



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

4601 N Monroe Street • Spokane, Washington 99205-1295 • (509)329-3400

October 27, 2015

Mr. Mark Ioli
Vice President and General Manager
Echo Bay Minerals Company
363 Fish Hatchery Road
Republic, WA 99166

RE: Echo Bay Minerals Company - State Waste Discharge (SWD) Permit No. ST0008033
Site Inspection - October 8, 2015

Dear Mr. Ioli:

Enclosed is the inspection report from my site visit on October 8, 2015. This inspection fulfilled a quarterly inspection requirement of the Metals, Mining, and Milling Operations Act (Chapter 78.56 RCW).

Based on your SWD Permit, the leakage rate criteria evaluation submitted via email on September 1, 2015, is acceptable. We plan to modify your permit to include the proposed action leakage rates (<5, 5-25, and >25 gpm) and corresponding response actions. Because the site's discharges have not changed in either volume or character, the modification will not require a public notice. You will have an opportunity to comment on the proposed changes prior to any modification.

Appendix A of your SWD Permit includes a list of pollutants with analytical methods, detection limits and quantitation levels. For permit monitoring, you must use the specified analytical methods unless:

- Another permit condition specifies other methods, detection levels, or quantitation levels.
- The method used produces measurable results in the sample and EPA has listed it as an EPA-approved method in 40 CFR Part 136.

It appears you may be using EPA Method 200.7 to monitor selected metals (cadmium, copper, nickel, and others). Appendix A requires the use of EPA method 200.8 which achieves lower detection and quantitation levels. You should review Appendix A, and ensure you are using the required analytical methods for environmental testing for the Kettle River Operations.

I wish to thank your staff for their assistance during the inspection. Please review the inspection report and photolog. If you have any questions, please feel free to contact me at (509) 329-3500 or phal461@ecy.wa.gov.

Sincerely,

Pat Hallinan
Water Quality Section

Enclosures

cc: Gina Myers, Echo Bay Minerals Company
Shannon Daugherty, Echo Bay Minerals Company
Kyle Hawkins, Echo Bay Minerals Company



WASHINGTON STATE DEPARTMENT OF ECOLOGY WASTEWATER TREATMENT FACILITY SITE VISIT REPORT



Name of Entity	Echo Bay Minerals Company			
Permit No.:	ST0008033	Date of Visit:	10/8/2015	
		Entry Time:	9:35 am	Exit Time: ~3:45 pm
City:	Republic	DOE Rep. #1:	Hallinan	
County:	Ferry	DOE Rep. #2:		
Person Contacted:	Shannon Daugherty	Phone No.:	(509) 775-8538	
Title:	Environmental Engineer			
Responsible Official:	Gina Myers	Phone No.:	(509) 775-3157	
Title:	Environmental Manager			
Facility Type:	State To Ground	Discharges To:	Lined Tailings Impoundment	
Type of Visit:	Compliance Inspection-Without Sampling			

Operation Status	S = Satisfactory	U = Unsatisfactory	M = Marginal	NA = Non Applicable	N = Not Evaluated
Permit on Site:	N	Laboratory:	N	Self Monitoring Schedule:	S
Records/Reports:	S	Effluent/Receiving Water:	S	Operations & Maintenance:	S
Facility Site Review:	S	Pretreatment	NA	Sludge Disposal:	NA
Flow Measurement:	N	Compliance Schedule:	NA	Other:	

Announced ? Yes ☒ No ☐ On ERO Inspection schedule ? Yes ☒ No ☐

Inspectors Comments:

Karen Noonan, Special Use & Mineral Program Manager & Administrator and Mark Gingrich, Zone Minerals Administrator for the US Forest Service were also present during the inspection. Karen works for the Colville National Forest in their Colville office while Mark works out of the Wenatchee Office of the Okanogan-Wenatchee National Forest.

Permit: Echo Bay Minerals Company (Echo Bay) operates gold and silver mining and milling operations, known as the Kettle River Operations, in northeast Washington. Ecology recently reissued the State Waste Discharge Permit (ST0008033) to Echo Bay for the active Key Mill. Facilities at the Key Mill site includes a mill for gold and silver recovery (using cyanide and carbon-in-leach process), cyanide destruction circuit, tailings disposal and reclaim water pond, shop, and administration buildings. Echo Bay obtains mined ore from either the Buckhorn Mine located near Chesaw or from small custom ore batches.

