

Report of Inspector of Mines - Reclamation

Issued pursuant to Section 15 of the Mines Act

Mine Name/Number	Copper Mountain (Similco)	Visit Date	2019-07-30
Type of Mining	MS. METAL MINE - SURFACE	Location	
Latitude/Longitude	49.33111, -120.53417	Northing/Easting/Zone	679150, 5467190, 10U
Manager	Eric Dell	Permittee	Copper Mountain Mine (BC) Ltd.
Phone Numbers	(250) 295 4735	Address	PO Box 1400 Princeton BC V0X 1W0
Email			
Inspector	Victoria Stevens, INSPECTOR	Accompanying Inspector	Adrienne Turcotte, MLWS, A.Ag., Inspector;
Address	441 Columbia Street Kamloops, B.C. V2C 2T3		
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.

Introduction

An inspection of the Copper Mountain Mine (CMM), including the Ingerbelle property, which is regulated under the same permit (M-29), was conducted on July 30, 2019 by Ministry of Energy, Mines and Petroleum Resources (EMPR) Reclamation Inspectors Victoria Stevens, P. Ag., P.Geo. and Adrienne Turcotte, P.Ag.

The site tour and inspection was guided by CMM representatives Michelle DesJardins (Environmental Manager) and Brenna Fossum (Environmental Coordinator). The Mine Manager, Eric Dell, was present at the pre-inspection meeting but did not attend the tour. The tour started in the main Copper Mountain Mine site, then down to the base of East Dam and then across the Similkameen River to the Ingerbelle property. The weather was sunny with some clouds, and approximately 25 degrees C.

Access to the main Copper Mountain Mine site is via Copper Mountain Road, accessed from Highway 3 in Princeton. The Ingerbelle Property is accessed from Highway 3, approximately 20km west of Princeton. The sites are directly across from each other, separated by the Similkameen River.

The purpose of the inspection was to familiarize inspectors with the layout of the site, assess the status of the site from an environmental and reclamation compliance perspective and review the general site conditions since the previous reclamation inspection conducted by Victoria Stevens and Liz Murphy on June 13, 2018. The map provided illustrates the inspection route and key observation points during the mine visit. The following areas were inspected during the mine visit:

- 2018 Resloping and Seeding Research Trials above Administration building
- Pit 3 Lookout
- 2019 Resloping area
- Oriole Pit
- South Soil Stockpile
- Nutrigrow South Soil Production Facility
- Virginia Soil Stockpile
- Wolfe Creek diversion settling pond
- East Dam abutment
- Ingerbelle Pit
- Ingerbelle Waste Rock dumps and general site

This report provides a general understanding of the site based on applicable reports, as well as the observations and discussion that occurred on-site and during the inspection. If required, inspection orders, warnings, advisories, or information requests have been issued related to requirements laid out in the M-29 permit, the Health, Safety and Reclamation Code for Mines in BC (the Code), and established practices in environmental management and mine reclamation.

The following documents were reviewed in preparation for the inspection and as part of the completion of this inspection report:

- M-29 Mines Act permit dated 2010 through 2019
- 2018 Copper Mountain Mine Annual Reclamation Report
- EMPR Copper Mountain Reclamation Inspection Report 75016 (conducted May 2nd, 2017)
- EMPR Copper Mountain Reclamation Inspection Report 74399 (conducted August 3, 2016)
- Five Year Reclamation and Mine Plan Update, January 31, 2017

The information provided in these documents form the basis for the background information presented below.

This report is governed by the conditions and limitations set forth in the Mines Act and Code. This report is based on a review of select reports and work areas at the Mine, and cannot practically cover the entire mine site. Professional reliance has been used throughout this inspection.

Preamble

The Copper Mountain Mine was operated as the Similco or Similkameen Mine from 1972 to 1996 under Mines Act Permit M-29. The mine was shut down in 1996 and held under care and maintenance until re-development activities commenced in 2010. Copper Mountain Mine (BC) Ltd. (CMML) submitted an Application to EMPR to approve the new mine plan and authorize CMML to proceed with the development activities necessary for reactivation of open pit mining activity on Copper Mountain. Commercial production resumed in June 2011. The mine has been actively operating as an open pit mining and milling operation since June 2011 with a design processing capacity of 35,000 tonnes of ore per day.

