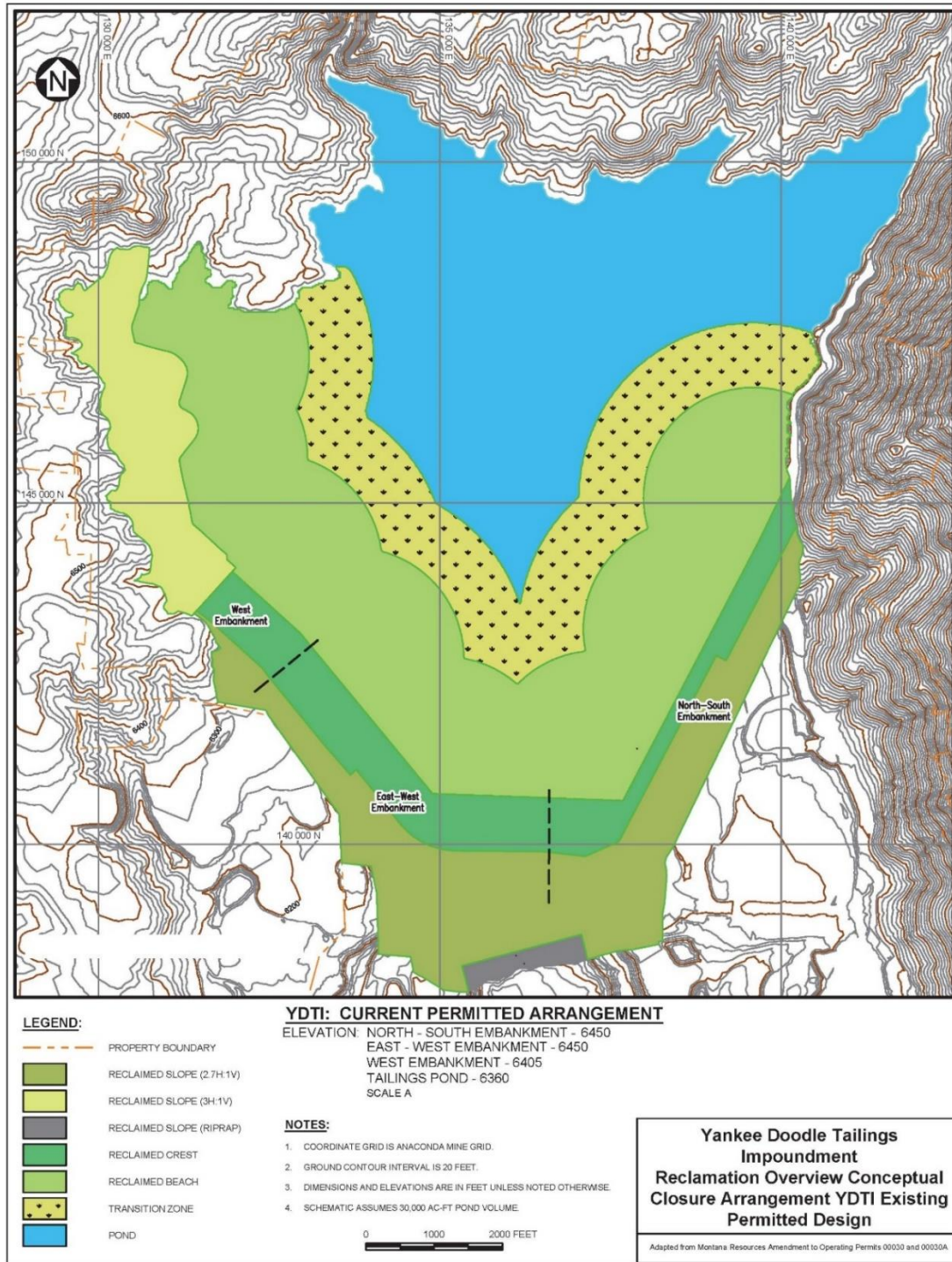
2.3.5.1 Reclamation Plan for YDTI

The No Action post-closure reclamation plan for the YDTI is described in the amendment application (Montana Resources 2018b). The existing permitted closure design is shown on **Figure 2.3-3**. Mining operations under the No Action Alternative would likely continue through 2022 and mine capacity, design, and processes would be limited to the current permits. Pond equilibrium for the No Action Alternative would be reached in approximately 2061 (Knight Piesold 2018b).

The reclamation plan for most of the tailings embankment would include regrading the downstream slopes to a ratio of 2.7 horizontal to 1 vertical (2.7H:1V), placing a 20-inch thick amended alluvium cap on the regraded surface, and revegetating the slope. The downstream slope of the northern portion of the West Embankment would be regraded to 3H:1V. The access road along the embankment crest would remain for post-closure monitoring. Ditches and swales would be constructed at 100-foot intervals on the regraded slopes to promote drainage and reduce erosion of the reclamation cap.

The section of the embankment adjacent to the Precipitation Plant would be reclaimed differently from the rest of the embankment. A cover of coarse rockfill (riprap) material would be placed on top of the constructed (steeper) slopes. The area of slope protected by riprap would be 2,000 feet long, 450 feet high, and 3 feet thick. The riprap material would be coarse (18-inch minus), durable, non-acid generating rock sourced from off-site. The reclaimed slopes would be revegetated using primarily native and introduced grasses and forbs. Species would be used that are locally adapted to a relatively wide range of cover material and conditions.

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Source: (Knight Piesold 2018b)

Figure 2.3-3. Reclamation overview and closure plan for the No Action Alternative.

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A 6-inch thick layer of rockfill would cover the tailings beach areas that are susceptible to wind erosion after completion of operations. The cover would be composed of rock, leached cap, or similar material and seeded for dust control if spreading of alluvium is not promptly conducted. Reclamation of the tailings beach areas would follow, including placement of a 28-inch thick amended alluvium cap and revegetation. A partial wet closure scenario is planned for the northern portion of the tailings impoundment consisting of a pond and adjacent wetland area, which would be periodically inundated as the seasonal pond water level fluctuates.

The alluvium used for reclamation would be excavated from the Central Zone area, located between the Berkeley and Continental Pits. The alluvium may need to be amended with lime for pH adjustment (to reduce acidity) and the addition of compost to increase the organic material content. The amount of amendment required would depend on the characteristics of the capping material and the quality of lime and organic material. Soil testing would be completed to confirm the required amendment specifications at the time of reclamation.

During closure, the tailings would be progressively reclaimed. Initially, the beach that is safely accessible would be reclaimed within 3 years of the end of operations. As the pool gradually recedes and the tailings stabilize, the beach surface more than 800 feet from the pool would be reclaimed. Remaining areas near the pool called the Transition Zone would remain without cover due to seasonal variation in pool stage. When saturated, the high-water content and low strength of the tailings would make cover placement hazardous (Knight Piesold 2018b).

Infiltration of water into the tailings from precipitation would vary between reclaimed and unreclaimed conditions. For unreclaimed tailings, 35 percent of precipitation water would be assumed to infiltrate whereas only 10 percent of precipitation water would be assumed to infiltrate for reclaimed conditions.

West Embankment Drain

The conceptual model developed for the water balance identifies separate sources and flowpaths for water entering the WED. Constant sources of inflow include ground water at 60 gallons per minute (gpm), runoff from the watershed area upgradient of the West Embankment at 24 gpm, runoff from the West Embankment at 14.8 gpm, and seepage through the surface of the West Embankment at 9.9 gpm (Schafer Limited LLC 2018). The remaining inflows to the WED would be variable and would include runoff, and about 20 percent of the seepage from the YDTI pool that would have otherwise traveled to the south and discharged at the Horseshoe Bend area. Seepage from the pool would include flow through the beach at 28 gpm and flow through the slimes at 0.010 gpm. Additional contributions to the WED would include infiltrating precipitation from beach sediments at 15.8 gpm and infiltration from slimes at 6.8 gpm (Schafer Limited LLC 2018). This volume would be expected to decrease when tailings slurry is no longer added to the YDTI and movement to more static conditions exist at closure.

2.3.5.2 Reclamation Plan for Associated Facilities

Under the No Action Alternative, no areas would be disturbed outside of the existing permit boundary; therefore, no additional reclamation planning or actions would be necessary other than what is currently permitted. Materials, including the leached cap and alluvium, would be salvaged and stockpiled or excavated from the Central Zone for use during reclamation of the mine facilities.

2.4 PROPOSED ACTION ALTERNATIVE: ON-SITE TAILINGS STORAGE AND WATER CONTAINMENT

Montana Resources has submitted an amendment application proposing to raise the West Embankment of the YDTI to the 6,450-foot elevation in order to increase the impoundment capacity and extend the life of the Continental Mine. The proposed amendment also outlines modifications to waste RDSs, roads, reclamation material stockpiles, tailings lines, Moulton water pipeline replacement near the West Embankment, spillway, the WED, tailings discharge, and YDTI closure and reclamation.

2.4.1 Introduction to the Alternative

The Proposed Action would raise the West Embankment to match the presently permitted elevations of the East-West and North-South embankments. It would also extend the northern boundary of the impoundment, which would allow continued tailings deposition and extend operations at the Continental Mine. The West Embankment would be raised 45 feet from an elevation of 6,405 feet to 6,450 feet. As the pond fills to the increased capacity, it would extend the northern boundary of the tailings pond to an elevation of approximately 6,428 feet. A gravity controlled subsurface drain, known as the WED, would intercept seepage before it migrates west of the impoundment.

The total permitted area would increase by about 237 acres. Approximately 99 acres within the expanded Permit 00030A area would be disturbed to accommodate increased tailings storage, construction, topsoil storage, roads, and monitoring wells. There would be no additional disturbance within Operating Permit 00030.

Other associated facilities are proposed and would include additional non-ore storage areas developed in an existing RDS, a new RDS, stockpile areas for soil and alluvium, access roads, and long-term monitoring sites within Operating Permits 00030 and 00030A. A closure spillway has been conceptually designed to provide a system for releasing water from the tailings impoundment to the Continental Pit, which is assumed to develop a pit lake after closure, subject to the BMFOU requirements.

To achieve the geotechnical objectives for beach development, enhance embankment stability, and limit the potential for internal erosion, the practice of inundating the tailings beach with water to manage wind-blown dust would be phased out. The potential for tailings dusting would be managed using multiple discharge points or by other means to wet the beach by recycling water within the mine area during critical periods.

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Closure would include dewatering of the impoundment via seepage to the WED and Horseshoe Bend, as well as through evaporation. The tailings beach or dry area and a Transition Zone would be incrementally created by dewatering and subsequently reduce the supernatant pond. The tailings beach would remain dry and the Transition Zone would continue to retain water. The reclamation of the Beach and Transition Zone would include the incremental capping and revegetation as the areas become accessible. Final reclamation would include a partial wet closure with a reclaimed beach, Transition Zone, and a pond with a volume of approximately 1,000 acre-feet.

2.4.2 Disturbed Areas Description

The Proposed Action would increase the total YDTI acreage, including embankments, by 118 acres from 2,177 acres to 2,295 acres. The acreage associated with the mine facilities (which includes the North RDS, Great Northern RDS, and the New Reclamation Materials Stockpile) would change from 160 acres to 465 acres between the No Action Alternative and the Proposed Action. **Table 2.4-1** compares the disturbance components between the No Action and the Proposed Action. All of the acres associated with mine facilities fall within the existing permit boundary, and therefore do not contribute to new disturbances. The change in associated facility acreage does not necessarily equate to new disturbance, but the areas may be categorized differently for acreage accounting because these acreage changes occur within the current mine permit boundaries.

**Table 2.4-1
Acreages Associated with MR Operations – Currently Permitted Design (No Action) and
Proposed Action**

Location	No Action	Proposed Action	Change
	Area (Acres) ^a		
N-S and E-W Embankments			
Reclaimed Slope (2.7H:1V)	209	154	-55
Reclaimed Slope (2H:1V)	64	64	0
West Embankment			
Reclaimed Slope (3H:1V)	118 ^b	22	-96
Reclaimed Slope (2.5H:1V)	8 ^b	8	0
Slope above Precipitation Plant (Riprap)	14	14	0
Reclaimed Crest	166	229	63
Reclaimed Beach			
At Closure ^b	806	1,122	316
At Pond Equilibrium ^c	1,305	1,487	182
Transition Zone ^d			
At Closure ^b	232	220	-12
At Pond Equilibrium ^c	122	146	24
Pond			

**Table 2.4-1
Acreages Associated with MR Operations – Currently Permitted Design (No Action) and
Proposed Action**

	No Action	Proposed Action	Change
Location	Area (Acres) ^a		
At Closure ^b	560	462	-98
At Pond Equilibrium ^c	171	171	0
SUB-TOTAL YDTI	2,177	2,295	118
Associated Facilities (within existing permit boundary)			
North RDS ^e			
Reclaimed Slopes	-	163	163
Reclaimed Top/Benches	-	86	86
Great Northern RDS	133	152	19
Reclaimed Slopes			
Reclaimed Top/Benches			
New Reclamation Material Stockpiles			
Soil	27	40	13
Alluvium (temporary) ^f		24	24
SUB-TOTAL ASSOCIATED FACILITIES	160	465	305

Sources: (Montana Resources 2018b, Knight Piesold 2019b, Knight Piesold 2019a)

^aAreas are plan areas, not sloped areas; totals are ± 1 acre due to rounding. Numbers in this table are estimates based on the most recent 2018 KP Water Balance and 2019 KP Surface Modeling Tables.

^bClosure for the currently permitted design is 2022 and 2031 for the 6,450 design.

^cEquilibrium in the current permit is assumed at a pond volume of about 500 acre-feet. However, to facilitate comparison with the proposed amendment, acreages are provided for an approximate 1,000 acre-feet pond for both the No Action and the Proposed Action. Both the currently permitted design and the 6,450 design assume a freshwater input of 1 MGD.

