August 11, 2015

Yukon Zinc Corp.
#701 – 475 Howe Street
Vancouver, British Columbia
V6C 2B3

Malcom Swallow
Consulting Mining Engineer

Dear Mr. Swallow:

Wolverine Mine
2015 Annual Physical Inspection of TSF and On-site Earth Structures

1 INTRODUCTION

1.1 General

Wolverine Mine is a zinc-silver-copper-lead-gold underground mine, located in southeast Yukon within Kaska Traditional Territory approximately halfway between Watson Lake, B.C. and Ross River, Yukon. The mine reached its current production capacity of 1,700 tonnes per day in January 2013. Yukon Zinc Corporation (YZC), owner of Wolverine Mine, placed the mine into care and maintenance on January 21, 2015. As a result, there has been no mining or milling operation or tailings discharge in the Tailings Storage Facility (TSF) since January, 2015.

YZC is required to submit an annual Dam Safety Inspection (DSI) report on the TSF and an annual report on the visual observations of earth structures located on-site throughout the Wolverine Mine site as per Quartz Mining License QML-0006. Mr. Mohammad Al-Mamun of Klohn Crippen Berger Ltd. (KCB) carried out a site inspection on July 6 to 8, 2015. This letter report presents the findings from this inspection and includes a summary of the stability and status of inspected structures, and provides recommendations for remedial actions where necessary. Recommendations made in this report are compiled in Table 5.1 and Table 5.2.

1.2 Tailings Storage Facility

The TSF (Figure 1) was constructed to its current crest elevation of 1313.5 m in two stages. In Stage 1, the starter dam was constructed between 2009 and 2010 to elevation 1306.5 m and was commissioned in October 2009. The main facility components that were constructed in 2009 include:

- a 19 m high homogeneous earthfill dam constructed with borrow material excavated from the impoundment area;
- a 40 mil LLDP geomembrane liner over the impoundment area. The liner is anchored into the dam crest and perimeter of the impoundment in a ditch backfilled with soil; and,

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- Diversion Ditch A and Diversion Ditch B, which direct non-contact runoff water around the impoundment.

The main facility components that were constructed in 2010 included:

- the reclaim pump barge and access ramp;
- tailings delivery pipelines and water reclaim pipelines;
- starter dam emergency spillway;
- seepage recovery pond dyke and water pump-back system; and,
- monitoring instrumentation.

In Stage 2 the dam was then raised to the crest elevation of 1313.5 m in 2012. The main facility components that were constructed in 2012 include:

- a 7 m high downstream dam raise;
- a 60-mil LLDPE liner on the raised impoundment;
- relocated Diversion Ditch A, to direct non-contact surface water around the impoundment; and,
- riprap lined emergency spillway.

The tailings impoundment has been accumulating water from runoff, mine discharge, and the sewage treatment plant since October 2009. Tailings were discharged to the impoundment from September 2010 to December, 2014. The volume of tailings and water at the time of the site visit was approximately 566,000 m^3 and 452,000 m^3 respectively, based on a pond bathymetric survey completed May 28, 2015 by YZC. The pond level was at elevation 1307.6 measured May 14, 2015 by YZC.

1.3 On-site Earth Structures

The list of other earth structures that was inspected was taken from Tetra Tech (2014)[1] and the scope of the inspection was limited to visual observation of the slopes of earth structures for signs of instability (cracks, erosion features etc.) and to take photos to compare with the Tetra Tech (2014) report. The on-site earth structures that were inspected are shown on Figure 2 and are listed below:

- Industrial Complex: Mill building pad, Fuel Tank and Genset pad – cut and fill slopes.
- Industrial Complex: Surface and underground water treatment Sumps (1, 2 and 5) - liners and slopes.

[1] Tetra Tech EBA Inc. 2014. "2014 Annual Observations of the On-site Earth Structures – Wolverine Mine Site, Southeastern Yukon", July 2014.

- Industrial Complex: Diversion Ditch 1 – cut and fill slopes.
- Industrial Complex: Collection Ditches (2, 3, 4 and 5) – liners, cut and fill slopes.
- Mine Camp pad area including upper generator and potable water treatment pad, Sewage Treatment Plant pad and Sewage Effluent Pond – liner, cut and fill slopes.
- Waste Rock and Ore Storage Facility including seepage collection sump and ore waste stockpile contained within the facility – liners, cut and fill slopes.
- Land Treatment Facility (hydrocarbon contaminated material) including runoff collection sump – liners and fill slopes.
- Vent Raise and Propane Tank pad – cut slopes.
- Truck Shop pad – cut and fill slopes.

1.4 Dam Classification

The Canadian Dam Association Dam Safety Guidelines (CDA 2007) were adopted to confirm the classification of the tailings dam for the TSF for seismic and flood protection criteria. The selected dam classification, based on the dam break analysis and assessment of consequences of failure is "High" to "Very High", and the criteria for Very High has been selected for design. The use of the Very High rating provides additional security for the long term performance of the tailings facility after closure.

The impoundment is designed to safely route the 1:10,000 year return period flood through the Stage 2 spillway located at the north end of the west dam. During operations, the tailings facility would also store the 1:200 year return-period flood event, without the release of water. The design earthquake is a 1:10,000 year return period, with a peak ground acceleration of 0.22 g. The minimum geotechnical factors of safety during operations are 1.5 for static stability and 1.1 for pseudo-static stability.

1.5 Documentation

The main documentation for the TSF includes:

- Yukon Zinc Corp., Wolverine Project, Tailings Facility, *Operations, Maintenance and Surveillance (OMS) Manual*, V2010-01, August 2010.
- Klohn Crippen Berger Ltd. (2009). *Wolverine Project - Tailings and Related Infrastructure Design and Construction Plan, V2009-02.* Vancouver: Klohn Crippen Berger Ltd.
- Klohn Crippen Berger Ltd. (2010). *Wolverine Project – Starter Tailings Storage Facility – 2009 Civil Works Construction Summary Report.* Vancouver: Klohn Crippen Berger Ltd.
- Klohn Crippen Berger Ltd. (2011). 2010 Civil Works Addendum to *Starter Tailings Storage Facility – 2009 Civil Works Construction Summary Report.* Vancouver: Klohn Crippen Berger Ltd.

- Klohn Crippen Berger Ltd. (2012). *2012 Civil Works Construction Summary Report.* Vancouver: Klohn Crippen Berger Ltd.
- Klohn Crippen Berger Ltd. (2014). *2014 Annual Tailings Facility Physical Inspection*. Vancouver: Klohn Crippen Berger Ltd.
- Yukon Water Board. (2007, October 4). Type A Water Use Licence QZ04-065. Whitehorse, YT, Canada.

YZC provided KCB with Monthly Impoundment Monitoring Reports for the TSF which conform to Operations, Maintenance and Surveillance (OMS) Manual requirements. The OMS Manual was last updated in July 2010, before the facility was raised to its current crest elevation. A review of the OMS Manual to reflect the current state of the TSF is recommended.

For the on-site earth structures the following document was reviewed:

- Tetra Tech EBA Inc. (2014). *2014 Annual Observations of the On-site Earth Structures – Wolverine Mine Site, Southeastern Yukon*. Whitehorse, YT.

2 SITE INSPECTION OBSERVATIONS

2.1 General

A walkover inspection was carried out during the July 6 to 8, 2015 site visit. Visual observations of various components of the TSF and on-site earth structures were made. Weather during the walkover was sunny. Select photos of the TSF and on-site earth structures are provided in Appendix I and Appendix II, respectively and detailed field notes and inspection checklist is provided in Appendix III. This section provides a brief summary of key observations for the TSF and on-site earth structures.

2.2 Tailings Storage Facility

2.2.1 Dam

The south and west side of the TSF was raised with a homogeneous earth fill section. The height of the dam varies between 8 m and 26 m with the maximum height along the southwest corner. The slope of the dam is 2H:1V and the design crest width varies between 5m and 6 m. Both the south and west dam are in good condition and there was no sign of settlement, cracking or slope movement that could be a slope stability concern.

There were signs of localized erosion along the dam crest and downstream slopes. Erosion gullies originated along the downstream edge of the dam crest were in the order of 10 cm to 30 cm wide and 10 cm deep. Most of the erosion was observed along the south dam and north side of the west dam. The crest width of the dam was approximately 4 m at several spots along the north side of the west dam indicating continuing erosion of the dam crest. There were 10 cm to 15 cm deep ruts on the dam crest which can pond water after rain storm. Erosion of the dam crest and downstream slope will continue and may cause significant crest loss if some erosion protection measures (such as

vegetation) are not undertaken. The crest of dam should be graded to avoid ponding water and further erosion.

2.2.2 Stage 2 Dam Emergency Spillway

The spillway would only be used during an extreme event (e.g. >200 year flood) when the impoundment is near full storage capacity. The spillway is located within natural ground. The spillway outlet consists of a riprap lined channel through the dam crest.

Currently the spillway channel reports to the east ditch along the Mine Haul Road. The closure spillway design extends the flow channel across the Mine Haul Road to report to the existing catch basin above Go Creek. YZC will extend the spillway to the catch basin for closure. The rip-rap in the spillway was in good condition. There is a piece of 8 inch insulated tailings line left at the downstream end of the spillway which is blocking the flow path and should be removed.

2.2.3 Impoundment Area and LLDPE Geomembrane Liner

The liner was generally in good condition with no sign of tear or puncture. Anchor of the liner along the crest was in good condition except at the north end where anchor is damaged due to a slip in the TSF wall. Further details on this slip along the north slope are provided in Section 4. YZC inspects the liner for defects as a part of routine surveillance as laid out in the OMS. Defects are not considered a concern provided they are small and patched when they are found.

2.2.4 Liner Underdrains

The liner underdrains, which consist of a French drain with a perforated pipe under the liner and two solid pipes under the dam, are performing as designed. At the time of the site visit there was no inflow into the underdrains at the upstream end of the impoundment.

The flow out of the underdrains daylighting downstream of the seepage dam is approximately 5- 7 L/s, similar to flows observed during the 2014 DSI. Rip rap along the outlet area was in good condition.

The purpose of the underdrains was to relieve uplift pressure on the liner during construction. As the impoundment becomes full, and the weight of water and tailings increases, the requirement for the underdrain diminishes and they could be decommissioned at a later stage of operations.

2.2.5 Seepage Recovery Pond and Dyke

The seepage recovery pond is a contingency structure which was installed to provide further security against the very low risk of impoundment seepage. The dam is formed by the mine access road and extreme flood flows are routed through a spillway culvert through the dam. The seepage impoundment area consists of an irregular pond partially shaped by areas excavated for construction of the main dam and the natural topography. No water quality data was reviewed but YZC's monthly monitoring reports for the current reporting period indicates water in the seepage collection pond were pumped back into the tailings impoundment at an average rate of 370 m^3 per month during the month of June and July 2014 and there were no pumping between August 2014 and April 2015.

The spillway culverts in the seepage pond exits into a rockfill channel-stilling area, which flows towards Go Creek. The rockfill appeared to be in good condition and will function to control erosion during extreme events.

Seepage collection ditches along the toe of the dam were dry. There was ponded water along the south side of the west dam from recent rain but no seepage was observed from any of the dam faces or abutments.

2.2.6 Diversion Ditch A and Diversion Ditch B

Diversion Ditch B that runs along the east side of the tailings impoundment was dry. The soils in the base of the ditch and along the slope that the ditch traverses are relatively pervious and most of the runoff from the upslope area appears to infiltrate into the slope. The ditch exits into a culvert, which extends down the slope towards the toe of the seepage dam, where it outflows into a rockfill stilling basin. The stilling basin was in good condition and the observed flow from the culvert was approximately 0.1 L/s.

Diversion Ditch A was reconstructed in 2014. The stretch of the ditch that runs along the north end of the TSF was lined and a new stilling basin was constructed at upstream the end (Figure 1). The ditch was flowing at approximately 1 m wide by 10 cm deep. The liner was generally in good condition but was not anchored properly to the crest of the ditch. The liner was loose and was exposed to erosion and should be anchored. The channel bottom along the lined part should be cleaned of debris to maintain flow capacity. The ditch exits into a culvert and rockfill stilling basin. The stilling basin was in good condition.

2.2.7 Other Infrastructure

The tailings delivery pipelines were in place to the northwest side of the impoundment and there was no tailings discharge at the time of the site visit.

The tailings water reclaim pump barge and pumps are in place at the south end of the impoundment. A thick conveyor liner has been placed under the ramp to protect the geomembrane liner. No areas of liner damage were observed.

2.2.8 Waste Rock Pad #2

North of the tailings facility is a temporary lined waste rock storage pad. The diversion ditches were dry but appeared to be functional. The service layer above the liner which had not been covered by waste rock was washed out and loose. Since the waste rock is currently being removed and complete removal of the stockpile is planned, remediation of the reduced service layer is not required, provided care is take during operations near the liner, and any damage to the liner is repaired. Seepage collected from the waste rock pad is discharged to TSF via a 4 inch line.

2.3 On-site Earth Structures

Visual observations of all on-site earth structures listed in Section 1.3 indicated the cut and fill slopes and the liner (where present) were generally in good condition. Large erosion gullies, tension cracks

were observed in several cut and fill slopes and a number of culvert inlets were completely plugged with debris. A brief summary of field observations are provided below. Further details on the field observations for all earth structures are provided in Appendix III.

