MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
HARD ROCK MINING BUREAU
OPERATING PERMIT – FIELD INSPECTION REPORT

Operator: Montana Resources, LLC							Inspection Date: September 6, 2023				
Operating Permit #: 00030			Project: Montana Resources-Continental Mine Complex				County: Silver Bow				
Nearest City or Town(s): Butte											
DEQ Staff: Conor Fox (Air), Garrett Smith (Mining)							Company Representative(s): Mark Thompson, Jeremy Fleege				
Agencies w/overlapping Jurisdiction:			USFS		BLM		Other	×	None		
Minerals: Copper, molybdenum, minor silver											
Status:	×	Active		Inactive		Suspended		Other			
Weather: Mostly sunny, high temp 74°F											

Type of Operation:		Purpose of Inspection:	
×	Open Pit		Initial (Pre-permitting)
	Underground	×	Regular Compliance
	Placer		Amendment #
×	Heap Leach- *Leach pads near HSB no longer receiving solution*		Complaint Received
	Vat Leach		Bond Release
×	Mill		Other
	Other:		NON issued

INSPECTION CHECKLIST
(N/O = Not Observed, N/A = Not Applicable)
Additional notes are italicized

GENERAL:							
	Yes		No		N/O		N/A	
	×							All mining-related disturbances within permitted and bonded areas.
							×	Incremental bonding requirements have been submitted
	×							Following approved mining plan and permit conditions
	×							Following approved monitoring plans
	×							Reclamation concurrent with mining

MATERIAL HANDLING:							
	Yes		No		N/O		N/A	
	×							Soil salvage according to plan
	×							Soil stockpiles properly maintained: *Soil was salvaged and stockpiled near D East as part of highwall layback. Ongoing salvage around the northwest of TSF/West Embankment*
	×							Special handling/stockpiling of materials consistent with plan

FACILITIES:								
	Yes		No		N/O		N/A	
	×							Construction reports properly filed.
	×							Acceptable liner integrity
	×							Tailings impoundment/heap leach/dump design as approved
	×							Road construction as approved
WATER CONTROLS:								
	Yes		No		N/O		N/A	
	×							Erosion-control measures (BMPs) concurrent with mining.
	×							Erosion/sedimentation mitigations acceptable: *Maintenance and repairs to follow Erosion Control Plan as needed. See notes about East RDS access road*
	×							Culverts installed and maintained as approved
	×							Diversions maintained and functioning as approved
	×							Process/storage/settling pond(s) constructed, operating, and maintained.
	×							Acid rock drainage controlled
	×							Adequate freeboard in all solution storage and process facilities
AIR QUALITY:								
	Yes		No		N/O		N/A	
	×							Acceptable air quality. *No fugitive dust observed. Water is sprayed on the roads and multiple strategies used on the tailings*
OTHER:								
	Yes		No		N/O		N/A	
	×							Noxious weeds controlled. *Sterilant recently applied around some features (visible dye). Weed control to continue in other locations during upcoming season.*
	×							Wildlife mitigations in place and functioning: *Berkeley Pit bird mitigation practices to increase during upcoming migration.*
							×	Cultural resource mitigations properly implemented
			×					Water sample(s) taken.
			×					Materials sample(s) taken
	×							Photos taken
	×							Are revisions or amendments anticipated in the next year? *Updated blasting plan will be developed. Potential future grant/project for installation of solar panels. Future amendment for TSF expansion, aligning mine life with ore reserves.*
			×					Is comprehensive 5-year bond review due in the next year? Date of next 5-year bond review: *Final due in January 2026*
								Other

DISCUSSION: DEQ staff arrived and signed in at Montana Resources (MR) offices at 1:30 PM. The site inspection focused on areas of recent activity and upcoming permit discussions-- the Continental Pit, Yankee Doodle Tailings Impoundment (YDTI), and Horseshoe Bend (HSB) area. **Compliance assistance and recommendations are provided in bold.**

Reclamation- Hillcrest and East Rock Disposal Areas (RDS)

