



Province of British Columbia
**Ministry of Energy
 and Mines**

Inspection No.: 47976
 File: 18040-02-02
 Mine No.: 1101163
 Permit No.:
 Emp/Cont: 0 / 0
 Orders H&S: 0 RECL: 0
 Stop Work: 0

Report of Inspector of Mines
 (Issued pursuant to Section 15 of the *Mines Act*)

Inspection Report

NAME OF MINE	Mount Polley Mine	LOCALITY	
OWNER/OPERATOR	Imperial Metals Corporation	ADDRESS	Po Box 12 Likely BC V0L 1N0
MANAGER	Dale Reimer	AREAS INSPECTED	

Persons Contacted

MANAGEMENT
 OHS COMMITTEE
 WORKERS

A copy has been forwarded to the Joint Occupational and Safety Committee and the union as applicable. The Mine manager shall complete the right hand column noting specific corrective actions taken by a specified date, and return a copy to the Inspector within 15 days of receiving the report. Further the manager shall post a copy to the bulletin board, to be replaced by a copy showing the manager's response. In this document, Code means Health, Safety and Reclamation Code for Mines in British Columbia.

INSPECTION ORDERS

The following orders are compiled from several inspectors' observations.

SEWAGE

1.9.1 Workplace conditions

The "blue box" in the mill is used to collect sewage from the crusher and crusher maintenance shop toilet facilities. The overflow pipe of the box spills onto the mill floor. There is a buildup of material under the grating in close proximity to the blue box overflow area.

Order: This material is likely contaminated with sewage and as per the Code 1.9.1 must be removed using appropriate procedures to a designated sewage location immediately.

MANAGERS RESPONSE OF ACTION TAKEN

DO NOT MODIFY THIS TEXT

Al Hoffman

Chief Inspector of Mines

7th floor, 1675 Douglas Street Victoria BC V8W 9N3

Address

Signature – Inspector of Mines

Signature – Manager

Date of Inspection: 11/24/2014

Dated: _____, 20____

Copies To

INSPECTION ORDERS	MANAGERS RESPONSE OF ACTION TAKEN
<p>The toilet facilities in the crusher, crusher maintenance shop, and magnetite plant are currently locked and marked as “do not use”.</p> <p>Order: In accordance with the Code 1.9.1 the crusher and crusher maintenance, and magnetite plant toilet facilities must not be used until the sewage system is reviewed by a licenced professional such as a Professional Engineer experienced with septic system design to ensure the system is adequately designed for its use. A program must be prepared to ensure proper operation and maintenance of the sewage system. This program must address capacity of the system, sewage gases, such as hydrogen sulfide, appropriate clean-up procedures and locations to remove contaminated material, alarm systems, and an ensure any overflows are appropriately addressed such as with secondary containment.</p> <p><u>CHEMICALS AND STORAGE</u></p> <p>1.9.1 Workplace Conditions and 2.3.3 Storage of Hazardous Materials</p> <p>A limited site tour was conducted and chemical storage deficiencies were noted at various locations. Observations included:</p> <ul style="list-style-type: none"> • Incompatible acids (sulfuric, hydrochloric and nitric acids) stored underneath perchloric acid fume hood #1. Acetic acid is incompatible with nitric acid and chromic acid, having the potential to explode if unintentionally combined. Nitric acid, sulfuric acid, and chromic acid are incompatible with organic materials and must not be stored directly on wooden surfaces • Unheated outdoor reagent storage and incompatible acids stored in unventilated space in the lab at the Magnetite Plant • A variety of totes stored on raised platforms in the fenced chemical storage area without containment. • Sulphur pile with inadequate moat, evidence of sulphur trailing to Bootjack Road. • Chemical totes outside Leach Plant that are no longer used in processes, and 1 tote unlabeled. • Totes of products stored outside of Alimak raise • Met lab storing outdated chemicals 	

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Order: In accordance with the Code 1.9.1(1) and 2.3.3 a site wide assessment must be conducted to determine and ensure all chemicals kept on site are being appropriately stored. Chemicals no longer used or outdated must be properly disposed of. In particular with the approach of winter there is urgency to ensure that chemicals that are temperature sensitive are stored appropriately in their recommended temperature range. In addition, as per the Code 2.13.11, MSDS for all controlled products on site must be updated to ensure appropriate storage and handling requirements are being met.

Order: As per the Code 2.3.3 all acids must be stored in/on storage materials/cabinetry that is acid and corrosion resistant and compatible with the products being stored.

Acids, such as nitric acid, sulfuric, hydrochloric acid and acetic acid must be stored in cabinets that are designed for the storage of acids. If storage is required where other incompatible materials exist then the products must be stored within appropriate secondary containment. At the time of inspection the bottom half of a nitric acid shipping container was stored under the lab fume hood. It should be noted that this Styrofoam packaging is not considered an adequate form of secondary containment as it will react and degrade as a result of contact with nitric acid.

Nitric acid must be stored in a separate storage compartment due to its ability to violently react with many different materials. It should be stored in a flammable storage cabinet below 30°C, due to its propensity to intensify fire events.

Special considerations should be given to storage arrangements of glacial acetic acid due to its low flash point (approximately 39°C) and high freezing point (approximately 16 - 17°C). If glacial acetic acid is allowed to freeze it may expand causing the container to break. Due to the low flash point, glacial acetic acid should be stored in a flammable storage cabinet to limit its potential to intensify fire events. Explosion proof equipment and non-sparking tools should be used when handling glacial acetic acid.

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REAGENT LEAKS AND EXPOSURE TO REAGENTS

Section 1.9.1 and 2.1.1 – Workplace Contaminants and Control

At the time of inspection a leak was observed in the piping and near the pump at the base of the PAX mixing tank. Recent employee concerns about dermal exposures to PAX when working on the pump (e.g. reagent causing coveralls to deteriorate) must be addressed. Some employees were unclear about respirator requirements around the PAX circuit. Concerns about reagent leaks in the mill have been previously identified (e.g. see inspection reports 25921, 27279, 28102, and 28597).

Order: As per section 1.9.1 and 2.1.1, within 14 days, the mine manager shall submit a written safe work procedure for repairing leaks at reagent tanks/in reagent lines.

DISPOSAL OF HAZARDOUS MATERIALS COLLECTED IN SCRUBBER SYSTEMS

Section 1.9.1, 2.3.6 and 2.1.1 – Hazardous Materials, Workplace Contaminants and Control

At the time of inspection, lead fumes/dust captured in fume hoods in the assay lab was being released as a slurry onto the mill floor.

Order: As per section 1.9.1 and 2.3.6, the mine manager shall ensure that lead-contaminated waste is disposed of in a manner that does not cause risk of worker exposure.

At the time of inspection acid fumes collected in fume hoods in the lab were passed through a wet scrubber system. Discharge from the scrubber system was being released on the mill basement floor.

Order: As per section 1.9.1 and 2.1.1, within 14 days the mine manager shall confirm the concentration of acid/lab reagents released on the mill basement floor and conduct a risk assessment of worker exposure to harmful chemicals discharged by this local exhaust ventilation system. Where there is risk of worker exposure to harmful chemicals, as per section 2.3.6, the mine manager shall submit a written plan to improve deficiencies with the disposal of the wash-down water used in the wet scrubber systems.

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<p>At the time of inspection, the scrubber system at the PAX mixing tank was not operational. The current design releases material collected in the scrubber system onto the mill basement floor near the entrance to the NaHS room.</p> <p>Order: As per section 1.9.1 and 2.3.6, the mine manager shall ensure that waste water from the PAX scrubber system is not released into work areas. As per section 1.9.1, the mine manager shall ensure that flammable vapours collected in the enclosure ventilation system over the PAX mixing tank do not pose a risk of fire or explosion (e.g. intrinsically safe ventilation system is working effectively).</p> <p><u>WELD BARN</u></p> <p>1.9.1 Workplace Conditions (ventilation) Inadequate ventilation and make-up air in the weld barn has been an ongoing deficiency dating to April 22, 2013 with repeat orders written.</p> <p>Order: The mine shall provide the Ministry with a plan with deadlines for installation of an improved ventilation and heated make-up air system in the current weld barn, or an alternate appropriate weld shop. The mine must demonstrate with ventilation and personal monitoring data that any weld shop used ensures workers are not being overexposed.</p> <p>Order: Effective immediately, until further engineering controls can be implemented, workers must be provided with appropriate respiratory protection such as powered air purifying respirators.</p> <p>2.1.3 Monitoring Contaminants</p> <p>Order: In accordance with the Code 2.1.3, to ensure workers are not being overexposed, the mine manager shall ensure a qualified person such as a Certified Industrial Hygienist (CIH) or Registered Occupational Hygienist (ROH) establishes a program for monitoring welder's exposure. The results of monitoring shall be made available to Ministry.</p>	

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2.10.1 Heat or Cold Stress

Thermal stress for welders is a concern in the winter.

Order: For welders working outdoors, or in the weld shop where there is little provision for heated make-up air, a thermal stress program shall be developed and implemented as per the Code 2.10.1.