^dThe Transition Zone is assumed to be about 800 feet wide along the beach and pond boundary.

^eThe North RDS covers about 92 acres of the embankment, primarily the previously permitted face of the North-South Embankment.

^fTemporary alluvium stockpiles are within the footprints of the North and Great Northern RDS.

^gIncludes areas disturbed by construction of the starter dike and WED.

Based on modeling of tailings deposition and filling schedule of the YDTI during operation, the total impounded area (i.e. tailings and pond) would increase from 1,598 to 1,804 acres and the pond volume would decrease from 20,000 acre-feet to 15,000 acre-feet. The beach area, which includes the beach and Transition Zone, is projected to be 1,342 acres when mining ceases, which is approximately 304 acres larger than the beach area under the No Action Alternative.

2.4.3 YDTI West Embankment and Water Management

The West Embankment would be raised to the proposed elevation of 6,450 feet to match the presently permitted elevations of the East-West and North-South Embankments. The storage

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capacity of the YDTI would be increased and closure would be extended until 2031. The West Embankment would include features to manage seepage from the YDTI. Some design features were developed in conjunction with a previous amendment for initial West Embankment construction under Amendment 9 to Permit 00030A (Knight Piesold 2017b). The design of the West Embankment for the 6,450-foot elevation and associated water management features were based on comprehensive, site-specific West Ridge resource inventories and analyses covering geology, hydrology, and geotechnical conditions.

The West Ridge hydrogeologic evaluation included numerous monitoring wells, drill holes, test pits, and trenches. The West Embankment design focused on depressed ground water elevations within a saddle in the central West Ridge, with the design goal of maintaining a ground water elevation similar to current conditions by using best available technology. This would limit potential migrations of seepage from the YDTI to the west of the permitted boundary. The West Embankment would be constructed to have a free draining upstream zone (i.e., the inner zone facing the tailings) and a less permeable downstream zone (the outer face of the embankment). The downstream zone would act as an impediment to drainage and horizontal migration of perched seepage flow towards the downstream face of the embankment, encouraging free draining to the more permeable zone for collection in the WED. This design would direct water into the drain (WED). The WED and West Embankment design are expected to control hydraulic heads. Hydrodynamic containment would occur along the western edge of the YDTI to prevent potential head increases related to the facility.

The WED is a gravity controlled subsurface collection system installed in the permeable upstream portion of the West Embankment. The WED is designed to intercept ground water flow before it moves into the lower permeable zone West Embankment and potentially migrates west of the YDTI. It is anticipated that the WED would be needed for about 20 years after closure to mitigate impacts to ground water west of the West Embankment. The WED is based on a conservative design to minimize the potential for water to move west of the Embankment. The design flow for the WED is 4,500 gpm which equates to the 98th percentile of the flow observed at HsB Water Treatment Plant since 2000. According to the IRP, the volume of water reporting to the WED during the closure period has not been quantified (IRP 2018). Estimated inflows from various sources are described in Section 2.3.5.1. Post-closure, the Extraction Pond and WED would be operated for long-term hydrodynamic containment or alternative water management scenarios, should they be needed.

Other components of the WED system include an Extraction Pond, Extraction Basin, drain pods, and Secondary Seepage Collection Drains. Each of these features would be connected hydraulically to the upstream side of the embankment.

The purpose of the 3.6 million-gallon Extraction Pond would be the gravity collection of the seepage water from the WED. It would be installed at the southern end of the WED, near a topographic feature known as Rocky Knob. The seepage would be pumped from the Extraction Pond back into the YDTI via pipeline. The pump system would have the capacity to collect and

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convey the water from the WED at any given time. The pipeline would convey flows from the pump system over the embankment, and the flow discharged onto the beach during operations. The pipeline would be buried on the crest of the embankment in areas of recurring traffic to prevent damage. Volumes in excess of the pond storage capacity would be directed to a spillway towards the Northwest Dumps area.

The Extraction Basin would be positioned within a topographic depression along the West Embankment. Pumping systems can be installed within the Extraction Basin to control water levels in the WED by pumping the captured flows back to the YDTI. The pumping systems for the Extraction Pond and Extraction Basin would be designed to manage full design flow of the WED and could operate independently or collaboratively if needed.

Two contingency drain pods would be positioned in topographic depressions along the West Embankment and would also be connected to the WED. They would serve as optional extraction areas that could be completed with pumping systems to augment the Extraction Pond and Extraction Basin, if needed.

The Secondary Seepage Collection Drains would consist of several finger drains placed in topographically low areas along the WED, perpendicular to the embankment alignment. They would connect the less permeable zone and the free draining zone boundary of the West Embankment to the WED.

2.4.4 Modifications to Associated Facilities

Modifications to associated facilities include the Great Northern RDS. Non-ore rock generated from the Continental Pit would be primarily used to construct the YDTI embankments. Non-ore rock not placed in the YDTI embankment or in the North RDS would be added to the existing Great Northern RDS. However, as access to the embankment is necessary when rock production exceeds the requirement for embankment construction, rock would be used to construct access ramps and the North RDS. No new disturbance is expected since the addition would be over the top of the existing disposal or in areas previously disturbed. However, construction of the North RDS would require the relocation of the current solid waste disposal site at some point between 2022 and 2031. The change would be addressed in a revision application to MR's operating permit prior to construction. The bottom of the Continental Pit was approved to an elevation of 4,720 feet, ACM datum, in the D-East Pushback Amendment in 2013. Based on current mine design planning for the Proposed Action, the extended timeframe for mining operations in the Continental Pit would lower the bottom elevation to 4,900 feet in year 2031. This would deepen portions of the Continental Pit that are already disturbed within Permits 00030A and 00041, and it would not expand the footprint of the pit or the permit boundaries. Mining below that depth, presumably beyond 2031, would be contingent upon MR developing additional tailings disposal capacity and amending the operating permits accordingly.

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Portions of the 16-inch Moulton water pipeline would be relocated due to the proposed expansion of the West Embankment, beach, and pond. Development of the West Embankment crest to an elevation of 6,450 feet would affect a portion of the pipeline, and tailings would encroach over part of the pipeline after 2022. MR would need to coordinate with Butte-Silver Bow City-County to relocate the pipeline segment that would be affected by the YDTI. Roads would be modified as necessary to meet operational objectives for construction and access. Modifications would include ramps to build embankment lifts, adjustment of the access road along the east side of the impoundment for reclamation, soil haulage roads, perimeter roads around the impoundment, and access roads to monitoring sites.

Volumes of capping materials required to reclaim the YDTI and associated facilities and stockpile area footprints would increase. Material would include alluvium and leached cap material which has been weathered and has been depleted of most sulfides and metals.

Salvaged soils would be transported to soil stockpile areas or placed on regraded sites. Soils stockpiled for over one year would be seeded for revegetation until used. Vegetation like aspens would be planted in stockpile areas along Moulton Road as a visual barrier.

As part of the wet closure design for the YDTI and to enhance dam safety, a closure spillway is conceptually designed to release water from the YDTI to the Continental Pit when the pond elevation exceeds the 6,430-foot elevation. The YDTI spillway would not be operated as a routine water discharge system. It would only convey flow if an unlikely sequence of storm events was to occur in combination with a starting pond volume equal to the 95th percentile (wet condition) steady-state pond volume (8,000 acre-feet). Release from the spillway would limit the maximum pond volume to below approximately 26,000 acre-feet following a 1 in 1,000-year, 30-day rainfall event, immediately followed by the Probable Maximum Flood (PMF) event (probable maximum precipitation plus snowmelt), which is then immediately followed by an additional 1 in 1,000-year, 24-hour rainfall event (Montana Resources 2018b). This spillway would ensure that the supernatant pond does not encroach on the embankment during extreme storm events.

2.4.5 Modifications to Reclamation Plan for the YDTI and Associated Facilities

Reclamation of the YDTI under the Proposed Action would be similar to the No Action Alternative but would incorporate additional acreage due to the tailings impoundment expansion. The current YDTI closure plan includes three reclamation components, the embankment, the tailings beach, and tailings pond.

Modifications to the current reclamation plan under the Proposed Action would include the construction of the West Embankment to a crest elevation of 6,450 feet, additional impoundment acreage, a closure spillway, and the WED decommissioning. Under the Proposed Action, reclamation would be expected to begin at the end of 2031 when mining operations cease.

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Reclamation of North RDS and Great Northern RDS would not change substantially from other permitted RDSs. Reclamation methods would include reducing slopes to gradients less than 2.7H:1V, regrading to mitigate water ponding, constructing benches or runoff collection ditches at 100-foot intervals on regraded slopes, redistribution of 20-inches of alluvium on slopes and 28-inches on tops and benches. The alluvium would be tested, and soil amendments would be added if necessary. Twenty-three tons per acre of organic matter would be incorporated if topsoil is not spread over the alluvium. Vegetation would be established, and weeds controlled. Final grading would be made with non-noxious, nonflammable, noncombustible solids.

Areas once serving as soil stockpiles would be reclaimed by ripping the surface to relieve compaction and revegetating. Areas used as alluvium stockpiles would either be reclaimed as part of the North RDS, or ripped if needed, capped, and seeded. Other areas would be ripped where compacted, covered with stockpiled or direct-haul material, and revegetated.

All roads not necessary for post-closure management would be regraded to blend with adjacent areas, ripped to relieve compaction, capped with 24-inches of alluvium, and revegetated. Stable road cuts in rock would not be regraded.

2.4.5.1 West Embankment Drain

At the time of reclamation, the discharge pipeline from the WED system Extraction Pond to the YDTI would be extended progressively as the closure pond retreats and the tailings beach is reclaimed. These pumpback flows would continue during the closure period for approximately 20 years to mitigate the potential ground water impacts to the west of the West Embankment through hydrologic control of the ground water and tailings seepage into the WED. Water that would be continually returned to the supernatant pond from the WED would eventually evaporate or seep out of the impoundment at Horseshoe Bend.

2.4.5.2 Embankment Reclamation

The modification to the embankment reclamation would include regrading downstream slopes flatter than current reclamation (2H:1V) with final regrading of 2.7H:1V. The lower portion of the North-South Embankment would be covered by the North RDS. A portion of the East-West Embankment located upstream of the Precipitation Plant would be constructed with a 2H:1V downstream slope. The West Embankment would be constructed with a final slope of 3H:1V except near the WED Extraction Pond. A small segment near the WED extraction pond would be graded to 2.5H:1V. Swales and ditches would be constructed at 100-foot intervals on the downstream, regraded slopes to reduce erosion and facilitate drainage of the reclaimed areas. Structures would include grass-lined swales, riprap lined ditches, and plunge pools at the lower reaches.

West Embankment capping would include 6 inches of soil over 36 inches of non-acid generating alluvium. The volume of the capping material for the West Embankment is estimated to be about 19,000 cubic feet. The East-West Embankment face would be capped with 20 inches of alluvium on 2.7H:1V slopes and 36 inches on 2H:1V slopes. Reclamation material amendments

would be based on testing during reclamation. The North-South Embankment would be covered and reclaimed with the North RDS. The embankment crest would be capped with 28 inches of suitable or amended alluvium unless mine scheduling allows for direct-haul of the final 28 inches of the crest using suitable leached cap. The embankment area covered by the North RDS would be reclaimed at a 2.7H:1V slope consistent with the North RDS reclamation and redistributing 20 inches of alluvium on the slopes.

2.4.5.3 YDTI Reclamation

A partial wet closure for the tailings pond is planned for the north portion under the current permits. Under the Proposed Action, closure of the YDTI would be expected to begin when mining ceases in 2031. A general arrangement plan for YDTI is shown in **Figure 2.4-1**. The impoundment would include a pond with an adjacent area that is periodically inundated with seasonal pond water level fluctuations. During closure activities, the YDTI pond would begin to retreat until the pond reaches equilibrium leaving a pond of approximately 1,000 acre-feet in 2062. An overview of reclamation at the equilibrium condition is shown on **Figure 2.4-2**.

Under the Proposed Action, an impoundment area would be created that is 13 percent larger than under the No Action Alternative. In addition, as described in Section 2.4.2, a larger beach area with a smaller pond area would be created under the Proposed Action than under the No Action Alternative.

Closure would include dewatering of the impoundment via seepage to the WED and Horseshoe Bend, as well as through evaporation. The tailings beach or dry area (approximately 1,122 acres) would be reclaimed in the first 5 years post-closure, and a Transition Zone would be incrementally exposed by dewatering and shrinking the supernatant pond. The tailings beach would remain dry and the Transition Zone would continue to retain water beneath the drying surface.

The Transition Zone resembles a mudflat and consists of tailings slimes that have settled out onto the bottom of the pond, rather than the coarser materials found in the beach tailings. Slimes are composed of finer silt and clay particles while the beach is composed of coarser-grained, sand-like particles. As the dewatering transitions, the slimes closest to the supernatant pond would remain saturated with water due to their inherent moisture holding capacity while the slimes nearest the beach would “crust” over as they dry. The beach, Transition Zone, and water level would be observed multiple times per day in accordance with the air quality permit to assess the potential for fugitive dust, and if dust is detected, MR would be required to implement its dust control plan.