The inspection began on the southeast portion of the permit area, where the south end of the East RDS has been reclaimed and revegetated within the past 5 to 6 years. As noted through monitoring conducted by Westech (2021 and 2022 Annual Reports), the vegetation is establishing well in most areas (Photo 1). There are a few areas of minor rilling and erosion on the slopes that do not appear to be expanding from year to year. There are also some "hot spots" where the vegetation is sparse, particularly on portions of the southern Hillcrest RDS slope that were reclaimed and vegetated decades ago (Photo 2). As described by Westech, "Hot spots are small areas without typical reclamation, although they are surrounded by typical reclamation at the Hillcrest RDS. Hot Spots contain high metal concentrations, have low pH, and support very little vegetation. It is unclear what created these features and whether any reclamation occurred on them; hot spots may be the result of uneven coversoil distribution over acidic alluvium, a past disturbance that removed the coversoil and vegetation, or some other activity."

The next stop was the east slope of the East RDS which faces Interstate 15. Like much of the south end of the complex, vegetation is looking good across this area (Photos 3 and 4). There are a few areas of rilling and erosion on the slopes that do not appear to be expanding, repair activities are not yet warranted. A variety of perennial species continue to establish across the slopes, following a reduction in some interim/pioneer species (e.g. sterile triticale). Previous inspections noted abundant knapweed in some areas near the primary access road down the East RDS slope, but control efforts appear to have reduced the extent of weeds. This access road has been damaged with recent storm runoff, preventing further travel by a light vehicle (Photo 5). **Monitoring should continue in the future to document the progression of vegetation and identify any maintenance work that may be needed for areas of erosion, poor soil quality, or other growth-limiting factors. Weed control and other vegetation and soil maintenance activities should continue across the East RDS when necessary. Repairs to the access road are recommended to limit further degradation and water infiltration into the waste rock below the road.**

Continental Pit and D East Highwall

MR observed areas of instability on the D East highwall in the Continental Pit during fall 2022. Revision 22-002 was approved on 10/26/2022 for additional disturbance and overburden removal to the east of the current extent of the highwall, to create a shallower slope on the rock face and limit future instability (Photo 6). Vegetation removal and soil salvage has occurred to the east of the highwall as part of constructing an access ramp and this material is stockpiled in other locations along the East RDS. No changes were made to the current provisions in the Operating Plan about blasting within the Continental Pit, which state:

> "All production blasts in the Continental Pit comply with ARM 17.24.157, 17.24.158, and 17.24.159 *[Coal Rules]* and permit conditions established in 2013 that no blasting would occur within 1,000 feet of the Montana Department of Transportation (MDT) I-15 right of way, unless there is prior approval from DEQ, in consultation with MDT."

MR began proactive communication and planning with DEQ and Dept. of Transportation in case blasting would be necessary less than 1,000 feet from the interstate right-of-way. Geotechnical investigations were conducted and a risk evaluation report was completed in mid-summer (Call & Nicholas, Inc.). MR has also been drilling modified blast patterns with smaller holes in the current pit to better understand how those changes might control impacts from future blasting for the highwall layback. **MR does not anticipate needing changes to the current disturbance**

boundary, but a permit revision will be submitted to modify the Operating Plan with additional details and procedures for blasting activity that might occur within proximity of Interstate-15. Any activities that may impact the nearby highway should be coordinated with MDT, but DEQ would like to be included for opportunities to collect seismic data during such events.

YDTI Embankments and Tailings Management

Non-ore rock is being used as construction material to expand the capacity of the Yankee Doodle Tailings Impoundment (YDTI) by raising the embankment crests to 6,450 feet (Amendment 010). The primary haul route now follows along the ramp constructed on the N-S Embankment, rock placement is occurring on top of the former leach pads adjacent to this embankment slope. The tailings surface was accessed near the central portion of the E-W Embankment. A wide beach area is important to separate the tailings pond from the embankments, thus contributing to the safety and stability of the facility. There are now 28 tailings discharge points around the facility, which allow greater flexibility for selectively applying tailings slurry in areas that might become dry and prone to blowing dust, and to control the development of the beach and pond areas (Photo 7). In addition to site specific weather forecasting, there is a dedicated crew for tailings monitoring and dust management. The placement of magnesium chloride storage tanks and bladders positioned around YDTI allow for more rapid filling and deployment of the tracked vehicles used for dust suppression. MR reported that the wet spring and summer months were helpful for dust control efforts and the necessary volume of magnesium chloride to date (~250,000 gallons) is much less than what was used in 2022 (1.5 million gallons).