- Mill building – large erosion channel along the southeast corner of downslope observed in 2014 was not repaired; there was no photo record available from 2014 inspection for comparison, but it appears to be deteriorated as surface runoff from the Mill pad accumulates and drain through this gulley.
- Sinkhole around a manhole upslope of the MSE wall – This manhole is located up slope of the MSE wall by the conveyor belt which collects surface runoff from Ditch 5. A sinkhole was developed around this manhole after a recent heavy rainstorm. The sinkhole was backfilled with rock fill at the time of the inspection. The reason for the sinkhole formation is unknown, but it could be caused by leakage in the manhole or the culvert that outflows into the manhole. YZC should monitor this area and identify the root cause of the sinkhole to prevent future washouts.
- Sump 2 – The liner was in good condition but a bulge was visible in the cross dam due to groundwater. A high water level could destabilize the dam and should be lowered by pumping.
- Ditch 1 – A 20 m long tension crack was visible along crest of the ditch embankment. There was no sign of instability in the down slope or in the toe, but this area should be monitored and repaired as required. The inlet of the culvert that diverts surface runoff to downslope of the Mill pad was completely plugged with debris and should be cleaned. There was construction litter and debris in the ditch bottom, which should also be cleaned to maintain the flow capacity of the ditch.
- Ditch 2 –The inlet end of the culvert that diverts surface runoff downslope of the Mill pad was completely plugged and should be cleaned to convey runoff from the Mill pad, particularly after spring melt and heavy rainfall events.
- Ditch 4 – This ditch was lined in 2014 and 2015, but the liner was not anchored properly. The end of liner on the channel crest was covered with un-compacted fill, which may erode during a large rain event. The liner should be keyed to the channel crest to prevent further damage. The ditch bottom was filled in with debris washed from the upslope and should be cleaned to promote flow.
- Camp pad – Five large erosion gullies in the downslope along the south side back were backfilled with rock fill, but need to be monitored and repaired as required.
- Vent Raise and Propane Tank pad – The cut slope behind the underground mine office is very steep but there was no signs of instability (crest of the slope was not inspected). This slope should be monitored for instabilities, particularly in the upper part where bedrock overlies more erodible surficial units.
- Truck Shop pad – A large erosion channel in the fill slope near the west corner of the Truck Shop building should be repaired.

3 INSTRUMENTATION REVIEW AND WATER BALANCE UPDATE FOR TSF

3.1 Instrumentation

Instrumentation for the dam consists of piezometers, survey pins and inclinometers. Piezometers (Figure 1) were installed in both the dam foundation and the dam fill. In general, piezometric levels in the foundation are about 2 m below the foundation elevation. Piezometric levels in the dam fill are about 2 m above the foundation level. Elevated groundwater levels in April, May and June are due to seasonal changes, and there appears to be a pattern to these fluctuations over the past four years. All water levels are within parameters required for stability (i.e. below "yellow trigger" levels defined in the OMS Manual) except the following:

- PZ-10-03 indicated a spike in pore water pressure reading in May and June, 2012 has now dropped below the yellow trigger level.
- PZ-10-02 located close to the left abutment (southeast corner) indicating a gradual increase in pore pressure in the dam since early 2012. The pore pressure level was elevated approximately 2m between June 2014 and December 2014 and has dropped since then. This increase in pore pressure does not appear to be related to the Stage 2 dam raise which occurred between June and August 2012. The elevated pore pressure is still below the "yellow trigger" level. The pore pressure level in this piezometer should be closely monitored and the reason for this gradual increase should be considered.

The piezometer data is presented in Appendix IV.

Two inclinometers (Figure 1) were installed in the downstream slope of the dam. Both inclinometers have been damaged. The inclinometer data collected to date has not indicated any significant slope movement. Since there is no new data since 2013, inclinometer data are not added to this report.

YZC installed five survey monuments September 2014 (Figure 1). These survey monuments were surveyed on a monthly basis until January, 2015. The complete data set was not available for review at the time of the preparation of this report.

3.2 Water balance

The water balance was reviewed and updated with as-built data from the Monthly Monitoring Reports, pond bathymetric survey and updated forecasts were made for current care and maintenance state. It was assumed that there will be no pumping of water from the underground operations to the TSF and inflow from the Sewage Treatment Plant (STP) would be much less during care and maintenance period. The water balance indicated that the TSF can hold all inflows until July 2020 without an overtopping of the Stage 2 spillway. This includes 0.3 m of storage for 200 year flood event. If the water treatment plant is operational by May, 2019, the pond elevation can be maintained to elevation 1311 m by treating at an average rate of 35 m^3/hr for 6 months out of the year. This will allow YZC to manage release times to best take advantage of natural high flow periods to limit the impact of introducing additional flows.

The updated water balance is presented in Appendix V.

4 ASSESSMENT OF SLUMP ALONG NORTH WALL OF THE TSF

4.1 Progression of Slump

A slump along the north wall of the TSF has progressed to its current state over the last few years. A brief summary of field observations since 2013 is provided below and shown on Figure 3:

- 2013 observations: In the 2013 DSI cracking ranged from 1 mm to 7 mm wide was observed in this area along the crest of the impoundment. These cracks were not deeper and there was no slump or damage to the anchor of the liner noted.
- 2014 observations: In the 2014 DSI both a slump and tension cracks were reported in this area. The length of the liner affected by the slump was approximately 3 m along the anchor trench. Cracking observed in 2013 was reported to be reopened and was approximately 100 m long parallel to the crest and was 1 mm to 10 cm wide.
- 2015 observations: Slump along the anchor trench noticed in 2014 has deteriorated in 2014/15 and was approximately 14 m wide. The crest of the impoundment has been completely eroded with complete loss of anchor. Approximately 1.5 m of crest has been lost along the slump. The total height of tailings and water at the toe of the impoundment slope along the north end is less than 2 m and there was visible sign of distress in the slope underneath the liner under the slump and approximately 75 m west of the slump along the crest. At the slump location it appears soil underneath the liner has slid towards the downslope and created a bulge shape. No damage to the liner was visible due to this bulge except a puncture from an exposed rock (<5 cm). Tension cracks approximately 30 m long are visible upstream of the slump area but appear to be filled in with soil and are less than 10 cm deep.

4.2 Cause of Slump

During 2013 and 2014 DSI observations, the slump was primarily attributed to poor surface water control and it was assumed that seepage through the bottom of unlined Ditch A and surface cracks was causing this slump. In 2014 YZC re-graded this area and lined Ditch A which improved overall surface water control and prevented seepage through the ditch bottom. However, the slump has deteriorated further since then, indicating that surface water may not be the only cause for this ongoing cracking and slump. The groundwater table in this area was known to be elevated as observed during the construction stage. A number of seeps were observed along the impoundment slope during construction and an underdrain system was placed to collect and convey this seepage. Currently there is no monitoring well upstream of the north end of the TSF to estimate the groundwater level and it is unknown how effective the underdrain system has been. Since there is no tailings to buttress the impoundment slope a higher groundwater table can destabilize the slope. In addition surface water can still seep through the open cracks and the slump area particularly during

the spring melt and the near surface soils may undergo freeze and thaw cycles that exacerbate the slump.

The slump appears to be localized along the TSF slope and caused by an elevated water level. No tension cracks were observed upslope of the slump area in the crest or the waste dump during the site visit indicating a deep seated failure mechanism.

4.3 Potential Risks

The progression of the slump observed over the last three years indicates it can further widen laterally (along east west direction) which would cause further crest and anchor loss. If the slump becomes very wide (in the order to 50 m to 100 m) a larger portion of the TSF slope could fail casing a severe distress in the liner. Soil from upslope may slide towards the toe and can damage the liner. A leakage in the liner could allow seepage from the TSF to groundwater. Although the depth of tailings and water is quite low along the north end, a larger crack or a large number of punctures may compromise the integrity of the liner.

The potential risk to the TSF due to this slump should be reviewed in the context of YZC's plan for potential use of the facility going forward. In the short term (order of one to two years) the slump is expected to further deteriorate if no remedial measures are taken, but this would not cause any obvious risk to the TSF if the liner is not damaged severely. However, in the longer term, if YZC wants to deposit tailings as planned following a re-opening of the operation, the risk to the TSF due to the deteriorating slope will need to be reviewed within the context of its ability to safely store tailings and water.

4.4 Remediation Options

Selection of remediation options depends on understanding of the root cause of the slip and YZC's plan for the TSF. Preliminary assessment completed for this letter indicates groundwater level in this area may be one of the key contributing factors. But further monitoring is required to confirm this which may include installation of monitoring wells and or piezometers along the upstream of the slump.

In the short term YZC should do the following:

- Cover the entire slump area and cracks with a liner or equivalent product to prevent ingress of water from heavy rain events and spring melt. This cover should be placed before the winter season begins.
- Monthly survey of the slump area during the summer months.
- Visual monitoring on a weekly basis during the summer months.
- Immediately repair any damage to the liner caused by the slump.

In the long term, if the monitoring data confirms elevated ground water level as the root cause of the slump; then the following remedial measures may be considered to repair the slump area:

- Upstream remediation: install a pumping system upstream of the slump area to lower the groundwater table.
- Downstream remediation: cut the existing liner from the slump area, excavate the slope, rebuild the slope with granular backfill to drain ground water to the existing underdrain system and replace the liner.

Long term remedial measures are not recommended at this stage and YZC should implement the short term measures and monitor the slump area as outlined above.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 TSF

The tailings facility is performing as expected. The dam structure appears stable and no dam safety concerns were observed.

The main recommendations are summarized in Table 5.1. Deadlines for action on the recommendations have been categorized as:

(A) requiring attention within 3 months; or

(B) requiring attention within 12 months.

Table 5.1 List of Recommendations from 2015 Annual Inspection-TSF

No.	Recommendation	Deadline for Action
TSF-15-1	Continue to operate the facility as described in the Operation, Maintenance and Surveillance Manual V2010-01.	B
TSF-15-2	Include regular monitoring of the slumping and cracking at the north end as a part of regular surveillance of the facility. Cover the slumped area with geomembrane liner or similar product to prevent ingress of water from rainfall and spring melt.	A
TSF-15-3	Prepare a plan for erosion control for dam crest and downstream slope.	B
TSF-15-4	Monitor Piezometer PZ-10-02 to confirm the trend in the pore pressure response. If the pore pressure continues to rise review the risk of elevated pore pressure on dam stability and develop a mitigation plan as required.	B
TSF-15-5	Review OMS Manual and Update to reflect current status.	B
TSF-15-6	The next Dam Safety Inspection should be in 1 year.	B

5.2 On-site Earth Structures

The cut and fill slopes for the on-site earth structures are performing as expected with no sign of major instabilities. The erosion gullies, tension cracks and sloughing noted in this report should be

monitored and repaired to prevent any significant slope loss that can lead to a slope failure. The liners in the ditches and sumps were in good condition; however, debris build up in the ditch bottom and the culvert inlets should be cleaned periodically to maintain good flow conditions. The main recommendations from this inspection are summarized in Table 5.2.

Table 5.2 List of Recommendations from 2015 Annual Inspection – On-site Earth Structures

No.	Structure	Recommendation	Deadline for Action
M-15-1	Mill Building pad	Repair the large erosion gully in the downslope (south east corner) to prevent further deterioration from spring melt and runoff from heavy rainfall event.	A
M-15-2	Sump 2	Monitor the bulge in the liner in the cross dam and develop a mitigation measure to lower groundwater table, such as pumping.	B
M-15-3	Ditch 1	Monitor the tension crack on the ditch embankment and repair as required. Clean the culvert inlet and the construction litters and debris from the ditch bottom.	A
M-15-4	Ditch 2	Clean the plugged culvert inlet.	A
M-15-5	Ditch 4	Properly anchor the ditch liner by keying in along the ditch crest.	A
M-15-6	Camp Pad	Monitor five erosion gullies located along the south slope and repair as required.	B
M-15-7	Truck Shop pad	Repair the erosion gulley in the downslope located west corner of the Truck Shop pad.	A

6 CLOSING

This report is an instrument of service of Klohn Crippen Berger Ltd. The report has been prepared for the exclusive use of Yukon Zinc Corp. (Client) for the specific application to the dam safety inspection of the Wolverine Mine Tailings Facility and an annual report on the visual observations of earth structures located on-site throughout the Wolverine Mine site as per Quartz Mining License QML-0006. The report's contents may not be relied upon by any other party without the express written permission of Klohn Crippen Berger. In this report, Klohn Crippen Berger has endeavored to comply with generally-accepted professional practice common to the local area. Klohn Crippen Berger makes no warranty, express or implied.

Yours truly,

KLOHN CRIPPEN BERGER LTD.

