WOLVERINE PROJECT

Starter Tailings Storage Facility - 2009 Civil Works Construction Summary Report

M09234A05

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1. INTRODUCTION

This report documents the civil works construction for the tailings facility and related infrastructure for the Yukon Zinc Corporation (YZC) Wolverine Project undertaken in 2009. The project is an underground zinc-silver, massive sulphide mine located in south-eastern Yukon Territory (location shown on Drawing D-4001). Yukon Zinc Corporation was issued *Quartz Mining License QML-0006* by Yukon Energy, Mines and Resources (EMR) in December 2006 and *Type A Water License QZ04-065 (A-License)* by the Yukon Water Board in October 2007. The construction record drawings issued with this report summarize the work.

The tailings impoundment site is located in a natural, northwest-southeast trending elongated depression located on the northeast valley slope of Go Creek (See Drawing D-4001). The depression is flanked on the downhill side by a natural ridge that drops in height gently towards the upstream end of the tailings facility.

The tailings dam is a compacted semi-homogeneous earthfill dam with an upstream impervious geosynthetic liner. The liner covers the base of the tailings impoundment and the upstream face of the dam. In 2009, material was excavated from the tailings reservoir footprint for use as fill for the starter dam. The foundation was prepared to receive the geomembrane, and the geomembrane was installed. Appurtenant structures installed included two perimeter surface water diversion ditches (designated Ditch A and Ditch B), under-liner drains, a seepage collection dam, and a spillway in the starter dam.

Water has been collecting in the pond between fall 2009 and spring 2010 (from mine dewatering, and will collect surface runoff during the 2010 spring freshet. Tailings are scheduled to be spigotted into the pond starting in June, 2010, following mill start up.

1.1 Report Disclaimer

This report is an instrument of service of Klohn Crippen Berger Ltd. The report has been prepared for the exclusive use of Yukon Zinc Corporation for the specific application to the Wolverine Project. 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 endeavoured to comply with generally accepted geotechnical practice common to the local area. Klohn Crippen Berger makes no warranty, expressed or implied.

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2. SCOPE OF WORK

The Contractor's scope of work for the development of the Wolverine Project tailings storage facility (TSF) in 2009 was as follows:

a) Clearing, grubbing, and stripping of work areas;

b) Installing diversion channels Ditch A and B;

c) Producing specified fill materials;

d) Installing liner and dam underdrains;

e) Constructing the earthfill starter dam;

f) Preparing liner foundation;

g) Assisting Others to install a geosynthetic liner;

h) Constructing a seepage collection dam;

i) Excavating the starter dam spillway channel; and,

j) Completing post-construction survey of as-built conditions.

3. PROJECT ORGANIZATION

The contractual relationship between the Owner, Contractor, Sub-Contractors and Consultant and key personnel for each party are shown in Figure 3.1. KCB was on site to perform field review and quality assurance of the civil construction and observe whether it was being completed in a manner consistent with the intent of the civil design. YZC was responsible for the design and monitoring of environmental aspects.

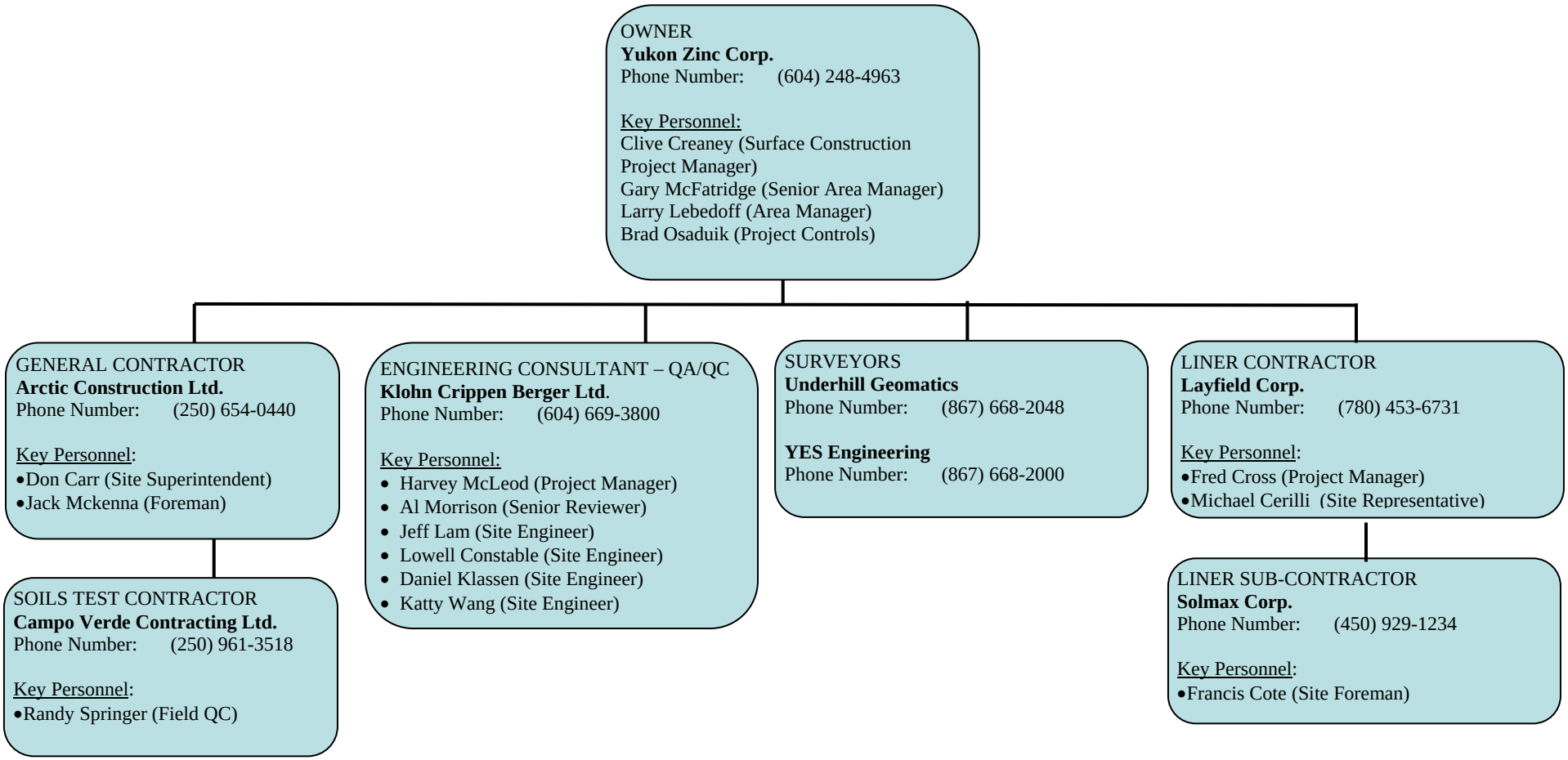


Figure 3.1 Organization Chart

4. CONSTRUCTION SCHEDULE

The construction sequence for 2009 is shown on Figure 4.1.

Item No.	Description
1.0	**Starter Tailings Storage Facility Construction**
1.01	Clearing, Grubbing, and Stripping of Work Areas
1.02	Diversion Ditch A
1.03	Diversion Ditch B
1.04	Liner/Dam Foundation Grading, Drainage and Preparation
1.05	Construct Roads
1.06	Install Dam Underdrains
1.07	Install Liner Underdrain
1.08	Construct Starter Dam
1.09	Excavate Spillway
1.10	Liner Subgrade Proof Rolling
1.11	Install Geosynthetic Membrane
1.12	Install Liner Anchor Trench
	Weather Summary
	Field Review
	Lowell Constable
	Jeff Lam
	Daniel Klassen
	Katty Wang

