

WOLVERINE MINE

QUARTZ MINING LICENSE QML-0006

2012 ANNUAL REPORT

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Appendix A: Monthly Tailings Monitoring Reports

1 Introduction

This Annual Report has been prepared to satisfy requirements contained within Quartz Mining License QML-0006 (QML) Condition 10.5 for activities that occurred during the period of January 1 to December 31, 2012 at the Wolverine Mine.

Table 1-1 outlines the QML Annual Report documentation requirements and the corresponding report section where the information is provided herein. A Socio-Economic Assessment summary is provided in Section 9 of this report, to satisfy requirements of the Environmental Assessment Screening Document (issued September 20, 2006 by the Development Assessment Branch, Government of Yukon).

 Table 1-1:
 QML Annual Report Information Requirements and Corresponding Report Section

QML Section	Requirement	Section
10.5 a)	A summary of mining activities at the mine.	2.3
10.5 b)	A map showing all structures, works and installations associated with the Undertaking.	2.1
10.5 c)	The total amount of ore and waste removed from the mine.	2.7
10.5 d)	The total amount and the average head grade of ore processed through the mill.	2.7
10.5 e)	The total amount and grade of all stockpiled ore.	2.7
10.5 f)	The total amount and grade of concentrate produced, stockpiled, and transported from the Undertaking.	2.7
10.5 g)	As-built drawings of the mine and of all structures, works and installations constructed or altered in the mine.	2.3
10.5 h)	Details respecting any action taken as a result of the recommendations made by the engineer in relation to the inspection referred to in paragraph 10.1.	3
10.5 i)	A summary of any updates to estimates of ore reserves and mine life, including reserve category, tonnage and grade.	2.4
10.5 j)	A summary of any underground stability incidents.	2.5
10.5 k)	A summary of paste backfill placement activities conducted and their locations in the mine.	2.6
10.5 l)	A summary of humidity cell tests undertaken for waste rock and paste backfill.	2.6
10.5 m)	A summary of quantity and related analysis of leachate collected from paste backfill.	2.6
10.5 n)	The total amount of tailings deposited in the tailings impoundment.	2.2
10.5 o)	An evaluation of the performance of the tailings facility, including an estimate of	2.2

QML Section	Requirement	Section
	remaining available storage capacity in the facility.	
10.5 p)	The data generated from the full depth sampling of the tailings.	2.2
10.5 q)	A summary of any hydrogeology studies undertaken and related analysis of these data, including groundwater flow pathways as influenced by underground workings.	4
10.5 r)	A summary and evaluation of data results from the field pilot test of the bio-pass system.	8
10.5 s)	A summary of surface water quality monitoring, including any acute lethality testing conducted.	5.1
10.5 t)	A summary of groundwater quality monitoring in wells downslope of the mine workings.	5.2
10.5 u)	A summary of the programs undertaken for environmental monitoring and surveillance as outlined in the Monitoring and Surveillance Plan and the Wildlife Protection Plan, including an analysis of these data and any action taken or adaptive management strategies implemented to monitor or address any changes in environmental performance.	5
10.5 v)	A summary of progressive and ongoing reclamation activities.	8
10.5 w)	A summary of proposed development and production for the coming year.	10
10.5 x)	A summary of activities related to care and maintenance of the Undertaking, including any temporary closure activities, if applicable.	8
10.5 y)	A summary of spills and accidents that occurred as a result of the Undertaking.	6
10.5 z)	A summary of the previous and projected use of the access road, including maintenance work conducted, a summary of the level of traffic, access control issues, wildlife incidents and other accidents, and upgrade or maintenance work planned for the upcoming year.	7

1.1 Quartz Mining License Requirements

All major and minor permits are in place for the Wolverine Mine, with all infrastructure located on YZC mineral claims. All QML requirements pertaining to monitoring and reporting were achieved in 2012, and the submissions to Yukon Energy, Mines and Resources (EMR) are summarized in Table 1-2. All plans and reports submitted to EMR are available on the EMR website: http://www.emr.gov.yk.ca/mining/wolverine.html.

Table 1-2:QML Submissions in 2012

Submission	Date Submitted
Operations Phase Waste Rock Pad As-Built Report	31-Jan-12
Notice of Commencement of Production	21-Mar-12
Tailings Facility Plan (V2009-02) – Addendum Ultimate Dam Design	20-Mar-12
2011 Annual Report for QML-0006	2-Apr-12
2011 Annual Report for QML-0006: Wildlife Protection Plan	2-Apr-12
2011 Annual Report for QML-0006: Monitoring and Surveillance Plan	2-Apr-12
Revision to Monitoring and Surveillance Plan V2011-03 Section 8.3	26-Apr-12
Tailings Facility Plan (V2009-02) – Addendum Ultimate Dam Design	24-Jul-12
EBA Engineering Consultants Annual Inspections of the On-Site Earth Structures	15-Aug-12
Underground Geotechnical Inspection	15-Aug-12
Update to Reclamation and Closure Plan	19-Sep-12
As Constructed Report for the Tailings Facility Ultimate Dam	7-Dec-12

2 2012 Mine Activities

Mine activities in 2012 focused on the ramping up of the underground mine operations toward full production, reaching the commercial production threshold in March, continued ramp-up of milling operations, and continued underground development.

2.1 Mine Development – Surface Infrastructure

Figure 2-1 and Figure 2-2 provide the location of major surface infrastructure for the overall site, and at the industrial complex area, respectively. These figures are updates to the proposed construction figures provided in *General Site Plan V2011-05*.

There were no major construction activities associated with the mine development-surface infrastructure in 2012.

2.2 Tailings Facility Activities

The total amount of tailings deposited into the tailings impoundment in 2012 was 259,963 tonnes tonnes, derived from 494,661 tonnes of ore and waste milled. In addition to the 147,501 tonnes deposited in 2010 and 2011, the total amount of tailings stored in the facility was 407,464 tonnes as of the end of 2012.

The tailings facility has performed as planned and as of December 31, 2012, was surveyed to contain 568,300 m³. As the ultimate tailings facility has a capacity of 1,513,900 m³, the available volume remaining is 63%.

A full depth sampling of the tailings was conducted but, unfortunately, the data collected was corrupted and was not able to be accessed.



Picture 2-1: Tailings storage facility after dam lift construction project, looking east (top) and west (bottom).



Figure 2-1: Wolverine Mine General Site Plan End of 2012



Figure 2-2: Wolverine Mine Industrial Complex End of 2012

2.3 Underground Mine

The primary objectives of underground development were to increase the number of stopes available for development to increase the production of ore and the extraction of waste. A number of initiatives were completed to facilitate increasing production, including:

- acquisition of mining equipment to improve operational efficiencies;
- review and Optimization of the Ground Control Management Plan and other systems such as the paste fill system;
- establishment of grade cut-off criteria in mine planning to improve milling efficiencies;
- use of controlled blasting to control ground conditions and reduce dilution; and,
- start of mining on upper lifts above, and adjacent to, paste fill, as well as retreat slashing to maximize ore recovery.