Mohammad Al-Mamun, M.Eng., P.Eng. (B.C.)
Senior Geotechnical Engineer

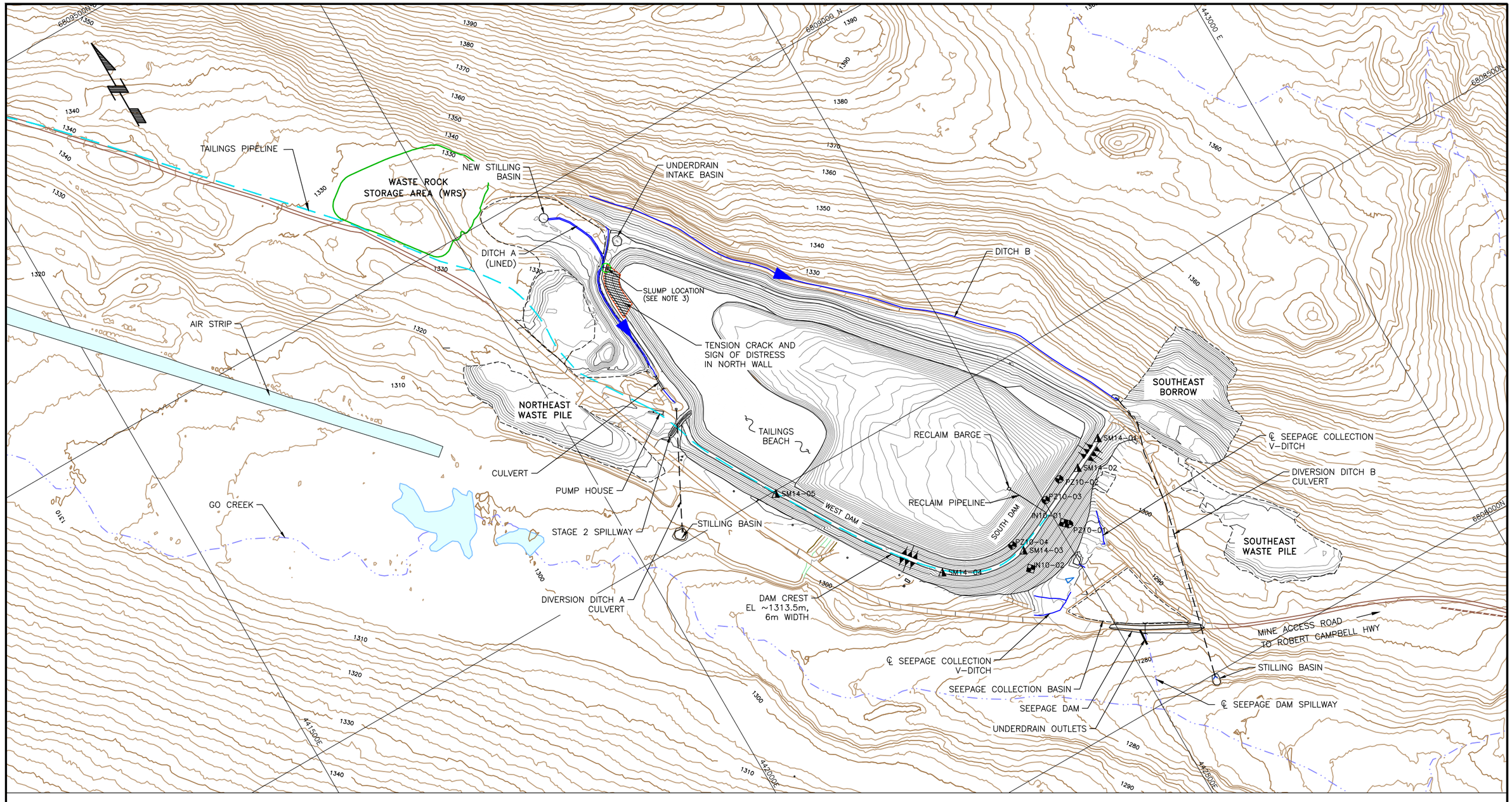
PROFESSIONAL ENGINEER
YUKON TERRITORY
H. N. McLEOD
11 August 2015

Harvey McLeod, P.Eng. (Yukon)
Project Director

LC: jcp

Attachments: Figures 1 to 3
Appendix I - Photo Record -TSF
Appendix II – Photo Record – On-site Earth Structures
Appendix III –2015 Annual Inspection- Checklists and Field Notes
Appendix IV – Piezometric Water Levels
Appendix V – Water Balance

FIGURES



LEGEND

- PIEZOMETER
- INCLINOMETER
- SURVEY MONUMENT
- DITCH (LINED)
- DITCH (UNLINED)

NOTES:

1. NOT ALL CULVERTS HAVE BEEN SHOWN.
2. ALL ELEVATIONS IN METRES.
3. LOCATION OF THE SLUMP WAS TAKEN BY HANDHELD GPS UNIT.
4. TSF AS-BUILT PROVIDED BY YZC SEPT. 2012.

CLIENT: Yukon Zinc CORPORATION

Klohn Crippen Berger

PROJECT: WOLVERINE MINE 2015 ANNUAL INSPECTION

TITLE: SITE PLAN
TAILINGS STORAGE FACILITY (TSF)

SCALE	PROJECT NO.	FIG. NO.
AS SHOWN	M09234A11	1

CANCEL PRINTS BEARING PREVIOUS REVISION

KCB-DWG-D-L

Time: 13:30:55
Date: 7/27/2015
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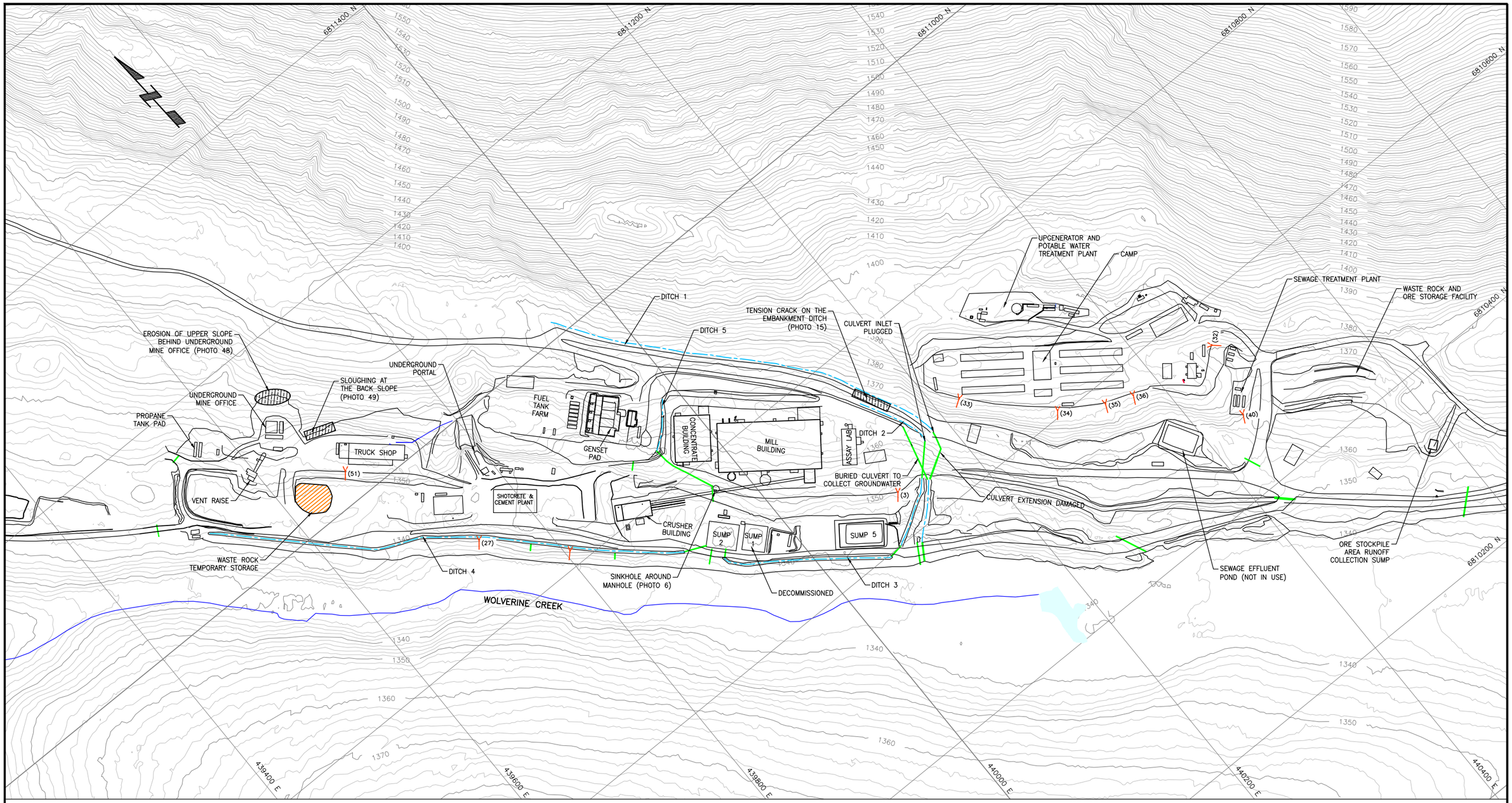


SCALE 0 100 m

LEGEND

- CULVERT
- DITCH ℄
- (51) EROSION GULLEY (PHOTO NUMBER)

NOTES:

1. THE SITE PLAN WAS PROVIDED BY YZC.
2. PHOTOS ARE PROVIDED IN APPENDIX II.
3. EROSION LOCATION SHOWN ARE APPROXMATE TAKEN BY HANDHELD GPS UNIT.

CLIENT: Yukon Zinc CORPORATION

Klohn Crippen Berger

PROJECT: WOLVERINE MINE 2015 ANNUAL INSPECTION

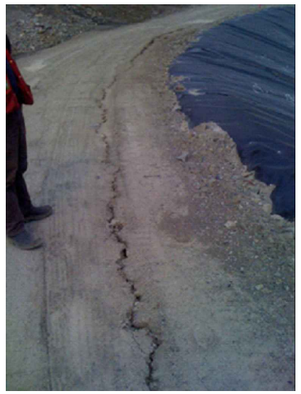
TITLE: SITE PLAN ON-SITE EARTH STRUCTURES

SCALE	PROJECT NO.	FIG. NO.
AS SHOWN	M09234A11	2

CANCEL PRINTS BEARING PREVIOUS REVISION

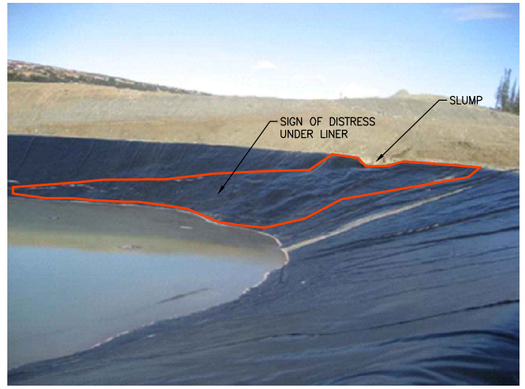
KCB-DWG-D-L

Time: 14:11:44
Date: 7/2/2015
Scale: 1:2(PS)
Drawing File: Z:\M\VCR\M09234A11-YZC-Wolverine Annual Inspec\400 Drawings\Fig 2 - Surface As Built June 2013.dwg (dhu)



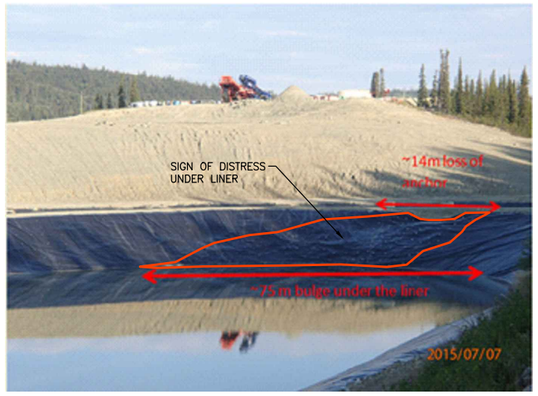
2013: CRACKS AT NORTH
END OF IMPOUNDMENT ON CREST

2014: CRACKS
AT NORTH END OF IMPOUNDMENT



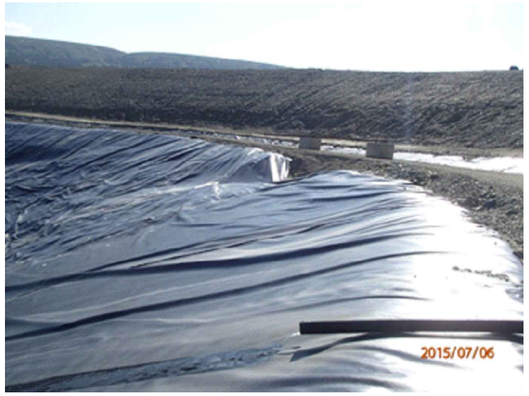
2014: SLUMPING
IN NORTH END OF IMPOUNDMENT

2014: CRACKS
AROUND SLUMPING AREA



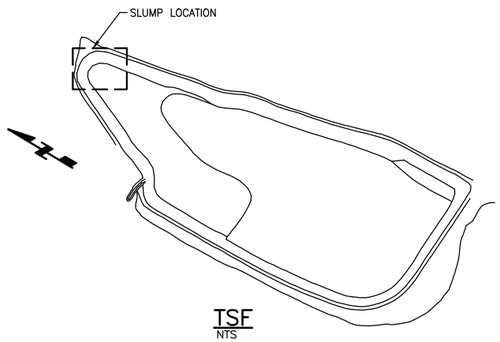
2015: SLUMP
IN THE NORTH END OF IMPOUNDMENT

2015: CREST LOSS
ALONG THE 2014 SLUMP AREA



2015: ANCHOR FAILED
IN 2014 CRACK AND SLUMP AREA

2015: TENSION CRACK UPSTREAM
OF SLUMP APPERED TO BE FILLED IN



CLIENT: Yukon Zinc CORPORATION

Klohn Crippen Berger

PROJECT: WOLVERINE MINE 2015 ANNUAL INSPECTION

TITLE: PROGRESSION OF SLUMP IN THE TSF NORTH WALL

SCALE	PROJECT NO.	FIG. NO.
NTS	M09234A11	3

CANCEL PRINTS BEARING PREVIOUS REVISION

KCB-DWG-D-L

Time: 14:21:15
Date: 7/27/2015
Scale: 1:2(P2)
Drawing File: Z:\VM\VGR\M09234A11-YZC-Wolverine Annual Inspec\400 Drawings\Fig 3 - Progression Along North Wall.dwg (dhu)

APPENDIX I

TSF Photos

Appendix I
TSF Photographs

Photo 1 **South dam crest - looking west; ruts on the crest surface**

Photo 2 **South dam –erosion gulley on downstream edge**

Photo 3 **South dam –downstream slope looking east, erosion gulley, minor grass grown naturally**

Photo 4 South dam – downstream slope, looking west

Photo 5 South dam and east abutment – upstream slope

Photo 6 **West dam crest - looking north between access ramp and spillway, tailings line and reclaim line**