VENTILATION

Metallurgy Sample Prep Room

2.1.1 and 1.9.1 Workplace Contaminants and Control

At the time of inspection, insufficient supply air was provided to the metallurgy sample prep room. Negative pressure in the room rendered it very difficult to open the door. Air flow measurements taken at the cone crusher and the jaw crusher indicate air flows may be insufficient for capturing dust generated during sample preparation. Compressed air lines have been installed to clean equipment and remove dust that is not captured by the local exhaust ventilation systems. Air currents generated by the compressed air lines are much stronger than air velocities generated by the local exhaust ventilation systems and therefore use of compressed air generates an airborne dust hazard. Concerns about ventilation in the metallurgy sample prep room have been previously identified (e.g. see inspection reports 27279 and 26584).

Order: As per section 2.1.1 and 1.9.1, within 60 days, the mine manager shall submit a written plan to the ministry, prepared by a qualified individual (such as a ventilation engineer) for rectifying deficiencies with the ventilation system in the metallurgy sample prep room.

Hydraulic Hose Cutters

2.1.1 and 1.9.1 Workplace Contaminants and Control

The local exhaust ventilation at the hose cutter in the underground shop and at the hose cutter at the shop in the mill building do not have the capacity to effectively capture airborne contaminants generated when cutting hydraulic hose.

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<p>Order: As per section 2.1.1 and 1.9.1, within 30 days, the mine manager shall ensure the local exhaust ventilation systems provided have the capacity to capture contaminants generated when cutting hydraulic hose.</p> <p><u>ELECTRICAL POWER SYSTEM</u></p> <p>4.2.1 Mine plans M421-11 The single-line drawing for power distribution for the Mt Polley mine site does not show the current configuration. During review of the drawings it was noted, but not limited to, the White pit Alimak Raise Climber, U/G distribution and Magnetite Plant were not on the drawings.</p> <p>Order: 4.2.1.1 Each mine in which electricity is used shall have a plan or single-line diagram showing the (a) relative location of all fixed electrical distribution equipment; (b) routes, properly noted and referenced, of all fixed power distribution feeders; and (c) rating of all fixed electrical distribution equipment.</p> <p>The manger shall have the single-line distribution drawings updated to show the current configuration.</p> <p>To be remedied in 14 days.</p> <p>5.3.3.3 Station-ground resistance M421-11 Testing of substation ground grids before being put into service has not been a practice consistently used at Mt Polley. It was noted that the new Ground Grid at the Central Collection Sump had not been tested. Testing insures the relay settings provide the required protection values and compliance to the code.</p> <p>Order: 5.3.3.3 The station-grounding system shall be designed and installed in a way that prevents the transfer of potentials exceeding 100 V from the station-ground electrode to any connected movable or mobile electrical equipment. The resistance of the station-ground electrode shall be measured and the ground-fault protection shall be tested</p>	

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<p>after installation or relocation of the substation. Changes shall be made, if necessary, to ensure that the ground potential rise will not exceed 100V.</p> <p>4.5.6 Ground-fault protection Order: When ground-fault protection is required by this Standard, the supply shall be (a) grounded through a neutral-grounding device that limits ground-fault voltage to 100 V or less; and (b) de-energized in less than 1 s if ground-fault current exceeds 20% of the prospective ground-fault current</p> <p>System Testing HSRC Order: 5.7.1 Supply systems for mobile electrical equipment shall be tested before being put into service, and at least once a year thereafter, in order to prove the effectiveness of the ground fault tripping and the ground conductor monitoring circuits.</p> <p>Record of Testing HSRC Order: 5.7.2 A record of the tests required under part 5.7.1 shall be kept at the mine and shall be available for examination.</p> <p>The manager shall supply clear documentation showing dates and test results for each substation ground grid on the mine site.</p> <p>To be remedied in 14 days.</p> <p>4.5.5 Testing and calibration of protection devices M421-11 During a tour of the mill and White Pit it was noted that there were high voltage relays that were either out of compliance or did not indicate when they were last tested. Of note was the No 3 Pebble Mill, the last test was indicated as 2008. The Skid breaker feeding the U/G distribution did not display a date as to the last calibration. Order: 4.5.5 Except for fuses, each protective device for an installation operating at a voltage exceeding 750 V shall be tested to confirm that the device prevents the equipment from being operated in</p>	