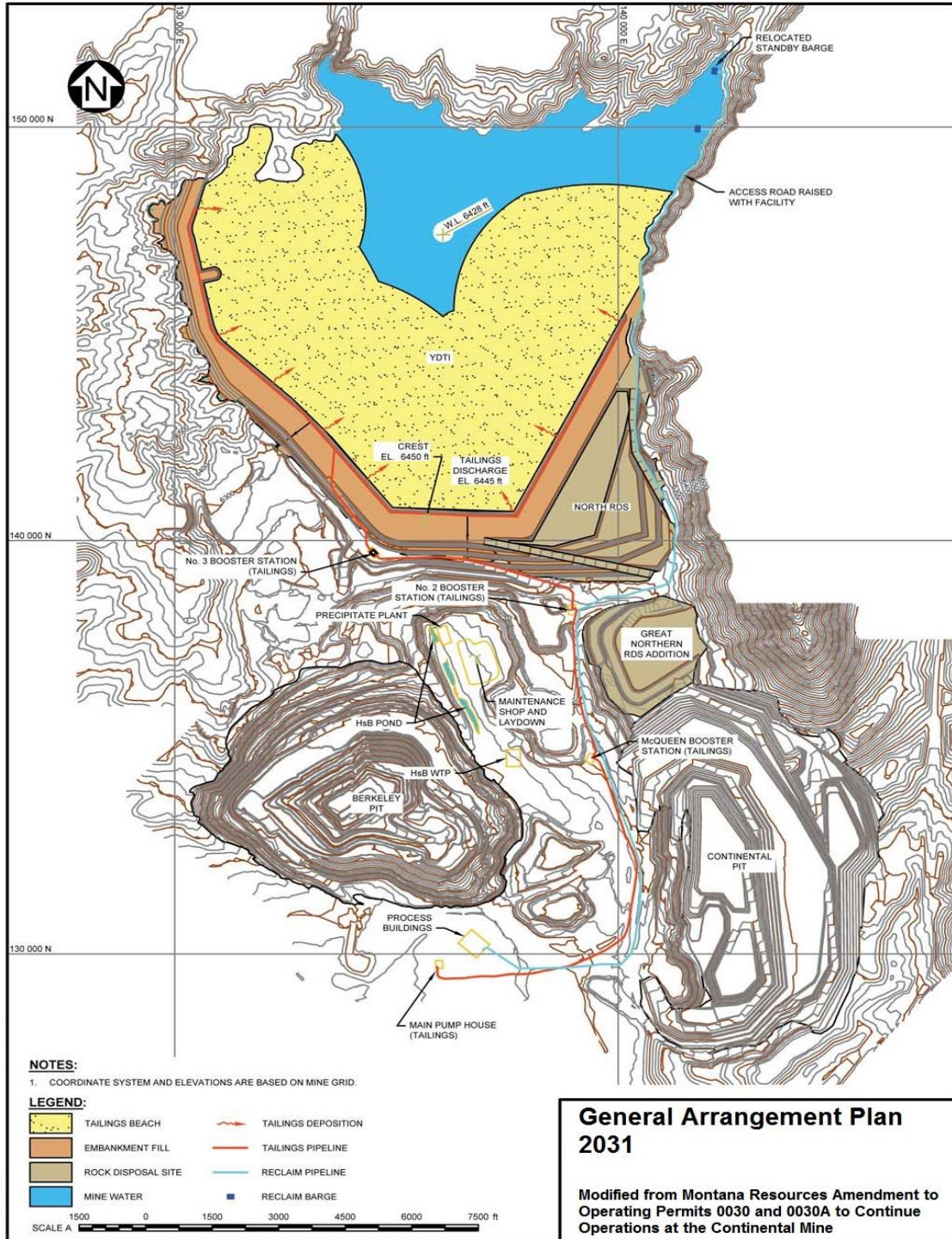


Figure 2.4-1. General arrangement plan for YDTI.

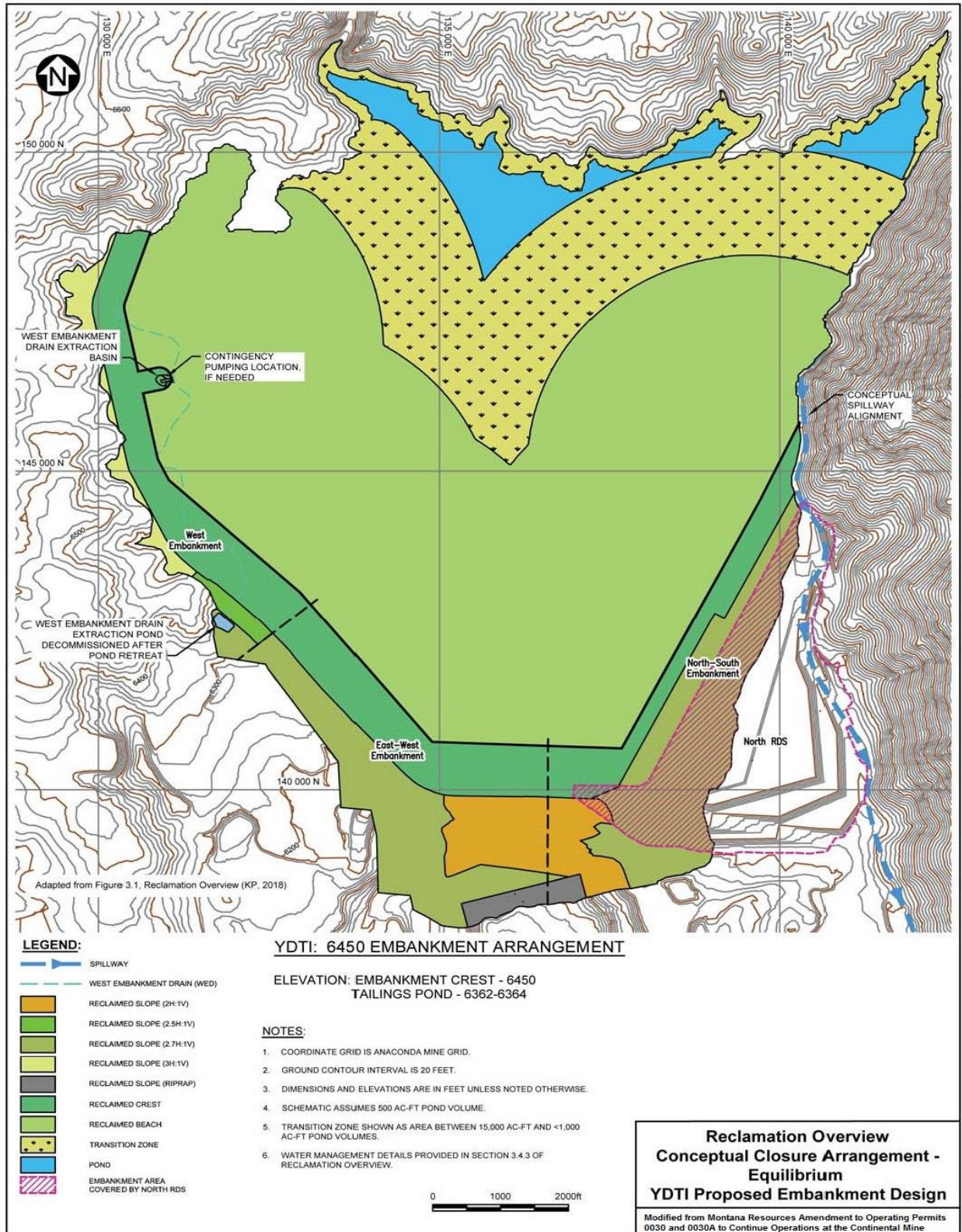


Figure 2.4-2. Overview of reclamation at closure and equilibrium.

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Further mitigations would include the placement of a 6-inch rock cover, leached cap (rock which used to contain sulfide ore but has since been depleted due to weathering), or similar material incrementally on the exposed beach as the water level drops, and placement of capping material and revegetation of the Transition Zone. The formation of dust on other areas could be controlled by maintaining and using rubber wheeled equipment to apply dust suppressant as needed.

The beach area would consist of drier tailings material that are susceptible to wind erosion. If alluvium cannot be spread promptly, the tailings beach areas would be covered with a 6-inch layer of rock, leached cap or similar material and seeded for revegetation. Reclamation of the tailings beach areas would be similar to the No Action Alternative, which includes placement of a 28-inch thick amended alluvium cap and revegetation. The quantity of available salvaged soil would provide a 6-inch upper soil layer for 731 acres of the permanent reclamation cap. Reclamation of the remaining 963 acres of beach would consist of placement of the 28-inch thick cap using alluvium with the top 6 inches amended as necessary followed by revegetation.

Application of soil amendments would be in accordance with the DEQ-approved 2002 Minor Amendment (MR- 02-001) for the Woodville Dump reclamation. Reclamation would be accomplished incrementally over an estimated 40-year period following mine closure as the tailings water recedes, exposing more Transition Zone for reclamation until the pond volume reaches approximately 1,000 acre-feet at equilibrium.

Water balance modeling results indicate that the YDTI supernatant pond volume will decrease and reach an equilibrium volume of approximately 1,000 acre-feet under average climatic conditions. The pond volume may be as high as approximately 2,500 acre-feet under wet climate conditions and as low as 500 acre-feet under dry climatic conditions (Knight Piesold 2018b). As shown on **Figure 2.4-3**, fluctuations in shoreline elevations total approximately 11 feet and range from a low of 6,363 feet to a high of 6,374 feet. Under wet climatic conditions, the pond would extend up onto the Transition Zone by about three-quarters of a mile compared to the pond under dry climatic conditions. Any alteration to the Transition Zone surface, if any, would be dependent upon the length of time it was inundated by water or exposed to the air.

2.4.5.4 Soils and Reclamation Cover Material

The mine site has an estimated 63 million tons of material known as leached cap, which is mineralized rock that has been depleted of most metals and sulfides due to weathering. Leached cap is a potential resource for permanent reclamation cover material (Montana Resources 2018b). An additional 275,000 cubic yards of soil is stored in the Moulton Road and Buntown stockpiles, and approximately 67,000 cubic yards of soils are yet to be salvaged from new disturbance areas. It is expected that shortages of soil needed for reclamation would be taken from the Central Zone Alluvium. A total of 609,000 cubic yards of soil would be used for primary reclamation of the West Embankment and a portion of the beach. Alluvium used for

reclamation would be sourced from areas between the Berkeley and Continental Pits. Leached cap would be sourced from the Continental Pit (Montana Resources 2018b).

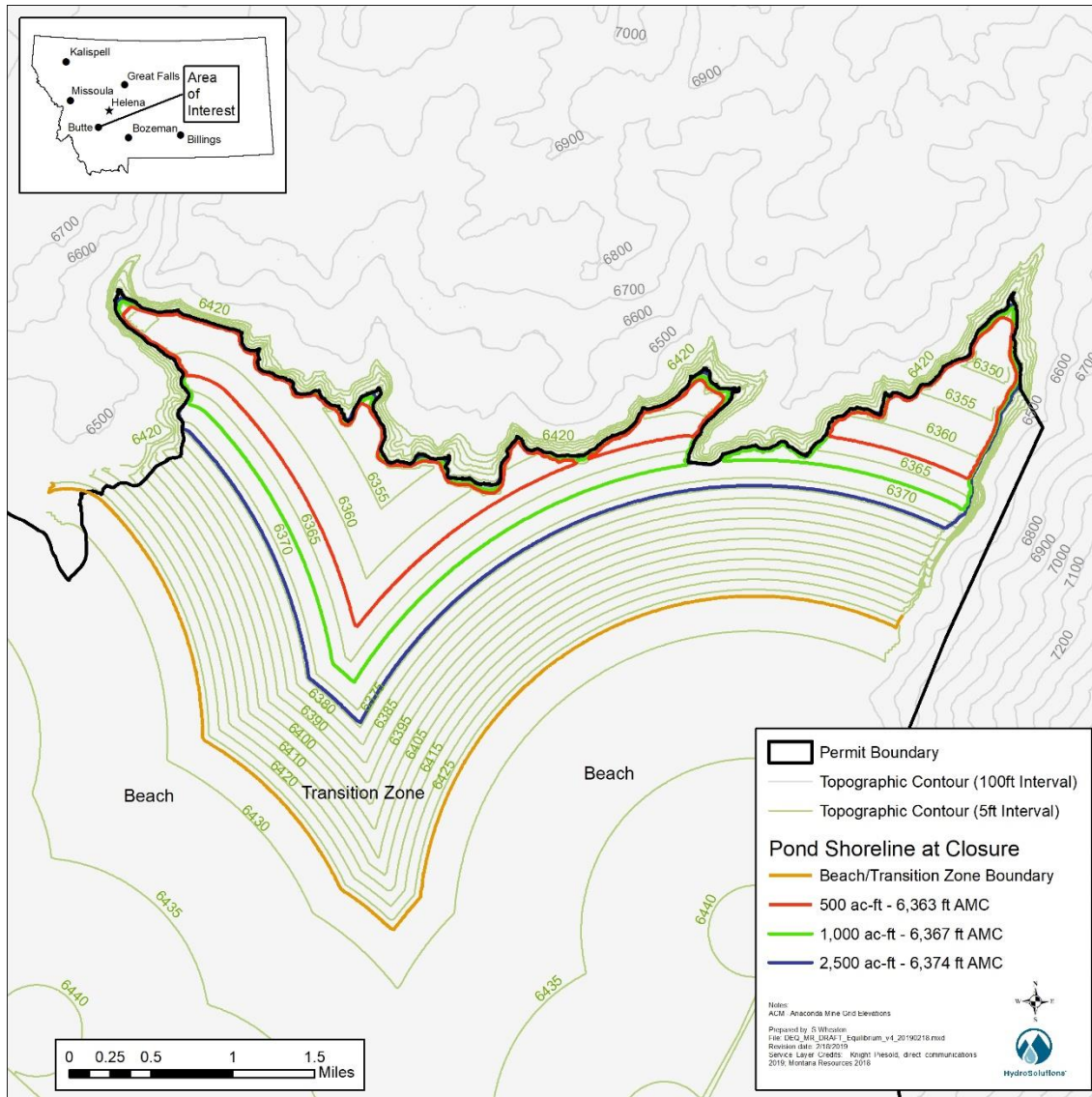


Figure 2.4-3. Approximate contours and extent of the supernatant pond under three post-closure volume conditions.