Along the northwest part of the permit area, contractors for Butte-Silver Bow have finished relocating a pipeline that conveys water from Moulton Reservoir to the municipal water treatment plant to the north of Walkerville. Soil salvage is occurring along the northwest portion of YDTI, at the north end of the West Embankment (Photo 8). Based on project scheduling and material availability, the downstream (outer) slope of the West Embankment is the next area that will undergo concurrent reclamation. **The salvaged soil will be hauled directly to the embankment slope and MR may propose to conduct test plots to optimize methods for growth media placement and revegetation. This soil material currently supports vegetation consistent with undisturbed areas and it is unlikely to need the degree of characterization required for some other reclamation material at the site. The testing regime for coversoil should be implemented for this material during placement (see Reclamation Plan, 2023), rather than the details specified for Central Zone alluvium. Testing would indicate whether any soil amendments may be necessary to support revegetation (e.g. lime, compost, fertilizer).**

YDTI Water Management and Superfund Overlap

The YDTI pond elevation is influenced by surface water inflows, seasonal precipitation and evaporation, tailings slurry deposition, and the rate of YDTI water being treated at the Polishing Plant and discharged offsite as part of the Pilot Project for the Butte Mine Flooding Operable Unit (BMFOU) remedy. Through the end of Q2-2023, over 7.7 billion gallons have been treated and discharged since September 2019. While on the tailings beach surface, DEQ noted that the pond appeared smaller and more distant than observed in previous inspections. MR explained that although Pilot Project discharge has been temporarily suspended since late July due to increased temperatures in the receiving stream, the pond elevation dropped approximately 1.5 feet through July. It seems like the transition to 12-inch tailings discharge lines has increased the potential for evaporation, allowing further reduction of the pond volume and consistent beach development.

The annual bathymetric survey was completed earlier in the summer, with a measured pond volume around 17,000 acre-feet. This is a notable reduction from the maximum volume that was observed prior to initiation of the Pilot Project (>34,400 acre-ft). The current water management strategies will continue for the foreseeable future to

achieve the operational pond volume approved through Amendment 010 (15,000 acre-ft). This also aligns with plans proposed under the BMFOU Pilot Project to demonstrate the management of the tailings pond and evaluate various treatment scenarios. **Any proposed changes to the closure/post-closure water management strategies for the YDTI that are evaluated and approved by BMFOU parties should also be incorporated into the operating permit, likely as part of the next major amendment.**

While leaving the YDTI, the area known as the Northwest Dumps was observed. This area was removed from the operating permit approximately 20 years ago, as it was incorporated into a historic preservation area within the BMFOU and Butte Priority Soils Operable Unit (BPSOU) boundaries. MR recently acquired this land from Atlantic Richfield, anticipating that this location may be needed for some rock placement and expansion of the YDTI in the future. **The operating permit boundary and reclamation bond must be modified prior to conducting additional disturbance activities in this area.**

Horseshoe Bend (HSB), Seep 10, and Water Treatment

The inspection continued to the HSB overlook near Tailings Booster Station #3. DEQ approved Minor Amendment 011 on 7/14/2022 for the construction of the HSB RDS at the southern toe of YDTI. The RDS design includes a foundation drainage layer and engineered rock drains to capture and convey seepage flows from underneath the RDS, through a conveyance channel, and then to the management and treatment systems required under the BMFOU remedy. Construction of the foundation drainage layer and rock drains is ongoing, while the old precipitation plant is being decommissioned (Photo 9). The new precipitation plant near the HSB Water Treatment Plant (MR22-001) is still under construction and not yet operational (Photo 10). As a component of Minor Amendment 011, the seepage that emanates on a bench above HSB ("Seep 10") will eventually be diverted around the future HSB RDS. Instead of flowing directly to the HSB area, seepage will be routed into a lined channel and pipe system that is currently being constructed (Photos 11 and 12). This configuration may also improve the accuracy of monitoring flow rates from Seep 10.

MR is currently coordinating with a research group through the University of West Virginia to evaluate the potential to recover rare earth elements (REE) and other critical metals (CM) from the sludge produced by water treatment at the HSB plant being operated under the BMFOU remedy. MR anticipates that pilot scale testing will begin in late September 2023, which would involve the placement of "geotubes" (permeable material tubes) in a flat area adjacent to the current plant facility (Photo 13). Following a two-stage pH adjustment, the resulting sludge would be dewatered within the geotubes until the moisture content is ~40%, and then shipped off-site for further analysis and processing to separate the elements of interest. **Similar to the recovery of precipitated copper, the extraction of REE/CM from water treatment sludge would constitute the production of "minerals in commercial quantities for sale, beneficiation, refining, or other processing or disposition" (definition of mining, 82-4-301, MCA). DEQ requests updates on the timeline for this project and it may be appropriate to schedule a focused site tour for others in the department. DEQ would like to further discuss potential permit implications for such a recovery system, as the operation, reclamation, and financial assurance for the system may also be addressed through BMFOU water treatment agreements.**

Other Topics

- The Natural Resource Damage Program (NRDP) has been overseeing the excavation of historic waste from the Parrot Tailings site (southwest of MR) and relocation to the mine permit area for disposal. Revision 23-002 allowed an increase in the total volume of waste material hauled to the mine, up to approximately 575,000 cubic yards. NRDP has since completed this phase of the project, additional hauling of material is not expected at this time.

- Plans continue to be developed for the disposal of material to be removed under BPSOU activities. Although initial concepts included placement of waste along a Berkeley Pit access ramp, it now seems that the preferred location may be near the Kelley Mine yard on Atlantic Richfield's property. Material may be hauled along access roads cutting through the mine permit area, but no changes to permit conditions are expected.
- MR has been coordinating with Butte-Silver Bow and Montana Tech to applying for grants related to installing solar energy systems on previously mined lands. A few potential locations have been identified around the permit area for such activity, although the grant award announcements and any subsequent decisions have not yet been made. **Depending on the outcome for grants, MR and DEQ should discuss how the installation, operation, and ultimate removal of the solar energy system might occur with regard to the current Operations and Reclamation Plans and associated bond.**

The inspection concluded around 4:00 PM, with a wrap-up of the concepts that were discussed during the inspection. There were no issues identified that need immediate attention. DEQ expects additional information and coordination for the potential permitting actions that are discussed above in bold.

Signature of Inspector(s):		Date:	9/18/2023
Signature of Reviewer:		Date:	9/18/2023
Copy reports to:	Permittee (c/o Mark Thompson, Montana Resources); eFile 00030.3		

Photo 1- Revegetation on the southern slopes of the East RDS is looking good. **Photo 2**- A "hot spot" on the Hillcrest RDS shows less vegetation than surrounding slopes with more recent reclamation, although the soil is not completely bare. Sampling and monitoring indicate some test plot areas received atypical reclamation in the 1990s, rather than hot spots being a failure of current reclamation practices.

Photos 3 and 4- The eastern slopes of the East RDS are showing good vegetation establishment, with few erosional features observed. Weed control has reduced knapweed that was previously observed in this area, but spraying should continue as needed.

