

Inspection Number: 090222
File Number:
Permit Number: M-26
Total Orders: 1

Report of Inspector of Mines - Permitting

Issued pursuant to Section 15 of the Mines Act

Mine Name/Number	MYRA FALLS - HW 0800007	Visit Date	2018-06-26
Type of Mining	MU. METAL MINE UNDERGROUND	Location	
Latitude/Longitude	49.57125, -125.59369	Northing/Easting/Zone	312480, 5494194, 10U
Manager	Nicole Pesonen	Permittee	Nyrstar Myra Falls Ltd.
Phone Numbers	(604) 336 8314	Address	2840 - 650 West Georgia Street Vancouver, BC V6B 4N8
Email			
Inspector	Paul Beddoes, INSPECTOR	Accompanying Inspector	Andrew Craig, B.Sc., G.I.T., Inspector; Jennifer Brash, M.Eng., P.Eng., Inspector; Paul Hughes, Inspector;
Address	PO Box 9395, STN PROV GOVT Victoria, B.C. V8W 9M9		
In Attendance			
Copies to			

The Mine Manager is required to provide a written response within 15 days of receiving the inspection report. The Manager's response must outline the remedial steps taken by a specified date and the work still outstanding. A copy must be provided to the inspector, and in the case of health and safety matters, the occupational health and safety committee and the local union. In this document, Code means Health, Safety and Reclamation Code for Mines in British Columbia.

General Observation: Kick off meeting at HW complex

Latitude/Longitude: 49.570859, -125.591294 **Northing/Easting/Zone:** 312652, 5494145, 10U

Mine Inspectors Paul Beddoes, P.Geo., R.P.Bio. (Senior Environmental Geoscientist), Andrew Craig, G.I.T. (Environmental Scientist), Jennifer Brash, P.Eng. (Senior Geotechnical Inspector), and Paul Hughes, P.Eng. (Contact Geotechnical Inspector) met with Nicole Pesonen (Environmental Advisor, Nyrstar Myra Falls) at the HW Complex on the Myra Falls Mine site at approximately 8:30 am on June 26, 2018.

A kick off meeting was held outside the HW Complex to discuss the site tour plans for the day. The purpose of the inspection was to observe new or planned features at the mine site related to ongoing permitting and restart processes, and assess compliance with the Mines Act, the permit, and the Health, Safety and Reclamation Code for Mines in British Columbia.

Weather during the inspection was clear, sunny, and approximately 20°C.

Inspector	Manager Initials	Report Date: 2018-07-03	MYRA FALLS - HW 0800007
Paul Beddoes	<input type="text"/>		

Area Inspected 1: Price 4 Portal

Latitude/Longitude: 49.554481, -125.570891

Northing/Easting/Zone: 314065, 5492273, 10U

Water flowing from the Price 4 Portal was being collected in a series of two small settling ponds (Photos 1 and 2). The first, smaller pond was lined with a geofabric. The second pond was unlined and overflowed into a pipe which conveys water to the Price 5 Portal (Photo 3). Ms. Pesonen indicated that water does seep from the second pond, but seepage would also report to the Price 5 Portal. Flow at the Price 4 Portal ultimately reports to the Price 13 level where it is directed to the existing treatment system in the Myra Creek watershed.

No new surface storage of waste rock is planned at the Price portals. Ms. Pesonen indicated that during closure of the Price portals, waste rock from the existing pads would be backfilled into the underground workings as much as possible. Ms. Pesonen indicated that Robertson Geoconsultants (RGC) was on site recently and had sampled waste rock from all Price portal pads for geochemical characteristics to inform incorporation of these facilities into the site wide water quality model.

Request 1

Geochemical characterization, material volume estimates and interpretation for the waste rock in the Price portal pads should be provided to EMPR and incorporated into the updated site wide water quality model, due on October 31, 2018. Detailed plans for closure of the Price pads should be included in the next 5 year Mine Plan and Reclamation Plan update.

Request Response:

Respond Date:

Area Inspected Attachments:



Photo 1: Price 4 Portal.



Photo 2: Second pond at Price 4 Portal and overflow.



Photo 3: Conveyance pipe from Price 4 ponds to Price 5.

Area Inspected 2: Price 5 Portal

Latitude/Longitude: 49.554093, -125.569876

Northing/Easting/Zone: 314136, 5492228, 10U

A lined sump was located next to the Price 5 Portal (Photo 4). The sump was dry at the time of inspection, but Ms. Pesonen indicated that this pond does collect water from the portal. A pipe at the bottom of the sump directed water to the Price 13 level so that it can be conveyed to the existing treatment system in the Myra Creek watershed. The pipe conveying water from the Price 4 Portal also directs water to the Price 13 level through a small sump at the Price 5 level pad (Photo 5). Ms. Pesonen indicated that sediment buildup in this sump would be cleaned out prior to starting mining in the Price areas.

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Ms. Pesonen indicated that any PAG waste rock identified in the Price 5 Portal pad would be prioritized for backfill in the underground during closure of the Price area (Photo 6).

Area Inspected Attachments:



Photo 4: Price 5 Portal and sump.



Photo 5: Outlet of pipe from Price 4 ponds to Price 5 level.



Photo 6: Price 5 Portal pad.

Area Inspected 3: Price 13 Portal

Latitude/Longitude: 49.553771, -125.562944

Northing/Easting/Zone: 314637, 5492175, 10U

Ms. Pesonen indicated that the small pile of waste rock at the Price 13 level had been sampled by RGC for geochemical characteristics, and Onsite Engineers had performed volume estimates. Following mining activities in the Price areas, this material is to be backfilled in the Price 13 underground workings.