2.4.6 Post-Closure Management and Monitoring for the YDTI and Associated Facilities

At closure, input from the tailings and makeup water would cease with corresponding changes in output. Under the Proposed Action, water would only be removed from the impoundment through evaporation loss or seepage to Horseshoe Bend. The water management system for the YDTI would no longer be a closed loop, as treated water from the HsB Water Treatment

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Plant would no longer be used in the mill or utilized to convey tailings into the impoundment. The water would be treated and managed in accordance with the 2002 BMFOU Consent Decree. (See Section 1.3.3.1).

Prior to post-closure, a closure spillway would be constructed at the 6,430-foot elevation to maintain the maximum pond volume below 26,000 acre-feet. The spillway would be designed to handle an additional 1 in 1,000-year 24-hour rainfall event that occurs after the YDTI pond has reached the maximum volume (26,000 acre-feet), due to an unlikely sequence of storm and flooding events (See Section 2.4.4). This would ensure that the supernatant pond does not encroach on the embankment during extreme storm events. Limited spillway maintenance would be required in the long term, although periodic inspection would be necessary to verify the spillway is operational. The Conceptual Closure Spillway is shown on **Figure 2.4-4**.

Mass load models were run on the YDTI pool (supernatant pond) water under two scenarios. The probable case scenario assumed geochemical differences between current rock and tailings from the Continental deposit and the worst-case Berkeley Pit rock and included different assumptions for the tailings contact water quality under each scenario. The model accounted for contributions in flow and mass loading from the WED pumpback system.

For the probable case, the pool water would remain alkaline (high pH) throughout operations and closure and metals would remain low. Sulfate levels are anticipated to be 1,100 milligrams per liter (mg/L) with a total dissolved solids (TDS) concentration of 1,800 mg/L at closure and would gradually decline to about 250 mg/L with a TDS of 400 mg/L about 30 years post-closure.

However, for the worst-case scenario, the pool would gradually become slightly acidic (low pH) after closure with an increase in iron and aluminum of up to 36 mg/L and 16 mg/L, respectively. Sulfate levels would be around 1,100 mg/L with a TDS of 1,800 mg/L at closure. Sulfate and TDS are expected to decline 30 years post-closure to about 600 mg/L and 1,000 mg/L, respectively. If acidic conditions exist, lime could be added to the pool to maintain alkaline conditions and low metal concentrations. About 5,000 tons of lime would be required to maintain alkaline conditions throughout post-closure under the probable-case scenario, or about 150 tons per year throughout the 30-year post-closure period. Slightly more lime would be needed during the first 3 to 5 years after closure for the worst-case scenario. Also, the WED discharge could be limed prior to discharge into the impoundment during its post-closure operation while the WED would be needed for ground water control.

The WED system would provide long-term hydrodynamic containment of the tailings water from the YDTI. This would prevent tailings water from the YDTI from migrating west of the MR property and West Ridge and adversely affecting off-site water quality. The system may be used for alternative water management strategies should they arise. Operation of the WED pumpback system would continue as long as post-operational ground water conditions indicate it is necessary to maintain long-term ground water gradients toward the YDTI. Alternate

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mitigations such as augmented recharge have not been designed and approved. Timeframe for operation of the WED pumpback is expected to be within about 20 years post-closure.

Once the YDTI supernatant pond retreats sufficiently to no longer require that the WED function as a ground water elevation control, the Extraction Pond would be reclaimed either by removing or breaching the liner, capping as necessary, and seeding. The WED connection to the Extraction Pond would be decommissioned by grouting a section of the gravity drain.

After plugging, the WED would flood and no longer act as a drain, and water levels within the west tailings beach and ground water west of the West Embankment would re-equilibrate to approximate pre-WED conditions. Once ground water conditions re-equilibrate, the overall West Ridge ground water flow pattern would be similar to current flow conditions, flowing eastward from the West Ridge crest toward and into the impoundment.

Following the completion of the YDTI reclamation, the EOR would evaluate the existing closure monitoring plan which outlines site specific needs for monitoring, inspections, and review. The plan details the requirements and frequency of monitoring, and the required qualifications of monitoring personnel (Montana Resources 2018b). The frequency of monitoring may vary depending on the implementation and functionality of facility components after reclamation, and the EOR would prepare a post-closure monitoring program and schedule to account for variations accordingly.

Post-operational water, reclamation, and revegetation monitoring programs would be implemented, and conditions documented at the mine site and surrounding water resources. The current operational and residential well monitoring programs operated by MR could continue for future monitoring; however, the scope of monitoring, including monitoring sites, frequency and parameters may be modified in the future in conjunction with DEQ if ongoing data evaluation warrants. Monitoring would continue until all bonding release milestones are met.

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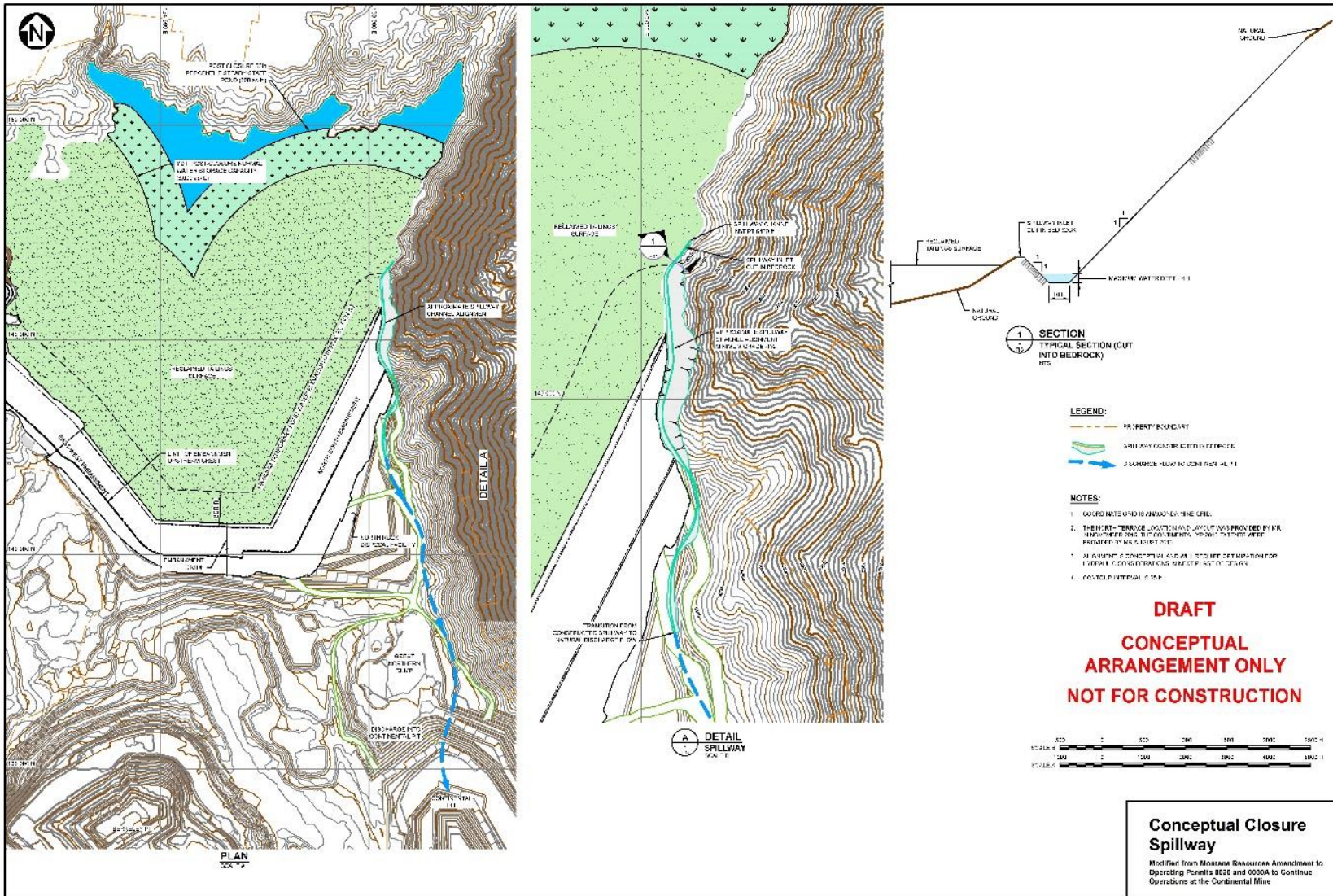


Figure 2.4-4. Conceptual closure spillway for the Yankee Doodle Tailings Impoundment at the Continental Mine.

2.5 ACCELERATED DRAWDOWN AT CLOSURE ALTERNATIVE

2.5.1 Introduction to the Alternative

Accelerating drawdown of the supernatant pond at closure would allow surface reclamation of previously saturated tailings or Transition Zone areas to happen more quickly than under the Proposed Action. Under the MMRA, all reclamation must be completed within two years after mining is completed, unless a longer period is allowed by DEQ (82-4-336, MCA). The Accelerated Drawdown at Closure Alternative would not achieve reclamation completion within two years, but it would be expected to significantly shorten the time to complete reclamation. Like under the No Action and Proposed Action alternatives, addition of saturated tailings to the YDTI would no longer occur at closure. By pumping water out of the tailings pond after mining ceases, a more rapid decrease in the pond level and hydraulic head in the YDTI would occur, tailings surfaces would be exposed more quickly, and seepage to the WED would be reduced at a faster rate than under the Proposed Action.

As previously described, the No Action Alternative anticipates closure in 2022. The Proposed Action Alternative would extend closure to 2031. Pond equilibrium for the No Action Alternative would be reached in approximately 2061 and in 2062 under the Proposed Action Alternative (Knight Piesold 2018b). The Accelerated Drawdown at Closure Alternative would not require a change to the design or function of the tailings impoundment during mine operations, but the pond would be reduced to the equilibrium volume more quickly following closure than under the No Action or Proposed Action alternatives.

Estimated Drawdown

The effect the Accelerated Drawdown at Closure Alternative would have on the reclamation timeframe was evaluated. This analysis represents a simplified quantitative estimate based on an initial pond volume at closure of 15,000 acre-feet and a remaining pond volume of approximately 1,000 acre-feet at equilibrium. These pond volumes were estimated to be the “normal case” through modeling, which is the 50th percentile condition in the water balance sensitivity analyses (Knight Piesold 2018a). Variables such as inflow from upstream watersheds, precipitation, evaporation, seepage loss through tailings, and water locked in pore spaces were either evaluated as a gain, loss, or not considered as part of the assessment. The incorporation of those variable and the values used for different time steps were consistent with the water balance submitted with the amendment application (Knight Piesold 2018a). A summary of assumptions used in calculating the accelerated drawdown at closure is shown in **Table 2.5-1** below.

Table 2.5-1.
Summary of assumptions used to calculate the time to reach equilibrium pond volume with accelerated drawdown.

Parameters		OPERATION (2031)	CLOSURE (2032)	POST-CLOSURE (2033 and beyond)
INFLOWS		MGD	MGD	MGD
Direct precipitation on pond/beach		0.8	0.7	0.5
Runoff from contributing catchment		0.7	0.6	0.6
Water in tailings slurry		22.0	0	0
Groundwater from West Ridge to WED		0.1	0.1	0.1
Total Inflows		23.6	1.4	1.2
		OPERATION (2031)	CLOSURE (2032)	POST-CLOSURE (2033 and beyond)
OUTFLOWS		MGD	MGD	MGD
Evaporation		1.0	0.9	0.6
Losses to tailings voids		4.5	0	0
Seepage losses from impoundment		4.2	3.4	1.0
Reclaim water to process		16.5	0	0
Total Outflows		26.2	4.3	1.6

Source: Table 3-2, (Montana Resources 2018b); Table C-1, (Knight Piesold 2018a)

MGD Million gallons per day

Based on the above input data, variable pumping rates were used to provide a range of accelerated drawdown rates. Existing mine equipment is expected to be used. **Table 2.5-2** summarizes the time in days and years to accelerate drawdown at different pumping rates.

As a maximum potential pumping rate, the current rate for pumping reclaimed water from the pond for use in milling operations was initially used (Knight Piesold 2018a). The average pumping rate for years 2012-2017 was estimated at 16.35 MGD. Additional decreased pumping rates were used to calculate a range of drawdown timelines (Table 2.5-2). Using drawdown rates between 16.35 MGD and 10 MGD, the pond could be reduced to the estimated equilibrium volume of 1,000 acre-feet in one year or less. Lower pumping rates may be utilized to balance the timeline of pond level reduction with the feasibility of reclaiming the exposed tailings surfaces. At pumping rates of 5 MGD, the equilibrium volume would be reached within 2 years. An accelerated drawdown rate of 1 MGD would be roughly equivalent to the assumed seepage rate at Horseshoe Bend under steady-state conditions, and the equilibrium pond volume would be reached in approximately 7 years. In comparison, the pond would take approximately 30 years to drain to equilibrium levels under the Proposed Action Alternative, which relies on evaporation and seepage to Horseshoe Bend to remove water from the facility.

Table 2.5-2.
Estimated pumping rates used to calculate drawdown time during accelerated drawdown.