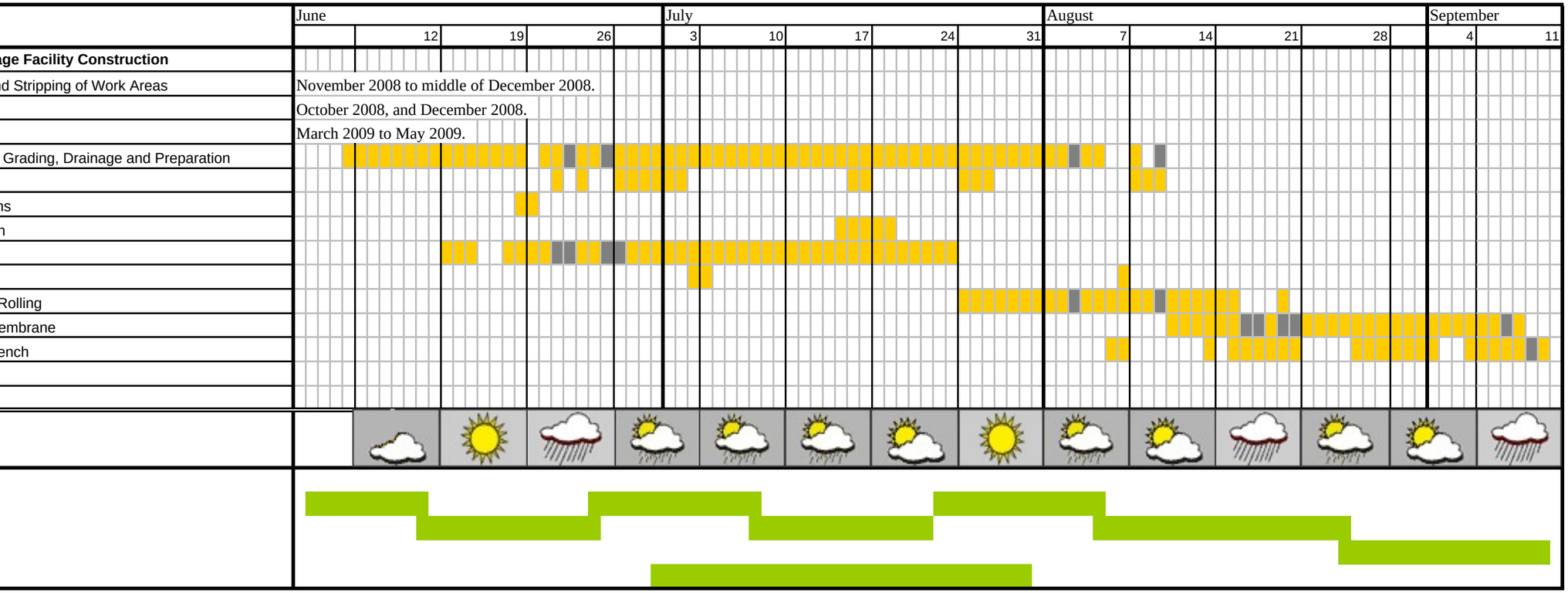


Figure 4.1 2009 As-built Construction Sequence

5. WEATHER

Weather conditions in June 2009 were generally a mix of sun and clouds with occasional showers. The weather ranged from cold and hailing to hot and sunny. There were often sudden weather changes during the course of any given day. In July the weather stabilized, with cool, wet overcast weather presiding for most of the month, and occasional windy days from the middle of the month and into August. August started off sunny and warm, transitioning to longer periods of showers and colder weather to the end of the month and into September.

During the construction period, earthworks were delayed by 8 to 10 days due to rain. Showers and wind slowed the overall liner installation productivity in the second half of August and beginning of September, resulting cumulatively in 6 to 8 days of delay.

The weekly weather conditions during construction are summarized on the construction schedule, Figure 4.1.

6. CONSTRUCTION EQUIPMENT

The major equipment used by Arctic Construction Ltd. From June 1st to September 6th, 2009 for TSF construction are shown in Table 6.1.

Table 6.1 Arctic Construction Equipment

EQUIPMENT	APPROX. HOURS	APPLICATION
4 Volvo A30D Rock Trucks	2153	General fill haul
2 Volvo A40 Rock Truck	711	General fill haul
1 CAT 30-Ton Rock Truck	25	General fill haul
1 CAT 730 Haul Truck	156	General fill haul
3 Gravel Trucks	35	Drain rock and bedding sand haul from km 17
1 DEERE 450 Excavator	611	Drainage work/Borrow cut
2 Hitachi 270 Excavators	893	Drainage work/Borrow cut
1 Hitachi 850 Excavator	165	Drainage work/Borrow cut
1 Hitachi 330 Excavator	195	Drainage work/Borrow cut
1 Link-belt 290 Excavator	305	Drainage work/Liner underdrain cut
1 CAT D7H Dozer	661	Spreading dam fill
1 CAT D6R Dozer	576	Spreading dam fill
1 CAT D8 Dozer	50	Grading/Sloping of Impoundment area
1 CAT D9 Dozer	290	Grading/Sloping of Impoundment area
1 CAT 928G Loader	112	Moving rolls of liner/Moving sandbags
1 DEERE 450J Dozer	205	Grading wet spots
1 Bobcat T300 Loader	232	Bedding sand placement
CAT 14H Grader	70	Impoundment area grading
3 Smooth Drum Ingersoll Rand SD100D Vibratory Roller	1289	Compaction of foundation and dam fill
1 Sheepsfoot Drum Ingersoll Rand SD100D Vibratory Roller	365	Compaction of foundation and dam fill
3 Jumping Jack Compactors	4	Compaction of fill around dam underdrain pipes
1 Plate Compactor	68	Compaction of fill around dam underdrain pipes and compaction of anchor trench
1 Water Truck	5	Dust Control
Honda ATV (Layfield)	217	Installing liner

7. MATERIALS

7.1 Construction Materials

All earthworks material for the construction of the TSF was sourced from the impoundment area when possible, and from other locations within the Wolverine mine site as required. A summary of the earth materials used for permanent works, including quantities and sourcing, is provided in Table 7.1. A summary of the manufactured materials used during the 2009 construction is provided in Table 7.2.

Due to the variation of material gradations within the impoundment borrow area, the starter dam contains a semi-homogeneous mix of material that ranges in gradation from silt and sand with some gravel to sand and gravel with trace fines as shown in Appendix IV and discussed in Section 10.5.

Table 7.1 Earth Materials

MATERIAL	SOURCE OF MATERIAL	QUANTITY (m^3)	AREA(S) PLACED	COMMENTS
General Fill[1]	Impoundment Area	130,000	Dam fill	Fill taken from borrow areas within the tailings impoundment. Gradation summary is shown on Drawing D-4002 Sheet 2, and the gradation plots are shown in Appendix IV, Figure IV.1 and Figure IV.5.
General Fill	Anchor trench	1,300	Anchor trench backfill	Anchor trench is backfilled with excavated material.
Culvert Bedding/Liner Bedding	Mine Stockpile at km 17.	400	Dam underdrain trench backfill, and on liner subgrade	Range of particle sizes shown on Figure IV.2.
Drain Rock	Screened blast rock produced by Arctic Construction for YZC	1,500	Main Liner Foundation French Drain and Foundation Finger drains	Material was a screened blast rock produced onsite. Sub-angular. Particle sizes shown on Figure IV.4.

Notes:
1. Material volumes were based on as-built surveys provided by Arctic Construction.
2. Total bank volume of material cut from impoundment area was approximately 200,000 m^3. Material with excess clay content or organics was removed and hauled to various stockpiles.

Table 7.2 Manufactured Materials

MATERIAL	MANUFACTURER	QUANTITY	AREA(S) PLACED	COMMENTS
40 mil LLDPE Geomembrane[2]	Solmax	96,000 m^2	Tailings Impoundment	Total 3D Impoundment area is 85,000 m^2. Roll Dimension 237.7 m x 6.8 m.
80 mil LLDPE Geomembrane[2]	Solmax	340 m^2	Tailings Impoundment, 2 locations in areas of future pump barge pipes	Roll Dimension 122 m x 6.8 m.
Nonwoven LP6 Geotextile[2]	Layfield	17,000 m^2	Upstream Starter Dam Slopes, on top of drain gravel, and as required on slope wash outs	Roll Dimension 4.57 m x 91.4 m.
8" SCLAIRPIPE HDPE[1]	KWH	240 m	Under Starter Dam	Two pipes installed underneath dam. Photo 4[3].
240 mm Diameter Corrugated Slotted HDPE Pipe[1]	-	310 m	Main Liner Underdrain	Photo 15[3]
4" Perforated pipe[1]	-	500 m	Main Liner Underdrain and Liner Underdrains	Photo 18[3]
Perforated Corrugated Steel Pipe	-	5 m	Main Liner Underdrain	Placed as a sleeve over the 4" perforated pipe for protection against traffic loading during construction.

Notes:
1. Material quantities were based on as-built surveys provided by Arctic Construction.
2. Manufacturer's data sheets provided in Appendix III.
3. Photos are included in Appendix I

7.2 QA Field Review – Earth Materials

General Fill

General fill was used for construction of the starter dam, seepage dam, and backfilling of the anchor trenches. During construction, ACL was responsible for performing their own set of QC tests according to Starter Dam Construction Technical Specifications (Appendix II).

The final accepted QA test results for the 2009 civil construction works are summarized in Table 7.3 and Table 7.4 below.

Table 7.3 Summary of General Fill QA Testing Values

	MAX. VALUE	MIN. VALUE	AVERAGE VALUE	SPECIFIED VALUE
Moisture Content (ASTM D2216)	14.8%	4.5%	7.8%	-4% to +2% of Optimum Standard Proctor
% Standard Proctor Density (ASTM D6938)	108%	95%	99.4%	95%
Standard Proctor Dry Density (ASTM D698)	2379 kg/m^3	2055 kg/m^3	n/a	n/a
Standard Proctor Optimal Moisture Content (ASTM D698)	11.5%	5.6%	n/a	n/a

Table 7.4 General Fill QA Testing Frequencies 2009

		MOISTURE CONTENT	PLACED DENSITY	STANDARD PROCTOR
Sand	Specified[2]	random	random	random
	Actual	9	435	4

Notes:
1. Frequencies are based on in-place volumes.
2. Minimum as stated in 2009 Technical Specifications documents.

Drain Rock for Liner Underdrain

The specified drain rock for the Liner Underdrain was a free draining 20 mm concrete coarse aggregate or approved equivalent. An approved equivalent non acid generating crushed drain rock was used and eight gradation tests were performed (See Appendix IV, Figure IV.4).

Liner Bedding

The specified Liner Bedding is a natural or screened silty sand or silty sand and gravel with maximum 20 mm particle size and less than 15 percent passing the #200 sieve. An approved equivalent material was used and the gradation tests are shown in Figure IV.3.

Three gradation tests performed on the material indicated that it has no particles larger than 20 mm, but the material passing the #200 sieve varied from 10% to 22%, which, although higher than the specified fines content, was still suitable for forming a bed for the liner.

Culvert Bedding/Backfill

A silty sand and gravel material backfill was used for the Dam Underdrain culvert trench backfill and compacted. Three gradation tests were performed and the results are shown in Appendix IV, Figure IV.2.