Ms. Pesonen indicated that flow from the Price 13 Portal into the Thelwood watershed is fed from the first 400 m to 600 m of the workings (Photo 8). Water passed this point will report to the existing treatment system in the Myra Creek watershed, along with flow redirected from the Price 4 and 5 portals.

The Price pond was observed below the Jim Mitchell road (Photo 7). Water from the Price 13 Portal is conveyed to the pond by a box culvert under the road and then exfiltrates to ground.

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Photo 7: Price pond, exfiltration basin



Photo 8: Price 13 portal

Area Inspected 4: Shallow Lynx Seepage Interception System

Latitude/Longitude: 49.573166, -125.600179

Northing/Easting/Zone: 312018, 5494423, 10U

A series of four dewatering wells have been installed along Myra Creek just before the Car Bridge (Photo 9), which are intended to intercept seepage flow into the creek that had been observed in January. A vacuum pump was being used to dewater the wells to the Superpond (Photo 10). Ms. Pesonen indicated that the seep orientation has changed since installation; the seeps are now diffuse enough that the seepage plume was not visible (Photo 11) and static water levels have been drawn down by approximately 1 m. Future plans for a possible cut off wall along the seep area were discussed. Ms. Pesonen indicated that

monitoring data from RGC will be used to inform the design of a permanent system, which will be completed by AMEC Foster Wheeler.

Advisory 1

Construction of a cut off wall to intercept the seeps along Myra Creek will require a Mines Act permit amendment. Monitoring data and engineered designs are needed to support the application for any new permanent seepage intercept system.

Advisory Response:

Respond Date:

Area Inspected Attachments:



Photo 9: Test interception wells



Photo 10: Vacuum pump system



Photo 11: Seepage area in Myra creek

Area Inspected 5: Superpond and Inlet Ditch

Latitude/Longitude: 49.574006, -125.601616

Northing/Easting/Zone: 311918, 5494520, 10U

Incomplete mixing of lime was observed along the inlet ditch that flows to the Superpond (Photo 12). Ms. Pesonen indicated that plans for drop structures and baffles are being considered to improve passive mixing of lime along the ditch. At the Superpond, four of the six lime agitators were in operation while the two inoperative agitators were in the same series (Photo 13). Ms. Pesonen indicated that scaling buildup on the agitator rods often caused breakdown and frequent repairs are required.

The new dredge system was observed in the Superpond (Photo 14). Ms. Pesonen indicated that the new

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dredge had improved efficiency because the system has a built in agitator and reaches the bottom of the pond. Sludge is currently placed in the Tailings Disposal Facility, but is ultimately planned to be stored underground once the Operations Phase commences.

Order 1 (Enforcement of Order):

Status: Open

Issued Pursuant To: Mines Act Section 35

Observation of Contravention:

Only four of the six lime agitators at the inflow of the Superpond were operating at the time of the inspection. As per inspection Order 1 from the October 25, 2017 geoscience inspection (#81262), all six agitators must be operating to ensure contact water is being effectively treated.

Remedial Action/Results To Be Obtained:

The Mine Manager shall ensure that all agitators are functioning and implement a maintenance and repair plan to ensure proper operation. Until passive mixing systems are installed and demonstrated to be effective to the satisfaction of the Chief Inspector, all agitators must remain in operation.

Rectify By/Completion Date: 2018-08-07

Manager Response:

Area Inspected Attachments:

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Photo 12: Lime addition and settling in Superpond inlet ditch.



Photo 13: Lime agitators.



Photo 14: Superpond and dredge.

Area Inspected 6: Treatment Ponds

Latitude/Longitude: 49.571283, -125.596655

Northing/Easting/Zone: 312266, 5494205, 10U

Sediment buildup was observed in Ponds 1, 2, and 2a (Photo 15). Repair work is planned in these ponds for 2018, including dredging, repair of wooden decant structures, and replacement of the pipe from Pond 1 to re-establish flow to Pond 2a. Ms. Pesonen indicated that with installation of the new dredge in the Superpond, the treatment ponds should not require dredging again in the future.

Area Inspected Attachments:



Photo 15: Treatment Pond 1.

Area Inspected 7: The Quarry

Latitude/Longitude: 49.575125, -125.577451

Northing/Easting/Zone: 313669, 5494584, 10U

Ms. Pesonen indicated that Mines Act permit amendment application will be prepared for expansion of the quarry area (Photo 16). A tree count has been submitted to BC Parks and once this has been reviewed, a Mines Act permit amendment application will be prepared and submitted to the Chief Inspector of Mines. Expansion will comprise a new borrow area to the east of the existing quarry (Photo 17).

Area Inspected Attachments:



Photo 16: Current borrow area.



Photo 17: Expansion area of the quarry.

Area Inspected 8: Upper Lynx Diversion Ditch

Latitude/Longitude: 49.580701, -125.601085

Northing/Easting/Zone: 311982, 5495263, 10U

The Upper Lynx Diversion Ditch redirects three permanent creeks and several ephemeral creeks to Cascade Creek, then to the Lower Diversion Ditch (Photo 18). The Upper Lynx Diversion Ditch is sized to a 1 in 50 year event and Ms. Pesonen indicated there is no space to build a larger ditch in the current ditch location. Ms. Pesonen indicated that there is a plan to replace the ditch during removal of the waste rock dumps below, and the new ditch would be sized for a larger event to meet closure objectives.

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Area Inspected Attachments:



Photo 18: Upper Lynx Diversion Ditch.

Received by _____ on _____
[Mine Manager Name, Title] [Date]

Signature: _____