Facility Site Review: Met at the Key Mill, the former Key and Lamefoot mine sites prior to a site inspection. At the mill site, Echo Bay will trial a reverse osmosis (RO) system to treatment tailings pond reclaim water. If the RO treatment produces a permeate suitable for discharge, Echo Bay may pursue this alternative to reduce the time necessary for the reclamation and closure of the tailings pond.

At the Key Mine, toured the Key Pit and Key water treatment system with the Forest Service personnel. The Forest Service holds a reclamation bond for the disturbance that occurred on Forest Service lands which include portions of the haul road and Key Pit area. At mine closure, Echo Bay designed and constructed a limestone berm at the pit outlet, and a limestone filled channel to divert any pit overflow to an infiltration area east of the pit, (see attached photos). Since closure, the pond filled with water and there has been no evidence of outflows from the pit. Echo Bay has been routinely monitoring pit lake water quality since 1995. Since 2007, the pit water pH has ranged from 7.84 to 8.65 s.u. with metals concentrations below water quality aquatic life criteria. TDS has ranged from 246 to 722 mg/L with calcium (54.9 to 144 mg/L) and sulfate (130 to 422 mg/L) the dominate ions.

At the Key water treatment system, located in the southern portion of the mine site, Echo Bay was in the process of replacing river rock media in biotreatment tank #2 (with wood chips) and refurbishing one of the four infiltration areas for treated groundwater (see attached photos).

-continued on next page-

Inspectors Signature: 10/26/2015

The Key water treatment system consists of the collection of groundwater immediately downgradient of the former waste rock dump, then treatment in above ground reactor tanks for biological reduction of nitrate and sulfate. Echo Bay infiltrates the treated water in a subsurface infiltration system.

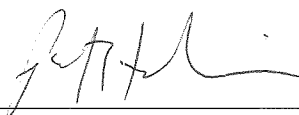
Next, I visited the Lamfoot mine site with Echo Bay personnel. We reviewed the locations of ground and surface water monitoring sites, including monitoring well LF-12 located adjacent to Wetland #4 and the concrete vaulted livestock well; and monitoring wells MSWOB2, LF-5, LF-1, Wolf Camp Spring, LF-2, artesian LF-4, LF-13, LF-14, LF-Tunnel-Well, all located on the eastern side of Wolf Camp Road Drainage. Three monitoring wells are located on the west side of Wolf Camp Road drainage which we did not visit: LF-10, LF-Up-Work-Well and LF-11.

Wetland #4 lies near the former waste rock storage area for the mine site. To mitigate potential impacts from leaching of contaminants from the waste rock, Echo Bay had previously removed waste rock material from the storage area and along the access road adjacent to Wetland #4 and well LF-12. The fill material for the access road bed appeared to contain rounded material, with only minor amounts of angular rocks toward the north end of the road, closest to the former waste rock disposal area.

Records/Reports: The Permit required an engineering report for setting action leakage rate criteria for the leakage collection and recovery system (LCRS) for the double lined portions of the tailings impoundment and water reclaim pond. Echo Bay submitted an engineering evaluation and a request for action leakage rates of <5, 5-25, and >25 gpm for the LCRS systems. Ecology has reviewed the proposed leakage rates and they are acceptable. Ecology plans to modify the SWD Permit to incorporate these action leakage rates.

For the Key pit water quality monitoring, reported levels for cadmium are typically <2 ug/L. The water quality criteria for cadmium may be below this reporting level, depending on water hardness. The reporting levels for EPA method 200.8 (detection level of 0.05 and quantitation level of 0.25 ug/L) are below the cadmium water quality criteria.