The following drawings to illustrate the development completed in 2012 are provided below:

- Figure 2-3: Underground workings emphasizing 2012 development; and
- Figure 2-4: Paste backfill locations.









2.4 Updates to Estimates of Ore Reserves and Mine Life

An update was not determined for the ore reserve or mine life in 2012.

2.5 Underground Stability Incidents

There were two reportable underground stability incidents in 2012. In both cases the walls of the drift on the 1200 and 1190 level became unstable due to slow unraveling failure of water saturated ground in proximity to exploration drill holes. The headings were abandoned and backfilled with paste (1200) and waste (1190) and mining continued on the ore horizon adjacent to the filled zone. No injuries or equipment damage resulted.

2.6 Paste Backfill

Paste backfill placement underground continued in 2012 and the locations are shown in **Error! Reference source not found.** In total, 96,550 tonnes of paste were placed underground in 2012. Details of humidity cell tests conducted for paste backfill analysis are provided in the *Wolverine Mine Monitoring and Surveillance Plan 2012 Annual Report*.

2.7 Mill Operations

The total amount of waste and ore removed from the mine in 2012 was 441,095 tonnes and 53,566 tonnes, respectively. 174,099 tonnes of ore were from the Wolverine Zone and 266,995 tonnes were from the Lynx Zone. At the end of 2012 approximately 15,519 tonnes of ore were stockpiled, with grades of 7.56% Zn, 0.70% Cu, 1.03% Pb, 1.24 g/t Au and 250.46 g/t of Ag.

Of the 441,095 ore tonnes extracted from the underground, 428,956 tonnes were milled with the average head grades of 7.72% Zn, 0.71% Cu, 1.00% Pb, 1.33 g/t Au and 248.5 g/t Ag. The total amount and grade of concentrate produced, stockpiled, and transported from the Wolverine Mine is summarized in Table 2-1.

Componentinates	C:: (0()	Db (0()	7 (0()	A = (= / +)		Dry Milled Tonnes	
Concentrate	Cu (%)	PD (%)	Zn (%)	Ag (g/t)	Produced	Stockpiled	Transported
Cu	16.95	4.18	6.95	3,704.4	8,124	243	7,881
Pb	3.95	15.93	9.04	2,308.6	10,411	346	10,065
Zn	0.77	1.76	42.00	323.8	64,590	5,650	58,940

Table 2-1:Total Amount and Average Grade of Concentrate Produced, Stockpiled and Transported
by End of 2012

Details of humidity cell tests conducted for mine waste rock and ore analysis are provided in the *Wolverine Mine Monitoring and Surveillance Plan 2012 Annual Report*.

3 Annual Engineering Inspections

Three engineering inspections occurred in 2012 and subsequent reports were submitted to EMR within 45 days of the inspections being completed. The results of these inspections are summarized below, as are the actions taken to date by YZC.

3.1 Mill and Associated Infrastructure Inspection

An annual inspection of water retaining structures (excluding the tailings storage facility) was conducted on July 10th and 11th, 2012 by EBA Engineering Consultants, and included a visual inspection of the following structures:

- 1. Industrial Complex cut and fill slopes.
- 2. Industrial Complex Surface and Underground Water Treatment Sumps (1, 2, and 5) liners and slopes.
- 3. Industrial Complex Diversion Ditch 1 cut and fill slopes.
- 4. Industrial Complex Collection Ditches (2, 3, 4 and 5) liners, cut and fill slopes.
- 5. Mine Camp Pad Area including upper generator and water treatment pad, sewage treatment plant pad, and treated effluent pond liner, cut and fill slopes.
- 6. Temporary Waste Rock and Ore Storage Facility including seepage collection sump and ore waste stockpiles contained within the facility cut and fill slopes.
- 7. Land Treatment Facility (Hydrocarbon Contaminated Material) including runoff collection sump liners and fill slopes.
- 8. Vent Raise and Propane Tank Pad cut slopes.
- 9. Truck Shop Pad cut and fill slopes.

The report contained the recommendations for water bearing structures, summarized in Table 3-1 with the corresponding actions taken by YZC in 2012. EBA concluded that all of tension cracks, sloughing, erosion channels, and areas of settlement associated with the on-site earth structures pose no significant risk to the environment or human health and safety. However, these areas should be monitored and repaired as required.

Structure	Recommendation	Actions
Industrial Complex	Erosion channels on the cut and fill slopes surrounding the Mill, Fuel Tank Farm, and Genst Pad locations, caused by runoff, should be filled.	Erosion channels along cut and fill slopes were filled, packed and graded, as required
Industrial complex surface and underground water treatment sumps (1, 2, 3, 4 and 5)	In the 2011 inspection report, settlement along the key trenches of Sumps 3 and 4 were noted, and it was anticipated that they would be decommissioned in 2011/12. Sumps 2 & 5: settlement along the key trenches as the backfill material was not compacted during placement. No other issues at this area.	Sump 4 was decommissioned in 2011 and Sump 3 in 2012, as anticipated. No work on sumps 2 and 5 took place in 2012.
Collection Ditches 1, 3, 4 & 5	Ditch 1: Noticeable tension cracks and an area of depression along the upper portion of the ditch embankment still noticeable. Tension cracks should be filled to reduce the amount of water infiltration. Depression should be graded to match the upper and lower sections of the ditch embankment.	Monitored.

Table 3-12012 Inspection Recommendations and Actions taken for Mill and Mine Associated
Infrastructure

Structure	Recommendation	Actions
	Ditch 3: Liner damaged (tears and punctures). Sediment in the bottom of the lined ditch. Tension crack along the upper portion of the outer slope. Liner should be repaired, sediment should be removed prior to freshet and tension cracks should be filled. The connector culvert from Ditch 3 to Sump 2 was completely plugged and will have to be cleaned out during the repairs to Ditch 3.	Ditch 3 liner was removed and replaced in August, 2012. The upper portion of the outer slope was filled in with fines and compacted. The connector ditch was cleared during the repair. A full report detailing the repair was submitted to the Water Board and EMR on November 9 th .
	Ditch 4: Many small tears along both sides of the ditch cause by snow removal prior to spring run-off. The side slopes require repair. A large tension crack is visible on the western side of the ditch. Additional repair work should be conducted to fill in the depression. Other erosion channels and tension cracks should also be filled in.	All the tears and punctures of the liner were repaired (reported on November 9 th with the Ditch 3 repair). Visible tension cracks and erosion channels along the western side were filled and compacted.
	MSE wall was almost completely plugged restricting runoff flow towards Sump 2.	runoff at end of culvert was removed.
Mine camp pad area including upper generator and water treatment pad, sewage treatment plant pad and treated effluent pond	Noticeable tension cracks along the perimeter of the fill slope of the camp, upper generator and water treatment pads. These areas should be monitored and repaired as required.	Tension cracks along the perimeter of the camp were monitored and filled as required

3.2 Tailings Storage Facility Inspection

Weekly and monthly inspections of the tailings storage facility and associated infrastructure are conducted by site personnel. These inspections include routine inspections regarding the condition of the dam, liner, diversion ditches, seepage collection system and spillways and pipelines. Monthly monitoring of the dam conditions includes inflows, outflows and water level elevation. All 12 reports from January to December, 2012, are provided in Appendix A. Instrumentation (piezometers and inclinometers) is also downloaded monthly and the data reviewed for consistency.