Pumping rate (MGD)	Percent of Average Operational Pumping Rate	Days to Reach Equilibrium Volume	Years to Reach Equilibrium Volume
16.35 ^a	100%	237.0	0.65
10.0	61%	353.6	0.97
5.0	31%	675.8	1.85
2.0	12%	1520.6	4.17
1.0	6%	2606.7	7.14
0.5	3%	4054.9	11.11
0.25	1.5%	5614.5	15.38

MGD=Million gallons per day

^a Average operational pumping rate from Water Balance Report used in calculations

2.5.2 Alternative Components Different from the Proposed Action

During active mining, no differences between the Proposed Action and the Accelerated Drawdown at Closure Alternative would occur and based on estimated production rates, mine operations would continue through 2031. To support mine operations, approximately 16.5 MGD of reclaim water from the tailings impoundment pond, which includes contributing volumes from upstream tributaries and watersheds and water contained in the tailings slurry, would be pumped to the MR Concentrator and used in the mine process circuit. Tailings pond water would continue to drain as seepage through the impoundment and would be collected at Horseshoe Bend to then be managed and treated under BMFOU remedial plans (Knight Piesold 2018a). During operations, HsB Water Treatment Plant discharge and the water collected in the WED Extraction Pond would be pumped back to the YDTI pond (Knight Piesold 2018a).

2.5.2.1 Rate of Drawdown

Under the Accelerated Drawdown at Closure Alternative, like the No Action and Proposed Action alternatives, approximately 22.0 MGD of water contained in the tailings slurry would no longer discharge into YDTI when mining ceases. The assumed pond volumes for closure (15,000 acre-feet) and equilibrium (1,000 acre-feet) would be the same as under the Proposed Action. Under this alternative, the approximately 14,000 acre-feet of excess water would be pumped out of the supernatant pond to reduce the time necessary to reach the equilibrium volume. The potential pumping rates and drawdown timelines are shown in **Table 2.5-2**. As discussed in Section 2.5.5, the tailings and slimes surfaces would be able to support truck traffic approximately 5 to 9 years after being exposed by the receding pond. Similar to the Proposed Action, the initial 1,122 acres of beach would be reclaimed in the first 5 years following closure. Pumping the excess pond water within 1 year after closure (i.e. at an average rate ≥ 10 MGD) would allow the drying and consolidation process to begin for an additional 365 acres, while

reclamation is performed on the initially dry areas of the beach. Consequently, there would be a reduction in the volume of pond water that would eventually drain out as seepage through the impoundment, and the steady-state conditions at Horseshoe Bend anticipated under BMFOU remedial plans may be attained more rapidly.

2.5.2.2 BMFOU Coordination

Development of this Accelerated Drawdown at Closure Alternative recognizes USEPA's authority over long-term water management and treatment at the site under the BMFOU. Accelerated removal of the supernatant pond would be a component of the reclamation under the mine operating permits, and not required as a part of the remedy under Superfund. Water pumped from the YDTI would need to be stored and managed elsewhere on the site, like in the Continental Pit, or it would need to be treated directly at a water treatment plant prior to off-site discharge. Discussions and coordination with all parties in the 2002 Consent Decree would be needed to review the options and feasibility for handling and treating this water, the potential use of existing or upgraded water treatment facilities and infrastructure, and to amend their agreement accordingly. No matter which facility might potentially treat the water, it would need to meet water quality criteria and final off-site discharge performance standards as described in the 2002 Consent Decree prior to discharge (Consent Decree for the Butte Mine Flooding Site 2002).

Based upon the available information about the BMFOU water treatment pilot studies, the current polishing plant and HsB Water Treatment Plant do not appear to have available treatment or discharge capacity capable of handling additional water from the accelerated drawdown of the YDTI pond (Wood 2018). This alternative would be contingent upon the treatment or storage of the water pumped during accelerated drawdown, but the feasibility of treating additional flow at existing facilities cannot be determined without further information about process optimization from the pilot studies. Until further evaluation of treatment and discharge is possible through Superfund, the option to store the excess YDTI water on-site in the Continental Pit remains feasible, since accelerated drawdown would only commence when mining in the pit has ceased.

The available storage capacity for water in the Continental Pit was analyzed. At closure, inflows to the Continental Pit would include ground water and precipitation. The volume of the pit below the BMFOU critical water level (5,410 feet, USGS datum; 5,460.64 ACM) at closure would be approximately 124 million cubic yards (25 billion gallons). At the current estimate of inflow into the pit of 0.5 MGD, it would take approximately 137 years for the Continental Pit lake to reach the critical water level. The excess YDTI pond water to be diverted into the Continental Pit under this alternative (estimated to be 14,000 acre-feet, or 4.6 billion gallons) would fill approximately 18.3 percent of total capacity below the critical water level. This rapid increase in inflow would shorten the time to reach the critical water level by approximately 25 years. The addition of high-pH (more alkaline) YDTI water to the Continental Pit would raise the pH

and alkalinity of the initial pit lake and would flood exposed mineral surfaces, lowering the potential for sulfide oxidation and acid generation.

2.5.3 YDTI West Embankment and Water Management

During operation, the West Embankment and water management of the YDTI would remain the same under the Accelerated Drawdown at Closure Alternative as under the Proposed Action Alternative. Reclaim water would be pumped to the MR Concentrator for incorporation into the mill circuit, as would water treated in the HsB Water Treatment Plant.

Seepage to the WED would continue to be pumped back into the YDTI during both the operation and closure period. This alternative does not necessarily preclude the implementation of the WED Pumpback Elimination at Closure Alternative described in Section 2.6, but each closure alternative is evaluated independently here.

Water in the YDTI supernatant pond is of better quality than Horseshoe Bend seepage waters. Tailings pond water would be expected to remain alkaline and the concentration of metals would remain low (Montana Resources 2018b). However, water quality monitored when the mine was temporarily not operating (mid 2000 to 2003) and when Horseshoe Bend seepage was collected and pumped back into YDTI (1996-2000) indicated an increase in sulfate concentration and a slight decrease in pH. Mine process water was not added to the YDTI during the temporary closure, a scenario which may represent possible water quality conditions at final closure (Schafer Limited LLC 2018). When operations started again in mid-2003, freshwater, tailings slurry, and lime were again pumped into the YDTI. This adjusted the pH of the system and reversed some of the impacts to pond quality that were noted during the shutdown.

If the supernatant pond water becomes acidic after closure, lime would be mixed with the water collected in the WED Extraction Pond and pumped into the pond to maintain alkaline pH (Knight Piesold 2018a). Baseline information in the hydrology report indicates that pH levels in the three tributaries are all above 7 (Hydrometrics, Inc. 2018a). Lime would be added to maintain alkaline conditions of the remnant pond in order to attain the post-mine land use of wildlife habitat and watershed protection. Additionally, if changes to management of the water result in modified agreements under Superfund, the water quality of the pond would still be maintained at an alkaline pH. If this water remained in the YDTI and eventually drained out of the facility at Horseshoe Bend, it would have more contact time with acidic waste rock and tailings and could become more acidic, thus requiring more treatment to meet discharge standards.

Accelerated drawdown of the supernatant pond would allow for storage of the alkaline water elsewhere, precluding seepage and tailings reactions within the YDTI, or allow for the direct treatment of this water, which would presumably need less treatment than what is needed for Horseshoe Bend seepage. Accelerated drawdown would allow the equilibrium volume of the pond (approximately 1,000 acre-feet) to be reached considerably faster, reducing the hydraulic

head in the facility and the duration of seepage to the WED, and ultimately shortening the facility reclamation timeframe.

2.5.4 Modifications to Associated Facilities

The Accelerated Drawdown at Closure Alternative would not affect changes proposed to other associated facilities included in the Proposed Action. Existing pumps and pipelines would continue to be used, but water would be pumped or drained by gravity to on-site storage or treatment facilities and not into the mine circuit. The Accelerated Drawdown at Closure Alternative would not require a change to the design or function of the tailings impoundment during mine operations.

DEQ does not consider modification to drawdown rates at YDTI a significant change to the designs of the tailings impoundment, West Embankment, or WED and would not require reopening the IRP review. The Accelerated Drawdown at Closure Alternative would remove water more quickly from the tailings impoundment and allow for reclamation of the facility to occur at a faster rate. This alternative would be contingent upon the treatment or storage of the water pumped during accelerated drawdown. The feasibility of treating additional flow at existing water treatment facilities, or the need to modify those facilities, would need to be reviewed by BMFOU Consent Decree parties. No matter which facility might potentially treat the water, it would need to meet water quality criteria and final off-site discharge performance standards as described in the 2002 Consent Decree prior to discharge (Montana Resources and Atlantic Richfield Company 2018).

2.5.5 Reclamation

Under the Accelerated Drawdown at Closure Alternative, reclamation at the YDTI would be similar to the Proposed Action. No changes to the proposed reclamation plan, other than accelerated drawdown of water and an accelerated time frame for reclamation, would occur.

Reducing the time required to consolidate the tailings with the Accelerated Drawdown at Closure Alternative would allow reclamation at YDTI to be completed sooner. The Proposed Action indicates approximately a 30 to 40-year period following closure before reclamation of the tailings could be completed. Based on additional information provided by Montana Resources, the top 10 to 20 feet of tailings near the margin of the supernatant pond would likely consolidate in less than 1 year following rapid dewatering (Knight Piesold 2019c). It may take an additional 2 to 3 years of air-drying and freeze-thaw consolidation to develop a surface that would enable surficial tailings to become trafficable. In addition, 2 to 5 years may be required for very fine-grained slime tailings to consolidate and develop into a trafficable surface to facilitate capping (Knight Piesold 2019c). Therefore, the exposed surfaces would be able to support truck traffic approximately 5 to 9 years after closure under the Accelerated Drawdown Alternative.

Considering the rate of initial beach reclamation in the Proposed Action (1,122 acres in the first 5 years), consolidation of the tailings seems to be the limiting step for completing reclamation and not the equipment or soil placement rates. Therefore, rapidly drawing down the pond within 1 year following closure would expose an additional 365 acres of Transition Zone. This would allow the drying and consolidation process to commence while reclamation is performed on other areas of the beach that are already dry and accessible to equipment. The next phase of sequential reclamation on the exposed Transition Zone could begin shortly after the initial beach area is completed.

Proposed capping materials and methods of reclamation cap would not change but would be able to be added to the YDTI beach area sooner than would be possible under the Proposed Action. Dust controls would still be integral in the reclamation plan. Reclamation of areas other than the YDTI tailings beach and Transition Zone would be expected to begin at the end of 2031 when mining operations would cease.

2.6 ELIMINATION OF WEST EMBANKMENT DRAIN PUMPBACK AT CLOSURE ALTERNATIVE

2.6.1 Introduction to the Alternative

The Elimination of West Embankment Drain (WED) Pumpback at Closure Alternative would discontinue pumping water from the WED back into the YDTI as soon as mining and milling are completed. This would reduce inflow into the post-closure YDTI pond, and the reduction in time to reach the equilibrium volume (approximately 1,000 acre-feet) would speed up reclamation activities at the facility. The volume of water contributed to the WED at closure is estimated to be 160 gpm (Schafer Limited LLC 2018). The Elimination of WED Pumpback at Closure Alternative would eliminate pumping the potentially poor-quality seepage water collected in the WED Extraction Pond back to the tailings pond for approximately 20 years post-closure. MR predicts that much of the YDTI seepage reporting to the WED (i.e. contact water) would most likely have a pH of 7.5, a positive net alkalinity, and acid neutralization potential (Schafer Limited LLC 2018). However, in MR's worst-case model scenario, contact water to the WED is assumed to be more similar in composition to current Horseshoe Bend seepage, with a pH around 3, negative net alkalinity, and no acid neutralization potential (Schafer Limited LLC 2018).

When mining ceases, YDTI water would not be used in the mill process circuit, but it would continue to seep into Horseshoe Bend and be collected for treatment under Superfund. The WED is predicted to initially capture approximately 20 percent of tailings pond seepage, but seepage rates would decline as the pond level decreases. Under this alternative, water collected at the WED Extraction Pond would be diverted away from the YDTI to be stored elsewhere on-site or treated prior to discharge, whether by pumping or using gravity drainage. Under the Proposed Action Alternative, the WED would be grouted approximately 20 years post-closure. The WED would not be grouted under the Elimination of WED Pumpback at Closure Alternative and would provide a greater certainty to capture and contain any seepage

to the west. Discussions and coordination with all parties in the 2002 BMFOU Consent Decree would be needed to review the options and feasibility for handling and treating this water, the potential use of existing or upgraded water treatment facilities and infrastructure, and to amend their agreement accordingly.

2.6.2 Alternative Components Different from Proposed Action

During active mining, there would be no difference between the Proposed Action and the Elimination of the WED Pumpback at Closure Alternative. Based on estimated production rates, mine operations would continue through 2031. As described in the Proposed Action, reclaim water from the YDTI would continue to be pumped to the MR Concentrator and used in the mine process circuit. Seepage from the tailings impoundment into Horseshoe Bend would be treated in the HsB Water Treatment Plant and pumped to the MR Concentrator. Water collected in the WED Extraction Pond would be pumped back to the YDTI pond during operations.

Under the Elimination of WED Pumpback at Closure Alternative, like the Proposed Action closure scenario, water contained in the tailings slurry would no longer be an input to YDTI when mining and milling cease. Approximately 22 MGD of water in tailings slurry would no longer be pumped into the tailings impoundment. Water in the tailings pond would continue to seep through the impoundment and discharge at Horseshoe Bend, to then be managed and treated under BMFOU remedial plans. Under the Elimination of WED Pumpback at Closure Alternative, seepage collected in the WED Extraction Pond would not be pumped back to the tailings pond, and potentially treated with lime to control the acidity, for approximately 20 years post-closure. Instead, the seepage water in the WED Extraction Pond would be diverted away from the YDTI to a water treatment facility or to the Continental Pit for storage, whether by pumping or by gravity drainage. This alternative would expedite the dewatering of tailings, reduce long-term risks to ground water seepage out of the facility due to the WED remaining operational, and shorten the reclamation and closure timeframe of the YDTI. It would also reduce the potential for acidification or metal loading in the YDTI pond, and thereby reduce the amount of lime needed as mitigation.