Inspectors Signature: _____



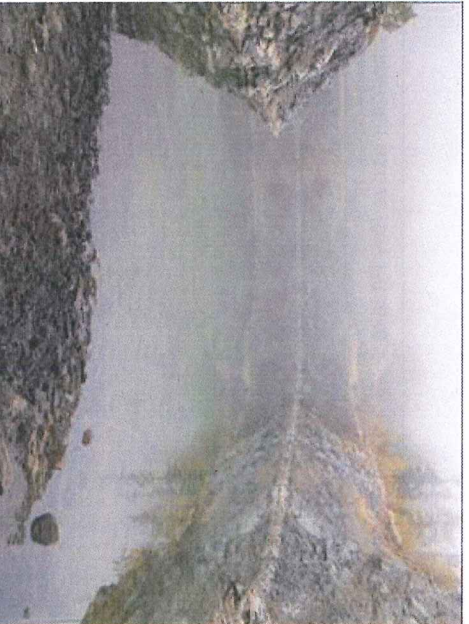
10/26/2015

Water Quality Photolog

Facility: Echo Bay Minerals Company

Location: Republic
Date Photos Taken: October 8, 2015

Permit No.: ST0008033
Photographer: Pat Hallinan



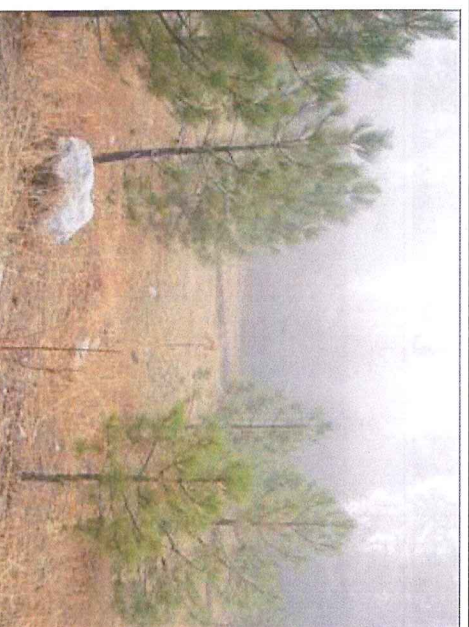
Key Pit at outlet berm.



Key Pit outlet channel.



Lower portion of Key Pit outlet channel.



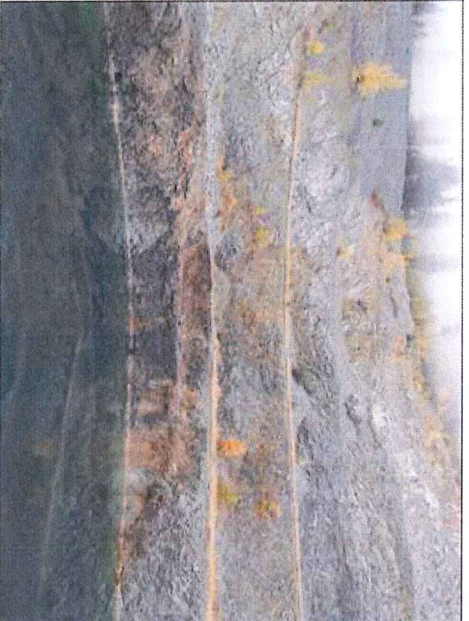
Infiltration area for Key Pit outlet channel.

Water Quality Photolog

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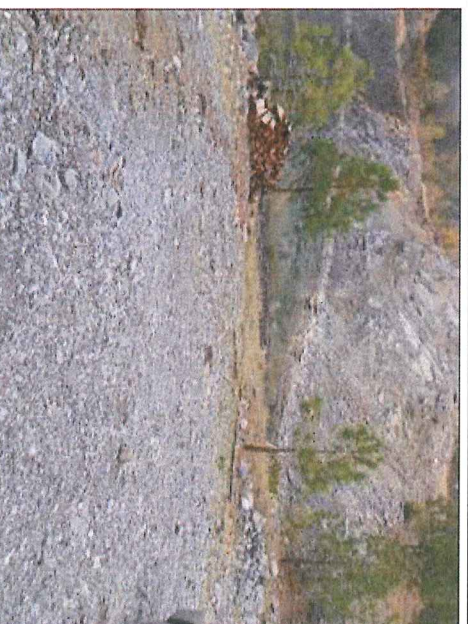
Key Pit.



Private dock on Key Pit lake.



Fish food dispenser above Key Pit lake.



Key Pit outlet berm.