7.3 QA Field Review – Geosynthetics

Upon arrival onsite, samples of the geomembrane were sent to TRI Labs for independent material properties quality control testing. The results are shown in Appendix V.

Quality control testing of the liner installation was conducted by Solmax and included daily air pressure testing, and destructive testing of the seams. KCB also performed

independent quality assurance by sending seam samples to TRI Labs. The results are summarized in Table 7.5.

Table 7.5 Solmax and TRI Liner Testing Results

	NO. OF TESTS	NO. OF SEAMS TESTED	MAX. SHEAR/PEEL STRENGTH (N/mm)	MIN. SHEAR/PEEL STRENGTH (N/mm)	AVERAGE VALUE	SPECIFIED VALUE SHEAR/PEEL (N/mm)
Air Pressure Test	550	85	-	-	-	-
Solmax Destructive Seam Testing	24	24	17.5/16.3	14.3/12.3	16.3/14.8	10.5/8.8
TRI Labs Destructive Seam Testing[1]	25	25	16/14	15/11	15/13	10.5/8.8

Notes:
1 Test performed in accordance to ASTM Standards. See Appendix V for test results.

Visual observations of the liner placement and liner protection were carried out by KCB and the Layfield representative during installation.

8. DESIGN CHANGES BY DESIGN ENGINEER

In some cases, modifications were made to the original specifications and design to field fit for site conditions.

Dam Underdrains

As per the letter "Wolverine Tailings Facility Site Visit – H. McLeod – June 18 & 19, 2009" (Appendix VI), the original Dam Underdrain design was modified to handle higher than expected flows in the impoundment main drainage channel. In order to transmit the higher than expected flows the trench dimensions were increased to those shown on Drawing D-4002 Sheet 1. The below liner drainpipe was attached to a non-perforated HDPE pipe upstream of the dam, and a second non-perforated HDPE pipe was installed adjacent to the first pipe to capture flows travelling in the drain rock in the impoundment main drainage channel. The trench was backfilled around the pipes with silty-sand, and compacted in two lifts with jumping jack compactors and plate compactors. The silty-sand has a low hydraulic conductivity to limit seepage below the dam, and is filter compatible with the drain rock to prevent piping failure.

Starter Dam Spillway

The Class A riprap on the upstream slope intake of the Starter Dam Spillway was replaced with a geomembrane liner, which was anchor trenched approximately 0.5 m into the spillway.

Geotextile on Dam Slopes

Due to steep grades, the vibratory compactors were unable to compact and prepare the 2H:1V slope surfaces in accordance with Technical Specifications. Geotextile was used as an alternative subgrade for all 2H:1V slopes on the upstream dam face (See Appendix I, Photos I-23 and I-24). It is expected that the contact friction between the liner and the

geotextile will be less than that of the liner and bedding sand or dam fill. However, because the liner is anchored into the anchor trench this is not likely to affect the performance of the tailings dam.

9. MODIFICATIONS BY OWNER

9.1 Modifications of Minor Effects

Liner Anchor Trench General Fill Cover

The original design of a 600 mm deep and 500 mm wide anchor trench with a 300 mm general fill cover was dug deeper and backfilled with a general fill cover as shown in Drawing D-4003 - Detail 1 (Also see Appendix I, Photos I-25 and I-26). This modification was done to expedite construction, and does not affect the effectiveness of the anchor trench.

Size of Liner Underdrains

The dimensions of the Liner Underdrains were increased from the original design to facilitate excavation with the available excavator bucket. As a result the flow capacity of the Liner Underdrains is increased. See Drawing D-4003, Detail 2.

10. CONSTRUCTION OBSERVATIONS

Construction methodologies and incidents of importance that occurred during the 2009 construction seasons are discussed in the following sections.

10.1 Borrow Area

The borrow area for the General Fill material is located within the Starter Dam impoundment. Following clearing and grubbing operations, and prior to construction, a creek with flows ranging from 9 L/s to 13 L/s ran through the entire length of the Starter Dam Impoundment. Liner foundation preparation included the installation of the Main Liner Underdrain to channel the creek water and to also receive any additional surface water flows.

On June 3rd, 2009, frost was noted at 1 m depth below the impoundment surface, but borrow from the impoundment area, initiated on June 13th, 2009, did not encounter any frost.

Excavation locations within the impoundment area changed regularly during dam raising in order to locate sources of drier borrow material during rain events, and to optimize haul truck traffic. In general, rows of material were removed with excavators and loaded onto haul trucks until the water table was encountered. The excavator then moved to the next location. In general, the material became finer with depth. See Table 7.1 for quantities.

Springs

Borrow activity in the liner foundation area exposed localized springs that flowed at approximately 1 L/s to 2 L/s. 8 finger drains were constructed to capture and intersect the

spring flows into the Main Liner Underdrain, and are shown on Drawing D-4002 – Sheet 2 (also see Appendix I, Photo I-17).

Flow measurements were taken at various locations during construction and are summarized in Table 10.1.

Table 10.1 Impoundment Spring Flow Measurements

LOCATION	DATE MEASURED	FLOW (L/s)	COMMENT
Creek feeding into impoundment area from the north tip of impoundment.	June 21, 2009	1.5	Spring 1 (D-4002 – Sheet 2.)
Upstream toe of dam	June 21, 2009	9	Cumulative runoff collected from impoundment area prior to dam underdrain installation
Downstream end of Dam Underdrain Pipes	June 16, 2009	13	-
	July 13-19, 2009	5-10	Fluctuation due to rain.
	July 20-21, 2009	5-10	-
	August 20, 2009	3	Impoundment is 30% lined.

10.2 Foundation Preparation

Dam Foundation

All foundations in the dam raise footprint and impoundment area were cleared of organics and soft ground materials and the surface was proof rolled in accordance with Technical Specifications (see Appendix II) before placing fill. Prepared surfaces were inspected by KCB prior to placement of the initial lift of approved materials.

During placement of each subsequent lift on the abutments, the loose fill was graded into and mixed with the main fill, and the fills were "keyed" into fresh undisturbed foundation soils as outlined in the letter in Appendix VI - "Wolverine Tailings Facility – Site Visit – H. McLeod – June 18 &19, 2009".

Liner Foundation

Foundations in the impoundment area were cleared of organics and soft ground materials and the surface was proof rolled in accordance with Technical Specifications (Appendix II). Prepared surfaces were inspected by KCB and Layfield prior to placement of the geomembrane.

10.3 Dam Underdrain

Please refer to Section 8.

10.4 Liner Underdrains

The location of the Main Liner Underdrain is shown on Drawing D-4002. The drain consists of a slotted HDPE drain pipe which is backfilled around with drain gravel and wrapped by a geotextile. Water migrating into the underdrain will travel through either the drain gravel or the drain pipe.

The Main Liner Underdrain was constructed according the following procedure:

- Liner underdrain trench was excavated;
- Geotextile was laid out along trench;
- Approximately 200 mm to 400 mm of drain rock was placed along the bottom of the trench;
- Slotted pipe was placed on top of the drain rock;
- Remainder of trench backfilled with drain rock; and,
- Geotextile was folded over top of drain gravel with overlap.

The secondary Finger Drains were constructed in the same manner, five of which were installed with the 4" perforated pipe and drain rock, and three were installed with the drain rock only (See Drawing D-4002).

10.5 Fill Placement

Fills were typically placed and spread parallel to the dam axis in 300 mm thick lifts. The fill was spread using a CAT D6R and CAT D7H dozer and compacted using a smooth drum vibratory roller and sheepsfoot vibratory roller with a minimum of 6 overlapping passes. Each pass overlapped the previous by a minimum of 300 mm. Fill placement was alternated between upstream and downstream areas, and in most areas received additional compaction by haul truck traffic.

Due to regular rainfall during the construction period, various measures and procedures had to be used in order to control the moisture content of the dam fill. Whenever possible, freshly placed lifts were compacted and sealed prior to a rain event, and the over-wet surficial material slimed off before construction resumed. In instances when sliming off the surficial over-wet material was not sufficient, the following procedures were followed:

1. The surface of the lift was scarified or "ripped" up and allowed to aerate until the material was deemed acceptable by the Engineer;
2. Drier material from an alternative borrow source was mixed into the over-wet fill; or
3. Material with higher optimum moisture content was mixed into the over-wet fill.

On July 5th, 2009, a zone of fine grained silty material was encountered in the borrow cut location which is considerably softer than previous borrow material when placed. Arctic Construction Limited (ACL) and KCB lab test results indicated this material to have a higher optimum moisture content and lower maximum dry density than the previous general borrow material.

The fine grained silty material was mixed with coarser material in some areas, or placed in pockets up to 40 m long by 150 m wide such that it did not form a continuous zone. The majority of the material was placed on the upstream side of the Starter Dam above about El. 1292 m. A slope stability analysis performed by KCB indicated that with this material the factor of safety still met criteria.

On July 14th, wet/moist spots were first spotted on the upstream dam face from approximately Sta. 0+140 m to Sta. 0+170 m at El. 1292 m. The wet spots continued to spread until July 17th where they stretched from Sta. 0+13 m to Sta. 0+180 m, after which they stabilized but remained wet. On August 7th, three wet spots appeared on the downstream side of the Starter Dam from Sta. 0+80 m to Sta. 0+140 m at approximately El. 1292 m to El. 1294 m and remained relatively unchanged for the duration KCB was on site. The last photo taken of the area is on August 8th of the downstream side, and August 14th for the upstream side (Photo 20 & 21). These wet zones were caused by localized consolidation and will have negligible effect on the stability of the overall structure.