The as-constructed report prepared by Klohn Crippen Berger entitled 121121R-TSFConstructionSummary on November 21, 2012 detailing the activities undertaken to increase the height of the Dam to 26 m serves as the inspection report. The full report was submitted to the Water Board and EMR on December 7th, 2012. The report documents the construction activities of the Tailings Storage Facility (TSF) Stage 2 Dam Raise, and related infrastructure works carried out in 2012. It includes construction observations, design changes, quality assurance data, select photos and construction drawings. The ultimate height of the dam and capacity of the TSF was increased to 26 m and 1,513,900 m³, respectively. No significant observations were made that would suggest any concerns with the stability of the facility or its ability to store tailings as per the design. Further construction requirements for 2013 include:

- 1. Investigate repair options to western inclinometer, IN-02, since it was unable to be sounded beyond a depth of 10 m with the probe following construction.
- 2. Extend the spillway.
- 3. Install ten survey monuments along the top of the dam.

Since the report was issued, YZC has continued to operate the facility as per the OM&S Manual and is monitoring the facility monthly.

3.3 Underground Mine Inspection

An inspection of the geotechnical aspects of the Wolverine underground mine was conducted by Alfred Dune PEng. Guidelines and recommendations contained within the report continue to be followed for underground mine development activities.

Extended hours of work	This is currently under a temporary Variance. Industrial Hygiene testing is complete and an agreement has been reached with YWCHSB to make the variance permanent conditional on continued routine monitoring.
Fire fighting Equipment and Procedures for Fires	The mine has a supply of portable fire extinguishers on surface in addition to those deployed at fixed locations and on mobile equipment. The mine has developed underground fire response plans that will utilize the mine water supply for direct fire attack if necessary and isolation of the fire in the stopes by sealing as the primary means of controlling underground fires.
Fire doors	The lack of fire doors will be addressed by development of engineering solutions and proposals in 2013. The intent of the standard, to prevent spread of a surface fire to the underground can be met, in modern mines where timbers are not used for support, through adequate separation distances based on materials of construction as referenced in the fire codes.

Specific deficiencies identified are being addressed as follows:

4 Hydrogeology Studies

Hydrological flow rates in the underground workings have been monitored since 2006; however, in 2007 – 2008 the rates were calculated based on discharge volumes from treatment sumps, whereas in 2009 -2012 the flow rates were more accurately monitored using a flow meter on the discharge pipe.

These rates are presented in Figure 4-1. Flow rate increases during the summer months were evident in all four years. The average daily flow rates increased to 264 m^3 /day in 2012 from 173 m^3 /day in 2009. In 2012 recharge rates ranged from 261 m^3 /day (February 2012) to 375 m^3 /day (May 2012) and indicate seasonal variations consistent with previous years.



Figure 4-1: 2009-2012 Daily Average Underground Recharge Rates

5 Environmental Monitoring and Surveillance

As per annual report requirements, summaries are provided below for:

- Surface water quality monitoring and acute lethality testing; and,
- Groundwater quality monitoring in wells downslope of the mine workings.

In addition, Section 5.3 provides information on construction monitoring. Specific information on wildlife monitoring can be found in the *Wolverine Project Wildlife Protection Plan 2012 Annual Report*, and on environmental monitoring and surveillance in the *Monitoring and Surveillance Plan 2012 Annual Report*. Specific water quality results (i.e., laboratory reports) for surface and groundwater test work are provided in *Type A Water Use Licence QZ04-065 2012 Annual Report*, which is available upon request.

5.1 Surface Water Quality Monitoring and Acute Lethality Testing

Surface water quality monitoring for the purposes of baseline monitoring (as per Type A Water Use Licence QZ04-065) was taken at the locations and dates summarized in Table 5-1. A total of 191 sample sets were analyzed for physical parameters, TSS, dissolved and total metals (by ICP-MS) and

mercury (by CVAS), as well as cyanide and dissolved organic carbon for select sampling sites (W16 & W31).

Because all underground water was pumped, untreated, to the tailings storage facility in 2012, there were no discharges to the environment, and thus no acute lethality testing conducted in 2012.

Sampling Site	January	February	March	April	Мау	June	July	August	September	October	November	December
T1	25-Jan	19-Feb	21-Mar	А	08-May	25-Jun	16-Jul	12-Aug	31-Aug	02-Oct	А	28-Dec
L1	30-Jan	19-Feb	21-Mar	А	А	25-Jun	16-Jul	12-Aug	31-Aug	02-Oct	А	Е
W1	27-Jan	19-Feb	23-Mar	А	08-May	25-Jun	16-Jul	12-Aug	31-Aug	02-Oct	А	29-Dec
W8	27-Jan	D	D	А	08-May	25-Jun	16-Jul	12-Aug	31-Aug	02-Oct	А	29-Dec
W9	А	07-Feb	А	А	06-May	E	22-Jul	19-Aug	10-Sep	06-Oct	А	Е
W12	А	07-Feb	А	А	06-May	E	21-Jul	19-Aug	10-Sep	06-Oct	А	E
W14	14-Jan	17-Feb	18-Mar	06-Apr	02-May	04-Jun	02-Jul	27-Aug	29-Sep	27-Oct	06-Nov	18-Dec
W15	14-Jan	16-Feb	18-Mar	6-Apr	2-May	4-Jun	20-Jul	27-Aug	9-Sep	28-Oct	6-Nov	13-Dec
W16	А	11-Feb	10-Mar	03-Apr	04-May	05-Jun	01-Jul	06-Aug	02-Sep	26-Oct	17-Nov	03-Dec
W21	А	11-Feb	10-Mar	03-Apr	04-May	05-Jun	01-Jul	06-Aug	02-Sep	26-Oct	17-Nov	03-Dec
W22	14-Jan	17-Feb	D	D	03-May	04-Jun	03-Jul	01-Aug	08-Sep	28-Oct	05-Nov	D
W31	02-Jan	11-Feb	10-Mar	03-Apr	04-May	05-Jun	01-Jul	06-Aug	02-Sep	26-Oct	17-Nov	03-Dec
W40	02-Jan	12-Feb	17-Mar	04-Apr	03-May	05-Jun	01-Jul	06-Aug	02-Sep	26-Oct	24-Nov	05-Dec
W71	02-Jan	12-Feb	17-Mar	04-Apr	03-May	05-Jun	01-Jul	06-Aug	02-Sep	26-Oct	24-Nov	05-Dec
W72	4-Jan	12-Feb	17-Mar	4-Apr	3-May	5-Jun	1-Jul	6-Aug	2-Sep	26-Oct	24-Nov	5-Dec
W73	А	А	А	02-Apr	06-May	30-Jun	22-Jul	19-Aug	10-Sep	06-Oct	А	Е
W80	13-Jan	17-Feb	18-Mar	06-Apr	07-May	04-Jun	02-Jul	27-Aug	29-Sep	27-Oct	10-Nov	16-Dec
W81	04-Jan	04-Feb	D	D	05-May	04-Jun	20-Jul	01-Aug	07-Sep	25-Oct	10-Nov	19-Dec
W82	04-Jan	16-Feb	19-Mar	18-Apr	04-May	03-Jun	04-Jul	17-Aug	А	27-Oct	09-Nov	12-Dec