The available storage capacity for water in the Continental Pit was analyzed and described in detail in Section 2.5.2.2. At closure, inflows to the Continental Pit would include ground water and precipitation. Under the Elimination of WED Pumpback at Closure Alternative, the estimated 160 gpm (0.23 MGD) of seepage to the WED Extraction Pond may be diverted to the Continental Pit. Each year, the increase in inflow would fill approximately 0.34 percent of the total capacity of the Continental Pit below the critical water level. To preclude acidification of the Continental Pit lake, WED seepage would be amended with lime if necessary to neutralize acidity before being stored in the pit.

2.6.3 YDTI West Embankment and Water Management

During operation, the West Embankment and water management of the YDTI would be the same as under the Proposed Action. Reclaim water would be pumped to the MR Concentrator,

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as would water treated in the HSB Water Treatment Plant and used in the milling process. MR predicts that much of the YDTI seepage reporting to the WED (i.e. contact water) would most likely have a pH of 7.5, a positive net alkalinity and acid neutralization potential. However, in MR's worst-case model scenario, contact water to the WED is assumed to be more similar in composition to current Horseshoe Bend seepage, with a pH around 3, negative net alkalinity and no acid neutralization potential (Schafer Limited LLC 2018). This scenario aligns better with water samples collected from the southern end of the WED, which had pH values ranging between 3.0 and 4.1 between March and August 2018. This may represent flushing of easily mobilized solutes from recently placed embankment rock fill, in which case WED seepage water quality may improve over years of flushing during operations. If WED seepage water quality remains degraded after mining ceases, or the tailings pond degrades due to WED seepage pumpback, MR would add lime in order to maintain neutral conditions in the pond. Under worst-case conditions, MR estimates that about 5,000 tons of lime would be required to maintain alkaline conditions throughout post-closure, or about 150 tons per year for three decades. Slightly more lime would be needed during the first 3 to 5 years after closure for the worst-case scenario (Montana Resources 2018b).

Based on the water balance model completed as part of the design documents, 60 gpm of ground water is predicted to flow into the WED for up to 20 years after closure (Schafer Limited LLC 2018) (Knight Piesold 2018d). The rate of YDTI seepage into the WED is not well quantified (IRP 2017), but the basic WED design can accommodate 4,500 gpm, placing an upper bound on the expected seepage component of flow into the WED. During current operation with the addition of tailings slurry input into YDTI, MR estimates approximately 500 to 600 gpm is captured in the WED and pumped backed into the impoundment. This volume would be expected to decrease when tailings slurry is no longer added to the YDTI and static conditions are approached after closure. As the YDTI pond drains naturally towards Horseshoe Bend and water levels drop, the hydraulic gradient would change from west and south to east and south, away from the WED. The elimination of pumping this collected seepage back into the YDTI for 20 years would reduce the amount of water in the YDTI pond by an estimated 160 gpm or 84.1 million gallons per year. Water balance modeling indicate that without WED pumpback, the equilibrium pond volume would be reached 7 years sooner than under the Proposed Action (Knight Piesold 2018b). As seepage into the WED decreases over time, less volume of water would be available for removal from the WED Extraction Pond.

This alternative would be contingent upon storage or treatment of the water collected in the WED Extraction Pond that would not be pumped back into the YDTI. Seepage would be stored in the Continental Pit or it would be sent directly to a water treatment facility like other impoundment seepage. Water would be pumped directly from the WED Extraction Pond or allowed to drain by gravity. The Proposed Action identifies grouting to seal off the WED after 20 years since the drain system would no longer be necessary to maintain the ground water elevation in the tailings at a lower level than that beneath the west ridge. However, the WED

would not be grouted under the Elimination of WED Pumpback at Closure Alternative and would provide a greater certainty to capture and contain any seepage to the west.

The Elimination of WED Pumpback at Closure Alternative presents a different scenario for YDTI water management at closure, which necessitates recognition of USEPA's authority over long-term water management and treatment at the site under the BMFOU. Discussions and coordination with all parties in the 2002 BMFOU Consent Decree would be needed to review the options and feasibility for handling and treating this water, the potential use of existing or upgraded facilities and infrastructure (e.g. HsB Water Treatment Plant), and to amend their agreement accordingly.

2.6.4 Modifications to Associated Facilities

The Elimination of WED Pumpback at Closure Alternative would not affect changes to other associated facilities included in the Proposed Action like the soil and alluvium stockpiles, rock disposal sites, or access roads. DEQ does not consider eliminating pumping water from the WED Extraction Pond into the YDTI a significant change to the designs of the tailings impoundment, West Embankment, or WED and would not require reopening the IRP review. The Elimination of WED Pumpback at Closure Alternative would eliminate adding approximately 84.1 million gallons per year of collected seepage water into the tailings impoundment and allow for reclamation of the facility to occur at a faster rate.

The feasibility of conveying and treating additional flow at existing water treatment facilities, or the need to modify those facilities, would need to be reviewed by all BMFOU Consent Decree parties. No matter which facility might potentially treat the water, it would need to meet water quality criteria and final off-site discharge performance standards as described in the 2002 Consent Decree prior to discharge (Montana Resources and Atlantic Richfield Company 2018).

2.6.5 Reclamation

Under the Elimination of WED Pumpback at Closure Alternative, reclamation at the YDTI would be similar to the Proposed Action. No changes to the proposed reclamation plan would occur, other than slightly accelerating the drawdown of water and the time frame for reclamation. Proposed capping materials and the methods of reclamation would not change, but it would be possible to cap the gradually exposed Transition Zone area approximately 7 years sooner than reclamation under the Proposed Action. Dust controls would still be integral in the reclamation plan. The reclamation is expected to begin at the end of 2031 when mining operations would cease.

2.7 ALTERNATIVE CAPPING METHODS

2.7.1 Introduction to the Alternative

The Alternative Capping Methods option focuses on accelerating tailings reclamation and reducing potential dust upon initial closure conditions. It incorporates the introduction of alluvial material to the mill for processing to create a modified alluvial material used for initial

capping of the tailings beach and transition zones. The material would be hydraulically placed rather than with equipment as outlined in the Proposed Action. This method of alluvium placement for reclamation would allow for directed discharge to areas of the impoundment prone to produce dust but not accessible to equipment due to tailings saturation and instability. Interim seeding of the hydraulically placed material in the Transition Zone would provide stability and limit dust generation during the period between hydraulic placement of alluvium and final capping / final revegetation. Physical placement of the remainder of the capping material and revegetation would follow this initial reclamation as outlined in the Proposed Action. This alternative could potentially accelerate reclamation of the YDTI tailings beach area.

Alluvial material stockpiled throughout the mine or contained within the Central Zone, located between the Berkeley and Continental Pits (See **Figure 3.3-2**), would be removed, transported to the mill, processed to meet hydraulic and reclamation specifications, and pumped through existing tailings lines to the YDTI. Like the No Action Alternative, the processed alluvial tailings would be directed to up to eight discharge locations on the tailings beach and spread to the required depth.

It is anticipated that the processed alluvial tailings would consist of 85 percent water to enable the material to be pumped through the existing tailings lines to the YDTI, using supernatant pond water. The selection of the alluvium source and mill specifications such as particle distribution and water content, would aid in achieving suitable capping material consistent with the Proposed Action. DEQ anticipates that the processed alluvial material would be less reactive and have lower metal concentrations than typical tailings. If necessary, to support temporary vegetative cover, the capping material may be amended with compost or other organic material consistent with Minor Revision MR 02-001 to Operating Permit No. 00108.

2.7.2 Alternative Components Different from the Proposed Action

This alternative differs from the Proposed Action through the methods of initial capping material placement. This alternative would include excavating alluvium from the Central Zone and transporting it to the mill, processing (modifying) the alluvium to a specified size, and adding sufficient water to create a pumpable slurry. The modified alluvium would be transferred through any one of the three tailings lines to the YDTI for discharge through the existing tailings discharge lines. The Proposed Action reclamation would progress over decades as the Tailings Beach and Transition Zone become stable for equipment to place the cap. It takes time for the materials placed in the YDTI to dry, settle, and become stable enough for trucks and equipment to move on the surface safely. This alternative would allow for hydraulic placement of some of the capping material to limit the potential for dust, before the YDTI surface can be accessed by equipment and fully reclaimed.

2.7.3 YDTI West Embankment and Water Management

The alluvial material selected for the cap would need additional water for processing at the mill and pumping into the YDTI. The water needed to slurry the modified alluvium would come from

the supernatant pond. DEQ estimates that the total beach and transition areas may encompass approximately 1,342 acres in 2031 at closure. The material would be used for initial capping of the Transition Zone, estimated to be about 220 acres at the start of closure, to accelerate reclamation and control dust in areas not accessible to wheeled equipment. Following the hydraulic placement of the material, the remainder of the cap would be placed. An initial capping depth of 6 inches was used to estimate material volumes.

2.7.4 Modifications to Associated Facilities

Modification to the mill may be necessary to process alluvial material because its characteristics are different from the ore currently processed. The tailings discharge points may need to be modified for direct placement of the modified alluvium to areas without promoting segregation of the materials. Segregation of the materials can lead to development of an uneven cap. Uniform distribution of the initial capping material may be accomplished through the installation of multiple discharge points exceeding the currently proposed eight lines for the Proposed Action. Source areas for the alluvium would be accessed and reclaimed as necessary.

2.7.5 Reclamation and Revegetation

Overall reclamation using the modified alluvium would be similar to the Proposed Action with the exception of hydraulic placement of an initial cap to the Transition Zone for accelerated reclamation and dust control. Placement of the modified alluvium cap would occur as the Transition Zone becomes exposed during the initial few months following cessation of mining, and as soon as the mill could be modified (if necessary) to process alluvium. MR projects that, under the Proposed Action, the Transition Zone would become progressively exposed over a period of about 30 years. Assuming current milling rates, 6 inches of initial cap material could be deposited over the entire tailings surface (beach, Transition Zone, and subaqueous zone) in about one month. The remainder of the cap and reclamation would be similar to the Proposed Action. This action would occur sooner in comparison to the Proposed Action Alternative.

Flow characteristic studies should be performed to evaluate the modified alluvium and segregation of the material as it is discharged as a cap to control adequate particle distribution and placement thickness. The settling of larger particles near the discharge point could affect the flow and deposition thickness of the cap by diverting flows. This may result in thickness variation and possible increased alluvial material requirements to achieve the desired capping thickness.

Following the dewatering of the modified alluvium to enable equipment access, it is anticipated that the same revegetation plan would be implemented as the Proposed Action. However, the benefit of this alternative is long-term dust control of the Transition Zone without the need to inundate it with pond water for short-term dust mitigation. Also, reclamation may be able to commence sooner if the modified alluvium can drain faster than the tailings in place and provide adequate support for the equipment. This would facilitate accelerated reclamation with respect to the Proposed Action.

2.8 COMPARISON OF ALTERNATIVES

The following table (Table 2.8-1) presents a comparison of the components of each of the alternatives.

**Table 2.8-1.
Comparison of Montana Resources LLP Proposed Amendment EIS Alternatives**

Alternative Component	No Action Alternative (Current Operations)	Proposed Action – On-Site Tailings Storage and Water Containment	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback At Closure	Alternative Capping Methods
Alternative Description	<p>No increase in tailings storage capacity in the YDTI would occur, the northern boundary of the YDTI would not be expanded, disturbed acreage would not be increased, and revisions to the existing reclamation and closure plans would not be necessary.</p> <p>MR mining operations would continue into approximately 2022 and be limited to the current permits which include Operating Permits 00030, 00030A, 00041, and 00108, along with associated amendments, modifications, and revisions. A summary of all operating permits and components can be found in Montana Resources Continental Mine Operations Plan dated February 2017 and revised February 2018.</p>	<p>Increase in capacity of YDTI to allow for on-site storage of additional tailings. Extend the northern boundary of the impoundment, which would allow continued tailings deposition through 2031 as part of operations at the Continental Mine. Associated facilities to support continued operations include rock disposal sites, reclamation material stockpiles, access roads, monitoring sites, and a closure spillway.</p> <p>The West Embankment would be raised to match the presently permitted elevations of the other two embankments. The West Embankment would be raised 45 feet from the 6,405-foot to the 6,450-foot elevation and extend the northern boundary of the tailings pond.</p> <p>A gravity controlled subsurface seepage collection drain, known as the West Embankment Drain (WED), would intercept seepage before it migrates west of the impoundment. Water collected in the WED would be pumped back into the YDTI pond during operations and for approximately 20 years post-closure, after which time, MR proposes to grout the WED to prevent continued discharge.</p> <p>Reclamation of the YDTI is dependent on the gradual exposure and consolidation of tailings surfaces as the pond elevation decreases, which is estimated to be completed between 30- and 40-years post-closure.</p>	<p>The accelerated drawdown during the closure phase would involve pumping or diverting water from the supernatant pond, in order to reach the equilibrium volume more quickly than under the Proposed Action. Accelerated drawdown would lower the elevation of water in the pond and reduce the potential for ground water to move west. It reduces the timeframe for reliance on the WED for seepage collection and reduces the timeframe needed to access the Transition Zone for YDTI reclamation. It would also reduce the timeframe that tailings may react with water and degrade pond water quality.</p> <p>Water removed from the supernatant pond would need to be stored and managed elsewhere on the site, or treated directly, prior to off-site discharge. MR would need to have discussions and coordination with parties in the 2002 BMFOU CD.</p>	<p>Eliminating the pumpback of WED seepage to the YDTI during the closure phase would expedite the dewatering of tailings, by reducing flow inputs into the YDTI. This would help to reach the equilibrium pond volume more quickly than under the Proposed Action. Eliminating flow back into the YDTI would lower the elevation of water in the pond and reduce the potential for ground water to move west. It reduces the timeframe for reliance on the WED for seepage collection and reduces the timeframe needed to access the Transition Zone for YDTI reclamation. It would also reduce the potential for acidification or metal loading in the YDTI pond, and thereby reduce the need for lime addition as mitigation.</p> <p>Water from the WED Extraction Pond would need to be stored and managed elsewhere on the site, or treated directly, prior to off-site discharge. MR would need to have discussions and coordination with parties in the 2002 BMFOU CD.</p> <p>The WED would not be grouted post-closure but would be allowed to continue to flow.</p>	<p>The Alternative Capping Methods option would accelerate tailings reclamation. Immediately upon cessation of mining, alluvial material would be routed to the mill for processing and discharged as modified tailings material to cap the transition zone areas that would be susceptible to blowing dust and inaccessible to equipment.</p> <p>It would allow for capping in areas not accessible to equipment placement due to tailings saturation and stability. This initial cover would eventually be reclaimed to the full thickness (28 inches) when equipment access is possible. This alternative could potentially accelerate reclamation of the YDTI.</p>