10.6 Spillway Excavation

The Starter Dam Spillway channel is shown on Drawing D-4011. Construction was not completed while KCB was on-site. See Section 11 for further discussion.

10.7 Geotextile Installation

Layfield LP6 non-woven Geotextile was placed on the upstream starter dam face with a geotextile dispensing roller attached to the bucket of an excavator.

Due to steep grades, the vibratory compactors were unable to compact and prepare the 2H to 1V slope surfaces in accordance with Technical Specifications. See discussion in Section 8.

10.8 Geomembrane Installation

Solmax International Inc. was sub-contracted by Layfield Geosynthetics & Industrial Fabrics Ltd. to install the Layfield 40 mil LLDPE geomembrane in the Starter Dam Impoundment area (see Appendix I, Photos I28-I34). The weather during the installation was generally overcast with rainy and windy periods. The work was halted 8 times during this period due to rainy weather, totalling about 5.5 full work days of lost time. Refer to Figure 4.1 for construction schedule. The 80 mil geomembrane for the reclaim pump location was installed on September 10th, 2009 by extrusion welding (Photo 27).

The general geomembrane installation methodology was as follows:

- Geomembrane panels were deployed over prepared subgrade surface in an upslope/downslope direction;
- Panels were pulled taught and edges overlapped for seaming;
- Seams between panels were fused, geomembrane surface was cleaned of debris and moisture ahead of welder;
- Seams were pressure tested to ensure seal;
- Patches and repairs were made as necessary; and

- Repairs were tested with vacuum box to ensure seal.

10.9 Storage Capacity

Based on as-built survey data provided by Underhill Geomatics on Nov. 28, 2009, the calculated storage capacity of the starter dam tailings impoundment constructed in 2009 is 665,127 m^3.

Horizontal slices were used in end-area calculations with the contours spaced at one metre intervals. The starter dam spillway elevation is at 1304.5 m, which was used for maximum storage elevation. Table 10.2 provides the relationship between storage capacity and impoundment elevation assuming a horizontal surface.

Table 10.2 Impoundment Storage Capacity

ELEVATION (m)	HORIZONTAL SURFACE AREA (m^2)	CUMULATIVE STORAGE (m^3)
1287	0	0
1288	1,871	624
1289	4,510	3,719
1290	9,135	10,407
1291	14,413	22,081
1292	19,708	39,073
1293	24,619	61,191
1294	29,166	88,051
1295	33,992	119,599
1296	38,977	156,055
1297	44,381	197,705
1298	50,453	245,090
1299	55,070	297,834
1300	58,922	354,819
1301	62,815	415,678
1302	67,175	480,660
1303	72,314	550,389
1304	77,529	625,295
1304.5[1]	79,673	665,127

Note: 1. Starter spillway invert elevation=1304.5m

10.10 Diversion Ditch and B

Diversion Ditch A and B were constructed during the winter prior to development of the dam and impoundment. The ditches are shown on Drawing D-4112 and Drawing D-4113. Tension cracks formed along Diversion Ditch B, likely due to settlement of the fill during the spring thaw, and some slumping had occurred. Slumped material was removed and replaced, and the ditch was widened slightly in the area of the cracks. This area will continue to be monitored by YZC, and repaired as necessary. Remediation options will be assessed and implemented as required to maintain the safety and functionality of the diversion.

11. WORKS TO BE COMPLETED

Works to be completed in the summer, 2010 include:

Starter Dam Spillway

Excavation work was completed on the Starter Dam Spillway according to Drawing D-4011 (Photo 37) but no other work was done during the time KCB was on site. To complete construction of the spillway the following task is required:

- Three 1200 mm diameter culverts will be installed through the dam crest;
- YZC plans on completing construction in summer 2010.

Seepage Collection Dam

The as built alignment of the Mine Access Road is upstream of the design location of the Seepage Collection Dam. In order to satisfactorily adapt the existing Mine Access Road into the Seepage Collection Dam the following tasks are required:

- Seal or remove all road culverts at the location of the seepage pond;
- Extend dam underdrain pipes through the Mine Access Road to Go Creek;
- Raise the road crest adjacent to the seepage pond to minimum of elevation 1286.5 m; and
- Construct a runoff diversion ditch east of the seepage pond to reduce runoff to the pond.

This work will be undertaken in Summer, 2010. The design is shown on Drawing D-4004.

Reclaim and Seepage Transfer Pumps

The reclaim pump barge system will be installed at the location shown on Drawing D-4002, Sheet 1.

A transfer pump will be installed in the seepage collection pond once construction of the seepage collection dam is complete.

Instrumentation

No instruments were installed during the summer of 2009. Four piezometers and two inclinometers will be installed in summer 2010. A scale bar will be installed to monitor pond level.

12. USE OF REPORT

As a mutual protection to YZC, the public, and ourselves, all reports and drawings are submitted for the confidential information of YZC, for a specific project and authorization for use and/or publication of data, statements, conclusions, or abstracts from or regarding our reports and drawings is reserved pending our written approval.

This report was prepared by Klohn Crippen Berger Ltd. for the account of YZC. The material in it reflects KCB's best judgment in light of the information available to it at the time of preparation. Any use which a Third Party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such Third Parties. Klohn Crippen Berger Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

KLOHN CRIPPEN BERGER LTD.

Lowell Constable, E.I.T. (BC)
Project Engineer

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

REFERENCES

Klohn Crippen Berger Ltd. (KCB, 2009), "Wolverine Tailings Facility – Site Visit – H. McLeod – June 18 & 19, 2009", June 22, 2009.

APPENDIX I

Selected Photographs



Photo I-1 Temporary finger drains installed in Dam Foundation area (June 3, 2009).



Photo I-2 Removal of organics from Liner Foundation area (June 6, 2009).



Photo I-3 First lift of General Fill on top of prepared Starter Dam Foundation looking North (June 14, 2009).



Photo I-4 Dam Underdrains placed in trench in Dam Foundation (June 20, 2009).



Photo I-5 Completed first lift of Starter Dam Fill looking South (June 20, 2009).



Photo I-6 General Dam Fill placement (June 25, 2009).



Photo I-7 General fill borrowing from starter impoundment area (June 30, 2009).



Photo I-8 Typical equipment pattern placing dam fill, looking along dam crest (July 4, 2009).



Photo I-9 Cutting of Starter Dam Spillway, looking West (July 4, 2009).



Photo I-10 Overwet fill on dam crest scarified for mixing (July 8, 2009).



Photo I-11 Lift placement on west arm of Starter Dam (July 10, 2009).



Photo I-12 Dam fill placement along abutments (July 11, 2009).



Photo I-13 Trenching of Main Liner Underdrain in impoundment area (July 15, 2009)



Photo I-14 Conduit connecting Liner Underdrain with Dam Underdrains (July 16, 2009)



Photo I-15 Backfilling Main Liner Underdrain (July 16, 2009).



Photo I-16 Wet spots on downstream toe of Starter Dam (July 22, 2009).



Photo I-17 Installing finger drains in liner foundation area (July 25, 2009).



Photo I-18 Finger drain with 4" perforated pipe in liner foundation area (July 29, 2009).



Photo I-19 Main Liner Underdrain layout along base of impoundment (August 4, 2009).



Photo I-20 Starter Dam downstream wet spots (August 8, 2009).

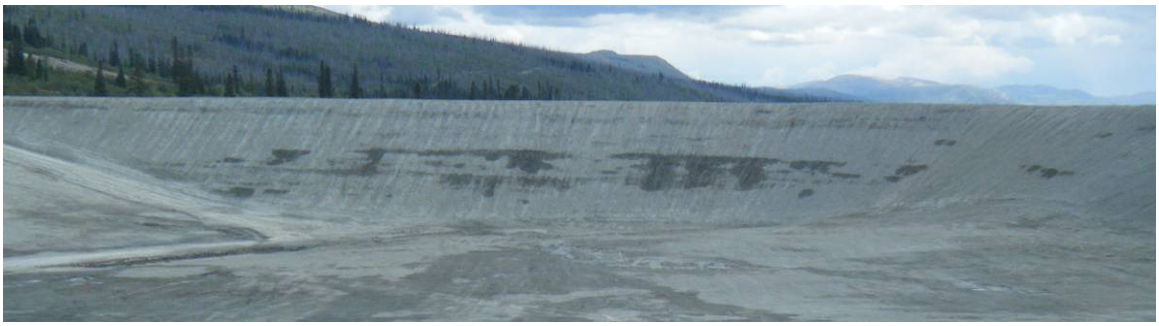


Photo I-21 Starter Dam upstream slope wet spots (August 12, 2009).



Photo I-22 Labourers helping Solmax liner crew install liner in tailings impoundment (August 11, 2009).



Photo I-23 Installation of geotextile subgrade on rocky areas (August 17, 2009).



Photo I-24 Excavator placing geotextile with roller (August 28, 2009).



Photo I-25 Labourer compacting Anchor Trench with plate compactor (September 9, 2009).



Photo I-26 Completed Anchor Trench around perimeter of impoundment (August 28, 2009).



Photo I-27 80 mil liner patch for Reclaim Pump (September 10, 2009).



Photo I-28 Solmax QC Personnel performing destructive peel and shear tests (August 17, 2009).



Photo I-29 Solmax liner crew seaming liner (August 19, 2009).



Photo I-30 Solmax QC personnel crew performing air pressure test.