 Table 5-1:
 Surface Water Monitoring Sites and Sampling Frequency

D = Site dry (i.e., all water tied up in storage) or frozen through to ground

E = Transportation equipment under repair

5.2 Groundwater Quality Monitoring

Groundwater wells downslope of the mine workings were sampled monthly in 2012, as required by A Licence QZ04-065. Sampling dates for groundwater wells downslope of the mine workings are summarized in Table 5-2. Gaps in Table 5-2 represent dates when the wells were frozen, and samples were not able to be taken. A total of 24 sample sets were collected from the groundwater wells downslope of the mine workings, and they were analyzed for physical parameters, TSS, dissolved metals (by ICP-MS) and mercury (by CVAS).

 Table 5-2:
 Groundwater Monitoring Sites and Sampling Frequency

Sampling Site	January	February	March	April	May	June	July	August	September	October	November	December
MW05-3A						12-Jun	11-Jul	05-Aug	06-Sep	07-Oct		
MW05-3B						12-Jun	11-Jul	05-Aug	06-Sep	07-Oct		
MW05-5A	23-Jan	18-Feb	16-Mar	13-Apr	11-May	09-Jun	06-Jul	26-Aug	10-Sep	30-Oct	01-Nov	07-Dec
MW05-5B				19-Apr	11-May	09-Jun	06-Jul	26-Aug	10-Sep	08-Oct		07-Dec
MW06-11S						10-Jun	11-Jul	08-Aug	10-Sep			

5.3 Environmental Monitoring for Construction Activities

There were no construction activities in 2012, hence environmental reporting was not required.

6 Environmental Incidents

There were five reportable spills (defined by the *Yukon Spills Regulations* as "a release of a hazardous substance to the environment in quantities above the spill reporting thresholds, or any amount of spill onto a watercourse") and six unauthorized discharges in 2012 (Table 6-1). Spills were immediately reported and full spill reports were submitted to EMR within 10 days of their respective occurrences. Follow up reports were submitted upon receipt of laboratory results, as required.

Date	Volume and Substance	Cause	Reporting and Follow-up Actions
04-Feb-12	~2m ³ of filtered tailings water	Overflowed from door # 7 of the Mill due to pump failure.	Initial Report: 9-Feb-12
7-Apr-12	~54.5 m ³ melt water from Ditch 4	Flow within Ditch 4 was restricted by ice built up	Initial Report: 15-Apr-12 Follow-up Report: 2-May-12
13-May-12	~0.4 m ³ reclaim tailings effluent	Uneducated operator sprayed tailings reclaim outside door #10 of the Mill.	Initial Report: 20-May-12 Follow-up Report: 31-May- 12
20-May-12	~2.4 m ³ discharge from new Waste Rock Pad	Pipe for future tie in with tailings was not blocked off, allowing snow melt to run out	Initial Report: 30-May-12
21-May-12	~0.5 m ³ discharge from Land Treatment Facility	Vacuum Truck was preoccupied with discharge from Waste Rock Pad, and could not keep up with snow melt	Initial Report: 31-May-12
5-Jun-12	~21.1 L waste oil	Loader operator flipped bin while loading.	Initial Report: 8-Jun-12 Follow-up Report: 31-Jul-12
5-Jun-12	~2kg CuSO ₄	Reagent bag broke open while removing it from Seacan.	Initial Report: 8-Jun-12
20-Jun-12	~0.3 m ³ tailings filter water	Filtered tailings water overflowed pump box	Initial Report: 28-Jun-12
20-Aug-12	~0.75 m ³ Ethylene Glycol (60/40)	Tote punctured by fork lift operator	Initial Report: 22-Aug-12 Follow-up Report: 10-Sep-12
21-Oct-12	~100 kg Zinc Sulphate Monohydrate	Reagent bag tore during transport	Initial Report: 26-Oct-12
2-Nov-11	~1 kg Zinc Concentrate	Lead haul truck roll-over	Initial Report: 21-Dec-12

Table 6-1:Environmental Incidents in 2012

7 Access Road Operation

Access road activities outlined in the sections below include the 2012 use, maintenance work, access control, and road upgrade or maintenance activities.

7.1 2012 and Projected 2013 Use

In 2012, all freight and service vehicles entering and exiting site were recorded by site personnel and are summarized by month in Table 7-1. The total annual access road usage for 2012 was 4402 vehicles.

Month	Vehicle Traffic
January	325
February	310
March	299
April	306
May	388
June	415
July	358
August	426
September	412
October	365
November	402
December	396
Total	4402

Table 7-1:2012 Access Road Vehicle Usage

In 2013, the number of concentrate haul trucks and service vehicles on the road is anticipated to be similar to 2012, for a daily average of 12.

7.2 2012 Work and Upgrades Conducted

Improvements to the access road included widening, raising and reducing grade, ditching and drainage control, decreasing side slopes, installation of berms, improvements to existing and additional pull out bays, surfacing and defining shoulders. Culverts and culvert extensions were installed and rip rap was placed at culvert entrances. All these works were ongoing throughout the spring, summer and fall months as the need arose. However, no major construction works were carried out on the Access Road in 2012.

Sediment and erosion control was conducted throughout construction and included silt fence and geotextile installation, as required.

7.3 Access Control Issues

There have been no issues with access control. There is one Wolverine Mine Access Control Gate at km 0.1, to prevent public use of the access road. A radio-controlled automated gate opener was installed at the gate at km 0.1 in 2008 and is currently in use. The Access Road is patrolled daily by on-site employees for on-going road maintenance. All vehicles entering and leaving the site are required to call security, via radio, to gain access/exit through the radio-controlled gate.

7.4 Projected Road Construction Activities

YZC will continue with road improvements for concentrate haul trucks and service vehicle use as needed in 2012.

7.5 Wildlife Incidents or Other Accidents

In 2012, there were a total of twenty-two wildlife related incidents, of which 2 were mortalities. On March 29th, a Ptarmigan was found dead on the Truck Shop pad, and on July 20th, a Raven was found dead along the side of the Access Road. The causes of these mortalities could not be verified but it is thought they were the result of vehicle strikes. The remaining incidents consisted of the presence of wildlife that posed a threat or danger to on-site employees (e.g., bear/wolf sightings), or bird species observed occupying the area surrounding the tailings facility. These incidents did not result in any harm to wildlife or YZC employees.