Photo 7 **West dam – erosion on downstream slope north of the access ramp, 10 m wide area; crest width is approximately 4 m**

Photo 8 **West dam crest - looking south, south of access ramp, less erosion and no crest loss**

Photo 9 **West dam – downstream slope, looking north, north of access ramp, ponded rain water at the toe**

Photo 10 West dam –downstream slope, looking south, south of access ramp

Photo 11 West dam – upstream slope, looking north

Photo 12 West dam – upstream slope, looking south

Photo 13 TSF east side liner –looking south

Photo 14 TSF east side liner– from west berm, minor bulging

Photo 15 East (right) abutment – downstream side, looking north east

Photo 16 Spillway – looking upstream

Photo 17 Spillway –looking downstream- rip rap ends upstream of the haul road and 12 inch redundant tailings line blocking the spillway

Photo 18 Underdrain intake basin – north end of the TSF

Photo 19 Underdrain outlet – downstream of seepage berm

Photo 20 Seepage Collection Basin

Photo 21 Seepage Collection Basin – V-ditch and wetland in the basin

Photo 22 Seepage berm- looking north

Photo 23 Ditch A – inlet to Ditch A culvert

Photo 24 Ditch A – outlet end of the upper culvert for Ditch A

Photo 25 Ditch A – unlined part beyond the west end of TSF

Photo 26 Ditch A – Rip-rapped section south of upper culvert

Photo 27 Ditch A – lined part

Photo 28 Ditch A – lined part – no anchoring of geotextile

Photo 29 Fill slope upstream of Ditch A – graded in 2014, signs of erosion

Photo 30 Ditch B – inlet of Ditch B culvert; no flow

Photo 31 Ditch B – parallel to the TSF looking north

Photo 32 Ditch B – culvert outlet at stilling basin

Photo 33 South Dam – Access ramp to reclaim barge on upstream slope

Photo 34 4 inch line discharging underdrain flow from waste rock storage area

Photo 35 8 inch tailings line over the spillway

Photo 36 Waste Rock Storage Area – seepage collection area

Photo 37 Waste Rock Storage Area - seepage and underdrain outlet

Photo 38 Southeast borrow

Photo 39 Southeast waste pile

Photo 40 Northwest waste pile

Photo 41 Northwest waste pile – erosion gulley at the slope by the air strip

Photo 42 Non-functional Inclinometer on the downstream slope

APPENDIX II

On-site Earth Structures Photos

Appendix II
On-site Photos

Photo 1 Mill building pad – upslope behind the Mill building

Photo 2 **Mill building – downslope, minor erosion**

Photo 3 **Mill building pad – downslope at southeast corner, large erosion gulley from previous year, not repaired**

Photo 4 MSE wall – by the crusher building

Photo 5 MSE wall – below the conveyor belt

Photo 6 **Manhole upslope of MSE wall corner of Mill building and Concentrate building, this manhole is outlet for culvert from Ditch 5, a large sinkhole developed around this manhole after a recent rain storm, backfilled with rock fill**

Photo 7 **Fuel Tank farm and Genset Pad – downslope at south side looking towards crusher building, minor erosion gulley**

Photo 8 **Fuel Tank Farm and Genset Pad –downslope at east side, half culvert with rockfill slope, good condition**

Photo 9 **Sump 1 – decommissioned and backfilled, now used as covered laydown area**

Photo 10 Sump 2 – culvert outlet from Ditch 4 in west sump, dry

Photo 11 Sump 2 – culver outlet from Ditch 3 in east sump, dry

Photo 12 Sump 2 – bulge in the liner in the cross dyke, caused by groundwater

Photo 13 Sump 5

Photo 14 Sump 5 – puncture in the liner

Photo 15 Ditch 1 – 26 m long crack in the Ditch 1 embankment, looking north from corner of Mill building

Photo 16 Ditch 1 –looking north, litter in the channel bottom

Photo 17 Ditch 1- culvert inlet completely blocked

Photo 18 Ditch 1 – culvert damaged

Photo 19 Ditch 2 – inlet for upper culvert, completely plugged, non-functional

Photo 20 **Ditch 2 – rip-rapped outlet for upper culvert on the left; gravel swale for groundwater culvert and Ditch 1 outlets on the right**

Photo 21 **Ditch 3 – culvert inlet at the end of Ditch 2, channel bottom of Ditch 2 filled with silt, reduced flow capacity**

Photo 22 Ditch 3 – culvert outlet; channel bottom filled in and liner loose

Photo 23 Ditch 3 – looking west, channel bed filled with silt and gravel

Photo 24 **Culvert inlet to Sump 2- damaged and blocked**

Photo 25 **Ditch 4 – lined channel looking east, liner along the downstream side loosely anchored by uncompacted fill, may wash away after large rainfall event (2015 construction)**

Photo 26 Ditch 4 – ditch bottom silted and filled with washed rock, reduced flow capacity

Photo 27 Ditch 4 – erosion channel in the downslope

Photo 28 **Ditch 4 – area of undercutting in the upslope noted in 2014 report was repaired (downslope of shotcrete and cement plant)**

Photo 29 **Ditch 4 – inlet for culvert, channel bottom and culver invert filled with sand, silt and gravel**

Photo 30 Ditch 5 –looking south

Photo 31 Ditch 5 – culvert inlet, channel bottom filled in and partially blocked with litter

Photo 32 **Camp Pad – large erosion channel in cut slope east wall, partially filled with rock, surface runoff from camp pad area accumulates at low point and drain through this area**

Photo 33 **Camp pad – erosion channel in cut slope in south wall, partially backfilled with rock (west end)**

Photo 34 **Camp pad – erosion channel in cut slope in south wall, partially backfilled with rock (centre part)**

Photo 35 **Camp pad – erosion channel in cut slope in south wall, partially backfilled with rock (centre part)**

Photo 36 **Camp pad – erosion channel in cut slope in south wall, partially backfilled with rock (east end), this channel was backfilled with rock to work as a French drain for surface runoff after large storm event**

Photo 37 **Upper generator and potable water treatment pad – cut slope looking west, minor erosion gullies**

Photo 38 **Upper generator and potable water treatment pad – cut slope, slumping along the water line corridor**

Photo 39 **Sewage Treatment Plan Pad – Back slope**

Photo 40 Sewage Treatment Plant Pad – erosion channel in the down slope south east corner

Photo 41 Sewage Effluent Pond

Photo 42 Waste Rock and Ore Storage Facility – outside slope

Photo 43 Waste Rock and Ore Storage Facility – inside slope

Photo 44 Ore stockpile area runoff collection sump – looking from the waste rock area

Photo 45 Land Treatment Facility – cover

Photo 46 Land Treatment Facility – sump

Photo 47 Propane Tank Pad – back slope, surface water cutting a small channel at the toe

Photo 48 **Vent Raise and Underground Mine Office – back slope, very steep cut slope, minor signs of erosion, crest of the slope not checked**

Photo 49 **Truck shop pad – back slope, signs of sloughing**

Photo 50 **Truck shop pad – downslope, looking west**

Photo 51 **Truck shop pad – downslope, erosion channel near the west corner of truck shop building**

Photo 52: Crusher Building - sloughing and erosion around the pipe line corridor in the back slope

APPENDIX III

Checklists and Field Notes

TAILINGS DAM INSPECTION REPORT
Wolverine Tailings Dam

All parts of inspection sheet should be completed. Adverse conditions should be described. Additional information may be put on attached pages.

PROJECT NO.	M09234A11	**INSPECTION DATE**	July 6 and 7, 2015
DAM NO.	Wolverine Tailings Dam	**LOCATION**	Southeast Yukon, YT
PERSONNEL			
Engineer	Mohammad Al-Mamun	Others	
Company Representative	Josh Norbjerg (July 6) Dave Lewis (July 7)		
WEATHER			
	Current	Last 3 Days	Last 2 Weeks
Dry	☒	☐	☐
Frost	☐	☐	☐
Rain	☐	☒	☐
Heavy Rain	☐	☐	☒
STATUS OF DISPOSAL FACILITY			
Active	☐	Closed ☒	Notes: Care and maintenance
DAM INFORMATION			
Pond Elevation	1307.6 (measured May 24, 215)	Freeboard	
Crest Elevation	1313.5 m	Distance from Ponds to Crest	N/A
DAM CONSTRUCTION METHOD			
Upstream	☐		
Centreline	☐		
Downstream	☒		
LOCAL CONSTRUCTION ACTIVITIES			
Spigotting	☐		
Cycloning	☐		
End Discharge	☐		
Dam Raising	☐		
Other	☒	No construction activity	
REASON FOR INSPECTION			
Routine	☒	Annual Dam Safety Inspection	
Special Condition	☐		
NOTES			

Upstream Slope / Tailings Beach

No.	Item	Chkd	Condition		
			Rating *	Remarks / Description	Photograph No.
1.	Slope Protection	Y	Y	Upstream slope lined	5, 11, 12
2.	Surface Erosion	Y	S	Except along the north end slip location. See notes below.	
3.	Surface Settlements/ Depressions	Y	S	Except along the north end slip location. See notes below	
4.	Sinkholes	Y	S		
5.	Cracks/Movements	Y	S		
6.	Debris	Y	S		
7.	Vegetation	N	N		
8.	Evidence of High Water Table	Y	N		
9.	Other Unusual Conditions	Y	S		

Notes:
Slump along the north end on the upstream slope has deteriorated since 2014 observation. Liner anchor damaged for approximately 14 m wide area. Crest loss approximately 1.5 m. Soil from the upper part of the slope appears to slumped and slide towards the toe and formed a bulge under the liner. Slope immediately west of the slumped area also showing some sign of distress underneath the liner for an approximate 75 m wide area.

(If space insufficient, continue on separate sheet)

* Legend
S = Satisfactory. Will fulfill intended purpose.
F = Fair. Will fulfill intended purpose. Maintenance or further study required.
P = Poor. May not fulfill intended purpose. Repair or modification required.
U = Unsatisfactory. Will not fulfill purpose. Repair or modification required.
N = Not inspected.

Dam Crest

No.	Item	Chkd	Condition		
			Rating *	Remarks / Description	Photograph No.
1.	Surface Cracks (a) Transverse (b) Longitudinal	Y	S	Except area along the slip in north wall; see notes below	
2.	Settlements/Depressions	Y	F	10 cm to 15 cm deep ruts on the slope	1
3.	Sinkholes	Y	S		
4.	Lateral Movements	Y	S		
5.	Surface Protections	Y	F	Requires grading to fill depressions.	
6.	Erosion	Y	F	erosion along the d/s edge of the crest; causing crest loss; approximately 4 m at several locations along the north side of west dam	2, 7
7.	Vegetation	Y	F	No vegetation on the dam crest	
8.	Animal Burrows	Y	S		

Notes:
Tension crack upstream of the slump in the north wall, approximately 30 m long, but appear to be filled in with soil.

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Downstream Dam Slope

No.	Item	Chkd	Condition		
			Rating *	Remarks / Description	Photograph No.
1.	Slope Protection	Y	S		
2.	Surface Erosion	Y	F	Erosion gullies in the south dam and north part of west dam	3, 4
3.	Surface Settlements/ Depressions	Y	S		
4.	Sinkholes	Y	S		
5.	Cracks/Slope Movements	Y	S		
6.	Seepage/Wet Areas	Y	S		
7.	Animal Burrows	Y	S		
8.	Vegetation	Y	F	Grass starting to grow but rate of growth appear to be quite slow and sporadic	4, 7-10
9.	Slope Angle				
10.	Other Unusual Conditions				

Notes:
Slope should be protected from surface erosion. Potential protection measure – hydro seeding. Dam crest is quite narrow 4 to 5 m and can erode relatively quickly, if no erosion protection measures are undertaken.

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Left Abutment – At Spillway

No.	Item	Chkd	Condition		
			Rating *	Remarks / Description	Photograph No.
1.	Surface Condition	Y	S		
2.	Vegetation and Debris	Y	F	No vegetation, grass growing sporadically	
3.	Slope Protection	Y	S		
4.	Movements	Y	S		
5.	Erosion	Y	S		
6.	Seepage/Wet Areas	Y	S		
7.	Other Unusual Conditions	Y	S		

Notes:
Spillway is aligned along left abutment.

(If space insufficient, continue on separate sheet)

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Right Abutment

No.	Item	Chkd	Condition		
			Rating *	Remarks / Description	Photograph No.
1.	Surface Condition	Y	S		
2.	Vegetation and Debris	Y	F	No vegetation, grass growing sporadically	15
3.	Slope Protection	Y	S		
4.	Movements	Y	S		
5.	Erosion	Y	S		
6.	Seepage/Wet Areas	Y	S		
7.	Other Unusual Conditions	Y	S		

Notes:

(If space insufficient, continue on separate sheet)

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N = Not inspected.

Toe Drainage and Seepage Collection Ditches / Ponds

No.	Item	Chkd	Condition		
			Rating *	Remarks / Description	Photograph No.
1.	Seepage/Wet Areas	Y	S		
2.	Signs of Instability	Y	S		
3.	Vegetation	Y	S	Thick vegetation in the Seepage Collection Pond	20, 21
4.	Other Unusual Conditions				

Notes:

(If space insufficient, continue on separate sheet)

* Legend
S = Satisfactory. Will fulfill intended purpose.
F = Fair. Will fulfill intended purpose. Maintenance or further study required.
P = Poor. May not fulfill intended purpose. Repair or modification required.
U = Unsatisfactory. Will not fulfill purpose. Repair or modification required.
N = Not inspected.