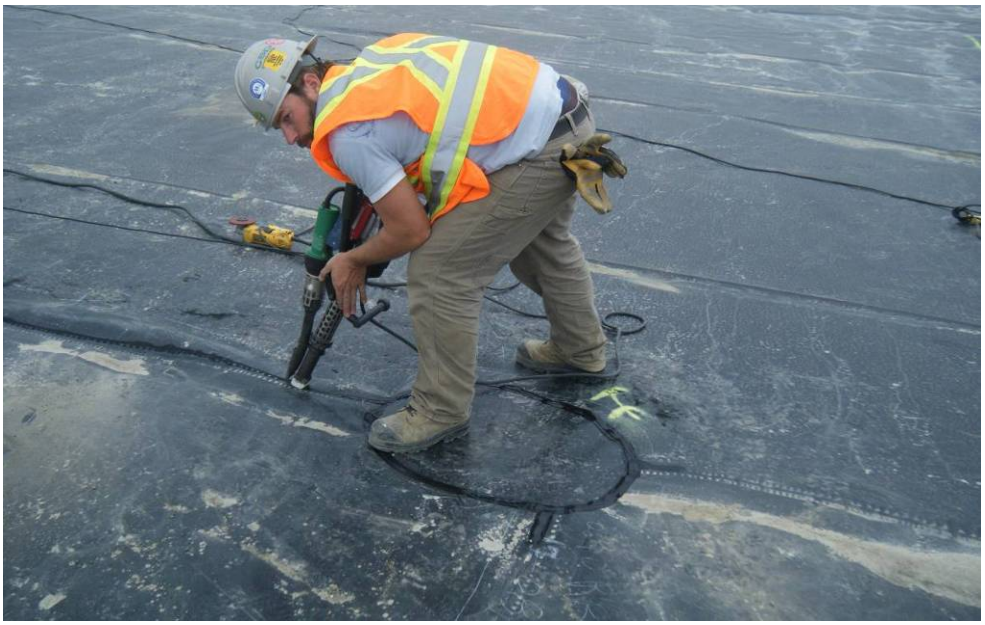


Photo I-31 Solmax personnel repairing leak in liner using extrusion welder (September 3, 2009).



Photo I-32 Repaired section tested for leaks using vacuum box (September 7, 2009).



Photo I-33 Completed lined impoundment overview (September 10, 2009).



Photo I-34 Completed lined impoundment overview (September 10, 2009).



Photo I-35 Diversion Ditch B (Sept. 10, 2009)



Photo I-36 Diversion Ditch A (Sept 10, 2009).



Photo I-37 Starter Dam Spillway (Sept 10, 2009).

APPENDIX II

Technical Specifications

Tailings Storage Facility Starter Dam Construction

YUKON ZINC CORPORATION
WOLVERINE PROJECT

TECHNICAL SPECIFICATIONS

Tailings Storage Facility

Liner Construction

February 5, 2009

Klohn Crippen Berger

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Measurement and Payment

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 DOCUMENTS

This section of the Specifications forms part of the Contract Documents, and shall be read, interpreted and coordinated with all other parts.

Measurement and payment for all items in Schedule 1 - Quantities and Prices are covered by this section of the Specifications.

1.2 DEFINITIONS

The following words and terms, in all Contract Documents, shall have the meanings set out below, unless the context requires otherwise:

Extra Work shall mean the furnishing of labour, materials, Contractor's plant or any of them, and the doing of work not directly or by implication called for in the Contract Documents.

Standby Time shall mean non-working time spent by manned Contractor's plant or labour. Standby Time will only apply to time pre-approved in writing by the Owner as a result of a delay requested by the Owner.

Stand-down Time shall mean an extended period of non-working time by non-manned Contractor's plant. Stand-down Time will only apply to time pre-approved in writing by the Owner as a result of a delay requested by the Owner.

Downtime shall mean a period of time when the Contractor’s plant or work force is unavailable due to weather delays, breakdowns, or the like.

Schedule 1 shall mean Schedule 1 – Quantities and Prices.

1.3 OWNER SUPPLIED ITEMS

The Owner will provide the following items, at site, to the Contractor:

- Ambulance and first aid services at no cost;
- CAMP ACCOMMODATION AT A RATE OF $_____/MAN DAY; AND
- OFFICE, SHOP ACCESS AND LAYDOWN AREA.

1.4 MEASUREMENT AND PAYMENT

1. Measurement and payment applies only to final approved construction of permanent works. Temporary works will not be measured for payment.

2. Work measured under one pay item shall not be measured again under another pay item.

3. Except as otherwise specifically provided, the prices entered in Schedule 1 – Quantities and Prices for the various items of Work shall constitute full compensation for supplying, operating and maintaining temporary works, material, Contractor's plant, labour, supervision, environmental controls, safety, public impact mitigation measures, cooperating with Others and all other costs for performing all the Work required by the Contract.

4. Any Work called for in the Contract Documents, or which is necessary for completion of the Work or which is not specifically listed as a separate pay item in Schedule 1 shall be deemed incidental to the Work and no separate measurement or payment will be made for such Work, but the cost of all such incidental Work shall be included in the prices entered for the various pay items appearing in Schedule 1.

5. The amount of Work to be performed with respect to each unit price pay item has been estimated as set out in Schedule 1. Notwithstanding, the Owner reserves the right to increase or decrease the amount of Work of any Work item as required and the Contractor shall make no claim for anticipated profit, for damages or for any extra payment whatsoever, except as provided for in the Contract.

6. If quantities are stated on the Drawings, they are provided as information only.

7. Where an item has been measured as a lump sum, the Contractor is responsible for determining all related costs necessary to complete the lump sum item including that of labour, materials and Contractor’s plant.

8. Where an item has been measured as a unit quantity, the quantity is subject to re-measurement after the item under consideration has been satisfactorily completed.

9. The Contractor shall be responsible for all aspects of measurement for payment. The methods of measurement shall be in accordance with standards normally accepted by the construction industry and in accordance with the relevant section of the Specifications for the respective types of Work.

10. A given type of Work shall not proceed until relevant initial surveys are approved in writing and signed quality approval certificates have been obtained for work completed.

11. Signed quality approval certificates will be prepared and issued by the Owner for all materials and construction. Quality approval shall apply to the actual nature and condition of materials used in the Work and their compliance with specified requirements.

12. No Work shall be undertaken that would preclude verification of any initial condition surveys or that would cover any unapproved work.

13. The Contractor shall prepare monthly estimates and a final statement of Work performed, in an approved format, and shall submit same together with signed quality approval certificates for relevant materials and completed construction and other supporting data and computations as required by the Owner to determine the accuracy and validity of the estimates.

14. The Contractor also shall submit Daily Reports containing a complete and accurate account of the previous day's progress to help support quantity estimates for progress payments.

MEASUREMENT

All quantity measurements will be made to the design lines shown on the Drawings, as applicable, unless otherwise directed or approved.
Measurement of excavations will be made of bank volume. (Bank volume means in-situ volume.)

Measurement of fills will be made of materials satisfactorily placed and compacted. Measurement will reflect in-place volumes after compaction unless otherwise specified.

Measurement of liner trench will be made of length along trench centreline.

Measurement of liner will be based on surface area, excluding folds, overlaps and anchoring trenches.

PAYMENT

Payment for the Work will be made at the respective lump sums and unit rates stated in Schedule 1 – Quantities and Prices.

Payment under the various pay items will only be made for Work satisfactorily completed in accordance with the Contract Documents.

Payment of mobilization and demobilization will be at the respective lump sum prices stated in Schedule 1, on the following basis:

1. Fifty percent (50%) of the mobilization lump sum price will be paid upon mobilization of Contractor's plant and personnel to the Work Site, but only after acceptance of the construction schedule, the safety program, the environmental protection plan, and the quality control program.

2. The remainder of the mobilization lump sum price will be paid on a pro-rata basis over the Contract period, reflecting delivery of required liner materials and making adjustments for any advanced monies.

3. The demobilization lump sum price will only be paid once upon complete demobilization and submission of all deliverables.

1.5 MOBILIZATION AND DEMOBILIZATION

The lump sum prices tendered shall be relative to the costs involved for each item.

The total amount of all items related to mobilization and demobilization shall not exceed 20% of the Total Contract Price. The demobilization lump sum price shall be at least twenty-five percent (25%) of the mobilization lump sum price.

Mobilization or re-mobilization if specified and approved, shall be to the Work Site and shall include all costs required to:

1. Mobilize plant, labour, supervision, technical personnel, liner materials and other services required for the Work;

2. Insurance and permits;
3. Set up and assemble Contractor's plant and move to the first specific Work location; and

4. Attend ongoing Work Site safety orientations for every new worker.

Demobilization will be considered complete when all labour, Contractor's plant, temporary facilities and surplus and waste materials resulting from the Contractor's operations have been removed from the Work Site, and the Work Site has been cleaned and restored to the satisfaction of the Owner.

1.6 CHANGES IN THE WORK

The Owner, without invalidating the Contract, may order Extra Work, or make changes by altering, deleting or adding to the Work, and the Contract Price shall be adjusted accordingly. All such Extra Work shall be executed under the conditions of the Contract, except that any claim for extension of time caused thereby shall be adjusted at the time that the Change Order or Field Order for Extra Work is prepared.

In giving instructions, the Owner shall have the authority to make minor changes to the Work not involving extra costs, and not inconsistent with the purposes of the construction, and such changes shall not be considered as Extra Work.

No changes in the Work shall proceed without a written order issued by the Owner and no request for a change in the Contract Price or change in the Contract time may be made unless such an order has been made.