8 Reclamation Activities

In 2012, the focus of activities was the completion of the Stage 2 Tailings Dam Raise (see section 3.2 for further details), and improvements to the access road and infrastructure associated with the Industrial Complex (e.g., replacement of Ditch 3 and repairs to Ditch 4). All activities were completed within defined footprints and impacts minimized as necessary to lessen reclamation requirements. The overburden removed from the area prepared for the Stage 2 Tailings Dam Raise was stockpiled along the side of the Access Road between KM 25 + 200 and 25 + 500, and Ditch A was extended to intercept any surface water and divert it to Go Creek. Several interconnecting french drains were extended/installed beneath the tailings footprint to control flow through and stabilize surrounding soil.

An update to the Reclamation and Closure Plan (Plan) was completed in 2012, and was submitted to EMR on September 19th, 2012. As per *QML-0006 Section 8.0*, the updated Plan addresses care and maintenance of the mine site during a temporary closure period, and decommissioning of operations and reclamation of the site at final closure. The Plan was developed to address two possible scenarios for permanent decommissioning:

- 1. The mine site in its current state (Existing Condition), or
- 2. The mine after ore reserves are exhausted (Life of Mine).

Changes to the following surface facilities and infrastructure for mine operations were described:

- 1. Site Access Road
- 2. Airstrip
- 3. Fuel storage pad
- 4. Power generation and distribution
- 5. Process buildings
- 6. Assay laboratory
- 7. Wet shotcrete plant
- 8. Waste rock storage pads
- 9. Tailings facility
- 10. Truck shop

- 11. Mining office complexes
- 12. Administration, first aid and mine rescue buildings, dry, and Camp

The results of reclamation and closure research programs, such as the Biopass Pilot Testing program, were detailed in the Plan, and recommendations for further testing were described. The extent to which disturbed areas (e.g., site Access Road, Ditches, Tailings facility, Industrial Complex) were progressively reclaimed through erosion mitigating techniques and seeding programs were also described, and illustrated using select photographs. The final security bond payment required to fully reclaim and close the mine for each of the three situations (i.e., Temporary Closure, Existing Condition closure, and Life of Mine closure) was estimated.

9 Socio-Economic Assessment

The EA Screening Report requires that YZC report annually on the following:

- The number of Yukoners and non-Yukoners employed at the mine; and,
- The value of goods and services procured within Ross River, Watson Lake and the Yukon as a whole.

Over the course of the year, 162 Yukoners and 432 non-Yukoners were employed at the project site by YZC and numerous contracting companies. The contractors included Procon Mining and Tunnelling Ltd, Arctic Construction Ltd., ESS Compass Canada and Maple Leaf Loading. Wages from the local region are not included in the totals below.

The value of goods and services procured from Ross River, Watson Lake and the Yukon in 2012 is estimated at \$31,534,000 in Table 9-1. In addition to these Yukon Zinc expenditures, the Kaska First Nation communities (Ross River, Watson Lake and three in northern BC), who formed joint venture businesses with Arctic Construction Ltd., ESS Compass, Maple Leaf Loading, Procon Mining and Tunnelling, and Tu Lidlini/Alberta Fuel Distributors shared payments in 2012 estimated at \$1.7 million.

Location	Amount
Ross River	\$143,000
Watson Lake	\$565,000
Yukon	~\$31,534,000
Kaska Joint Venture Businesses	~\$1,700,000

Table 9-1:Goods and Services Procured from Ross River, Watson Lake and the Yukon for 2012

10 Project Development and Production for 2013

In 2013, stopes will continue to be developed for ore extraction. The projected amount of ore to be mined from underground workings is 646,160 tonnes (Table 10-1).

Table 10-1: Planned Total Ore to be Mined from Underground in 2013

2013 Mine Production Plan		
	Access Level	Tonnes
	1300	49,508
	1280	44,617
	1270	44,769
	1260	46,800
	1250	42,410
	1240	49,348
	1230	42,646
	1220	45,020
Se	1210	40,623
ů	1200	48,481
U	1190	34,004
Lo	1180	34,841
ພ	1170	31,494
)r(1160	29,843
0	1150	26,002
	1140	24,343
	1130	11,411
	1120	0
	1110	0
	1100	0
	1080	0
	Total Ore Tonnes Mined	646,160
	Tonnes/day Ore Mined	1,742
	Tonnes of Waste	38,605
	Total Tonnes Mined	684,764
	Tonnes/day Total Mined	1,876

Projected concentrate production in 2013 is summarized in Table 10-2 for lead, copper and zinc concentrates.

Table 10-2: Concent	te Production Estimated	for 2013
---------------------	-------------------------	----------

Variable	Dry Milled Tonnes
Copper Concentrate	20,200
Lead Concentrate	16,686
Zinc Concentrate	109,892
Total Concentrate Produced	146,779

Appendix A: Monthly Tailings Monitoring Reports



Month January 2012 Avg. Daily Temp. Average: -16.9°C; Low: -33.7°C; High: -0.6°C Mill Record Data: Total Monthly Tailings Deposition 17771. Dry Tonnes Average Monthly Tailings % Solids 15-20 % Total Monthly Tailings Slurry Volume 100397. m³

Total Monthly Reclaimed Water Volume _____ 99753. m³

Site Measurements:		
Date of survey <u>Jan. 31, 2011</u> Pond Elevati	on <u>1300.55</u> m Es	stimated volume <u>388,862</u> m ³
Total Monthly Precipitation	0	mm
Total Monthly Underground Input	8,673	m ³
Total Monthly STP Effluent Input	841	m ³
Total Monthly Industrial Complex Runoff Input	0	m ³
Total Volume from Seepage collection pond to Facility	0	m ³
Average Monthly Underdrain Flow Rate	0	L/s
Average Monthly Ditch A Flow Rate	0	L/s
Average Monthly Ditch B Flow Rate	0	L/s
Total Monthly Volume Discharged from Water Treatment	0	m ³
Depth of Water at Reclaim Barge	11.45M	m
See page 3 to Annotate Pond Diagram		
	Photo Sheet Attached?	Y 🖄 N 📋



Special Remarks:

- 1. Brief on Mill Operation: Mill operated 25 days during the month.
- 2. Brief on any maintenance: De-icing pumps were replaced at the tailings reclaim barge



Sketch to Include:

- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Robin McCall/Wade Ritchie	Signature		
			Original	
			was	
			dated	
			January	
			2011	
Supervisor/Manager	Peter Nelega	Signature & D	ate	