**Table 2.8-1.
Comparison of Montana Resources LLP Proposed Amendment EIS Alternatives**

Alternative Component	No Action Alternative (Current Operations)	Proposed Action – On-Site Tailings Storage and Water Containment	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback At Closure	Alternative Capping Methods
Permit Boundary/Disturbed Area	Permit boundary and disturbed area would remain the same as currently permitted. This includes 2,177 acres for the YDTI and 160 acres for associated facilities.	<p>The proposed amendment would increase the total area of Permit 00030A by approximately 237 acres, but only 99 of these acres would be disturbed to accommodate the West Embankment raise and YDTI expansion. Although the proposed amendment would affect mine facilities that are located within Operating Permit 00030, it would not authorize the disturbance of any additional land under Operating Permit 00030. All acreage changes would occur within the current MR mine permit boundary.</p> <p>Additional disturbances within Operating Permit 00030A would accommodate increased tailings storage, construction, topsoil storage, roads, and monitoring wells.</p>	No change to Proposed Action acreage.	No change to Proposed Action acreage.	No change to Proposed Action acreage.
YDTI West Embankment and Water Management	<p>Water management is expected to continue as permitted. MR monitors surface water quality at several sites within and adjacent to the mine. The Berkeley Pit and Horseshoe Bend monitoring sites are sampled as part of the BMFOU. The monitoring program continuously evolves with changes in the operation and site conditions. YDTI and treated HsB seepage reclaim water would continue to be used in the MR Concentrator until closure unless water management and treatment strategies change as a result of the BMFOU pilot study.</p> <p>The elevation of the West Embankment would remain at 6,405 feet and not be raised to the proposed elevation of 6,450 feet to match the presently permitted elevations of the East-West and North-South Embankments. Storage capacity of the YDTI would not be increased and current mining could only continue through 2022.</p> <p>The WED is a gravity controlled subsurface collection system installed in the permeable upstream portion of the West Embankment</p>	<p>The design of the West Embankment includes features to manage seepage from the YDTI. The WED Design Report incorporates these previous design elements with additional features to manage seepage. Design of the West Embankment to the 6,450-foot elevation and associated water management features were based on comprehensive, site-specific West Ridge resource inventories and analyses covering geology, hydrology, and geotechnical conditions.</p> <p>Other elements included as part of the WED system are an Extraction Basin, drain pods, and Secondary Seepage Collection Drains. Each of these would be connected hydraulically to the upstream side of the embankment.</p> <p>The purpose of the 3.6-million-gallon Extraction Pond would be the gravity collection of the seepage water from the WED. The seepage would be pumped from the Extraction Pond back into the YDTI during operations and for approximately 20 years post-closure. Potential acidification of the pond would be mitigated by the addition of lime.</p>	<p>Accelerating drawdown of the supernatant pond at closure would allow surface reclamation to happen sooner than proposed. As high flow rate estimates, the equilibrium pond volume could be achieved in one year or less, with a pumping rate between 10 and 16.35 MGD (the average reclaim water pumping rate during 2012-2017 operations). Lower pumping rates may be utilized to balance the timeline of pond level reduction with the feasibility of reclaiming the exposed tailings surfaces.</p> <p>During operation, no changes would be expected to the West Embankment and water management of the YDTI as presented in the Proposed Action. Reclaim water would be pumped to the MR Concentrator, as would water treated in the HsB Water Treatment Plant unless water management and treatment strategies change as a result of the BMFOU pilot study.</p> <p>At closure, water removed from the supernatant pond would be stored and managed elsewhere on the site, or treated</p>	<p>Eliminating WED pumpback at closure would reduce the pond elevation and allow surface reclamation to happen sooner than the Proposed Action, but not as quickly as the Accelerated Drawdown at Closure Alternative. It would also reduce the potential for acidification or metal loading in the YDTI pond, and thereby reduce the need for lime addition as mitigation.</p> <p>During operation, no changes would be expected to the West Embankment and water management of the YDTI as presented in the Proposed Action. Reclaim water would be pumped to the MR Concentrator, as would water treated in the HsB Water Treatment Plant unless water management and treatment strategies change as a result of the BMFOU pilot study.</p> <p>At closure, water from the WED Extraction Pond would be stored and managed elsewhere on the site, or treated directly, prior to off-site discharge. MR would need</p>	Similar to the Proposed Action. To preclude the incorporation of additional flow into the YDTI, water from the supernatant pond may be used to place the modified alluvium cover material during the initial phase of closure.

**Table 2.8-1.
Comparison of Montana Resources LLP Proposed Amendment EIS Alternatives**

Alternative Component	No Action Alternative (Current Operations)	Proposed Action – On-Site Tailings Storage and Water Containment	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback At Closure	Alternative Capping Methods
	<p>which would intercept flow before migration to the lower permeable downstream zone and potentially migrating west of the YDTI. The WED was previously approved in Amendment 9 and has been constructed. Pumping water from the WED into the YDTI was approved during operations as a contingency for hydrodynamic containment, but was not anticipated beyond closure to maintain the ground water gradient.</p>		<p>directly, prior to off-site discharge. MR would need to have discussions and coordination with parties in the 2002 CD.</p>	<p>to have discussions and coordination with parties in the 2002 CD.</p>	
<p>Modifications to Associated Facilities, Materials, and Personnel</p>	<p>No changes would occur to the associated facilities permitted under Operating Permits 00030 and 00030A. Access roads and pit haul roads would continue to be maintained for safe conditions. Haul truck traffic would continue to occur 7 days per week, 24 hours per day, 365 days per year. Salvage of material for mine reclamation has been contemporaneous with mining since 1972. Some alluvium is suitable for surface or sub-surface reclamation material, and some leached cap material is suitable for subsoil reclamation material.</p> <p>Workforce levels would be expected to remain the same and operations would continue through 2022. MR's workforce may fluctuate on a seasonal and annual basis, but the operation has typically employed between 350 and 400 employees and on-site contractors since 2010.</p>	<p>Associated facilities proposed include additional area in an existing rock disposal site, a new rock disposal site, stockpile areas for soil and alluvium, access roads, and long-term monitoring sites within Operating Permits 00030 and 00030A. A closure spillway has been conceptually designed to provide a system for releasing water from the tailings impoundment and maintaining a safe water level during a major storm event.</p> <p>There would be no changes to personnel during operations, which would be extended through 2031. Some positions may then be reduced or reassigned during reclamation and post-closure management and monitoring.</p> <p>Under the Proposed Action, water would only be ultimately removed from the impoundment through evaporation loss or seepage to Horseshoe Bend. The water would be treated and managed in accordance with the 2002 BMFOU Consent Decree.</p>	<p>Associated facilities that support mine operation would be the same as the Proposed Action. There would be no changes to personnel during operations. Some positions may be reduced or reassigned during reclamation and post-closure management and monitoring, which would occur more quickly than under the Proposed Action.</p> <p>Modified plans to manage water and to pump directly from the supernatant pond would need to be developed. Water would be stored and managed elsewhere on the site, or treated directly, prior to off-site discharge. MR would need to have discussions and coordination with parties in the 2002 BMFOU CD.</p> <p>Use of existing infrastructure would be evaluated. Options for gravity drainage would be evaluated. Storage locations will be identified and may include the Continental Pit.</p> <p>Upgrades to water treatment facilities managed under Superfund may need to be considered. The water would be treated and managed in accordance with the 2002 BMFOU Consent Decree.</p>	<p>Associated facilities that support mine operation would be the same as the Proposed Action. There would be no changes to personnel during operations. Some positions may be reduced or reassigned during reclamation and post-closure management and monitoring, which would occur more quickly than under the Proposed Action.</p> <p>Modified plans to divert water away from WED Extraction Pond would need to be developed. New water lines may be needed to pump or divert water from the WED Extraction Pond. Locations of water lines would need to be placed to avoid interference with other ongoing reclamation.</p> <p>Upgrades to water treatment facilities managed under Superfund may need to be considered. Locations for discharge of treated water may need to be coordinated with other parties in the 2002 BMFOU CD and amendments to their agreement may be needed. The water would be treated and managed in accordance with the 2002 BMFOU Consent Decree.</p>	<p>Associated facilities that support mine operation would be the same as the Proposed Action. There would be no changes to personnel during operations. Following the initial placement of modified alluvium as cover material, the personnel needs during reclamation and post-closure management and monitoring would be more similar to the Proposed Action.</p> <p>Modification to the mill would be necessary to process alluvial material due to its different characteristics in comparison to ore.</p> <p>The tailings discharge points may need to be modified for direct placement of the modified alluvium to areas without promoting segregation of the materials. This may be accomplished through the installation of multiple discharge points exceeding the currently used eight lines for the Proposed Action.</p> <p>Tailings lines may need to be modified or replaced to handle the potential abrasive characteristics of the modified alluvium.</p>

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Alternative Component	No Action Alternative (Current Operations)	Proposed Action – On-Site Tailings Storage and Water Containment	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback At Closure	Alternative Capping Methods
					Source areas for the alluvium would be accessed and reclaimed as identified in the Proposed Action.
Reclamation and Post-Closure Management for the YDTI and Associated Facilities	<p>The reclamation plan for most of the tailings embankment includes regrading the downstream slopes to 2.7H:1V, placing a 20-inch thick amended alluvium cap, and revegetation. The access road along the embankment crest would remain for post-closure monitoring. Ditches and swales would be constructed at 100 ft intervals on the regraded slopes to promote drainage and reduce erosion risk of the reclamation cap.</p> <p>WED construction was permitted by DEQ as part of Amendment 9. However, the operation of the WED identified a maximum operational supernatant pond elevation of 6,360 feet, and the WED was not required as a hydrodynamic containment feature. The WED would still effectively capture seepage moving west from the YDTI after closure, but at a lesser flow anticipated under the Proposed Action.</p> <p>Rockfill would cover the tailings beach areas susceptible to wind erosion after termination of operations. The cover would be comprised of leached cap material and seeded for dust control. Reclamation of the tailings beach areas would follow, which would include placing a 28-inch thick amended alluvium cap and revegetation. A partial wet closure scenario is planned for the northern portion of the tailings impoundment consisting of a pond and adjacent wetland area periodically inundated as the seasonal pond water level fluctuates.</p>	<p>Reclamation at the YDTI would be similar to the No Action Alternative but would incorporate additional acreage due to the tailings impoundment expansion.</p> <p>The WED system and Extraction Pond would be operated for hydrodynamic containment for approximately 20 years post-closure, until the pond elevation/saturated head is below the WED invert elevation. Potential acidification of the pond would be mitigated by the addition of lime.</p> <p>Reclamation methods for the rock disposal sites do not change substantially from methods for other permitted rock disposal sites. In general, reclamation includes reducing slopes steepness, constructing benches or runoff collection ditches; testing and amending alluvium. Soil stockpiles will be ripped to relieve compaction and revegetated. The spillway walls and bottom in the segment excavated in bedrock will be broadcast-seeded. The spillway segment traversing previously disturbed areas will be regraded, ripped, covered with 28 inches of alluvium, and seeded. Roads not necessary for post-closure management and monitoring will be reclaimed.</p>	<p>Reclamation at the YDTI would be similar to the Proposed Action Alternative, and no changes to the reclamation of associated facilities would occur. No changes to the proposed reclamation plan, other than accelerated drawdown of water and accelerated time frame for reclamation, are planned. Pumping rates should be utilized to balance the timeline of pond level reduction with the feasibility of reclaiming the exposed tailings surfaces.</p> <p>Proposed capping materials and methods of reclamation cap would not change. Dust controls would still be integral in the reclamation plan. The reclamation is expected to begin at the end of 2031 when mining operations cease.</p> <p>Reclamation methods for the rock disposal sites, soil stockpiles, spillway, and roads would be similar to the Proposed Action.</p>	<p>Reclamation at the YDTI would be similar to the Proposed Action Alternative, and no changes to the reclamation of associated facilities would occur. Eliminating WED pumpback at closure would reduce the pond elevation and allow surface reclamation to happen sooner than the Proposed Action, but not as quickly as the Accelerated Drawdown at Closure Alternative.</p> <p>Reclamation methods for the rock disposal sites, soil stockpiles, spillway, and roads would be similar to the Proposed Action.</p>	<p>Reclamation using the modified alluvium would be similar to the Proposed Action with the exception of hydraulic placement of modified alluvium as cover for some areas of the tailings beach and Transition Zone.</p> <p>Placement of the material would occur immediately after mining on areas that are susceptible to blowing dust and/or inaccessible to equipment due to tailings saturation and instability.</p> <p>Studies may need to be performed to evaluate the flow characteristics of the modified alluvium and segregation of the material as it is discharged as a cap to ensure adequate particle distribution and placement thickness.</p> <p>Reclamation methods for the rock disposal sites, soil stockpiles, spillway, and roads would be similar to the Proposed Action.</p>

**Table 2.8-1.
Comparison of Montana Resources LLP Proposed Amendment EIS Alternatives**

Alternative Component	No Action Alternative (Current Operations)	Proposed Action – On-Site Tailings Storage and Water Containment	Accelerated Drawdown at Closure	Elimination of West Embankment Drain Pumpback At Closure	Alternative Capping Methods
	No areas would be disturbed outside of the existing permit boundary; therefore, no additional reclamation planning or actions would be necessary other than what is currently permitted.				
Years after closure when reclamation of the Transition Zone could begin (Reduction in reclamation timeline)	30 to 40 years (No change)	30 to 40 years (No change)	5 to 9 years (25 to 31 years)	23 to 33 years (7 years)	28 to 38 (2 years)

2.9 ALTERNATIVES CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

Under MEPA, a reasonable alternative is one that is practical, achievable under current technology, and economically feasible (EQC 2015). Economic feasibility is determined solely by the economic viability for similar projects having similar conditions and physical locations and determined without regard to the economic strength of the specific project sponsor (75-1-201(C)(I), MCA). Pursuant to 75-1-220(1), MCA, an “alternatives analysis” under MEPA does not include an evaluation of an alternative facility or an alternative to the proposed project itself. In addition, any alternative under consideration must be able to meet the purpose and need of the Proposed Action.