Water Quality Photolog

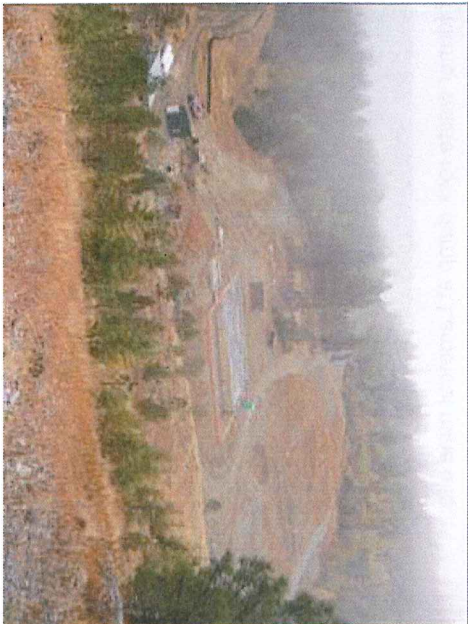
Facility: Echo Bay Minerals Company

Location: Republic

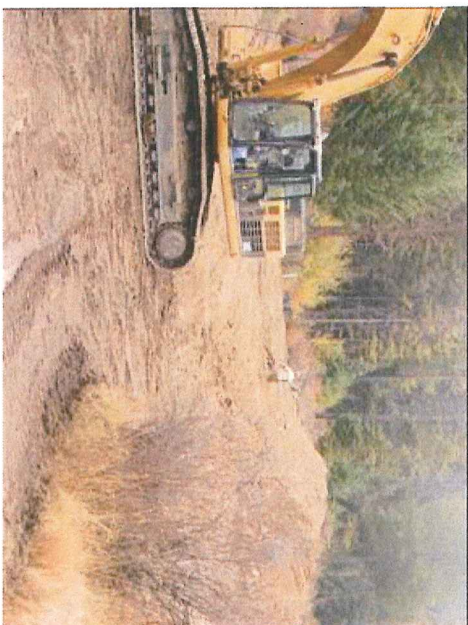
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Key Pits water treatment system. Echo Bay was in the process of changing media in one of the biotreatment system tanks and refurbishing an infiltration gallery at the site.



Earthwork at one of the four infiltration galleries at the Key Pits water treatment system. This gallery lies at the eastern portion of the site.



First cell of the eastern infiltration gallery.



Cleanout between cells 1 and 2 of the eastern gallery.

Water Quality Photolog

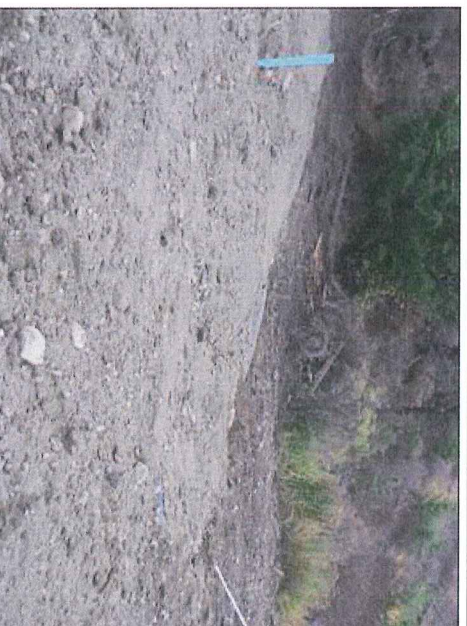
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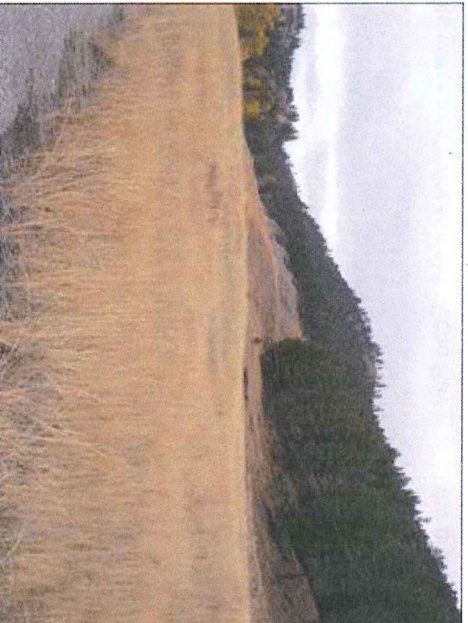
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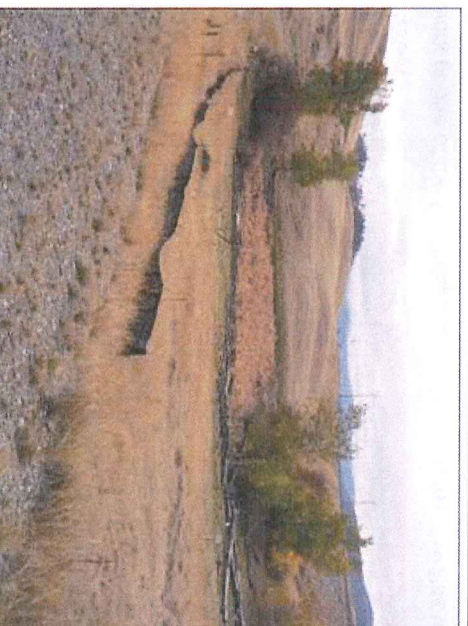
Water level observation port at cell 2 of the eastern gallery.



Downstream end of eastern infiltration gallery, cell 2. Echo Bay placed a membrane liner on the downstream edge to prevent any surface expression/exfiltration of treated groundwater.