WOLVERINE PROJECT Tailings Facility Monitoring

Monthly Impoundment Monitoring Report

Month February 2012	Avg. Daily Temp	Average: -11.1°C; Low: -27.1°C; High: 0.3°C
Mill Record Data:		
Total Monthly Tailings Deposition	22863.9	Dry Tonnes
Average Monthly Tailings % Solids	15-20%	%
Total Monthly Tailings Slurry Volume	110894.8	m ³
Total Monthly Reclaimed Water Volume	108084.9	m³

Site Measurements:		
		_
Date of survey <u>Feb. 29, 2011</u> Pond Ele	evation <u>1300.76</u> m	Estimated volume 401,500 m ³
Total Monthly Precipitation	0	mm
Total Monthly Underground Input	7,321	m ³
Total Monthly STP Effluent Input	780	m ³
Total Monthly Industrial Complex Runoff Input	0	m ³
Total Volume from Seepage collection pond to Facility	0	m ³
Average Monthly Underdrain Flow Rate	0	L/s
Average Monthly Ditch A Flow Rate	0	L/s
Average Monthly Ditch B Flow Rate	0	L/s
Total Monthly Volume Discharged from Water Treatment	0	m ³
Depth of Water at Reclaim Barge	11.64M	m
See page 3 to Annotate Pond Diagram		
Pictures Taken? Y 🗌 N 🖂	Photo Sheet Attached?	Y 🗌 N 🖂



Special Remarks:

- 1. Brief on Mill Operation: Mill processed 29845.8 dmt for the month with 22863.9 reporting to the tailings facility
- 2. Brief on any maintenance: No maintenance performed for the week.



Sketch to Include:

- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Robin McCall/Wade Ritchie	Signature	
Supervisor/Manager	Peter Nelega	Signature & Date	







WOLVERINE PROJECT Tailings Facility Monitoring

Monthly Impoundment Monitoring Report

Month March 2012	Avg. Daily Temp.	Average:-10.8 °C; Low: -24.3 °C; High: 2.9 °C
Mill Record Data:		
Total Monthly Tailings Deposition	24980	Dry Tonnes
Average Monthly Tailings % Solids	15-20	%
Total Monthly Tailings Slurry Volume	111245.1	m ³
Total Monthly Reclaimed Water Volume	114453.8	m ³

Site Measurements:				
Date of survey <u>Mar. 31, 2011</u> Pond Elevat	ion <u>1301.06</u> m	Estimated volume	420,500	m ³
Total Monthly Precipitation	4.0	mm		
Total Monthly Underground Input	8,067	m³		
Total Monthly STP Effluent Input	865.3	m³		
Total Monthly Industrial Complex Runoff Input	0	m³		
Total Volume from Seepage collection pond to Facility	0	m ³		
Average Monthly Underdrain Flow Rate	0	L/s		
Average Monthly Ditch A Flow Rate	0	L/s		
Average Monthly Ditch B Flow Rate	0	L/s		
Total Monthly Volume Discharged from Water Treatment	0	m³		
Depth of Water at Reclaim Barge	11.97	m		
See page 3 to Annotate Pond Diagram		.	_	
	Photo Sheet Attached	r Y 🖂 N		



Special Remarks:

- 1. Brief on Mill Operation: Operated at 75% availability.
- 2. Brief on any maintenance: No maintenance performed.



Sketch to Include:

- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Robin McCall/Wade Ritchie	Signature	
Supervisor/Manager	Peter Nelega	Signature & Date	






WOLVERINE PROJECT Tailings Facility Monitoring

Monthly Impoundment Monitoring Report

Month April 2012	Avg. Daily Temp.	Average: -2°C; Low: -14.1 °C; High: 10.6°C
Mill Record Data:		
Total Monthly Tailings Deposition	31338.4	Dry Tonnes
Average Monthly Tailings % Solids	15-20%	%
Total Monthly Tailings Slurry Volume	148536.58	m ³
Total Monthly Reclaimed Water Volume	146349.02	m ³

Site Measuren	nents:					
Date of survey	May 1, 2012 Pond El	evation 1301.5	4_ m	Estimated volume	451,000	m³
	Total Monthly Precipitation	n <u>1</u>	3.0	mm		
	Total Monthly Underground Inpu	t7	,935	m³		
	Total Monthly STP Effluent Inpu	t9	81	m ³		
Total Mo	nthly Industrial Complex Runoff Inpu	t6	,190	m³		
Total Volume fro	m Seepage collection pond to Facility	y 3	,131	m ³		
Av	erage Monthly Underdrain Flow Rate	e 2	.64	L/s		
	Average Monthly Ditch A Flow Rate	V eflo	ery low	L/s		
	Average Monthly Ditch B Flow Rate	e 0		L/s		
Total Monthly Volur	ne Discharged from Water Treatmen	t 0		m³		
	Depth of Water at Reclaim Barg	e <u>12.44</u>		m		
See page 3 to Annot	ate Pond Diagram					
Pictures Taken? Y	N 🗌	Photo Sheet Attach	ned?	Y 🔀 N		
				1	Page 1 of 4	



Special Remarks:

- 1. Brief on Mill Operation: Mill processed 40297.5 DMT operating at 96.7% availability for the month
- 2. Brief on any maintenance: The barge reclaim pumps had the isolation valve repaired as well as installing a new breather valve on the discharge line.



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Robin McCall/Wade Ritchie	Signature	
Supervisor/Manager	Peter Nelega	Signature & Date	







Month	May 2012		Avg. Daily Temp.		Average: 2.24; Low: - High: 14.47	7.8;
Mill Record	Data:					
Total Mont	hly Tailings Deposition	25484		Dry Ton	ines	
Average Mo	onthly Tailings % Solids		15-20%	%		
Total Monthly	Tailings Slurry Volume		132190.89	m³		
Total Monthly Re	claimed Water Volume		123385.69	m³		
Site Measurem	ents:					
						3
Date of survey	May 31, 2012	Pond Elevation	1301.88	<u>s</u> m	Estimated volume	474,800 m ⁻
	Total Monthly F	recipitation	19.4		mm	
	Total Monthly Underg	round Input	6,443		m ³	
	Total Monthly STP Ef	fluent Input	944		m ³	
Total Mont	thly Industrial Complex F	Runoff Input	1,039		m ³	
Total Volume from	n Seepage collection por	d to Facility	308		m ³	
Total volume from	m Sumps (Waste Rock Pa	ads and LTF)	3,695		m ³	
Ave	rage Monthly Underdrai	n Flow Rate	4.20		L/s	
	Average Monthly Ditch	A Flow Rate	2.54		L/s	
	Average Monthly Ditch	B Flow Rate	2.2		L/s	
Total Monthly Volum	e Discharged from Wate	r Treatment	0		m ³	
	Depth of Water at Re	claim Barge	12.81		m	
See page 3 to Annota	te Pond Diagram				<u>- 7</u>	_
Pictures Taken? Y	X N 🗌	P	hoto Sheet Attach	ned?	Y 🖂 N	



pecial Rer	nar	ks:
	1.	Brief on Mill Operation: Mill processed 36077.6 operating at 90.6% availability for the month
	2.	Brief on any maintenance: # 1 reclaim barge pump was lifted for inspection, the shroud was cleaned of built up calcium/lime, reinstalled and tested and put back into service.
	3.	The volume from the 3 sumps on site (i.e., Old Waste Rock Pad Sump, New Waste Rock Pad Sump, and Land Treatment Facility (LTF) Sump) that was transferred to the tailings facility during the spring snow melt period were added to the "Site Measurements" section because of their significant volume, and will continue to be added moving forward.