Instrumentation

No.	Item	Chkd	Condition		
			Rating *	Remarks / Description	Photograph No.
1.	Piezometers	Y	S	5 data logger found and data was downloaded	
2.	Standpipes	N	N		
3.	Survey Monuments	Y	N	Site Personnel could not show the locations	
4.	Inclinometers	Y	U	Non-functional	42
5.	Relief Wells	N	N	None Present	
6.	Weirs	N	N	None Present	
7.	Other	N	N		

Notes:

(If space insufficient, continue on separate sheet)

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Spillway

No.	Item	Chkd	Condition		
			Rating *	Remarks / Description	Photograph No.
1.	Slope Protection	Y	S	Rip rap in good condition	16
2.	Surface Erosion	Y	S		
3.	Surface Settlements/ Depressions	Y	S		
4.	Sinkholes	Y	S		
5.	Cracks/Movements	Y	S		
6.	Debris	Y	F	8 inch insulated tailings line left at the d/s end – can block flow	17
7.	Vegetation	Y	S	None	
8.	Evidence of High Water Table	Y	S	None	
9.	Other Unusual Conditions				

Notes:

(If space insufficient, continue on separate sheet)

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U = Unsatisfactory. Will not fulfill purpose. Repair or modification required.
N = Not inspected.
N/A = Not Applicable.

On-Site Earth Structure INSPECTION REPORT
Wolverine Mine

All parts of inspection sheet should be completed. Adverse conditions should be described. Additional information may be put on attached pages.

PROJECT NO.	M09234A11	**INSPECTION DATE**	July 7 and 8, 2015
PROJECT SITE	Wolverine Mine	**LOCATION**	Yukon Territory
PERSONNEL			
Engineer	Mohammad Al-Mamun	Others	
Company Representative	Dave Lewis		
WEATHER			
	Current	Last 3 Days	Last 2 Weeks
Dry	☒	☐	☐
Frost	☐	☐	☐
Rain	☐	☒	☐
Heavy Rain	☐	☐	☒
REASON FOR INSPECTION			
Routine	☒	Annual Inspection	
Special Condition	☐		
NOTES			

No.	Item	Chkd	Condition		
			Slope	Liner	Photograph No.
1.	Industrial Complex: **Mill** –cut and fill slopes	Y	• The 1H:V cut slope behind the Mill building considered stable. • 2H:1V fill slope along the western side consider stable with minor erosion gullies. • The large erosion channel along the southeast corner of the down slope (cut) observed in 2014 not repaired. • MSE wall below the conveyor belt area and crusher building had no signs of bulging or zones of failure; some rocks from wire mesh appear loose and some of the rocks may fall in course of time. • A large sinkhole developed after recent rain storm around a manhole upslope of the MSE wall located corner of Mill and Concentrate building. Sinkhole was backfilled with rock fill.	None	1 2 3 4,5 6
2.	Industrial Complex: **Fuel Tank Farm and Genset Pad**–cut and fill slopes	Y	•Small erosion gullies observed in south fill slope •The erosion channel below the half CSP culvert above the west side fill slope was backfilled with rock fill and is in good condition.	None	7 8
3.	Industrial Complex: **Sump 1** – liners and slopes.	Y	•Decommissioned and backfilled with rock fill. Will be used as heated lay down area	None	9
4.	Industrial Complex: **Sump 2** - liners and slopes.	Y	•Was half full but no visible flow from any out let (Ditch 3 and 4); the crest area was wet and muddy; •There was areas of bulging in the liner in the cross dyke indicating presence of high groundwater level impacting	•Liner looks dirty, but no sign of tear or puncture	10, 11 12

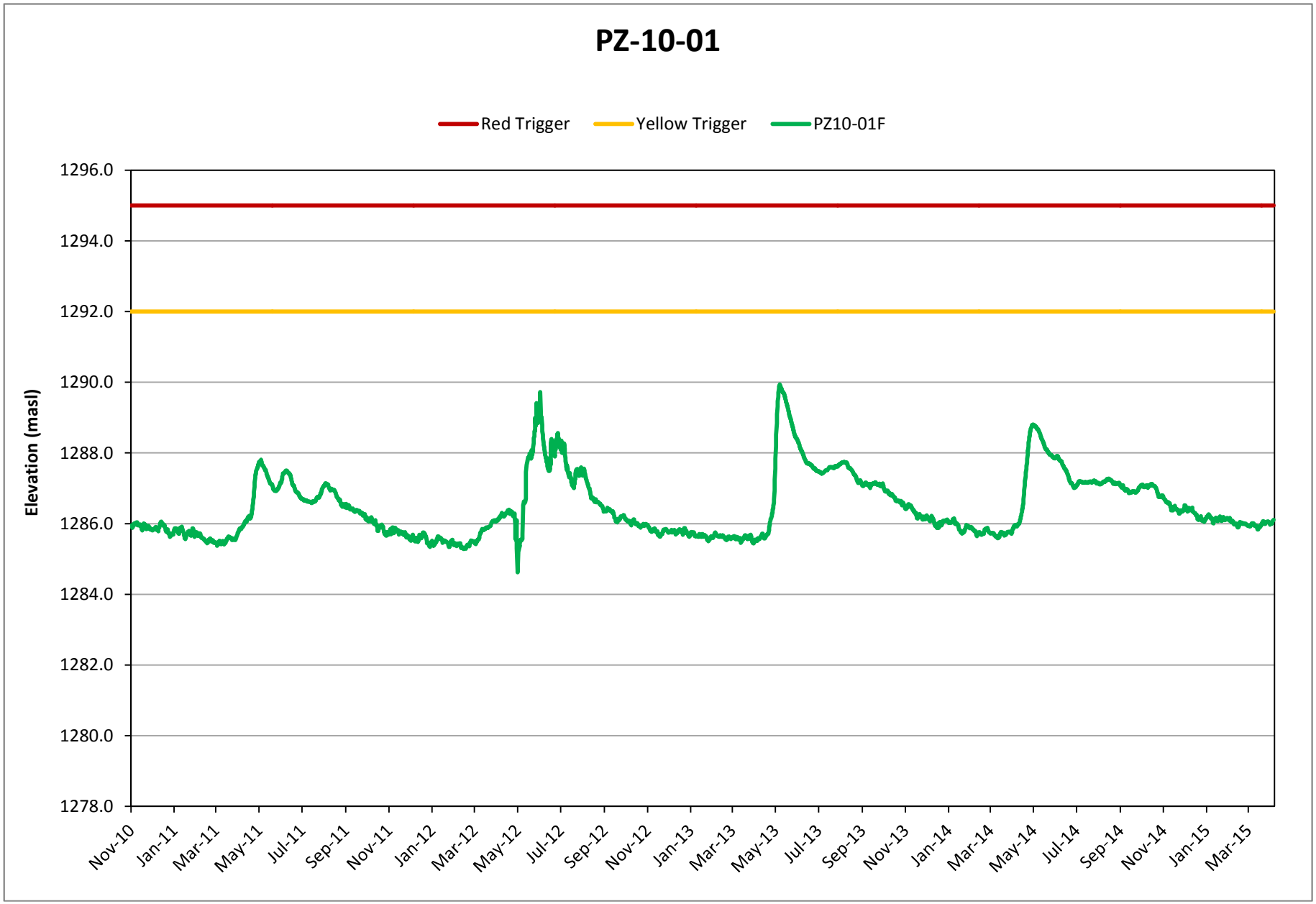
No.	Item	Chkd	Condition		
			Slope	Liner	Photograph No.
			liner		
5.	Industrial Complex: **Sump 5** - liners and slopes.	Y	• No flows in the sump, mostly holding inflows from precipitations. Good condition.	• Anchor is in good condition, but there was some small puncture noted along the upstream edge	13, 14
6.	Industrial Complex Diversion **Ditch 1** – cut and fill slopes.	Y	• Cut slope of the ditch embankment generally in good condition but there are tension crack along the crest, 26 m long 2 to 10 cm wide • There are litters in the ditch than can block the flows; need to be cleaned • Culvert inlet completely plugged with debris, need to be cleaned • Culvert that diverting flow downslope was ploughed and completely destroyed	• Part of the ditch bottom was lined towards east, partly eroded and covered by debris;	15 16 17 18
7.	Industrial Complex Collection **Ditch 2** – liners, cut and fill slopes	Y	• The inlet of the culvert coming from the Mill pad is completely plugged and need to be cleaned • Lower portion of the ditch is liner and culvert outlet is in good condition		19 20
8.	Industrial Complex Collection **Ditch 3** – liners, cut and fill slopes	Y	• Culvert inlet and outlet at the end of Ditch 2 is in good shape with some silting in the ditch bottom • Inlet of culver to Sump 2 is damaged and should be checked;	• Liner anchor generally in good condition; ditch bottom filled with debris	21, 22 23 24
9.	Industrial Complex Collection **Ditch 4** – liners, cut and fill slopes	Y	• Ditch bottom silted and filled in with materials form up slope at a number of locations, need to be cleaned to promote flow • Downslope is generally in good	• Ditch 4 was lined in 2014 and 2015. Liner is in good condition but is not anchored	25 26 27

No.	Item	Chkd	Condition		
			Slope	**Liner**	**Photograph No.**
			condition with minor erosion gullies •A large sloughing area in the upslope that was repaired in previous year •Culvert inlet to Sump 2 is in good condition with minor silting	properly, covered with uncompacted fill and may washed away	28 29
10.	Industrial Complex Collection **Ditch 5** – liners, cut and fill slopes	Y	•It is an unlined ditch partially filled with washed material from the surroundings but can carry the flow to the culver •Inlet to culver in plugged but construction debris around the pipe need to be cleaned	None	30 31
11.	**Mine Camp Pad Area** – liner, cut and fill slopes.	Y	•There are 5 erosion gullies along the south side of 1.5H:1V down (fill) slope; these gullies were partially backfilled with rock fill	None	32-36
12.	**Upper generator Potable water Treatment Pad** – liner, cut and fill slopes.	Y	•2H:!V cut slope in good condition with minor erosion gullies •Minor slumping along the water line corridor in cut slope		37 38
13.	**Sewage treatment Plant pad**– liner, cut and fill slopes.	Y	•Cut slope generally in good condition •Erosion gulley partially filled with rock fill in the down (fill) slope –south east corner		39 40
14.	**Sewage Effluent Pond**– liner, cut and fill slopes.	Y	•Good condition; full off surface water from precipitation	•Good condition	41
15.	**Waste Rock and Ore Storage Facility** including seepage collection sump – liners, cut	Y	•Cut and fill slopes in the waste rock pile observed were stable	•Liner in the seepage collection sump is in good condition	42-43 44

No.	Item	Chkd	Condition		
			Slope	Liner	Photograph No.
	and fill slopes				
16.	**Land Treatment Facility** (hydrocarbon contaminated material) including runoff collection sump – liners and fill slopes.	Y	• No noticeable deterioration to the berm and the cover	• No noticeable damage to the liner	45 46
17.	**Vent Raise and Propane Tank Pad** – cut slopes	Y	• Cut slope behind the Propane Tank is stable with minor erosion • Cut slope behind the Vent Rise and Underground Mine Office is considered very steep, but stable with signs of erosion in upper part (surficial units)	None	47 48
18.	**Truck Shop Pad** – cut and fill slopes	Y	• The cut slope at the back of the Truck Shop building is considered stable, but there are signs of sloughing at the lower part of the slope • Fill slope considered stable • Larger erosion gully in the fill slope near the west corner of the Truck Shop building	None	49 50 51
19.	**Crusher Building -** fill slope	Y	• Erosion gullies and sloughing along the pipe line corridor in the back slope	None	52
Notes:					