Area of former waste rock dump at Lamefoot mine site.



Wetland #4 at Lamefoot mine site.

Water Quality Photolog

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Location: Republic
Date Photos Taken: October 8, 2015

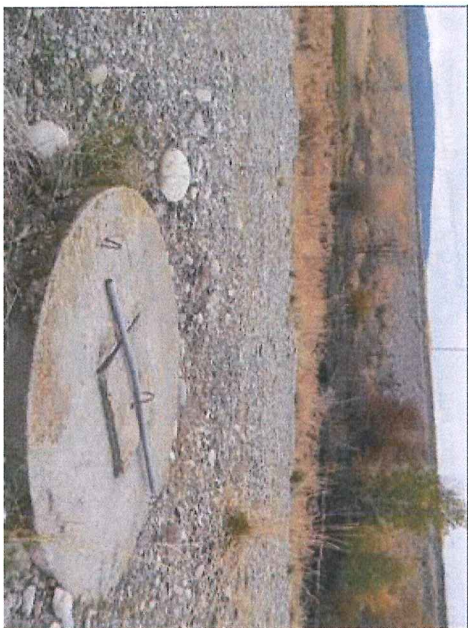
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Monitoring well LF-12 adjacent to Wetland #4 at Lamefoot mine site.



Livestock monitoring well adjacent to Wetland #4 at Lamefoot mine site.



Livestock monitoring well with Wetland #4 in background at Lamefoot mine site.



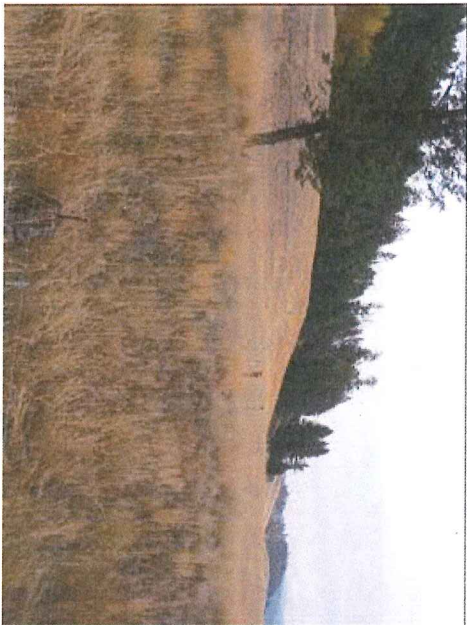
Area of former waste rock dump at Lamefoot mine site.

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Photographer: Pat Hallinan



Along Wolf Camp Road, monitoring well MSWOB2 at the Lamefoot mine site. Monitoring well LF-5 lies across the road at this location.



Monitoring well LF-1 at the Lamefoot mine site.



Monitoring point for Wolf Camp Spring at Lamefoot mine site.



Nested wells LF-1 and LF-4 at Lamefoot mine site. LF-4 is an artesian well.

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Steep slopes to the west of monitoring wells LF-2 and LF-4.



Steep slopes to the west of monitoring wells LF-2 and LF-4.



LF-4 (artesian) well and standpipe.



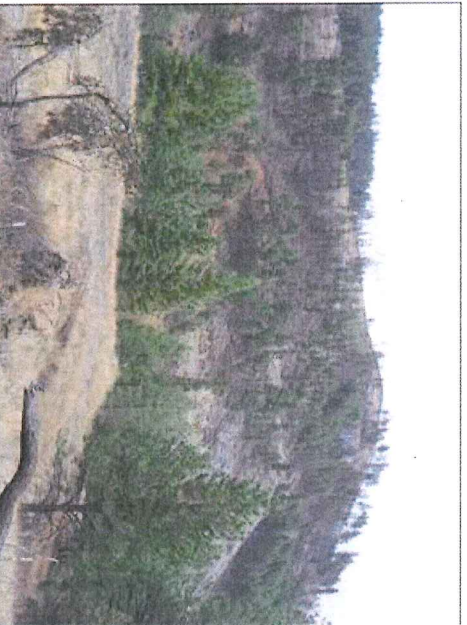
Monitoring well LF-14 at Lamfoot mine site.

Water Quality Photolog

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Location: Republic
Date Photos Taken: October 8, 2015

Permit No.: ST0008033
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Near monitoring well LF-14, view of the eastern slopes of Wolf Camp drainage.



Monitoring well LF-13 at Lamfoot mine site.



Monitoring well LF-Tunnel-Well at Lamfoot mine site. View of eastern slopes of Wolf Creek drainage in background.