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Kate Walsh/Wade Ritchie	Signature	
Supervisor/Manager	Peter Nelega	Signature & Date	







WOLVERINE PROJECT Tailings Facility Monitoring

Monthly Impoundment Monitoring Report

Month June 2012	Avg. Daily Temp.	Average 7.14; Low – High ; 19.04	0.6
Mill Record Data:			
Total Monthly Tailings Deposition	16,268	Dry Tonnes	
Average Monthly Tailings % Solids	14.0	%	
Total Monthly Tailings Slurry Volume	117,052.78	m ³	
Total Monthly Reclaimed Water Volume	111,443,13	m ³	
Site Measurements:			
Date of surveyJune 30, 2012 Pon	d Elevation 1302.22	2 m Estimated volume	_497,000 m ³
Total Monthly Precip	vitation 88	mm	
Total Monthly Undergroun	d Input9,628	m ³	
Total Monthly STP Effluen	nt Input 988	m³	
Total Monthly Industrial Complex Runo	ff Input1798	m³	
Total Volume from Seepage collection pond to	Facility <u>3044</u>	m ³	
Total volume from Sumps (Waste Rock Pads a	nd LTF) 1421	m ³	
Average Monthly Underdrain Flo	w Rate 9.62	L/s	
Average Monthly Ditch A Flo	w Rate 5.36	L/s	
Average Monthly Ditch B Flo	w Rate 0.1	L/s	
Total Monthly Volume Discharged from Water Trea	atment 0	m ³	
Depth of Water at Reclain See page 3 to Annotate Pond Diagram	35'- n Barge 6.750"	m	



Pictures Taken? Y

N 🗌

WOLVERINE PROJECT Tailings Facility Monitoring Monthly Impoundment Monitoring Report

Photo Sheet Attached?

Y 🛛 N 🗌

mai	ks:
1.	Brief on Mill Operation: Mill presently operating at different low tonnages because of ore supply.
2.	Brief on any maintenance: Reclaim pipe and tailings pipes have been temporally moved because of tailings dam lift project. These pipe will need to be moved again.
3.	



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Doug Shippam	Signature	
Supervisor/Manager		Signature & Date	







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Month July 2012	Avg. Daily Temp.	Average: 13 °C; Low: 3 °C; High: 24 °C
Mill Record Data:		
Total Monthly Tailings Deposition	12,824.9	Dry Tonnes
Average Monthly Tailings % Solids	12	%
Total Monthly Tailings Slurry Volume	107,073.4	m³
Total Monthly Reclaimed Water Volume	102,670.8	m ³

Site Measurements:		
Date of surveyJuly 31,2012 Pond Elevat	on <u>1302.34</u> m	Estimated volume <u>505,000</u> m ³
Total Monthly Precipitation	16	mm
Total Monthly Underground Input	11,316 ³	m³
Total Monthly STP Effluent Input	1,012	m ³
Total Monthly Industrial Complex Runoff Input	See Remark 3	m ³
Total Volume from Seepage collection pond to Facility	0	m ³
Average Monthly Underdrain Flow Rate	3.67	L/s
Average Monthly Ditch A Flow Rate	1.68	L/s
Average Monthly Ditch B Flow Rate	0.02	L/s
Total Monthly Volume Discharged from Water Treatment	0	m ³
Depth of Water at Reclaim Barge	36'1.875	m
See page 3 to Annotate Pond Diagram		
Pictures Taken? Y 🔀 N 🗌	Photo Sheet Attached?	Y 🖂 N 🗌



Special Remarks:

- 1. Brief on Mill Operation: The mill operating at various tonnages as ore from underground is supplied.
- 2. Brief on any maintenance: Reclaim , tailings, and pump house overflow pipes have been moved as needed to make room for the dam lift construction
- 3. Total industrial complex runoff could is included in the "Total Monthly Underground Input" as it could not be measured separately this month.



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator _	Doug Shippam / Robin McCall	Signature	
Supervisor/Manager	Peter Nelega	Signature & Date	Reviewed August 17, 2012







WOLVERINE PROJECT Tailings Facility Monitoring

Monthly Impoundment Monitoring Report

Month August 2012	Avg. Daily Temp.	Average: 8.6 °C; Low: -2.9 °C; High: 19.4 °C
Mill Record Data:		
Total Monthly Tailings Deposition	19,895	Dry Tonnes
Average Monthly Tailings % Solids	13	%
Total Monthly Tailings Slurry Volume	136,439.1	m ³
Total Monthly Reclaimed Water Volume	129,693.2	m ³

Date of survey August 31,2012 Pond Elevation 1302.52 m Estimated volume 517,000 Total Monthly Precipitation 52.8 mm Total Monthly Underground Input 13,461 ³ m ³ Total Monthly STB Effluent Input 1,002 m ³	
Total Monthly Precipitation 52.8 mm Total Monthly Underground Input 13,461 ³ m ³ Total Monthly STB Effluent Input 1,002 m ³	m³
Total Monthly Underground Input <u>13,461³</u> m ³	
Total Monthly STR Effluent Input 1 002 m ³	
Total Monthly Industrial Complex Runoff Input See Remark 3 m ³	
Total Volume from Seepage collection pond to Facility0 m ³	
Average Monthly Underdrain Flow Rate 3.64 L/s	
Average Monthly Ditch A Flow Rate 0.99 L/s	
Average Monthly Ditch B Flow Rate 0	
Total Monthly Volume Discharged from Water Treatment0 m ³	
m	
Access currently under construction Depth of Water at Reclaim Barge (July 36'1.875")	



res Ta	ken? Y 🛛 N 🗌	Photo Sheet Attached?	Y 🛛 N 🗌
al Ren	narks:		
2	 Brief on Mill Operation: Tonnag amounts of tailings being pump 	e milled was 93% of budget, Paste has been runni ed underground.	ing well with increasing
	 Brief on any maintenance: Dam slopes. Preparing for tails barge 	lift construction continues, liner currently being i move and piping to be relocated to top of west a	nstalled on south and west nd south perimeter road.
3	 Total industrial complex runoff i measured separately this month 	s included in the "Total Monthly Underground In n.	put" as it could not be



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Doug Shippam / Andrea Kenward	Signature	
Supervisor/Manager _	Peter Nelega	Signature & Date	