APPENDIX IV

Piezometric Water Level


PZ-10-01
Red Trigger
Yellow Trigger
PZ10-01F
Elevation (masl)
1296.0
1294.0
1292.0
1290.0
1288.0
1286.0
1284.0
1282.0
1280.0
1278.0
Nov-10
Jan-11
Mar-11
May-11
Jul-11
Sep-11
Nov-11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
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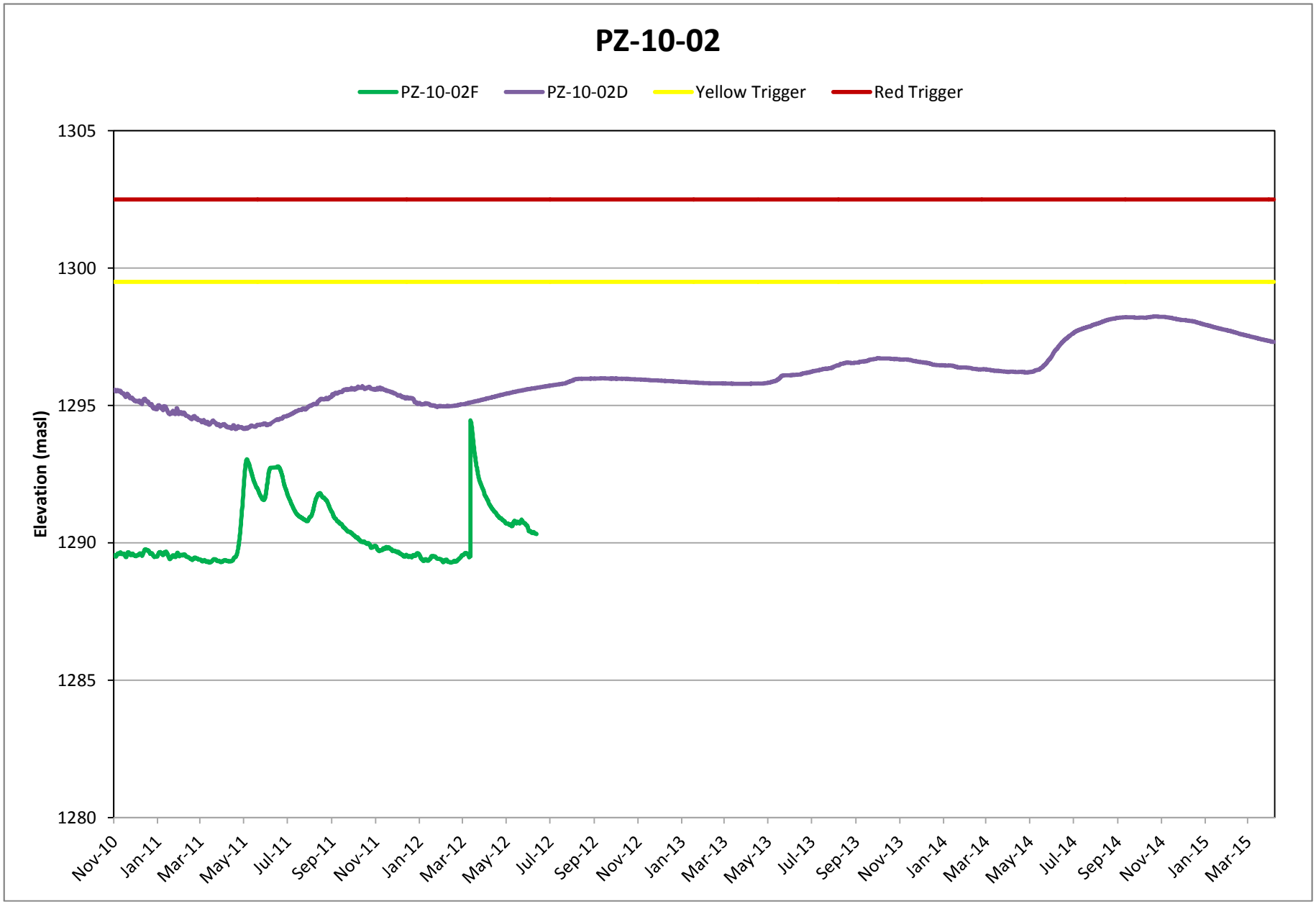
PZ-10-02
PZ-10-02F
PZ-10-02D
Yellow Trigger
Red Trigger
Elevation (masl)
1305
1300
1295
1290
1285
1280
Nov-10
Jan-11
Mar-11
May-11
Jul-11
Sep-11
Nov-11
Jan-12
Mar-12
May-12
Jul-12
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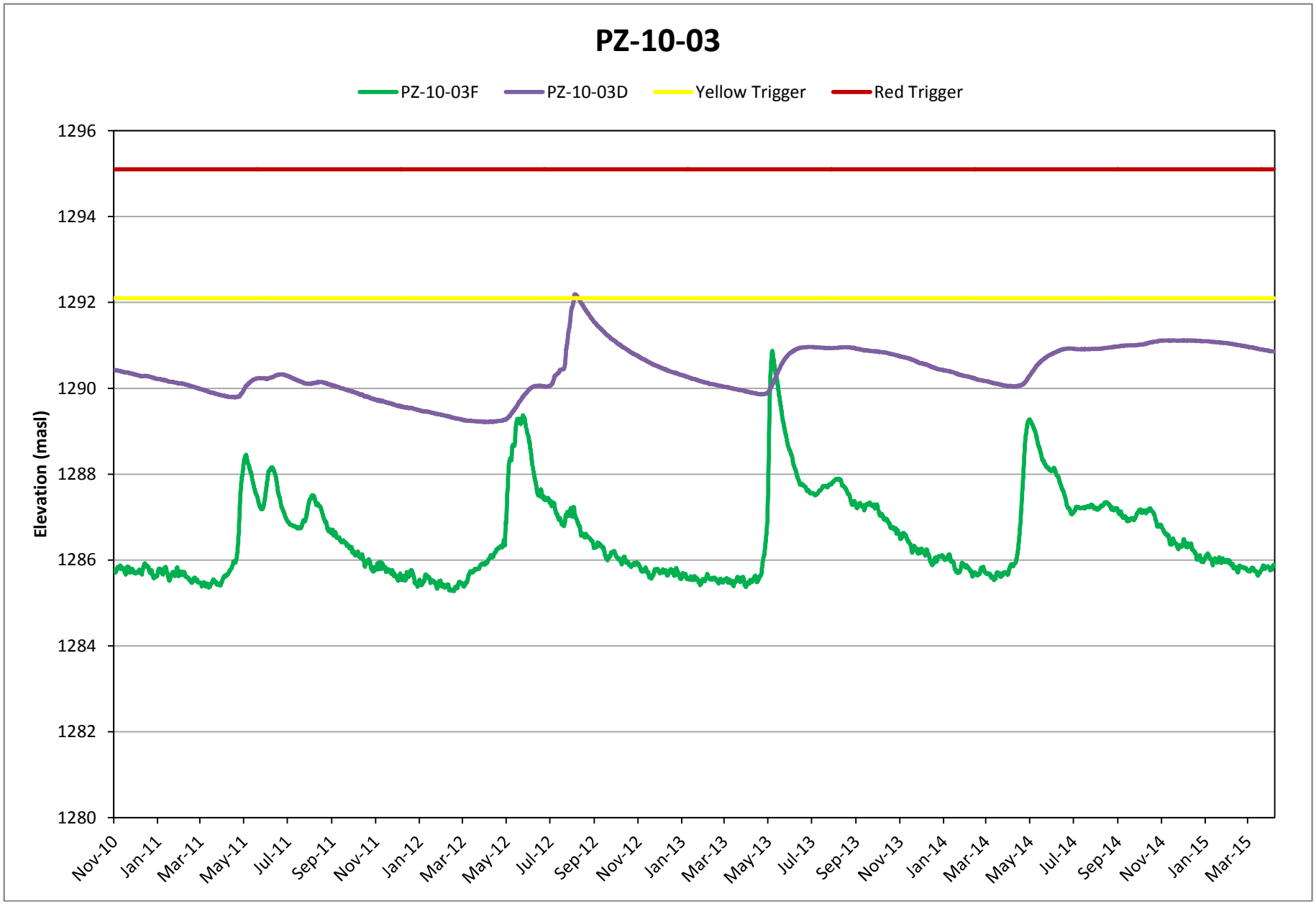
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PZ-10-03F
PZ-10-03D
Yellow Trigger
Red Trigger
Elevation (masl)
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1294
1292
1290
1288
1286
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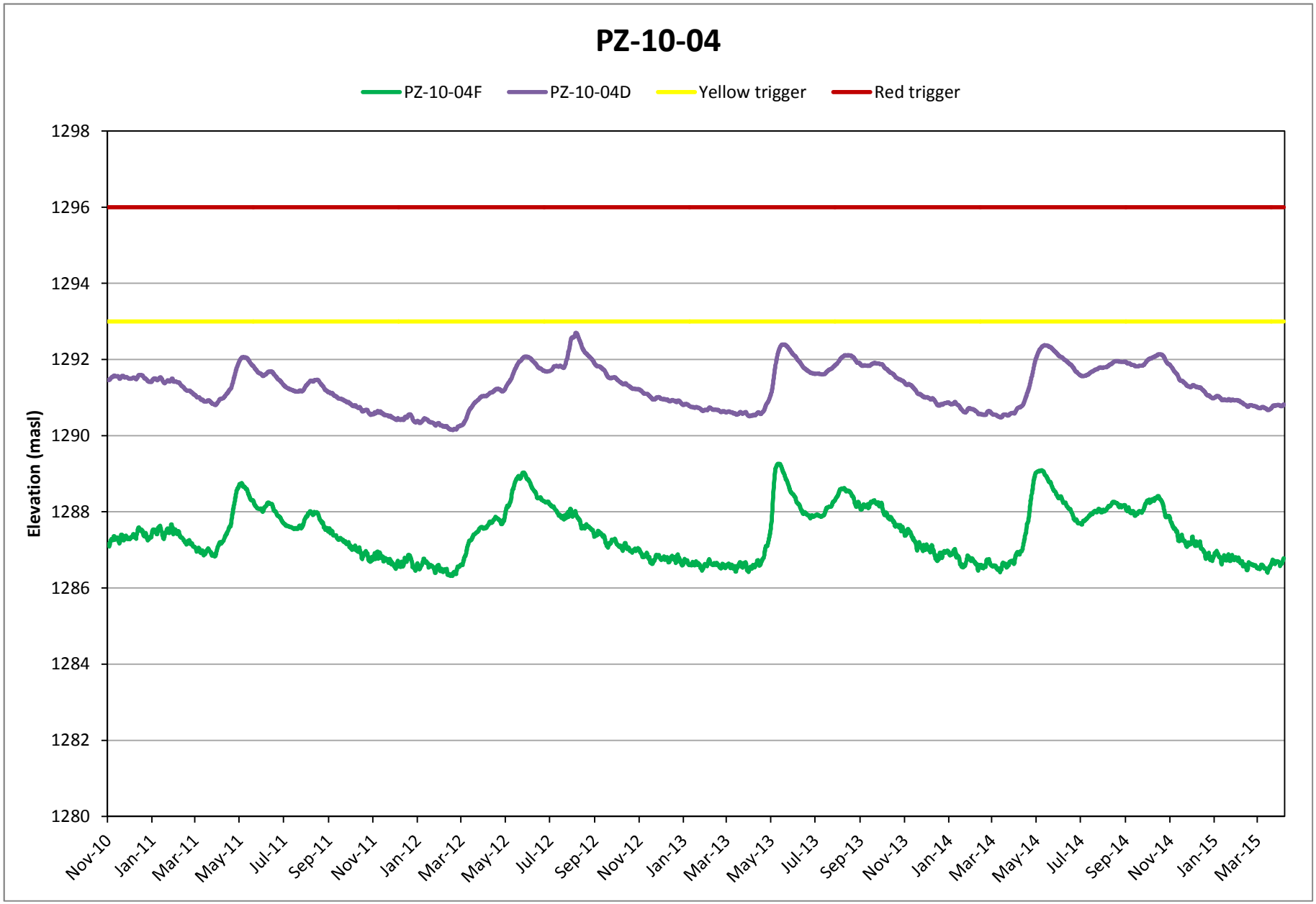
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PZ-10-04F
PZ-10-04D
Yellow trigger
Red trigger
Elevation (masl)
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APPENDIX V

TSF Water Balance

WOLVERINE TAILINGS FACILITY WATER BALANCE
AVERAGE CLIMATE CONDITIONS

Update for Wolverine Annual Inspection - As of July 2015

DATA

	% Solids		
	Transport	Starter	Final
Tailings production	18.9%	74%	78%
Paste production	74.1%	74.1%	74.9%

As Built Input
Monthly Monitoring Report Input

Annual Precipitation (mm)	570			
Runoff Coefficient	0.23			
Precipitation area (lined) (km²)		0.105		0.13
Precipitation area (unlined) (km²)	Starter	0.053	Ultimate	0.036
Evaporation area (km²)		0.084		0.104
Uphill catchment area (km²)	0.751			
% Diversion ditch seepage	25%			
Preproduction % Diversion Water	75%			