A change order may or may not result in a change in the amount of the Work or in the cost of the Work. If a change order does result in an increase in the cost of the Work or a decrease in the cost of the Work, unless the parties agree otherwise, that increase or decrease in cost shall be calculated as set out below in the Extra Work or Work And Materials Omitted clauses below.

When a change in the Work is proposed by the Contractor, it shall present a request to the Owner, for review, for a change in the Contract Price or change in Contract time with appropriate documentation in a form acceptable to the Owner.

Within 15 days of receipt of the Contractor's request, the Owner will in writing advise the Contractor of its decision to accept or reject the request.

When the Owner requests a substantial change in the Work, the Contractor shall present a proposal to the Owner for review, for a change in the Contract Price or change in the Contract time, if the Contractor considers the change to materially affect price or schedule. The proposal for the extra compensation shall be made within 48 hours of such change; otherwise the claim need not be considered. The proposal shall include appropriate documentation in a form acceptable to the Owner.

The Owner will make a written decision within 14 days of receipt of the Contractor's proposal.

The value of the Work performed in a change order shall be included for payment with regular progress payments.

The change in the Contract Price stated in a change order shall be deemed to be the total cost of all work required by the change order. A change in the Contract time stated in a change order is the only change to be made to the Contract time. No other request or claim by the Contractor for additional costs or time may be made by the Contractor or will be considered by the Owner.

The Contractor shall be conclusively deemed to have waived any right it may have for an adjustment of the amount to be paid for the Work under this section or elsewhere under the Contract if the Contractor does not make the request within the required time.

The Contractor shall keep accurate records, as agreed upon, of quantities or costs and present an account of the cost of the change in the Work, together with vouchers where applicable.

Request for Change
If the Contractor intends to make a request for a change in the Contract Price or a change in the Contract time under this section, it must, within 15 days after receipt of a written change order or the furnishing of a written notice, submit to the Owner a written statement setting forth the general nature and monetary extent of such request. Nevertheless, the giving of such a written statement to the Owner shall not relieve the Contractor of its obligations to carry out and obey such orders and instructions.

EXTRA WORK

Extra work means the furnishing of materials and equipment or the doing of Work not directly or implicitly called for in the Contract. If the Owner requires extra work it may do it itself or by the employment of others or it may direct the Contractor to do the extra work by the issuance of a change order on the following basis:

1. Unit prices from Schedule 1 or otherwise as agreed;

2. Mutually agreed lump sum, or

3. Force Account (time and materials).

Unit Prices
For extra work carried out under unit prices, the unit price shall be all inclusive and no other payment whatsoever will be made on this account.

Mutually Agreed Lump Sum
For extra work carried out on an agreed lump sum basis, the allowance for overhead, profit, general superintendence, use of plant and equipment, subcontractor's costs for work performed by a subcontractor, and any other cost or expense associated with the extra work shall be fifteen (15) percent. No other payment will be made on this account.

Force Account (Time and Materials)
For extra work carried out on a time and materials basis, the Contractor shall keep an accurate record in a manner approved by the Owner of all the actual necessary and reasonable expenses pertaining thereto and make such records available to the Owner for inspection and verification daily while the work is taking place. The extra work will be paid for on the basis of the actual necessary expense to the Contractor of doing the extra work plus an allowance of fifteen (15) percent of the actual necessary expense to cover overhead, profit, general superintendence, use of plant and equipment, subcontractor's costs for work

performed by a subcontractor, and any other cost or expense associated with the extra work. No other payment will be made on this account.

Actual Necessary and Reasonable Expense

In this clause, "actual necessary and reasonable expense" means the sum of the following items:

Materials and Equipment: Actual and reasonable costs for materials and equipment provided by the Contractor and necessarily used in the Work and shall include applicable taxes;

Labour: The cost of labour shall be the sum of actual wages, labour surcharge, and subsistence and travel allowances. Actual wages paid shall include employer payments to or on behalf of the worker for health and welfare, pension, vacation and similar purposes. The labour surcharge includes applicable labour related taxes, and Workers' Compensation assessments, and other legally required costs directly related to labour. Where subsistence and travel allowance are required for performance of extra work, the charges shall consist of the actual and reasonable amount paid to each worker for these items.

Supervision: If, in the Owner's judgement, full-time supervision of the extra work is required, it will be authorized in writing by the Owner and included as an actual necessary expense.

Construction Equipment: Charges for construction equipment shall be based on rental rates set forth in the Contract Documents, and if not set out will be according to the latest edition of the local government Roadbuilder's Rental Rates. For equipment not listed, the rental rate will be mutually agreed upon in writing between the Contractor and the Owner. The reasonable cost of moving equipment onto and off the Work Site shall be included. If equipment is transported to the Work Site, the rental cost of the transporting of the equipment only shall be charged. Equipment rental shall not be paid when the equipment is inoperative due to breakdowns. Individual pieces of equipment or small tools having a replacement value of $1000 or less shall be considered expendable and no payment therefore shall be made. When equipment is used on the extra work for less than five days, hourly rates shall be used. When equipment is used on the extra work for more than five days, daily rates shall apply. Hourly and daily rates shall be prorated for fractional time worked.

Professional Services: Professional services shall be included only if the Owner has determined that such services are necessary and has provided written authorization.

Other Costs: Charges for items not included in the foregoing may be included if authorized in advance and in writing by the Owner.

WORK AND MATERIALS OMITTED

The Contractor shall, when ordered by change order, omit Work to be done or material to be furnished under the Contract and the value of the omitted work or material will be deducted from the total Contract Price. The value of omitted work or material will be based on tendered unit rates or as otherwise agreed.

CHANGE ORDER PROCEDURES

Changes in the Work will be documented by the Owner, using the following forms:

1. "Field Order" will be used when an instruction is given to the Contractor in the field, which may result in an adjustment to the Contract Price. A signed Field Order is authorization to proceed with the Work

on a Unit Price, Lump Sum or Force Account/Time and Material basis as stipulated on the Field Order form.

2. "Field Memo" will be used as an instruction in situations where the change is not anticipated to result in an adjustment to the Contract Price.

3. "Change Order" will be used for additions or deletions to the Work which originate as revisions to Drawings and Specifications, and which may result in a change to the Contract Price or Contract Time.

Contemplated Change Order

Where Extra Work is contemplated, the Owner will issue a Contemplated Change Order for a cost quotation. The Contractor shall submit, within the time specified on the form, either a lump sum quotation or an estimate based on quantities and unit prices from Schedule 1 and/or other proposed unit prices. The Contractor's quotation shall:

1. Be set out in sufficient detail with backup, acceptable to the Owner;

2. Indicate the proposed methodology and resources;

3. Indicate the schedule and cost or credit to complete the Extra Work;

4. Indicate any incremental cost impact included in Contractor’s quotation to maintain the Completion Date; and

5. Indicate that the quotation will remain open for acceptance for thirty (30) days.

The Owner will determine whether the quotation is acceptable, requires re-submittal or should be rejected. The Contractor shall provide additional data if requested to support the price quotation.

When the quotation is deemed acceptable, the Owner will prepare a Change Order entering the quotation adjustments to the Contract Price and Completion Date. Both parties shall sign the Change Order.

Unit Price Orders

1. These Orders will be based on either prior agreed quantities or a survey of completed Work.

2. When quantities can be determined prior to start of Work, the Owner will prepare the Order based on unit prices and known total quantities and adjust the Contract Price and the construction schedule as required.

3. When quantities cannot be determined prior to start of Work, the Owner will issue a Field Order authorizing the Work to proceed on the basis of the unit prices and estimated quantities. Upon completion, the Owner will complete the Field Order based on measured quantities and adjust the Contract Price and Completion Date as applicable.

Lump Sum Orders

1. These Orders will be based on an agreed quotation from the Contractor.

2. The Contractor shall submit all necessary backup and the quotation shall be broken down as required by the Owner.

Force Account/Time and Material Orders

1. When a change in the Work cannot be agreed upon by the Unit Price and Lump Sum methods, the Owner may authorize the Work to be carried out on a Force Account/Time and Material basis.

2. The Owner will issue a Field Order, authorizing the Extra Work to proceed on a Force Account/Time and Material basis.

3. The Contractor shall submit all required Force Account records daily, in approved detail and format.

4. Upon completion of Work, the Owner will complete the Field Order entering the final approved cost, and adjust the Contract Price and Completion Date as applicable.

Any dispute arising under this Section shall be governed by dispute resolution procedures set out elsewhere in the Contract Documents.

1.7 CONTRACTOR'S PAYMENT TO THE OWNER

The Contractor shall reimburse the Owner for costs incurred due to:

1. Overtime work performed by Owner's site staff in excess of the standard shifts, to suit the convenience of the Contractor.

2. Employment of Owner's site staff, after the approved completion date, if necessary due to failure of the Contractor to complete the Work by the approved Contract Time.

3. Redesign of any portion of the Work made necessary by a Contractor's error.

4. Any fines levied by any government jurisdiction due to the Contractor's failure to abide by the Contract Documents.

5. Rental rates on equipment borrowed from the Owner.

6. Materials purchased from the Owner.

Up to $_____per key employee transferred from site without Owner approval, if, in the Owner's opinion, the change of personnel has a significant delay or cost impact to the Work.

$_____ per day or portion thereof for any uncontrolled fuel or petroleum by-product spill.

$_____/hr for all survey work or quantity documentation work.