A Mine Plan and Reclamation Program Update was submitted to the Chief Inspector on January 31, 2017. The M-29 permit was amended on July 23, 2019 to approve an increase to the Low Grade Ore (LGO) stockpile, mining of the Alabama deposit and to divert Wolfe Creek away from the toe of the East Dam.

The 2018 Annual Reclamation Report indicated that the total disturbance on the Copper Mountain side of the property is 1,186 ha which includes roads, soil stockpiles, waste rock dumps, Tailings Management Facility (TMF), LGO stockpile, pits and plant site. Total disturbance reported for the Ingerbelle side of the property was reported as 159.1 ha.

The Ingerbelle portion of the property is located to the west of the current pits and across the Similkameen River. Historic

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens

mining occurred throughout Ingerbelle and large areas of the waste rock dumps were reclaimed using agronomics with some ingress of native conifers. Active exploration is currently underway and the results of the drilling program indicate that adequate resource has been identified for the company to apply for a permit amendment to re-start mining operations on the Ingerbelle property. The restart would involve an expansion of the Ingerbelle Pit, hauling ore to the Copper Mountain Mill, and expansion of existing and new waste rock dumps. A significant portion of the Ingerbelle site will be re-disturbed.

Portions of the Ingerbelle Property are occupied by third party businesses, Envirogreen Technologies Ltd., operator of a contaminated soil treatment facility, and All Seasons, a mushroom farm business.

The site is located within the traditional territories of the Upper Similkameen Indian Band (USIB) and Lower Similkameen Indian Band (LSIB).

Area Inspected 1: 2018 Resloping and Seeding Research Trials above Administration building

Latitude/Longitude:

Northing/Easting/Zone:

Located above the main parking lot and administration building, this area of the main Waste Rock Storage Area (WRSA) was resloped and the surface prepared in 2018 to set up a research trial intended to test site preparation methods and seed mixes. The research has been undertaken in partnership with Nutrigrow. Site staff explained that the area was resloped in Summer 2018, amended soils consisting of biosolids were applied and the area was seeded. The upper area site preparation was site prepped with a smooth profile and capped with 50 cm of amended soil, while the lower area was site prepped with a more hummocky profile, with surface roughening. The upper and lower zones were divided into 3 sections, and a seed and forb mix applied to each section: one section was seeded with all native species, one section was seeded with native species with fall rye, and one section seeded with native species and agronomics. The seed mixes were designed by a Professional Agrologist with Nutrigrow, and the seed mix compositions submitted for review the USIB and LSIB.

There are gaps in the treated area that have not germinated, and this is attributed to application error during hand seeding. These areas will be infill seeded and seed mix application methods will be reviewed by site staff. Monitoring has been undertaken by Nutrigrow and an early learning is that the seed mix contained too much fall rye. On June 16, 2019, a significant rainfall event resulted in the rilling observed in the seeded areas. Site staff reported that there was no significant rilling observed during snowmelt and freshet.

Some of the long term monitoring parameters to determine treatment success will include native species establishment, invasive plant establishment and erosion control. Monitoring will include sampling for metal uptake. As well, the area may be planted in the next few years with shrubs in conjunction with USIB and LSIB.

Some invasive species were noted in this area, including mullein. CMML manages invasive species by hand pulling and does not use herbicides at this time.

Request 1

With the response to this report, please provide details on the reclamation monitoring program for the trials, including details about frequency, plot specifications, methods used and parameters measured, data interpretation and reporting, metal uptake monitoring and adaptive management.