WOLVERINE PROJECT Tailings Facility Monitoring

Monthly Impoundment Monitoring Report

Month September 2012	Avg. Daily Temp.	Average: 4∘C; Low: -7.9 ∘C; High: 20.2 ∘C
Mill Record Data:		
Total Monthly Tailings Deposition	19,563.35	Dry Tonnes
Average Monthly Tailings % Solids	16.3	%
Total Monthly Tailings Slurry Volume	107,183.7	m ³
Total Monthly Reclaimed Water Volume	100,437.7	m³

Site Measuren	nents:					
Date of survey	September 30 th	Pond Elevation	<u>1302.66</u> m	Estimated volume	526, 488	m³
	Total Monthly Pr	ecipitation	46.6	mm		
	Total Monthly Undergr	ound Input	10, 190	m ³		
	Total Monthly STP Eff	uent Input	793.2	m³		
Total Mo	nthly Industrial Complex R	unoff Input	See Remark 3	m³		
Total Volume fro	om Seepage collection pond	l to Facility	364	m³		
Av	verage Monthly Underdrair	Flow Rate	2.23	L/s		
	Average Monthly Ditch A	Flow Rate	0.98	L/s		
	Average Monthly Ditch E	Flow Rate	0	L/s		
Total Monthly Volur	ne Discharged from Water	Treatment	0	m ³		
	Depth of Water at Rec	laim Barge	22'1" (taken Sept 29,2012)	m		
See page 3 to Annot	ate Pond Diagram					
Pictures Taken? Y	' 🖂 N 🗌	Pho	oto Sheet Attached?	Y 🔀	N	
				Pag	ge 1 of 4	



Special Remarks:

1. Brief on Mill Operation: Mill operating at 67-72 tph.

 Brief on any maintenance: safety items completed with handrails on barge walkways, Barge moved into final position after dam lift construction completed O/F off of booster pump house re-directed into pond.

3. Total industrial complex runoff is included in the "Total Monthly Underground Input" as it could not be measured separately this month.



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Doug Shippam / Andrea Kenward	Signature	
Supervisor/Manager		Signature & Date	







WOLVERINE PROJECT Tailings Facility Monitoring

Monthly Impoundment Monitoring Report

Month October 2012	Avg. Daily Temp.	Average:-7.8 ; Low: -24.3 C; High: 12.9 C
Mill Record Data:		
Total Monthly Tailings Deposition	22046	Dry Tonnes
Average Monthly Tailings % Solids	12-16%	%
Total Monthly Tailings Slurry Volume	114058.6	m ³
Total Monthly Reclaimed Water Volume	110289.48	m ³

Site Measurements:		
Date of survey <u>October 31st</u> Pond Elevat	ion <u>1302.84</u> m Es	timated volume <u>540,000</u> m ³
Total Monthly Precipitation	10.4	mm
Total Monthly Underground Input	10,184	m ³
Total Monthly STP Effluent Input	820.8	m ³
Total Monthly Industrial Complex Runoff Input	See Remark 3	m ³
Total Volume from Seepage collection pond to Facility	0	m ³
Average Monthly Underdrain Flow Rate	2.91	L/s
Average Monthly Ditch A Flow Rate	0.70	L/s
Average Monthly Ditch B Flow Rate	0	L/s
Total Monthly Volume Discharged from Water Treatment	0	m ³
Depth of Water at Reclaim Barge	22' 6.375"(taken Oct. 31, 2012)	m
See page 3 to Annotate Pond Diagram Pictures Taken? Y 🛛 N 🗌	Photo Sheet Attached?	Y 🖂 N 🗌



Special Remarks:

- 1. Brief on Mill Operation: Mill currently running at 72 tph and the paste back fill circuit running. Paste back fill operated and record tonnages and operating time depositing tailings to the underground for the month.
- 2. Brief on any maintenance: No maintenance performed.
- 3. Total industrial complex runoff is included in the "Total Monthly Underground Input" as it could not be measured separately this month.



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator	Doug Shippam / Andrea Kenward	Signature	
Supervisor/Manager _	Peter Nelega	Signature & Date	







Site Measurements:					
Date of survey <u>November</u>	30 Pond Elevatio	on 1303.01_ m	Estimated volume	552,000	m³
To	tal Monthly Precipitation _	0.2 (as rain)	mm		
Total Mo	nthly Underground Input	10,306	m ³		
Total M	onthly STP Effluent Input	809.4	m ³		
Total Monthly Industr	ial Complex Runoff Input	0	m ³		
Total Volume from Seepage c	ollection pond to Facility	0	m³		
Average Month	nly Underdrain Flow Rate _	1.42	L/s		
Average M	onthly Ditch A Flow Rate	Low flow (cannot measure)	L/s		
Average M	onthly Ditch B Flow Rate _	0	L/s		
Total Monthly Volume Discharge	d from Water Treatment _	0	m ³		
Depth o	f Water at Reclaim Barge _	23' 5.25"	m		
See page 3 to Annotate Pond Dia Pictures Taken? Y 🔀 N 🗌	gram	Photo Sheet Attached?	Y 🖂	N 🗌	



Special Remarks:

- 1. Brief on Mill Operation: Mill operated at 91% time during month and the paste back fill circuit operated at 39%.
- 2. Brief on any maintenance: No maintenance performed.



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator _	Gerald Nitschke / Robin McCall	Signature	
Supervisor/Manager	Peter Nelega	Signature & Date	







Month December 2012 Avg. Daily Temp. Average:-18.7; Low: -28.0 C; High: -3.7 C Mill Record Data: Mill Record Data: Total Monthly Tailings Deposition 26,646 Dry Tonnes Average Monthly Tailings % Solids 15-19 % Total Monthly Tailings Slurry Volume 110,980 m³ Total Monthly Reclaimed Water Volume 116,325 m³

Site Measurements:					
Date of survey <u>December 31</u> Pond Elevati	tion1303.23 m Estimated volume568,300 m				
Total Monthly Precipitation	mm				
Total Monthly Underground Input	m ³				
Total Monthly STP Effluent Input	800.2 m ³				
Total Monthly Industrial Complex Runoff Input	m ³				
Total Volume from Seepage collection pond to Facility	m ³				
Average Monthly Underdrain Flow Rate	L/s				
Average Monthly Ditch A Flow Rate	Low flow (cannot L/s measure)				
Average Monthly Ditch B Flow Rate	L/s				
Total Monthly Volume Discharged from Water Treatment	m ³				
Depth of Water at Reclaim Barge	m				
See page 3 to Annotate Pond Diagram Pictures Taken? Y 🔀 N 🗌	Photo Sheet Attached? Y 🖂 N 🗌				



Special Remarks:

- 1. Brief on Mill Operation: Mill processed 45985 dmt for the month.
- 2. Brief on any maintenance: None undertaken.



- Pond area
- Ice area
- Tailings spigot points
- Tailings beaches
- Reclaim barge location



Operator _	Gerald Nitschke / Robin McCall	Signature		
Supervisor/Manager	Peter Nelega	Signature & Date	January 6, 2013	


WOLVERINE PROJECT Tailings Facility Monitoring Monthly Impoundment Monitoring Report