1.8 STANDBY TIME AND STANDDOWN TIME

Any payment to the Contractor for Standby Time or Stand-down Time will require approval and will apply only during delays caused by or requested by the Owner. The sum of Work hours and Standby Time and/or Stand-down Time due to approved delays shall not exceed eight hours per day and will not include Sundays or statutory holidays.

During Standby Time, the Contractor shall clean the Work Site and engage in any other Work as approved and directed.

END OF MEASUREMENT AND PAYMENT

YUKON ZINC CORPORATION
WOLVERINE PROJECT

TECHNICAL SPECIFICATIONS

Tailings Storage Facility

Liner Construction

February 5, 2009

Klohn Crippen Berger

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SECTION 1 – GENERAL

1.1 SCOPE OF WORK

The Yukon Zinc Corporation (YZC) Wolverine Project is an underground mine located off the Robert Campbell Highway in southeast Yukon, approximately 190 km northwest of Watson Lake and 180 km southeast of Ross River. These specifications cover geomembrane lining of the tailings basin. Associated earthworks and drainage control will be carried out by Others. The liner construction work includes the following:

1. Comply and demonstrate compliance with environmental requirements throughout the period of the contract.

2. Mobilization and demobilization;

3. Coordinate liner placement with Others (earthworks contractor);

4. Supply, handle, store and protect liner material;

5. Place and protect liner;

6. Coordinate excavation and backfill of liner trench with Others (earthworks contractor); and

7. Provide as-built surveys of liner panel layouts and repairs.

Drawings comprise the following:

DRAWING NO.	REV.	TITLE
D-4001	0	General Site Arrangement
D-4002	0	Starter Impoundment – Excavation and Fill Plan
D-4003	0	Starter Impoundment – Excavation and Fill Typical Sections

1.2 DEFINITIONS

The following definitions and interpretations shall apply to the Technical Specifications:

1. ASTM: American Society for Testing and Materials Standard Test Methods.

2. Construction Project Manager is Clive Creaney or his designate.

3. Contract Documents means, as applicable,

   - the Letter of Acceptance;

   - the executed Agreement Form;

- Instructions to Bidders, completed Bid Form, Schedule of Prices, and Supplements to Bid Form;
- Information Documents specifically incorporated into the Contract Documents;
- Definitions and Interpretation, Payment Conditions, Security Conditions, Insurance Conditions, General Conditions, Supplementary Conditions, conditions related to Public Works Act claims;
- the Specifications;
- the Drawings;
- Addenda;
- such other documents as may be identified as Contract Documents;
- and shall include amendments thereto made pursuant to the provisions of the Contract.

1. Contractor means the company to whom the Owner has awarded the construction contract.
2. Drawings, mean all drawings, plans, sketches and maps issued with the Specifications or subsequently as provided for in the Contract and includes any drawings submitted by the Contractor if signed as approved by the Engineer.
3. Engineer means Klohn Crippen Berger Ltd. or any person duly authorized by the Owner to act on its behalf.
4. Environmental Management Plan (EMP) means the Owner's environmental standards and procedures for management, reporting and compliance with applicable environmental regulations.
5. Others means any person, firm or corporation employed by or having a separate contract with the Owner for work related to the project other than that required by the Contract Documents.
6. Owner, and Corporation shall have common meaning and refer to Yukon Zinc Corporation.
7. The Project means the total construction contemplated of which the Work may be the whole or part.
8. Site means the place where the work is being performed and the immediate vicinity thereof.
9. Specifications mean the Technical Specifications.
10. Where the words shown, indicated, detailed, specified, or words of a similar nature are used such words shall refer to the Specifications and/or Drawings unless expressly stated otherwise.
11. Where the words directed, permitted, approved, accepted, required, rejected, satisfactory, or words of similar nature are used such words shall refer to the direction, permission, approval, acceptance, requirements, rejection or satisfaction, of the Owner unless expressly stated otherwise.
12. The Work means the total construction and related services required by the Contract Documents.

1.3 SURVEY

1. The Owner will provide survey benchmarks with coordinates and elevations near the work areas. The Contractor shall be solely responsible for providing other survey control including layout of the work, confirmation of compliance with required lines and grades, quantity measurements for payment purposes, and final survey of as-built conditions.

2. The Contractor shall provide survey information, in three-dimensional AutoCAD 2005 or newer format, and a summary of Northing, Easting, and Elevations for all survey points in Excel. The Contractor shall submit this information routinely and upon request during the Work and upon completion and as outlined under Submittals.

1.4 LAYDOWN AREA

The Owner will provide office space, laydown and storage area on the mine site. Any additional facilities or utilities must be approved.

1.5 SITE POLICIES

Without limiting Contractor responsibilities described elsewhere in the Contract Documents, the Contractor agrees to comply with Wolverine Project Environmental Protection Plan (EPP) requirements and Site procedures:

1. All safety policies of the Owner outlined elsewhere in the Contract Documents shall be followed, including the use of personal protective equipment (steel toed boots/shoes, hard hats, safety glasses and others as required). All Contractor employees shall receive site specific training before entering the work site to ensure familiarity with Owner standards and policies.

2. The Owner maintains high environmental and safety standards. The Contractor will receive Owner training on the Environmental Protection Plans and site specific safety aspects at the Site. The Contractor is responsible to have all personnel trained in the environmental and safety standards before commencement of the Work.

3. The Contractor shall have an established Safety, Health, and Environment Action Plan (SHEAP) that complies with all Owner HSE standards and EPPs. Safety aspects of the days work shall be part of the daily tool box meetings. Safety interactions shall be held daily with the Owner. Weekly documented safety meetings shall be held with the Owner in a predetermined area.

4. The Contractor shall obey all Owner vehicle and driving standards when driving on Site.

5. Any spills are to be dealt with immediately utilizing appropriate containment and clean up procedures in accordance with the Owner Spill Contingency Plan. Any release to the environment is to be reported immediately to the Owner. The Owner may be required to make notification to Government environmental authorities. No mixing of spilled materials is permitted. The Contractor's shop area shall be maintained and kept free of waste build up and have covered waste barrels to limit accumulating rain water in any containers, as per the Waste Management Plan.

6. The Contractor shall only clean equipment in contained and designated areas.

7. Natural conditions such as extreme storm events should be anticipated and corrective measures taken to mitigate the effects on the Work. Additional monitoring for safety and the environment may be required. Loss of production time as a direct result of wind, precipitation, freezing, or other adverse weather conditions (as determined by the Owner) and the related costs are the Contractor's responsibility and deemed to be included in the unit prices for the Work.

8. The Owner will have a representative/designate on Site during the period of the project who will oversee environmental monitoring as required. The Contractor is responsible for compliance with all Owner standards and regulatory requirements.

9. Drip pans shall be used whenever oil, diesel fuel, gasoline, hydraulic fluid and other such items may leak or spill, and are to be emptied on a regular basis into designated waste disposal containers only.

10. All oil or liquid fuel shall be kept in tightly closed labelled containers designated for that use at all times to eliminate spillage.

11. The Contractor's shop, lay-down and office areas shall be kept clean and tidy. Garbage generated by the Project shall be disposed of in the appropriate locations as directed by the Owner, including:

    a) Clean non-hazardous debris and putrescible (food) garbage shall be disposed of daily in a location specified by the Owner;

    b) Sanitary discharge shall not be allowed to flow onto the ground or into a fresh watercourse. Portable toilets will be supplied and maintained by Others.

12. All Work sites shall be kept clean and cleaned-up prior to completing the job. Normal cleanup will include:

    a) Cleanup of all work areas.

    b) Disposal to approved locations.

13. If extra precautions beyond those agreed upon, prior to the start of Work, are required to prevent environmental damage the actual and reasonable cost of providing such precautions will be at the Owner's expense.

14. In the case of an emergency condition, the Owner reserves the right to enter the Work area and perform the necessary cleanup at the Owner's expense. If the said emergency condition occurs as a result of the negligence or wilful misconduct of the Contractor, the Contractor shall bear the cost of the cleanup and all fines or penalties levied by Government agencies for the condition.

15. From time to time the Work will require the coordination of activities between the Contractor and the Owner or Others. Notwithstanding any policies, contracts, agreements or the like, the Contractor shall cooperate fully with the Owner or Others, as directed by the Owner, to execute cooperative work in a timely manner and achieve the desired result for the Owner.

1.6 SUBMITTALS

Without in any way limiting submittal requirements contained elsewhere in the Contract Documents, the Contractor shall submit the following information for the Owner's approval. Work shall not start until applicable approvals are obtained in writing.

BEFORE WORK STARTUP

1. Construction Schedule showing the critical path.
2. Certification of hazard communication training.
3. List of all employees proposed for the Work, including name, age, and number of years working experience, social security number and position (title).
4. List of all plant, equipment, and materials proposed for the Work including size, weight, and axle loads if required.
5. Copy of site specific safety plan, JSA's (Job Safety Analysis) and SHEAP.
6. Signed company safety training forms for all employees. Contractor must comply with relevant regulatory personnel safety requirements.
7. Documentation indicating that all construction equipment meets regulatory minimum operating standards.

DURING THE WORK

1. Copies of Daily Contractor Tool Box Safety meeting notes and Daily Equipment Pre-shift cards.
2. Copies of employee's incident reports of injury or property damage. Notification to the Owner is required immediately following any incident, with a written incident report submitted to the Owner as soon as practical, but no later than the end of shift.
3. Updates of medical reports for incident status as received.
4. Written property damage reports (by end of shift) with immediate notification to the Owner.
5. Written near miss incident reports (by end of shift) with immediate notification to the Owner.
6. Copies of completed required work permits, as applicable.
7. Copies of completed spill reports as per Owner Spill Contingency Plan with immediate notification to Owner and initiation of spill cleanup as a priority over the Work.
8. Timely Change Order requests.
9. Daily Contractor completion/manpower sheets, showing labour and equipment hours worked on each task as well as details on any delays or breakdowns, signed and submitted to the Owner by noon the following work day.