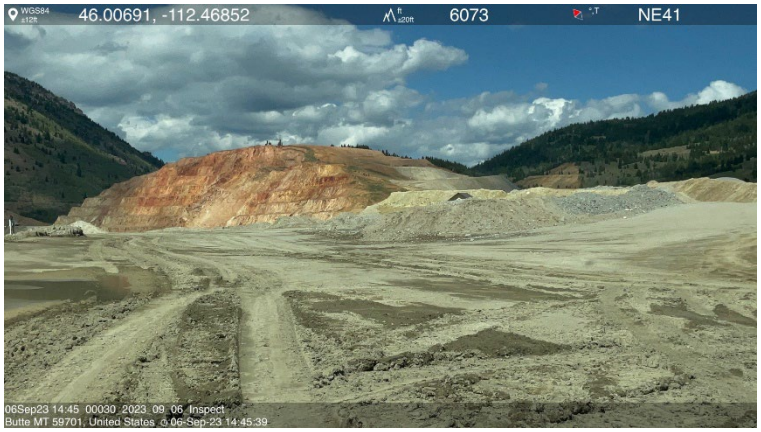

Photo 5- The primary access road on the East RDS has been eroded by recent storm events, preventing light vehicle traffic. When practicable, this feature should be repaired to restore access. **Photo 6-** A failure occurred in the central portion of the D East highwall in 2022, vegetation removal and soil salvage has occurred to the east (right) of the highwall as part of constructing an access ramp for the layback.

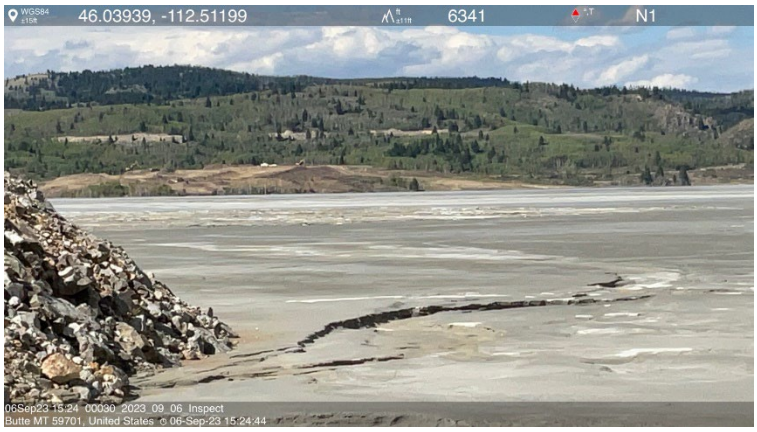

Photo 7- Additional tailings discharge lines allow greater flexibility for selectively applying tailings slurry in areas that might become dry and prone to blowing dust, and to control the uniform development of the beach and pond areas. The internal face of the embankment has been covered with alluvium and graded. **Photo 8-** As seen across the extent of the tailings beach, soil salvage is occurring along the north end of the West Embankment.

Photo 9- The HSB overlook near Tailings Booster Station #3, major features from the report are outlined and labeled.

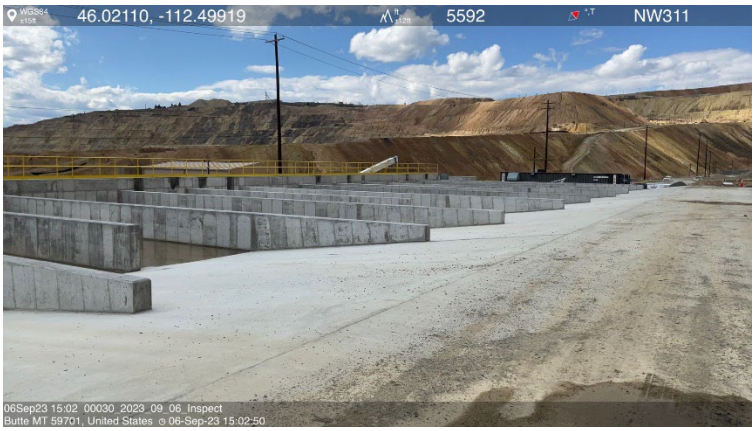

Photo 10- A new precipitation plant is being constructed to the south of HSB, near the HSB Water Treatment Plant. This facility was approved as revision MR 22-001. **Photo 11-** A lined channel and pipeline system is being constructed to divert Seep 10 flows around the future HSB RDS area.

Photo 12- A lined channel and pipeline system is being constructed to divert Seep 10 flows around the future HSB RDS area. **Photo 13**- Pilot scale testing for REE/CM recovery will begin later in September 2023, which would involve the placement of "geotubes" on a gravel pad area that is adjacent to the current plant facility.