Request Response:

Respond Date:

Area Inspected Attachments:

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens



2018 Reclamation research trial which is testing both site-preparation techniques and seed mixes on biosolids-amended soils



Upper slope of research trial which has a smoother site preparation technique and 3 different mixes of seeds

Area Inspected 2: Pit 3 Lookout

Latitude/Longitude:

Northing/Easting/Zone:

Site staff explained that Pit 3 will be mined down and through the Level 6 underground workings. At present, water has filled the Level 6 workings and flows from the Level 6 adit, so it is expected that at Closure, water will infill the bottom of Pit 3. If a higher water level is required at closure in order to submerge PAG waste rock, the Level 6 adit could be plugged to raise the water level in the pit. This contingency is part of the ML/ARD planning should PAG rock be encountered during mining, which is not the situation at present. Pit 3 is presently being used for a temporary short-haul backfill location, but will

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens

continue to be mined down. Pit 2 will also be backfilled.

Area Inspected Attachments:



Pit 3 which is being used as a temporary short-haul area but will continue to be mined down



Looking from Pit 3 to Pit 2 with Ingerbelle pit in the far background

Area Inspected 3: 2019 Resloping Area

Latitude/Longitude:

Northing/Easting/Zone:

Located on the south side of the main WRSA, an area of 21 hectares has been resloped and the surface prepared in 2019. Site staff explained the area will be capped with 50cm of soil and seeded with guidance from Nutrigrow. Discussion at the site included how to include landforming for drainage channels in site design and preparation, and that CMM will work with USIB and LSIB .

The area immediately below the road was cleared several years ago, and coarse woody debris was stockpiled for spreading in reclaimed areas. Soil was salvaged in windrows that were visible below the waste rock. This area will continue to be salvaged for soil and coarse woody debris as mining progresses.

Request 1

With the response to this report, please provide a summary of the activities completed to date for this area, if this area is part of a research trial, information on future planned activities, including revegetation and monitoring, and a description of the goals for this trial area.

Request Response:

Respond Date:

Area Inspected Attachments:



The long slope in the background as been resloped with a rough surface texture and will be seeded in 2019

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens



A soil windrow can be seen below the access road and piles of coarse woody debris have been stockpiled for use in reclamation activities. This area will be salvaged for soil and CWD as mining advances.

Area Inspected 4: Oriole Pit

Latitude/Longitude:

Northing/Easting/Zone:

Oriole Pit is an existing exhausted pit that is presently being backfilled with waste rock. At the time of the inspection, material was being placed and leveled in the base of the pit. Site staff explained that there was a shallow pit lake in the bottom of the pit prior to backfilling, but it did not require pumping prior to backfilling. The dumping plan will proceed to high dumping from the highwall into the Pit, which has been approved by EMPR (Permit M-29 issued July 23, 2019).

Area Inspected Attachments:

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens



Oriole Pit is currently being backfilled with waste rock

Area Inspected 5: South Soil Stockpile and Nutrigrow South Soil Production Facility

Latitude/Longitude:

Northing/Easting/Zone:

The Nutrigrow soil production facility has moved from the northern area of the mine site near the Virginia Soil Stockpiles in 2018 to the South Soil Stockpile. Biosolids are mixed in a Royer soil grinder with sawdust stockpiled adjacent to the biosolids, and then mixed with salvaged soil to produce an amended soil for reclamation. Site staff explained that only Class A biosolids are used in soil production.

A revegetated area, seeded in the early 1990s, is located adjacent to the Nutrigrow South Soil Production Facility under some powerlines. Invasive species were observed in this area, including an abundance of mullein.

Area Inspected Attachments:

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens



Pile of amendment consisting of biosolids and sawdust mixed together



On the right is the South Soil Stockpile and on the left is the finished soil stockpile made of a mix of amendment and salvaged soil



Area of reclamation from early 1990's adjacent to South Soil Stockpiles

Area Inspected 6: Virginia Soil Stockpile

Latitude/Longitude:

Northing/Easting/Zone:

The Virginia Soil Stockpile continues to be accessed/disturbed for use in reclamation activities, but the access road below the piles is not currently in frequent use. The piles were previously fertilized and seeded in the past (approximately 5 years ago) for consecutive years, but there was low success in germination with an appropriate vegetation cover. Invasive plants were observed at the base of the soil stockpiles. The stockpiles were appropriately signed.