10. Baseline surveys before starting and upon completing each area of the Work, in a timely fashion, to demonstrate compliance with design requirements and for payment and record purposes.

11. Weekly Report submitted with the weekly Construction Schedule update showing Work Completed, Work Planned, Problems Encountered, and Plans for Resolution.

12. Timely submission of invoices for all work completed, submitted within 30 days of completion of work to avoid late billing issues. This includes all progress payments and final payments.

13. Copies of all equipment safety and site specific training records.

AT COMPLETION OF THE WORK

1. Survey information and areas that required repair for as-built drawings and final payment.

2. Timely submission of Final Invoice.

3. Request for release for site cleanup.

1.7 CONTRACTOR'S PERSONNEL

Should the Owner object to any person or sub-contractor used by the Contractor on the work, the Contractor shall remove such person or sub-contractor from the work. The Owner's non-objection to any person or sub-contractor shall not be deemed to be an approval of such person or sub-contractor. The Contractor, by reason of such non-objection or by reason of the Owner's approval of any person or sub-contractor, shall in no way be relieved from its responsibility for the employment of such person or sub-contractor or from the performance and fulfillment of the work.

The Contractor shall at all times in connection with the execution of the work, keep and employ a competent general superintendent and a sufficient number of senior assistants capable of speaking, reading and writing the English language, at least one of whom must be at the site of the work at all times while such work is under progress, and any explanation, orders, instructions, directions and requests given by the Owner to such superintendent or senior assistant shall be held to have been given to the Contractor.

END OF SECTION 1 – GENERAL

SECTION 2 - LINER

PART 1 - GENERAL

1.1. DESCRIPTION

The work shall consist of furnishing and installing a linear low-density polyethylene (LLDPE) geomembrane liner over the tailings basin and upstream dam face as shown in the drawings and as specified herein.

1.2. CONTRACTOR QUALIFICATIONS

Manufacturing

The manufacturer shall have at least five (5) years continuous experience in manufacturing polyethylene liner and/or experience totalling 5,000,000 m^2 of manufactured polyethylene liner.

Installation

1. The installation contractor shall be the manufacturer or a dealer trained to install the manufacturer's liner.

2. Installation shall be performed under the constant direction of a field installation supervisor who shall remain on site and be responsible, throughout the liner installation, for liner layout, seaming, testing, repairs, and all other activities by the Installer. The field installation supervisor shall have installed or supervised the installation of a minimum of 500,000 m2 of polyethylene liner.

3. Seaming shall be performed under the direction of a master seamer (who may also be the field installation supervisor) who has seamed a minimum of 500,000 m2 of polyethylene liner, using the same type of seaming apparatus approved for this project. The field installation supervisor and/or master seamer shall be present whenever seaming is performed.

1.3. DEFINITIONS

The term Geosynthetics includes both geomembranes and geotextiles. Only a geomembrane is specified for the Work. The need for geotextiles may be identified during construction. The term Liner refers to the geomembrane.

1.4. CODES AND STANDARDS

The latest version of the following Standards shall apply for the supply, installation and field testing of the liner. (Abbreviated titles are used.)

ASTM D 4437 Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes

ASTM D 5641	Geomembrane Seam Evaluation by Vacuum Chamber
ASTM D 6365	Non-Destructive Testing of Geomembrane Seams using the Spark Test
ASTM D 6392	Determining the Integrity of Non-reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
ASTM D 1004	Initial Tear Resistance Of Plastic Sheeting
ASTM D 1505	Density Of Plastics By The Density-Gradient Technique
ASTM D 1603	Carbon Black In Olefin Plastics
ASTM D 4833	Index Puncture Resistance Of Geotextiles, Geomembranes And Related Products
ASTM D 5199	Measuring Nominal Thickness Of Geotextiles And Geomembrane
ASTM D 1790	Test for Brittleness Temperature of Plastic Sheeting by Impact
ASTM D 638	Test for Tensile Properties of Plastics

1.5. SUBMITTALS

The Contractor shall submit the information requested in Section 1 – General and the following information for approval.

1. In preparing submittals, the Contractor shall recognize the assistance of Others with regard to supply of labour, and equipment.

2. The Manufacturer shall provide the following information:

   a) With the Bid:

      - List of material properties.
      - Manufacturing quality control program.

   b) Prior to Liner Installation:

      - Copy of quality control certificates issued by the resin supplier.
      - Copy of quality control certificates for the geomembranes in conformance with Manufacturer's Quality Control and Quality Assurance Testing as set out herein.

3. The Installer shall provide the following written information:

   a) With the Bid:

- A list of completed projects, totalling a minimum of 150,000 m^2, for which the installer has installed polyethylene liner. For each installation, the following information shall be provided:

  a) Name and purpose of facility, location, and date of installation.

  b) Name of owner, design engineer, manufacturer, and name and telephone number of contact at the facility who can discuss the project.

  c) Thickness and quantity of the installed liner.

- A list of equipment that will be used to place the liner (Contractor supplied and those required from Others). In this submittal the Contractor shall provide commentary that demonstrates that the equipment is adequate to handle the load of placing the liner and that the equipment will not damage the liner.

- A list of personnel who will install the liner system. The Contractor shall obtain approval from the liner manufacturer to use the designated personnel, as required to satisfy manufacturer warranties.

- The Contractor shall submit construction methods in accordance with Section 1.

b) Prior to liner installation:

- Resume of the field installation supervisor and master seamer.

- Manufacturer approvals for liner placement

- Calibration certificates for all liner test equipment, for approval, at least 14 days prior to starting liner installation. Calibrations shall be current and represent the actual condition of the equipment at the time of use on the Work.

- A panel layout drawing, for approval. The Panel Layout Drawing shall indicate, at minimum, the configuration of the liner panels and the general location of field seams plus all test equipment.

c) During installation:

- Calibration certificates for new test equipment and periodic re-calibration certificates of in-use test equipment as required

4. A written Warranty shall be submitted by the manufacturer (for material) and the installation contractor (for workmanship). These documents shall warrant both the quality of the material and workmanship for a specified duration of time.

PART 2 - PRODUCTS

2.1 LINER

The liner shall be linear low-density polyethylene (LLDPE) with properties as described below, or a liner of approved similar quality.

Property	ASTM Test Method	Value
Thickness	D5199	40 mil 1 mm
Density	D1505	0.92 g/cc
Tensile Properties:	D638 (Type IV at 2 in/min)	
Yield Stress		60 lb/in 10.5 N/mm
Break Stress		150 lb/in 26.3 N/mm
Yield Elongation		13%
Break Elongation		800%
Tear Resistance	D1004	22 lb 98 N
Puncture Resistance	D4833	60 lb 267 N
Low Temp. Impact Resist.	D1790	-94°F -70°C
Carbon Black Content	D1603	2% to 3%
Carbon Black Dispersion	D5596	Cat 1-2
Seam Properties:	D4437 (1 in wide at 2 in/min)	
Shear Strength		60 lb/in 10.5 N/mm
Peel Strength (FTB)		50 lb/in 8.8 N/mm

The Film Tear Bond (FTB) is defined as a failure of one of the bonded sheets before compete separation in the bonded area.

PART 3 - EXECUTION

3.1. GENERAL

1. The liner rolls shall be shipped by flatbed trailer to the job site. The liner shall be transported and stored so as to be protected from puncture, dirt, grease, moisture, direct sunlight, ultraviolet rays and excessive heat. Damaged material shall be stored separately for repair or replacement. The rolls shall be stored on a prepared smooth surface (not wooden pallets) and shall not be stacked more than two rolls high.

2. The Contractor shall supply sandbags (liner ballasting). Sand fill will be provided by Others.

3. The Contractor shall exercise due caution to prevent injury to personnel, particularly due to slipping on the liner when wet.

4. The Contractor shall secure and protect the installation during construction to prevent wind-lifting, tearing or similar damage to the liner.

5. The Contractor shall be responsible for the material and confirm quantities prior to installation to avoid delays or shortages.

6. The Contractor shall minimize waste and shall protect the liner integrity during transportation, installation and after installation.

7. In-place seaming is required. The Contractor shall use an experienced technician/crew to supervise and perform the installation. The supervisor shall be on site at least one full day prior to liner placement for safety training and shall remain on site until 100% of the liner has been installed and approved.

8. The Contractor shall maintain the installation equipment, including power supplies, welding machines and accessories, to avoid delays and minimize repairs.

9. The Contractor shall provide spare welders and generators sufficient to prevent lost time due to equipment breakdown.

10. The liner shall be installed and quality assurance field tested in accordance with the manufacturer's recommendations.

11. The method used to unroll the panels shall not cause scratches or crimps in the liner and shall not damage the supporting soil.

12. Personnel working on the liner shall not smoke or wear damaging shoes. Only soft-soled safety footwear is allowed.

13. The Contractor shall arrive on site prepared to handle rain water collecting on the liner and have pre-made sand bags to hold the liner down during windy conditions. The Contractor is responsible to protect the liner from weather damage.

14. Vehicular traffic will not be permitted directly on the liner.

3.2. EARTHWORKS

1. