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

Operator: Montana Resources, LLC							Inspection Date: June 20, 2023				
Operating Permit #: 00030			Project: Montana Resources-Continental Mine Complex				County: Silver Bow				
Nearest City or Town(s): Butte											
DEQ Staff: Christine Abelmann, Derrek Schultz, Garrett Smith							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: Partly cloudy, high temp 55°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 is being salvaged and stockpiled near D East as part of highwall layback. Vegetation continues to establish on Moulton Ridge/west side stockpiles*
	×							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: *Reclaimed surfaces to be further assessed as vegetation is established. Maintenance and repairs would follow Erosion Control Plan.*
	×							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: *Continuing success for the Berkeley Pit bird mitigation program during 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? D*evelopment of "E East" highwall layback and updated blasting plan may involve a revision to the permit. Increase the volume of waste material being hauled to the mine from Parrot Tailings*

								removal. Future amendment (2024/2025) to raise TSF embankments and align storage capacity 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 9:00 AM. 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.**

Continental Pit and D East Highwall

MR observed areas of instability on the D East highwall in the Continental Pit during fall 2022. Revision MR22-002 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. 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. As predicted by the pit monitoring system, a failure occurred in the central portion of the D East highwall in early November 2022 (Photos 1 and 2). Although an estimated 1 million tons of rock were displaced along a series of benches, there were no employee injuries or damage to equipment. 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 Dump Complex (Photo 3). Mining continues in other portions of the Continental Pit, with little influence from the failure area.

MR anticipates that blasting within 1,000 feet of the interstate will be necessary in the future, so geotechnical investigations are ongoing, and a risk evaluation report will be available later this summer. MR has also been drilling modified patterns with smaller holes in the current pit to better understand how those changes might better control disturbance with future blasting for the highwall layback. **Any activities that may impact Interstate-15 should be coordinated with MDT, but DEQ would like to be included for opportunities to collect seismic data. MR is evaluating whether any additional disturbance boundary adjustment may be necessary as part of the layback in this area now called "E East," which would be addressed as a permit revision. The language about blasting in the Operating Plan may also need to be modified to reflect updated strategies.**

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). Very few portions of the YDTI have not been constructed to this elevation. 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 (Photos 4 and 5). In late April 2023, small transverse cracks were observed along the Crest in areas of recent rock placement. The engineer of record was notified and focused monitoring was implemented, consistent with the requirements of the TOMS Manual for Level 1 events. Monitoring and trenching investigations demonstrated that the cracks were shallow and limited in extent. Mapping of recent rock fill sequences confirmed that the cracks

formed along the orientation of placement margins as the material settles and compacts. These surficial features do not indicate larger-scale movement in the embankment. The independent review panel (IRP) also evaluated these areas and the monitoring data during on-site meetings in June 2023, and agreed with the proposed strategy to fill and repair these cracks. Monitoring will continue in the future although additional settlement is not anticipated.

An overlook for the tailing storage facility was reached by the barge access road on the eastern margin, along the path of the return water lines (Photo 6). 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.

With a few small exceptions, the West Embankment crest has been constructed to an elevation of 6,450 feet and tailings discharge along this side of YDTI continues to develop a wide beach between the West Embankment and the supernatant pond. Along the northwest part of the permit area, contractors for Butte-Silver Bow are still in the process of relocating a pipeline that conveys water from Moulton Reservoir to the municipal water treatment plant to the north of Walkerville. This construction activity was anticipated and included in the previous YDTI designs. **Based on project scheduling and material availability, the downstream (outer) slope of the West Embankment is the next area that should undergo concurrent reclamation as approved in Amendment 010.**

YDTI Water Management and Superfund Overlap

Some details were obtained from the "Q4 2022- YDTI Quarterly Water Data Summary, Knight Piésold; and the 2022 Baseline and Operational Water Resources Monitoring Report, Hydrometrics). At the end of 2022, the elevation of the YDTI supernatant pond was 6,357.53 feet. The supernatant pond elevation decreased approximately 0.7 ft in 2022, which is similar to the pond elevation change observed in 2021. The objectives for hydrodynamic containment approved in Amendment 010 were based on the lowest baseline elevation identified for groundwater in the West Ridge (6,380 feet), although that groundwater elevation has risen in recent years. Monitoring well MW12-16, located in an area referred to as the groundwater potentiometric low where West Ridge groundwater elevations are the lowest, showed a decline of 3.22 feet through 2022 (6,394.60 ft total elevation). **Future permit modifications for the YDTI should consider these changing groundwater elevations and assess the objectives for hydrodynamic containment in terms of water elevations near/within the West Embankment Drain (WED).**

The rate of pond elevation change is influenced by seasonal precipitation, 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 BMFOU remedy. Approximately 7.6 billion gallons have been treated and discharged since September 2019, at an average rate of 5.6 million gallons per day. The annual bathymetric survey will be completed in the weeks ahead, but MR estimates that the pond volume is likely near 20,000 acre-ft. This is a notable reduction from the maximum volume that was previously observed (>34,000 acre-ft) prior to initiation of the Pilot Project. The current water management strategy will continue for the foreseeable future to achieve the operating pond volume approved through Amendment 010 (approx. 15,000 acre-ft). **Future permit modifications for the YDTI should include updated models for pond drawdown and address different potential scenarios for water management, incorporating the observations made at the facility with and without the influences from the BMFOU Pilot Project. 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.

At the south end of the West Embankment, the WED continues to discharge captured seepage into a lined extraction pond and the flow is pumped back into the YDTI (Photo 8). From November 2019 to January 2022, the average weekly pumping rate for the dewatering system ranged from 250 gpm to 440 gpm. Since February 2022, the weekly averages have increased and range between 600 to 1,000 gpm. The elevated flows are attributed to the discharge of tailings near to the West Embankment, where the tailings have now overtopped the historical tailings pipeline corridor for the 6,400 ft lift of the embankment. The crest of the pipeline corridor acts as a preferential pathway for tailings water to infiltrate into the WED. MR and Knight Piésold anticipate the WED seepage and pumping rates will slowly decrease as the tailings beach thickness increases above the pipeline corridor bench. MR monitors the daily pumping records and conducts regular visual inspection of the tailings beach adjacent to the West Embankment. No signs of tailings slurry flowing directly into the embankment or other adverse conditions have been observed.

The 2022 average field-measured pH of the extraction pond inflow was 3.34, and the concentrations of some metals (Al, Cd, Cu, Fe, Pb, Mn, U, Zn) are enriched in the extraction pond as compared to the tailings pond. These metals and other constituents (like elevated Mg) are likely sourced from infiltrating water encountering rock used in the embankment. Ongoing monitoring of domestic wells on the West Ridge do not indicate water level or water chemistry influences from the tailings pond or the WED. **Water quantity and quality monitoring in the WED Extraction Pond should continue as specified in the Operating Plan. These results should be compared to the modeling assumptions that were included in Amendment 010, and incorporated into the development of water management plans associated with future YDTI expansion.**

While leaving the YDTI, the area known as the Northwest Dumps was observed (Photos 9 and 10). 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). MR is currently acquiring this land from Atlantic Richfield, anticipating that this location may be needed for rock placement and expansion of the YDTI in the future. **The operating permit must be modified to incorporate any disturbance and expansion of the permit boundary in this area prior to any activity occurring.**

Horseshoe Bend (HSB) and Concentrator

The inspection continued to the HSB overlook near Tailings Booster Station #3, before going through the HSB area (Photo 11). DEQ approved Minor Amendment 011 on 7/14/2022 for the construction of a rock disposal site (RDS) within the HSB area, at the southern toe of YDTI. The RDS would include 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 Superfund remedy. The foundation drainage layer has been placed in some areas and based on the rapid infiltration of seepage that has been observed, it seems likely that much of the seepage that emanates in HSB would be conveyed within this layer, beneath the layered rock drains. Portions of the rock drains have also been constructed and that work is ongoing, using 3 different size fractions of Pipestone rock, similar in design and construction to the WED (Photos 12 and 13).

The average flow measured in the HSB Weir through the end of 2022 was approximately 3,200 gpm, which is comparable to the average flows observed since the recirculation of leach pad solutions was stopped in July 2021. A new precipitation plant continues to be constructed to the south of HSB, near the HSB Water Treatment Plant (Photos 14 and 15), as approved through revision MR22-001 on 10/26/2022. MR reported that the facility would likely be operational later in 2023, although some aspects of construction have been delayed. The historical copper

precipitation plant has been undergoing demolition in preparation for the RDS construction, though some portions of the plant are still operational at decreased capacity (Photo 16). Copper is being recovered from water pumped out of the Berkeley Pit and the HSB seepage.

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 requirements. Pilot scale testing may begin later in 2023, which would involve the placement of "geotubes" (permeable material tubes) in a flat area adjacent to the current plant facility (Photo 17). 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 would like to further discuss potential permit implications for such a recovery system, as the operation, reclamation, and financial assurance for the system may be addressed through BMFOU water treatment agreements. DEQ requests updates on the timeline for this project before implementation and it may be appropriate to schedule a focused site tour for others in the department.**

Parrot Tailings Waste Removal

The Natural Resource Damage Program (NRDP) is overseeing the excavation and removal of historic waste from the Parrot Tailings site (southwest of MR) and moving it into the permit area for disposal. Phase IIB was initiated earlier in 2021, with the removal of the Butte-Silver Bow (BSB) County shops that were east of the Civic Center. Permit revision MR21-003 was approved on 6/15/2021, increasing the total volume of waste material hauled to MR from 350,000 cubic yards to 550,000 cubic yards. NRDP has removed/reclaimed the separate haul route that was developed for this project, however correspondence on 6/21/2023 indicates that waste hauling may not yet be complete. **If additional Parrot Tailings or related waste material would be hauled to MR in excess of 550,00 cubic yards, a revision would be necessary to increase the allowable volume going to the Pittsmont Dump for disposal.**

<u>Exploration Disturbance</u>

Most of the disturbances associated with Exploration License #00711 have been reclaimed and bond released, or incorporated into the Operating Permit. One exception is a small access road to the north of YDTI. MR indicated that the road is needed to access monitoring locations and this area would likely be incorporated into the Operating Permit in a future amendment to expand the YDTI. **DEQ is currently reviewing bond amounts held for existing exploration projects and the requirements to complete reclamation within two years of inactivity. As described in ARM 17.24.108, reclamation may be deferred under certain conditions, including the incorporation of exploration disturbance into an Operating Plan for a permit. Please provide correspondence to Macy Livesay within 90 days of issuance of this report, with an update about the status of the existing exploration disturbance and the timelines for reclamation or incorporation into the operating permit. This will provide a clear records trail for Exploration License #00711.**

<u>West Ridge Stockpiles and Vegetation</u>

After the on-site inspection concluded, DEQ traveled along the Moulton Reservoir Road to evaluate the establishment of vegetation on stockpiles, which also serve as visual barriers along the public access road (Photos 18 through 20). The stockpile topography and surrounding native vegetation generally provide an effective barrier from most vantage points along the road. In most places, the establishment of grass and forb species on the piles is looking good and only minor erosion has occurred on the stockpile surface. A few of the aspen trees that were

planted on top of the piles have survived, although most of them have not. There may be sufficient tree growth along the undisturbed margins of the piles to promote encroachment and further tree growth in the future. **The West Ridge stockpiles should continue to be monitored and any maintenance of soil surfaces and vegetation (e.g. supplemental seeding, planting, weed control) should be completed as needed.**

The on- site inspection concluded around 12:45 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:	6/27/2023 6/28/2023 6/28/2023
Signature of Reviewer:		Date:	6/30/2023
Copy reports to:	Permittee (c/o Mark Thompson, Montana Resources); eFile 00030.3		

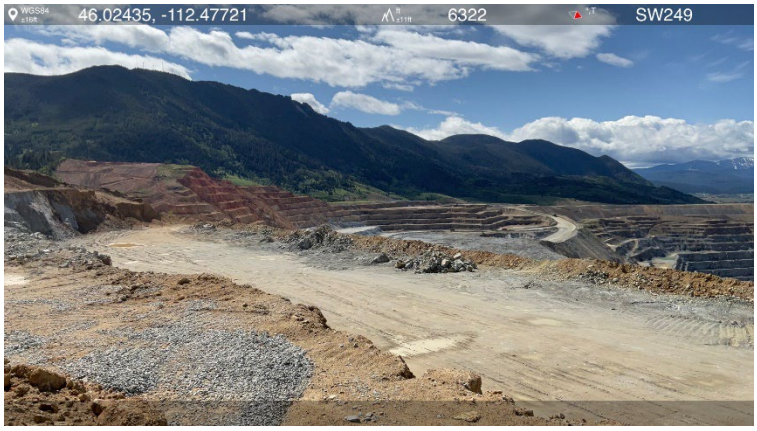


Photo 1- A failure occurred in the central portion of the D East highwall on November 1, 2022, which is a relatively small area in the Continental Pit (left side of photo). **Photo 2**- Vegetation removal and soil salvage has occurred to the east of the highwall as part of constructing an access ramp.

Photo 3- The backside of the highwall and soil salvage area in Photo 2 (from Interstate 15, northbound). **Photo 4-** Haul trucks moving non-ore rock, only small portions of the YDTI embankment crests have not been constructed to the 6,450 ft elevation.

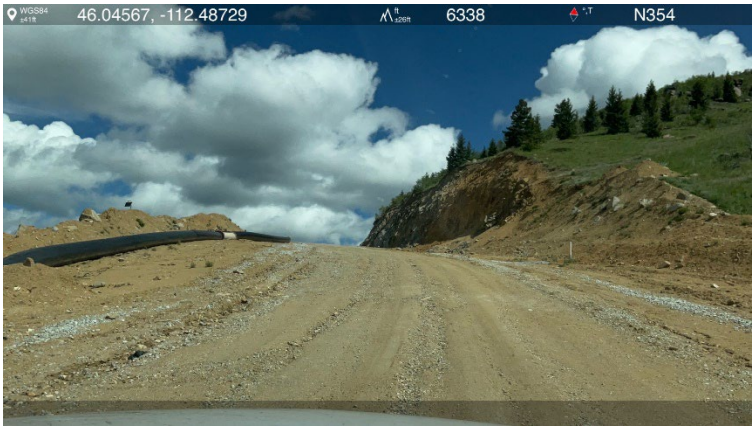


Photo 5- The primary haul route now follows along the ramp constructed on the N-S Embankment. **Photo 6-** The return water lines are functioning along the new barge access road (east side of YDTI), the former road will be decommissioned as the tailings and pond elevations rise.

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.

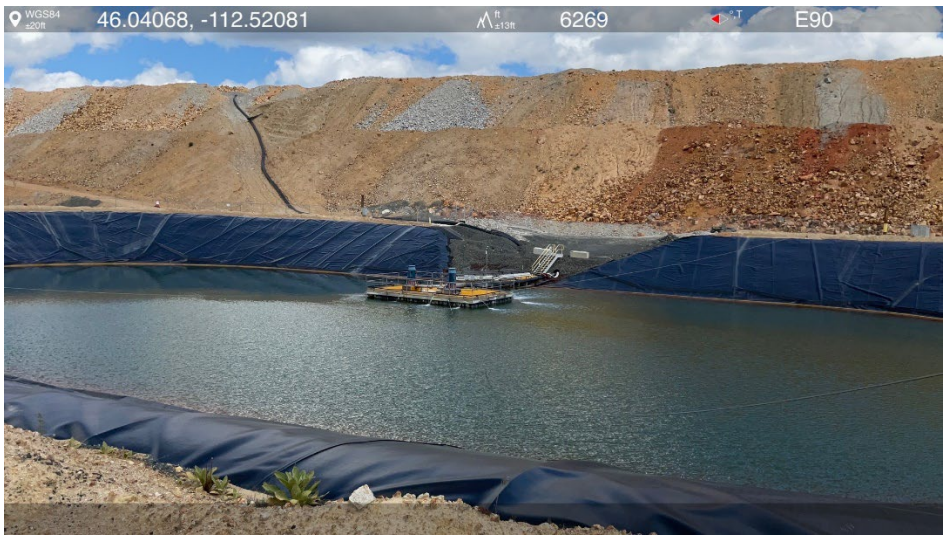
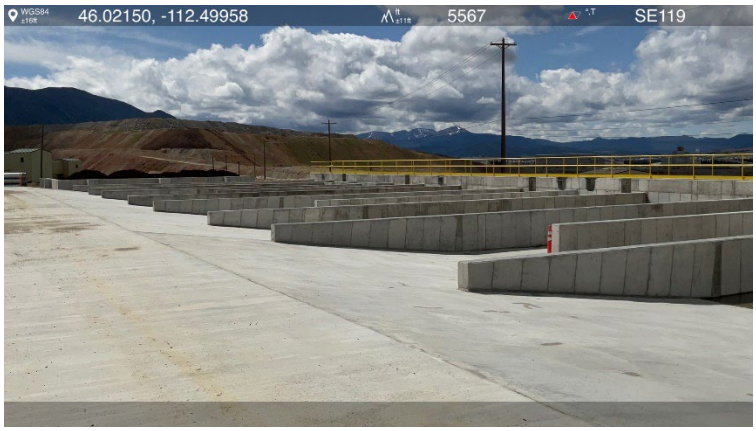


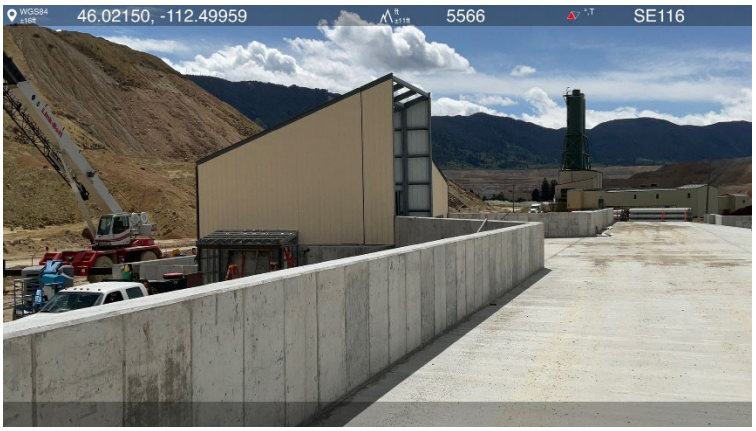
Photo 8- Compost is being stockpiled along a portion of the West Embankment, to be mixed with soil during concurrent reclamation.

Photos 9 and 10- Looking south/southwest from the WED Extraction Pond area. The disturbed areas and flat waste rock are called the Northwest Dumps. MR is acquiring this land from Atlantic Richfield.

Photo 11- The HSB overlook near Tailings Booster Station #3, major features from the report are outlined and labeled.

Photo 12- The 3-layer rock drains are being constructed on top of the foundation drainage layer, some portions have not yet been constructed. **Photo 13**- The foundation drainage layer continues to be constructed prior to placement of Pipestone drain rock.





Photos 14 and 15- 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.

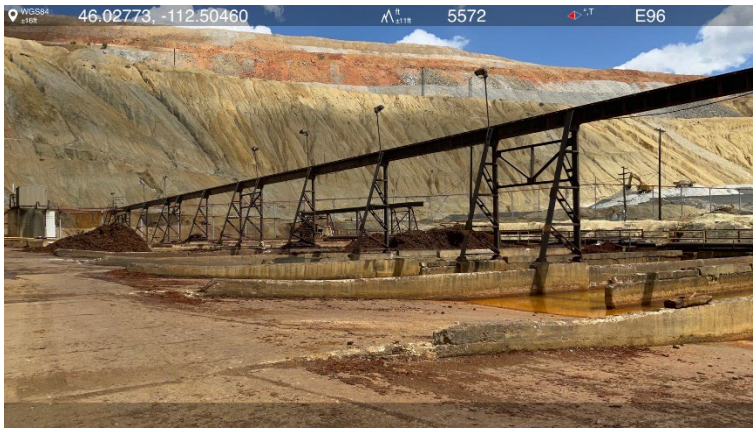


Photo 16- The historical copper precipitation plant has been undergoing demolition in preparation for the RDS construction, though some portions of the plant are still operational at decreased capacity. **Photo 17-** Pilot scale testing for REE/CM recovery may begin later in 2023, which would involve the placement of "geotubes" in a flat area adjacent to the current plant facility (inside fence, other side of road berm).

Photos 18, 19, 20- Vegetated soil stockpiles along the Moulton Reservoir Road. The stockpile topography and surrounding native vegetation generally provide an effective visual barrier from most vantage points along the road. In most places, the establishment of grass and forb species on the piles is looking good and only minor erosion has occurred on the stockpile surface. A few of the aspen trees that were planted on top of the piles have survived, although most of them have not.