During scoping, alternatives to the Proposed Action were suggested and discussed by agency representatives and MR as required by MEPA. Alternatives covered in this section include alternatives or alternative components that were considered and eliminated from detailed study. For each alternative discussed, a synopsis of the changes proposed and a discussion of why the alternative or component was dismissed from further analysis is included.

2.9.1 Dry Closure of YDTI Through Upstream Diversions for Tributaries

Surface runoff from the upstream watershed flows directly into the YDTI supernatant pond via three perennial streams: Silver Bow Creek, Yankee Doodle Creek, and Dixie Creek (Knight Piesold 2018a). The total contributing watershed area is approximately 4,000 acres. The Moulton Reservoirs #1 and #2 store water for the town of Walkerville and limited utilization by Butte and are located in the upper reaches of the Yankee Doodle Creek watershed. The two reservoirs have an additional total catchment area of approximately 1,680 acres. The Moulton Reservoir dams are designed to facilitate the emergency spill of excess water into Yankee Doodle Creek, which then flows downstream to the YDTI supernatant pond.

Total inflow into YDTI include 3 percent (0.7 MGD) from runoff from the contributing catchment basin, 4 percent (0.9 MGD) from direct precipitation on the pond and beach, and 93 percent (22 MGD) from water in the tailings slurry.

Developing diversion systems to capture upstream ground water and surface water prior to flowing into YDTI was planned in the 1990s as part of the BMFOU. The diversion systems were found to be of limited benefit. Only 3 percent of the flow into YDTI is from runoff whereas the majority of inflow is from tailings slurry, which would be eliminated upon mine closure. Upstream capture systems would not appreciably speed reclamation.

2.9.2 Off-Site Tailings Storage

Locating a new tailings storage in a location outside of the currently permitted mine site was considered during development of the design documents (Knight Piesold 2017c). During the analysis, it was agreed that a newly developed tailings disposal facility could be identified,

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designed, permitted, and constructed to the north (upslope) of the existing YDTI. However, any of the off-site options have limitations imposed by the project location and surrounding development, including 1) the existing access into and out of the mine, 2) private property and federal property surrounding the mine, 3) construction and operation of a tailings pipeline crossing private lands, and 4) impacts to multiple stakeholders (Knight Piesold 2017c).

A new tailings facility located off-site would change the risk of tailings management. Any new site would add to the project risk portfolio and negate the long-term experience of operating the current facility. Land ownership and topographic constraints limit the possibility of development in most directions. The timeline to locate, investigate, design, permit and construct a new facility could easily exceed three years, which would likely lead to a temporary interruption of operations. It is possible that a new site would be difficult or even impossible to permit, or that the local site conditions would not be conducive for development of a suitable tailings facility (Knight Piesold 2017c).

Any new development would likely result in large scale disturbance of a previously undisturbed site and would require considerable increases to the area requiring reclamation following mine closure. The alternative is dismissed because it does not meet the purpose and need of the Proposed Amendment and is essentially proposing an alternative to the project itself. DEQ is acting on MR's proposal to expand the capacity for storing tailings by increasing the storage capacity of the YDTI.

2.9.3 Tailings Storage in Berkeley Pit

Although the Berkeley Pit is located within MR's permitted mine area, it is also located within the BMFOU to the Silver Bow Creek/Butte Area National Priorities List (NPL) Site and subject to USEPA jurisdiction and requirements. According to USEPA, the Berkeley Pit is the major feature in the BMFOU. That determination was made in compliance with CERCLA and is documented, along with other remedy requirements, in the 1994 Record of Decision (USEPA 1994). The use of the Berkeley Pit for tailings storage would require a change to both the BMFOU ROD and the 2002 Consent Decree (See Section 1.3.3.1). The use of the Berkeley Pit for tailings storage would also obstruct access and the potential for future exploration of a significant mineral resource. This alternative was dismissed because the use of the Berkeley Pit for tailings storage would not meet the purpose and need of this proposed amendment.

2.9.4 Alternative Tailings Management Strategies

Alternative tailings management strategies would consider options for dealing with the tailings slurry prior to deposition in the YDTI. Two options were considered, filtering the tailings and depositing them on existing disturbed areas, and changing the tailings process to create a thicker tailings material. More detail on the proposed processes is provided below. Neither of these alternative processes would meet the purpose and need for the proposed amendment. In

addition, analysis of these processes did not identify any benefit to operations or reduction in environmental effects (Knight Piesold 2017c).

2.9.4.1 Filtered Tailings

Modification of the tailings processing and distribution infrastructure to produce and stack filtered tailings within the currently disturbed mine site area was evaluated. A tailings thickener and filtration plant would need to be added at the back end of the process to produce filtered tailings. Tailings would then be distributed by conveyor or truck to the disposal area. A filter plant capable of dewatering tailings at the rate required for the project exceeds the current industry precedent (Knight Piesold 2017c).

The outer edge of the tailings pile would be compacted and armored with rockfill to reduce erosion, improve stability, and to facilitate reclamation. An area within the tailings stack would be designated for tailings that do not meet the required moisture content for optimum compaction in the structural areas, to allow ongoing placement during precipitation events and freezing conditions. The existing pond at the northern end of the YDTI would be maintained for additional reclaim water, storage of storm water, and storage of slurry tailings during upset conditions at the filtration plant. Water removed during filtration would be sent back the mill for reuse in processing. Water from the storage pond would be reclaimed for use in processing as a supplement to water recovered during filtration (Knight Piesold 2017c).

According to the EOR, there are many issues associated with the development of this alternative (Knight Piesold 2017c). Distribution using a truck fleet would at least double the existing truck fleet and the fuel needs. The risk of blowing dust would increase for this alternative compared to other alternatives. The closure objectives for the entire site would be fundamentally altered by pursuing this alternative. The ultimate size of the filtered tailings pile would substantially exceed any existing precedent by nearly an order of magnitude. The rate of rise in the maximum section would be on the order of 30 feet per year and would have the potential for development of saturated conditions and excess pore pressures due to the rapid rate of construction and due to water entrainment from snowfall or rainfall events. The entrainment of snow and/or excess pore pressure development could impact the stability of the pile in the short and long-term. The pile position adjacent to both open pits would add loading to the surface in these areas and could potentially impact pit wall stability. The seismicity of the area and the presence of the Continental Fault is also a consideration.

2.9.4.2 Thickened Tailings

Modification of the tailings processing to thicken the tailings slurry to the YDTI was evaluated. A tailings thickener would need to be added at the back end of the process. The tailings thickener would conceptually be located in the vicinity of the concentrator buildings. The tailings distribution system would be modified, and tailings would be deposited from multiple locations during the continued construction and use of the facility (Knight Piesold 2017c).

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The existing tailings distribution system pumps and pipelines would need to be replaced to distribute thickened tailings. The cost would be considerable without an offsetting benefit to balance the incremental capital and operating costs of the change. The reclaim water system is already in place, and therefore no offsetting benefit can be realized by reducing the size of that system. Tailings would segregate less during deposition; however, tailings beaches could still be developed. There would be no expected detriment or benefit to environmental attributes or closure objectives as a result of thickening the tailings. In addition, this operational change would not provide additional capacity in the YDTI. Therefore, it would not meet the purpose and need of the proposed amendment.

Alternative tailings management strategies would consider options for dealing with the tailings slurry prior to deposition in the YDTI. The current permitted operation would continue to manage tailings as has been done for years with proven and successful operational management techniques typically used for slurry tailings management. Alternative tailings management strategies have been evaluated in the options and have considered common and proven tailings slurry management techniques such as filtering or thicken tailings slurry.

2.9.5 Alternative Post-closure Topography

Post-closure topography could possibly be redesigned to minimize erosion or infiltration based on topographic features. However, any runoff would remain within the mine permit boundary and drain into Horseshoe Bend or Berkeley Pit where it would continue to be managed by MR and under the BMFOU. Changing the topography would not provide additional capacity at the YDTI and would not meet the purpose and need for the proposed amendment. The option of altering the topography during reclamation management to better address site conditions would be available to MR in consultation with DEQ.

2.10 SUMMARY OF IMPACTS AND ALTERNATIVES

A series of tables summarize the impacts for each alternative in Chapter 5. Descriptions and analyses of the types of impacts are provided by resource area and by alternative in Chapter 3, Environmental Consequences and in Chapter 4, Cumulative, Unavoidable, Irreversible, and Irretrievable Impacts.

2.11 PREFERRED ALTERNATIVE

ARM 17.4.617(9) requires an agency to state a preferred alternative in the draft EIS, if one has been identified, and to give its reason for the preference. DEQ has identified the West Embankment Drain (WED) Pumpback Elimination at Closure Alternative as the agency's preferred alternative.

Under the Proposed Action, the impoundment seepage captured by the WED would be pumped back into the impoundment after mining ceases (closure). It is estimated that this would occur for approximately 20 years, or until the tailings pond level decreases to the point that the West Embankment Drain no longer captures impoundment seepage. Pumping the impoundment seepage captured by the WED back into the impoundment would maintain a closed loop so that water only permanently exits the facility through evaporation or through seepage at Horseshoe Bend, where it is captured and treated under the Superfund remedy. Because the impoundment seepage captured by the WED is anticipated to be acidic with elevated ion and metal concentrations, the seepage would be treated with lime to limit the acidification of the remnant tailings pond. When the WED ceases to capture impoundment seepage, it would be grouted to prevent continued discharge. The rate of reclaiming the surface of the impoundment is contingent upon safe access to dry tailings, which relies on draining the tailings pond to a steady state ("equilibrium").

Under the WED Pumpback Elimination at Closure alternative, the impoundment seepage captured by the WED would be diverted to the Continental Pit for storage (i.e. within the previously approved closure pit lake) or to the Horseshoe Bend Treatment Plant for treatment and discharge under the Superfund remedy. If the WED effluent is routed to the Continental Pit for storage, it would first be treated, if necessary, to eliminate acidity and maintain alkaline conditions in the Continental Pit lake. This would eliminate the need to maintain pumpback systems for decades post-closure, and the need to lime the impoundment seepage captured by the WED to mitigate acidification of the tailings pond. Furthermore, water balance modeling indicates that draining the tailings pond to a steady state would be accelerated by approximately 7 years by eliminating the return of tailing seepage back to the pond. As a result, the schedule for reclaiming the exposed tailings surfaces would be accelerated. Finally, the WED would not be grouted at some point after cessation of tailings disposal in the impoundment, but would be allowed to continue to function as a drain. This would maintain a more robust groundwater divide between the tailings impoundment and groundwater resources to the west of the West Ridge. For these reasons, the WED Pumpback Elimination at Closure alternative was selected as the agency's preferred alternative.

DEQ's review of an application for an operating permit amendment is governed by Section 82-4-337, MCA. That law requires DEQ to make an initial determination as to whether the permit amendment application contains all necessary information and whether the proposed amendment satisfies the substantive requirements of the MMRA.

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DEQ determined that MR's permit amendment application was complete and compliant on August 31, 2018 and issued a draft permit amendment. The analysis contained in this Draft EIS does not change DEQ's determination that the proposal contained in the permit amendment application, which is the Proposed Action, complies with the substantive requirements of the MMRA. Unless the analysis set forth in the Final EIS reaches a contrary determination, DEQ will be required to select the Proposed Action even though DEQ believes that there is environmental benefit to the WED Pumpback Elimination at Closure Alternative. However, if after the public comment period, DEQ still prefers the WED Pumpback Elimination at Closure alternative, the applicant and BMFOU parties could voluntarily agree to the alternative.

The WED Pumpback Elimination at Closure Alternative presents a different scenario for YDTI water management at closure, which necessitates recognition of USEPA's authority over long-term water management and treatment at the site under the BMFOU. Discussions and coordination with all parties in the 2002 BMFOU Consent Decree would be needed to review the options and feasibility for handling and treating this water, the potential use of existing or upgraded facilities and infrastructure (e.g. HsB Water Treatment Plant), and to amend the agreement accordingly.