100 yr wet 795 mm
100 yr dry 279 mm

Assume full diversion but 75% of precip. To allow for dry year

Mine Year													1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3
Calendar Year	2009	2009	2009	2009	2009	2009	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2011	2012	2012	2012
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
Mean Monthly Temperature	11	8	2	-7	-10	-18	-15	-16	-12	-8	2	9	11	8	2	-7	-10	-18	-15	-16	-12	-8	2	9	11	8	2	-7	-10	-18	-15	-16	-12
Monthly percent of annual precip.	14%	11%	10%	9%	8%	8%	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%	8%	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%	8%	8%	6%	5%
Monthly Precipitation (mm)	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5
Average monthly runoff (% of annual)	17%	9%	9%	6%	3%	1%	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%	1%	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%	1%	0%	0%	0%
Monthly Evaporation (mm)	90	61.5	32	14.5	6	2	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6	2	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6	2	5	4.5	9.5
Incremental ice thickness on pond (m)	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1
Tailings to TSF (tpd)											0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.0	235.4	342.0	303.3	511.9	40.4	567.7	414.6	433.4	522.4	619.0	573.3	788.4	805.8
Tailings to paste (tpd)											0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Inputs (m³/hr)																																	
Tailings water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.93	138.94	136.40	131.43	113.46	7.39	141.81	116.32	85.89	101.67	108.88	134.94	159.33	149.52
Paste plant overflow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Balance of process plant	0.00	0.00	0.00	0.00	0.00	0.00	6.00	6.00	6.00	6.00	6.00	6.00	8.55	8.55	8.55	8.55	8.55	8.55	9.84	8.32	9.54	19.18	18.99	21.31	20.52	16.77	18.32	12.61	15.70	14.29	12.79	11.64	12.01
Direct precipitation	10.96	8.79	8.32	6.89	6.80	6.69	6.03	5.18	3.74	2.92	5.97	9.52	10.96	8.79	8.32	6.89	6.80	6.69	6.03	5.18	3.74	2.92	5.97	9.52	10.96	8.79	8.32	8.53	8.42	8.28	7.47	6.41	4.64
Climate Runoff from unlined area	1.27	1.02	0.97	0.12	0.00	0.00	0.00	0.00	0.03	0.05	0.69	1.10	1.27	1.02	0.97	0.12	0.00	0.00	0.00	0.00	0.03	0.05	0.69	1.10	1.27	1.02	0.97	0.08	0.00	0.00	0.00	0.00	0.02
Snowmelt runoff from unlined area	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	1.24	1.28	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	1.24	1.28	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Seepage from diversion ditch	16.87	8.93	8.96	5.89	3.49	0.99	0.00	0.00	0.00	1.03	18.86	11.97	5.62	2.98	2.99	1.96	1.16	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Seepage reclaim	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Subtotal: All Inputs	30	19	18	13	10	8	12	11	10	10	33	31	29	22	22	19	18	17	17	61	153	160	159	148	42	169	145	108	127	132	156	178	167
Water Losses (m³/hr)																																	
Tailing voids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.55	3.45	5.01	4.44	7.49	0.59	8.31	6.07	6.35	7.65	9.06	8.39	11.54	11.80
Water reclaim to process plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.29	147.84	141.37	137.19	164.39	7.67	180.51	123.33	85.85	104.39	119.82	134.08	155.29	153.84
Estimated pond area (m²)					*4,000*	*7,000*	*8,400*	*9,400*	*10,300*	*11,400*	*16,000*	*22,000*	*26,000*	*30,000*	*60,000*	*61,000*	*62,000*	*62,000*	*62,000*	*63,000*	*63,000*	*64,000*	*65,000*	*66,000*	*68,000*	*68,000*	*68,000*						
Climate Pond evapor.	0.00	0.00	0.00	0.00	0.03	0.02	0.06	0.06	0.13	0.33	1.55	2.64	3.15	2.48	2.67	1.19	0.52	0.17	0.42	0.42	0.80	1.87	6.29	7.93	8.23	5.62	3.02	2.03	0.87	0.28	0.70	0.70	1.33
Seepage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Subtotal: All Losses	0	0	0	0	0	0	0	0	0	0	2	4	4	3	4	2	2	1	1	54	153	149	149	181	17	195	133	95	114	130	144	169	168
Net water surplus (deficit)	**30**	**19**	**18**	**13**	**10**	**8**	**12**	**11**	**10**	**10**	**31**	**27**	**25**	**19**	**18**	**16**	**16**	**15**	**15**	**7**	**0**	**11**	**10**	**-33**	**25**	**-26**	**12**	**13**	**13**	**2**	**12**	**10**	**-1**
Discharge period water surplus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	8.1	8.1	8.1	8.1	8.1	0.0	0.0	0.0	0.0	0.0
Actual water treatment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental pond volume (m3)	-	-	-	-	-	5,698	8,911	7,472	7,176	7,265	23,222	19,604	18,235	14,031	13,075	12,149	11,520	11,457	11,500	4,816	130	7,733	7,734	(23,857)	18,527	(19,385)	8,290	9,585	9,277	1,698	8,952	6,621	(576)
Seasonal pond volume (m3)	-	-	-	-	15,500	21,198	30,109	37,581	44,757	52,022	75,243	94,847	113,082	127,113	140,188	152,338	163,858	175,315	186,815	191,631	191,761	199,494	207,227	183,371	201,897	182,512	190,802	200,387	209,665	211,363	220,315	226,936	226,360
Overall Mass Balance																																	
Tailings Input (Tonnes)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,968	7,296	10,261	9,401	15,357	1,252	17,600	12,438	13,436	15,672	19,188	17,771	22,075	24,980
Cumulative Tailings Tonnage (tonnes)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,968	10,264	20,525	29,926	45,283	46,535	64,135	76,572	90,008	105,680	124,868	142,639	164,714	189,694
Tailings Input (m³)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,855	4,560	6,413	5,876	9,598	783	11,000	7,774	8,398	9,795	11,992	11,107	13,797	15,613
Cumulative Tailings Volume (m3)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,855	6,415	12,828	18,704	28,302	29,084	40,084	47,858	56,255	66,050	78,042	89,149	102,946	118,559
Total Volume (Waste + Water) (m3)					15,500	21,198	30,109	37,581	44,757	52,022	75,243	94,847	113,082	127,113	140,188	152,338	163,858	175,315	186,815	193,486	198,176	212,322	225,931	211,672	230,981	222,597	238,660	256,643	275,715	289,405	309,464	329,882	344,919
Check total volume waste + water (m3)											75,243	94,847	113,082	127,113	140,188	152,338	163,858	175,315	186,815	193,486	198,176	212,322	225,931	211,672	230,981	222,597	238,660	256,643	275,715	289,405	309,464	329,882	344,919

WOLVERINE TAILINGS FACILITY WATER BALANCE
AVERAGE CLIMATE CONDITIONS
Update for Wolverine Annual Inspection - As of July 2015

--> Stage 2 construction complete

Mine Year	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5			0	0	0	0	0	0
Calendar Year	2012	2012	2012	2012	2012	2012	2012	2012	2012	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014
Month	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Mean Monthly Temperature	-8	2	9	11	8	2	-7	-10	-18	-15	-16	-12	-8	2	9	11	8	2	-7	-10	-18	-15	-16	-12	-8	2	9	11	8	2	-7	-10	-18
Monthly percent of annual precip.	4%	7%	11%	14%	11%	10%	9%	8%	8%	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%	8%	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%	8%
Monthly Precipitation (mm)	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4
Average monthly runoff (% of annual)	1%	19%	35%	17%	9%	9%	6%	3%	1%	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%	1%	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%	1%
Monthly Evaporation (mm)	21	72	86.5	90	61.5	32	14.5	6	2	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6	2	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6	2
Incremental ice thickness on pond (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4
Tailings to TSF (tpd)	1044.6	822.1	542.3	413.7	641.8	652.1	711.2	857.0	859.5	752.3	810.8	1055.4	715.7	811.2	1068.6	710.5	426.6	489.7	616.4	448.9	597.6	347.6	500.0	657.9	557.5	507.8	443.5	581.1	640.7	567.3	589.5	684.3	414.1
Tailings to paste (tpd)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Inputs (m³/hr)																																	
Tailings water	206.30	177.68	162.57	143.92	180.70	148.87	153.30	152.65	149.17	147.62	152.61	201.95	196.82	183.60	180.94	140.49	103.46	101.81	125.83	107.66	85.87	59.99	121.6	120.5	113.60	92.10	90.73	103.95	148.50	130.28	127.34	115.09	67.86
Paste plant overflow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Balance of process plant	25.33	16.71	23.44	16.57	19.44	15.76	14.79	15.44	16.44	11.32	9.93	8.68	9.85	34.44	14.90	15.00	15.07	15.13	14.82	12.50	6.56	12.83	15.5	17.1	32.86	27.60	14.30	16.21	19.22	15.74	13.19	9.71	10.38
Direct precipitation	3.61	7.39	11.78	13.57	10.88	10.31	8.53	8.42	8.28	7.47	6.41	4.64	3.61	7.39	11.78	13.57	10.88	10.31	8.53	8.42	8.28	7.47	6.41	4.64	3.61	7.39	11.78	13.57	10.88	10.31	8.53	8.42	8.28
Climate Runoff from unlined area	0.03	0.47	0.75	0.86	0.69	0.66	0.08	0.00	0.00	0.00	0.00	0.02	0.03	0.47	0.75	0.86	0.69	0.66	0.08	0.00	0.00	0.00	0.00	0.02	0.03	0.47	0.75	0.86	0.69	0.66	0.08	0.00	0.00
Snowmelt runoff from unlined area	0.29	0.84	0.87	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.84	0.87	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.84	0.87	0.84	0.00	0.00	0.00	0.00	0.00
Seepage from diversion ditch	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.29	11.97	5.62	2.98	2.99	1.96	1.16	0.33
Seepage reclaim	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Subtotal: All Inputs	237	204	200	177	213	177	178	178	175	167	170	216	212	228	210.2	172	131	129	150	130	102	81	144	143	151	136	131	142	183	161	152	135	88
Water Losses (m³/hr)																																	
Tailing voids	15.29	12.03	7.94	6.06	9.40	9.55	10.41	12.55	12.58	11.01	11.87	15.45	10.48	11.88	15.64	10.40	6.25	7.17	9.02	6.57	8.75	5.09	7.32	9.63	8.16	7.43	6.49	8.51	9.38	8.30	8.63	10.02	6.06
Water reclaim to process plant	203.26	165.84	154.78	138.00	174.32	139.50	148.24	140.34	156.35	153.33	180.83	186.78	186.53	171.93	165.58	130.28	97.33	94.77	116.97	121.18	96.68	54.99	114.4	111.0	105.59	71.2	90.9	95.7	139.1	104.1	94.1	105.3	61.9
Estimated pond area (m²)																																	
Climate Pond evapor.	3.03	10.06	12.49	12.58	8.60	4.62	2.03	0.87	0.28	0.70	0.70	1.33	3.03	10.06	12.49	12.58	8.60	4.62	2.03	0.87	0.28	0.70	0.70	1.33	3.03	10.06	12.49	12.58	8.60	4.62	2.03	0.87	0.28
Seepage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Subtotal: All Losses	223	189	176	158	193	155	162	155	170	166	194	205	201	195	194.7	154	113	108	129	130	107	62	123	123	118	90	111	118	158	118	106	117	69
Net water surplus (deficit)	**14**	**15**	**24**	**19**	**19**	**22**	**16**	**23**	**5**	**1**	**-24**	**12**	**11**	**33**	**16**	**18**	**18**	**21**	**21**	**0**	**-5**	**20**	**21**	**20**	**34**	**46**	**21**	**24**	**25**	**43**	**46**	**18**	**19**
Discharge period water surplus	0.0	29.5	29.5	29.5	29.5	29.5	29.5	0.0	0.0	0.0	0.0	0.0	0.0	19.9	19.9	19.9	19.9	19.9	19.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual water treatment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental pond volume (m3)	10,065	11,267	17,428	14,236	14,436	15,784	11,923	16,390	3,475	1,014	(16,424)	8,720	7,601	24,455	11,182	13,030	13,341	15,366	15,799	(27)	(3,724)	14,519	14,182	15,094	24,203	34,190	14,792	18,099	18,743	30,897	34,485	13,070	13,848
Seasonal pond volume (m3)	236,425	247,692	265,120	279,356	293,792	309,577	321,500	337,890	341,365	342,379	325,955	334,675	342,277	366,732	377,914	390,944	404,285	419,651	435,450	435,423	431,700	446,219	460,401	475,495	499,698	533,889	548,681	566,779	585,523	616,420	650,905	663,975	677,823
Overall Mass Balance																																	
Tailings Input (Tonnes)	31,338	25,484	16,268	12,825	19,895	19,563	22,046	25,710	26,646	23,322	22,702	32,718	21,470	25,148	32,057	22,025	13,225	14,692	19,109	13,468	18,527	10,775	14,000	20,394	16,726	15,741	13,305	18,015	19,861	17,018	18,273	20,529	12,837
Cumulative Tailings Tonnage (tonnes)	221,033	246,517	262,785	275,610	295,505	315,068	337,114	362,824	389,470	412,792	435,494	468,212	489,682	514,830	546,887	568,912	582,137	596,829	615,938	629,406	647,933	658,708	672,708	693,102	709,828	725,569	738,874	756,888	776,749	793,767	812,041	832,569	845,406
Tailings Input (m³)	19,587	15,928	10,168	8,016	12,434	12,227	13,779	16,069	16,654	14,576	14,189	20,449	13,419	15,718	20,036	13,766	8,266	9,183	11,943	8,417	11,579	6,734	8,750	12,746	10,454	9,838	8,316	11,259	12,413	10,636	11,421	12,830	8,023
Cumulative Tailings Volume (m3)	138,145	154,073	164,240	172,256	184,690	196,917	210,696	226,765	243,419	257,995	272,184	292,632	306,051	321,769	341,804	355,570	363,836	373,018	384,961	393,379	404,958	411,692	420,442	433,189	443,643	453,481	461,796	473,055	485,468	496,105	507,525	520,356	528,379
Total Volume (Waste + Water) (m3)	374,571	401,765	429,361	451,612	478,483	506,494	532,196	564,655	584,784	600,374	598,139	627,308	648,328	688,501	719,719	746,514	768,121	792,669	820,411	828,802	836,658	857,911	880,843	908,684	943,341	987,370	1,010,477	1,039,835	1,070,991	1,112,525	1,158,431	1,184,331	1,206,202
Check total volume waste + water (m3)	374,571	401,765	429,361	451,612	478,483	506,494	532,196	564,655	584,784	600,374	598,139	627,308	648,328	688,501	719,719	746,514	768,121	792,669	820,411	828,802	836,658	857,911	880,843	908,684	943,341	987,370	1,010,477	1,039,835	1,070,991	1,112,525	1,158,431	1,184,331	1,206,202

WOLVERINE TAILINGS FACILITY WATER BALANCE
AVERAGE CLIMATE CONDITIONS
Update for Wolverine Annual Inspection - As of July 2015