Order 1 (Inspection Mines):

Status: Open

Issued Pursuant To: Mines Act Section 15(4)

Permit Conditions:

Section D.9.(f) Soil Salvage and Stockpiling

Observation of Contravention:

The Virginia Soil Stockpiles are not vegetated for erosion control and have experienced rilling erosion. CMM has indicated that previous attempts at revegetation were not successful.

Remedial Action/Results To Be Obtained:

CMM should undertake remedial action to protect the stockpiles from further erosion.

Rectify By/Completion Date: 2019-08-23

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens

Manager Response:

Order Attachments:



Virginia Soil stockpile has not been successfully vegetated but is often disturbed for use in biosolids-amended soil production. Invasive plants have been identified on the stockpiles, predominantly at the base of the stockpile. Berms have been placed along the base of the stockpiles to capture any sediment run-off.

Request 1

In the response to this report, please outline what remedial action will be undertaken to protect the Virginia Soil Stockpiles from further erosion and fulfill the permit condition D.9.(f)

Request Response:

Respond Date: 2019-08-23

Inspector

Victoria Stevens

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Area Inspected 7: Wolfe Creek diversion settling pond

Latitude/Longitude:

Northing/Easting/Zone:

The Wolfe Creek diversion settling pond construction is now complete. Invasive plants were observed on the perimeter of the pond, and while there were attempts by invasive plant removal crews working in the area to remove some of the invasive plants, some of the plants could not be safely accessed due to the steep pond embankments. Some very large mullein was observed.

Once the Wolfe Creek Diversion is operational, a fish salvage program will be undertaken in the pond, and barriers installed to prevent ingress of fish into the pond.

Order 1 (Inspection Mines):

Status: Open

Issued Pursuant To: Mines Act Section 15(4)

Section 1.9.1, Health, Safety and Reclamation Code for Mines in BC (MA), General

Observation of Contravention:

Two high water outflow structures on the settling pond were observed to be only partially screened and inspectors and site staff noted that workers and animals/birds could fall into, or become trapped in, the outflow pipes. The pipes are easily accessible from the access road.

Remedial Action/Results To Be Obtained:

The current design of the outflow pipes presents a hazard to workers . The design of the screening should be reviewed and controls put into place to mitigate the hazards to workers and wildlife.

Rectify By/Completion Date: 2019-08-23

Manager Response:

Order Attachments:

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens



Open outflow pipes on Wolfe Creek Diversion settling pond present a safety hazard to workers and wildlife.

Request 1

With the response to this report, please advise EMPR how the hazard will be mitigated and provide photographs of the mitigations once in place.

Request Response:

Respond Date: 2019-08-23

Area Inspected Attachments:



Completed settling pond as part of the Wolfe Creek diversion project. At present, it is open to fish passage but will undergo a fish salvage and be closed off to fish

Inspector

Victoria Stevens

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

passage once appropriate permits are in place



Mullein observed on embankment of settling pond. It was apparent that an invasive plant removal crew had tried to access the mullein for mechanical removal but could not safely access it.

Area Inspected 8: East Dam abutment

Latitude/Longitude:

Northing/Easting/Zone:

The East Dam abutment was viewed from both above the TSF and at the base of the dam. A seepage pump circuit is in place to capture seepage from the dam and pumps it back up to the TSF beach. There is typically 300m – 500m of beach on the TSF. The end land use plan for the TSF still needs to be developed to direct the reclamation and closure plan for the site. A settling pond authorized under the site's EMA permit is located at the base of the East Dam. Several species of established invasive plants were noted at the toe of the East Dam and the settling pond.

Area Inspected Attachments:

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens



East end of TSF tailings beach. The small waterfall in the mid-background on the forested slope is the seepage return circuit.



Settling pond below East Dam. Several species of invasive plants were observed around the settling pond.

Area Inspected 9: Ingerbelle Pit, Waste Rock Storage Areas and General Site Observations

Latitude/Longitude:

Northing/Easting/Zone:

The base of Ingerbelle Pit is presently flooded. An upper lobe of the pit was previously backfilled and there have been some pit wall failures since it was last mined. Drilling was being undertaken at the time of the inspection for geotechnical investigations and a hydrometric station has been installed on the Similkameen River to collect data to inform design assumptions for the proposed restart of Ingerbelle. The conveyor that used to transport ore from Ingerbelle to Copper Mountain is still in place but is not used, and presently CMML is awaiting a cost estimate to dismantle the conveyor.

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens

Invasive species were observed throughout the Ingerbelle Waste Rock Storage Area. Site staff indicated that most of the area will be disturbed or buried if the Ingerbelle restart goes ahead.

Area Inspected Attachments:



Ingerbelle Pit which is proposed for restart



An upper lobe of the Ingerbelle Pit was previously backfilled

Area Inspected 10: Site Wide Observations

Latitude/Longitude:

Northing/Easting/Zone:

End Land Use Plan: Discussions regarding the development of an End Land Use plan (ELUP) have occurred between EMPR and site staff. The current end land use targets ungulate habitat (winter range in particular) and First Nations Traditional Use and more recently, the M-29 permit includes provisions for creating habitat suitable to support several other ungulate species, bears, cougar, furbearers and raptors. While EMPR is encouraged by the large-scale reclamation research and progressive reclamation presently being undertaken at CMM, an overarching ELUP should be developed to guide research goals, synthesize findings (including previous reclamation activities from 1990s) and maximize opportunities for ecosystem and habitat development.

Invasive Plant Management: Invasive Plant Management efforts focus on areas of high risk of invasive plant migration, such as frequently-used access roads and areas of high traffic. CMML only engages in manual treatment of invasive plants and does not use herbicides at this time. Invasive Plant removal crews were working in the area during the inspection, largely targeting infestations of a species of thistle and mullein. Several species of invasive plants were observed both at Copper Mountain and Ingerbelle. CMML has connected with OASISS (Okanagan and Similkameen Invasive Species Society) in regards to invasive plant management strategies for both sites. Management of knapweed at Ingerbelle was designed according to recommendations of OASISS, which noted that weevils that attack knapweed have been observed at Ingerbelle. Knapweed was removed from the immediate roadside areas, bagged and disposed of in a landfill. Off the road edges, the knapweed was left untreated in order to attract the weevils – one species attacks the flower and another species attacks the roots of the plants. Toadflax was observed in areas of disturbance on the top of the waste rock area, along with other common invasive plants to the area. Site staff noted that most of the Ingerbelle site will be redisturbed and areas of infestations will be buried by rock or reclaimed to current standards, so current invasive plant management at Ingerbelle is targeting access roads and high traffic areas.

Sediment and Erosion Control:

Excessive erosion was noted along the Copper Mountain Road in the vicinity of the mine, with some road edge failure and evidence of sedimentation in the ditches. Site staff noted that a significant rain event occurred on June 16, 2019 and had resulted in erosion of the access road, rilling in the reclamation research area above the Administration Building, and stockpiles.

Advisory 1

CMM is reminded that an update to the Erosion and Sediment Control plan is to be submitted to EMPR by December 31, 2019 as per Condition D.8.(a) of the M-29 permit. This updated Plan should include information on how erosion and sedimentation events such as the June 16, 2019 event will be minimized in the future.

Advisory Response:

Respond Date: 2019-08-23

Request 1

With the response to this report, please outline how an ELUP will be developed, what the process will look like and when an ELUP can be submitted to EMPR for review.

Request Response:

Respond Date: 2019-08-23

Inspector

Manager Initials

Report Date: 2019-08-08

Copper Mountain (Similco) 0300009

Victoria Stevens

Request 2

With the response to this report, please outline how invasive plant treatments are monitored for effectiveness.

Request Response:

Respond Date: 2019-08-23

Closure

Please address the response to Victoria Stevens, Inspector of Mines at victoria.stevens@gov.bc.ca.

You are reminded that, as per Section 15(6) of the Mines Act, your response is required within 15 days of the days of receiving this report. In addition, Section 30 (1) of the Mines Act requires this Inspection Report to be posted in a conspicuous location at the mine site for 30 days.

Please feel free to contact the undersigned with any questions or comments.

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

Signature: _____