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<p>excess of its rating. These tests shall be performed before initial use and after every three years of use, and the results shall be documented.</p> <p>The manager shall complete a site wide audit of all high voltage relays and ensure testing is compliant to the code.</p> <p>To be remedied in 14 days.</p>	
<p><u>FIXED EQUIPMENT (PLANT AND MACHINERY)</u></p>	
<p>4.4.1 (4) Fall arresting devices</p> <p>It was noted that anchor points (for use as fall arrest anchor points) have been installed in the air lock at the collar to the emergency egress raise. When asked, it was stated by Derrick Moritz (AKA Rick), Superintendent Underground Operations, that “these anchor points have not been engineered”.</p> <p>Order: As per 4.4.1 (4) of the Code: (4) When in use with a fall arresting device, a lifeline shall be anchored so that a person cannot fall, free of arrest, for more than 1220 mm, and it shall be connected to an object that is free from sharp edges and capable of resisting the force of an arrest.</p> <p>The Manager shall cause these anchor points to be assessed by an Engineer, licenced to practice in the Province of British Columbia, and this Engineer shall warrant that these anchor points are capable of withstanding the forces of an arrest on them.</p> <p>To be remedied prior to these anchor points being used as fall arrest anchor points.</p>	
<p>4.4.9 (4) Lifting devices</p> <p>It was noted that The Non-destructive testing (NDT) conducted on rough terrain forklift, Mount Polley equipment designation number 60-054, identified that one of the forks were bent. This forklift was in service at the time of this inspection, the bent fork had not been repaired/replaced, and the two forks were of two</p>	

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different widths.

Order: As per 4.4.9 (4) of the Code: (4) Each component that may affect the safe operation of a lifting device shall be examined and tested by a qualified person before initial use and thereafter at intervals not exceeding one year, and a record shall be kept showing the dates, findings and names of the qualified persons performing the examinations and tests and the record shall be kept available for inspection.

The Manager shall ensure that deficiencies noted during NDT testing of lifting devices are corrected prior to the lifting device being returned to service. Rough terrain forklift number 60-054 shall be removed from service until the forks are repaired or replaced.

To be remedied immediately.

SLINGS

4.21.4 Fiber webbing slings

Many, approximately 30, fiber webbing slings were found, in all departments inspected, that had sufficient damage that they should have been removed from service. These slings were removed from service and destroyed at the time they were found.

Order: As per 4.21.4 of the Code: Fiber webbing slings with nicks, cuts, burns, or other damage or defect shall be removed from service.

The Manager shall ensure that all rigging and lifting equipment is suitable for the intended task, and that this equipment is kept in a serviceable condition.

To be remedied immediately.

MINE DESIGN AND PROCEDURES

6.3.2 Underground and 6.37.1 Ventilation Monitoring

Mine plans (including ventilation and fire-fighting) for underground operations have not been updated since July, 2014.

Order: (Code 6.3.2; 6.37.1) The underground plans for ventilation and fire-fighting need to be updated immediately and be updated a minimum of every three months going forward. Copies of

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these plans must be posted in underground refuge stations, the shifter’s office and mine rescue room on surface.

MINE EMERGENCY RESPONSE PLAN

3.7.1 Mine Rescue and 6.3.1 Underground

The Underground Mine Emergency Response Plan (UGMERP) was found to be out of date (names of emergency contacts are not current; no mention of refuge stations underground; no mention of escape raise; etc.)

Order: (Code 3.7.1; 6.3.1) The UGMERP must be updated, within two weeks. The updated UGMERP must be reviewed with everyone who goes underground.

4.1.4 Access to work areas and 6.12.4 mine openings

The secondary emergency egress from the underground mine to surface, is via an Alimak raise climber, installed in a 200m raise. The primary compressed-air supply to the Alimak raise climber is via a pipeline in the main decline. If the primary compressed-air supply was disrupted, the Alimak raise climber could not be used, effectively preventing the use of the escape raise.

Order: (Code 4.1.4; 6.12.4) A secondary compressed-air supply from surface down the Alimak raise, to operate the Alimak raise climber if the primary compressed-air supply is disrupted, must be installed.

4.13.11 Communication Required

No direct communication link was observed between the raise climber conveyance and the Alimak station underground. There was also no communication link between the Alimak station underground and the collar of the Alimak raise.

Order: (Code 4.13.11) A method of communicating between the Alimak raise conveyance and the underground Alimak station must be established. It is also recommended that a communication link be established between the Alimak station underground and the collar of the Alimak raise.

MINE OPENINGS

6.12.4 Ease of Travel

Ice was observed to be forming in the Alimak raise and

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<p>ice/debris was seen falling down the raise. This ice could prevent the raise climber conveyance from travelling in the raise.</p> <p>Order: (Code 6.12.4) The formation of ice in the Alimak raise must be prevented.</p> <p>EVACUATION</p> <p>3.13.1 Procedures and Instructions</p> <p>The Alimak raise climber provides secondary emergency egress from the underground mine. This necessitates that all personnel underground be trained in the use of the conveyance to exit the mine.</p> <p>Order: (Code 3.13.1) All personnel who go underground (except visitors) must be trained to use the Alimak raise climber, to rescue themselves if the raise is the only means of egress from underground. The mine rescue team will also be trained to use the raise climber.</p>	