Mine Year	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3		
Calendar Year	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2017	2017	2017	2017	2017	2017		
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	
Mean Monthly Temperature	-15	-16	-12	-8	2	9	11	8	2	-7	-10	-18	-15	-16	-12	-8	2	9	11	8	2	-7	-10	-18	-15	-16	-12	-8	2	9	
Monthly percent of annual precip.	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%	8%	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%	8%	8%	6%	5%	4%	7%	11%	
Monthly Precipitation (mm)	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5	20.0	42.3	65.3	
Average monthly runoff (% of annual)	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%	1%	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%	1%	0%	0%	0%	1%	19%	35%	
Monthly Evaporation (mm)	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6	2	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6	2	5	4.5	9.5	21	72	86.5	
Incremental ice thickness on pond (m)	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1	0.0	0.0	0.0	
Tailings to TSF (tpd)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Tailings to paste (tpd)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Water Inputs (m³/hr)																															
Tailings water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Paste plant overflow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Balance of process plant	0.0392473	0.0421131	2	15	15.722245	5.21	1.4965726	1.143414	2.1017361	0.0518145	0.044375	0.03521505	0.0392473	0.0421131	2	15	15.7222446	5.21	1.4965726	1.143414	2.1017361	0.0518145	0.044375	0.0352151	0.03924731	0.0421131	2	15	15.722245	5.21	
Direct precipitation	7.47	6.41	4.64	3.61	7.39	11.78	13.57	10.88	10.31	8.53	8.42	8.28	7.47	6.41	4.64	3.61	7.39	11.78	13.57	10.88	10.31	8.53	8.42	8.28	7.47	6.41	4.64	3.61	7.39	11.78	
Climate Runoff from unlined area	0.00	0.00	0.02	0.03	0.47	0.75	0.86	0.69	0.66	0.08	0.00	0.00	0.00	0.00	0.02	0.03	0.47	0.75	0.86	0.69	0.66	0.08	0.00	0.00	0.00	0.00	0.02	0.03	0.47	0.75	
Snowmelt runoff from unlined area	0.00	0.00	0.00	0.29	0.84	0.87	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.84	0.87	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.84	0.87	
Seepage from diversion ditch	0.00	0.00	0.00	0.34	6.29	11.97	5.62	2.98	2.99	1.96	1.16	0.33	0.00	0.00	0.00	0.34	6.29	11.97	5.62	2.98	2.99	1.96	1.16	0.33	0.00	0.00	0.00	0.34	6.29	11.97	
Seepage reclaim	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Subtotal: All Inputs	9	7	7	20	32	32	23	17	17	12	11	10	9	7	7	20	32	32	23	17	17	12	11	10	9	7	7	20	32	32	
Water Losses (m³/hr)																															
Tailing voids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Water reclaim to process plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Estimated pond area (m²)																															
Climate Pond evapor.	0.70	0.70	1.33	3.03	10.06	12.49	12.58	8.60	4.62	2.03	0.87	0.28	0.70	0.70	1.33	3.03	10.06	12.49	12.58	8.60	4.62	2.03	0.87	0.28	0.70	0.70	1.33	3.03	10.06	12.49	
Seepage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Subtotal: All Losses	2	2	2	4	11	13	14	10	6	3	2	1	2	2	2	4	11	13	14	10	6	3	2	1	2	2	2	4	11	13	
Net water surplus (deficit)	**7**	**6**	**5**	**16**	**21**	**18**	**10**	**7**	**11**	**9**	**9**	**8**	**7**	**6**	**5**	**16**	**21**	**18**	**10**	**7**	**11**	**9**	**9**	**8**	**7**	**6**	**5**	**16**	**21**	**18**	
Discharge period water surplus	0.0	0.0	0.0	0.0	20.9	20.9	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0	0.0	0.0	20.9	20.9	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0	0.0	0.0	20.9	20.9	
Actual water treatment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Incremental pond volume (m3)	5,067	3,871	3,782	11,359	15,361	13,019	7,309	5,283	8,228	6,394	6,311	6,222	5,067	3,871	3,782	11,359	15,361	13,019	7,309	5,283	8,228	6,394	6,311	6,222	5,067	3,871	3,782	11,359	15,361	13,019	
Seasonal pond volume (m3)	682,890	686,761	690,543	701,902	452,000	465,019	472,329	477,612	485,840	492,234	498,545	504,767	509,834	513,705	517,487	528,846	544,207	557,226	564,536	569,819	578,047	584,441	590,752	596,974	602,041	605,912	609,694	621,053	636,414	649,433	
Overall Mass Balance																															
Tailings Input (Tonnes)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cumulative Tailings Tonnage (tonnes)	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	
Tailings Input (m³)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cumulative Tailings Volume (m3)	528,379	528,379	528,379	528,379	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	
Total Volume (Waste + Water) (m3)	1,211,268	1,215,140	1,218,922	1,230,281	1,018,000	1,031,019	1,038,329	1,043,612	1,051,840	1,058,234	1,064,545	1,070,767	1,075,834	1,079,705	1,083,487	1,094,846	1,110,207	1,123,226	1,130,536	1,135,819	1,144,047	1,150,441	1,156,752	1,162,974	1,168,041	1,171,912	1,175,694	1,187,053	1,202,414	1,215,433	
Check total volume waste + water (m3)	1,211,268	1,215,140	1,218,922	1,230,281	1,018,000	1,031,019	1,038,329	1,043,612	1,051,840	1,058,234	1,064,545	1,070,767	1,075,834	1,079,705	1,083,487	1,094,846	1,110,207	1,123,226	1,130,536	1,135,819	1,144,047	1,150,441	1,156,752	1,162,974	1,168,041	1,171,912	1,175,694	1,187,053	1,202,414	1,215,433	

Note: May 2015 water, tailings and total volume values updated based on May 24, 2015 bathymetric survey.

WOLVERINE TAILINGS FACILITY WATER BALANCE
AVERAGE CLIMATE CONDITIONS
Update for Wolverine Annual Inspection - As of July 2015

(With diversions)

Mine Year		3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5
Calendar Year		2017	2017	2017	2017	2017	2017	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019	2019
Month		**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**
	Mean Monthly Temperature	11	8	2	-7	-10	-18	-15	-16	-12	-8	2	9	11	8	2	-7	-10	-18	-15	-16	-12	-8	2	9	11	8	2	-7	-10
	Monthly percent of annual precip.	14%	11%	10%	9%	8%	8%	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%	8%	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%
	Monthly Precipitation (mm)	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7
	Average monthly runoff (% of annual)	17%	9%	9%	6%	3%	1%	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%	1%	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%
	Monthly Evaporation (mm)	90	61.5	32	14.5	6	2	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6	2	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6
	Incremental ice thickness on pond (m)	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	Tailings to TSF (tpd)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tailings to paste (tpd)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Inputs (m³/hr)																														
	Tailings water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Paste plant overflow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Balance of process plant	1.4965726	1.14341398	2.1017361	0.05181452	0.044375	0.03521505	0.03924731	0.0421131	2	15	15.722245	5.21	1.49657258	1.14341398	2.10173611	0.05181452	0.044375	0.03521505	0.03924731	0.0421131	2	15	15.722245	5.21	1.4965726	1.143414	2.10173611	0.05181452	0.044375
	Direct precipitation	13.57	10.88	10.31	8.53	8.42	8.28	7.47	6.41	4.64	3.61	7.39	11.78	13.57	10.88	10.31	8.53	8.42	8.28	7.47	6.41	4.64	3.61	7.39	11.78	13.57	10.88	10.31	8.53	8.42
Climate	Runoff from unlined area	0.86	0.69	0.66	0.08	0.00	0.00	0.00	0.00	0.02	0.03	0.47	0.75	0.86	0.69	0.66	0.08	0.00	0.00	0.00	0.00	0.02	0.03	0.47	0.75	0.86	0.69	0.66	0.08	0.00
	Snowmelt runoff from unlined area	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.84	0.87	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.84	0.87	0.84	0.00	0.00	0.00	0.00
	Seepage from diversion ditch	5.62	2.98	2.99	1.96	1.16	0.33	0.00	0.00	0.00	0.34	6.29	11.97	5.62	2.98	2.99	1.96	1.16	0.33	0.00	0.00	0.00	0.34	6.29	11.97	5.62	2.98	2.99	1.96	1.16
	Seepage reclaim	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Subtotal: All Inputs	23	17	17	12	11	10	9	7	7	20	32	32	23	17	17	12	11	10	9	7	7	20	32	32	23	17	17	12	11
Water Losses (m³/hr)																														
	Tailing voids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Water reclaim to process plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Estimated pond area (m²)																													
Climate	Pond evapor.	12.58	8.60	4.62	2.03	0.87	0.28	0.70	0.70	1.33	3.03	10.06	12.49	12.58	8.60	4.62	2.03	0.87	0.28	0.70	0.70	1.33	3.03	10.06	12.49	12.58	8.60	4.62	2.03	0.87
	Seepage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Subtotal: All Losses	14	10	6	3	2	1	2	2	2	4	11	13	14	10	6	3	2	1	2	2	2	4	11	13	14	10	6	3	2
Net water surplus (deficit)		**10**	**7**	**11**	**9**	**9**	**8**	**7**	**6**	**5**	**16**	**21**	**18**	**10**	**7**	**11**	**9**	**9**	**8**	**7**	**6**	**5**	**16**	**21**	**18**	**10**	**7**	**11**	**9**	**9**
Discharge period water surplus		20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0	0.0	0.0	20.9	20.9	20.9	20.9	20.9	20.9	0.0	0.0	0.0	0.0	0.0	0.0	20.9	20.9	20.9	20.9	20.9	20.9	0.0
Actual water treatment		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.9	34.9	34.9	34.9	34.9	34.9	0.0
Incremental pond volume (m3)		7,309	5,283	8,228	6,394	6,311	6,222	5,067	3,871	3,782	11,359	15,361	13,019	7,309	5,283	8,228	6,394	6,311	6,222	5,067	3,871	3,782	11,359	(10,581)	(12,085)	(18,632)	(20,658)	(16,877)	(19,547)	6,311
Seasonal pond volume (m3)		656,742	662,026	670,254	676,648	682,959	689,181	694,248	698,119	701,901	713,260	728,621	741,640	748,949	754,233	762,461	768,855	775,166	781,388	786,455	790,326	794,108	805,467	794,886	782,801	764,169	743,510	726,634	707,086	713,397
Overall Mass Balance																														
	Tailings Input (Tonnes)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cumulative Tailings Tonnage (tonnes)	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406
	Tailings Input (m³)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cumulative Tailings Volume (m3)	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000
	Total Volume (Waste + Water) (m3)	1,222,742	1,228,026	1,236,254	1,242,648	1,248,959	1,255,181	1,260,248	1,264,119	1,267,901	1,279,260	1,294,621	1,307,640	1,314,949	1,320,233	1,328,461	1,334,855	1,341,166	1,347,388	1,352,455	1,356,326	1,360,108	1,371,467	1,360,886	1,348,801	1,330,169	1,309,510	1,292,634	1,273,086	1,279,397
	Check total volume waste + water (m3)	1,222,742	1,228,026	1,236,254	1,242,648	1,248,959	1,255,181	1,260,248	1,264,119	1,267,901	1,279,260	1,294,621	1,307,640	1,314,949	1,320,233	1,328,461	1,334,855	1,341,166	1,347,388	1,352,455	1,356,326	1,360,108	1,371,467	1,360,886	1,348,801	1,330,169	1,309,510	1,292,634	1,273,086	1,279,397

WOLVERINE TAILINGS FACILITY WATER BALANCE
AVERAGE CLIMATE CONDITIONS
Update for Wolverine Annual Inspection - As of July 2015

(With diversions)

	Mine Year	5	Closure	Closure	Closure	Closure	Closure	Closure	Closure	Closure	Closure	Closure	Closure	Closure
	Calendar Year	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
	Month	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
	Mean Monthly Temperature	-18	-15	-16	-12	-8	2	9	11	8	2	-7	-10	-18
	Monthly percent of annual precip.	8%	8%	6%	5%	4%	7%	11%	14%	11%	10%	9%	8%	8%
	Monthly Precipitation (mm)	47.4	42.8	33.2	26.5	20.0	42.3	65.3	77.7	62.3	57.1	48.8	46.7	47.4
	Average monthly runoff (% of annual)	1%	0%	0%	0%	1%	19%	35%	17%	9%	9%	6%	3%	1%
	Monthly Evaporation (mm)	2	5	4.5	9.5	21	72	86.5	90	61.5	32	14.5	6	2
	Incremental ice thickness on pond (m)	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4
	Tailings to TSF (tpd)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tailings to paste (tpd)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Inputs (m³/hr)														
	Tailings water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Paste plant overflow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Balance of process plant	0.03521505	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Direct precipitation	8.28	7.47	6.41	4.64	3.61	7.39	11.78	13.57	10.88	10.31	8.53	8.42	8.28
Climate	Runoff from unlined area	0.00	0.00	0.00	0.02	0.03	0.47	0.75	0.86	0.69	0.66	0.08	0.00	0.00
	Snowmelt runoff from unlined area	0.00	0.00	0.00	0.00	0.29	0.84	0.87	0.84	0.00	0.00	0.00	0.00	0.00
	Seepage from diversion ditch	0.33	0.00	0.00	0.00	0.34	6.29	11.97	5.62	2.98	2.99	1.96	1.16	0.33
	Seepage reclaim	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Subtotal: All Inputs	10	8	7	6	5	16	26	22	16	15	12	11	10
Water Losses (m³/hr)														
	Tailing voids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Water reclaim to process plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Estimated pond area (m²)													
Climate	Pond evapor.	0.28	0.70	0.70	1.33	3.03	10.06	12.49	12.58	8.60	4.62	2.03	0.87	0.28
	Seepage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Subtotal: All Losses	1	2	2	2	4	11	13	14	10	6	3	2	1
Net water surplus (deficit)		**8**	**7**	**6**	**3**	**1**	**5**	**13**	**8**	**6**	**9**	**9**	**9**	**8**
Discharge period water surplus		0.0	0.0	0.0	0.0	0.0	13.9	13.9	13.9	13.9	13.9	13.9	0.0	0.0
Actual water treatment		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental pond volume (m3)		6,222	5,038	3,843	2,477	898	3,663	9,270	6,196	4,433	6,715	6,356	6,279	6,196
Seasonal pond volume (m3)		719,619	724,657	728,500	730,977	731,875	735,538	744,808	751,004	755,437	762,151	768,507	774,786	780,982
Overall Mass Balance														
	Tailings Input (Tonnes)	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cumulative Tailings Tonnage (tonnes)	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406	845,406
	Tailings Input (m³)	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cumulative Tailings Volume (m3)	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000	566,000
	Total Volume (Waste + Water) (m3)	1,285,619	1,290,657	1,294,500	1,296,977	1,297,875	1,301,538	1,310,808	1,317,004	1,321,437	1,328,151	1,334,507	1,340,786	1,346,982
	Check total volume waste + water (m3)	1,285,619	1,290,657	1,294,500	1,296,977	1,297,875	1,301,538	1,310,808	1,317,004	1,321,437	1,328,151	1,334,507	1,340,786	1,346,982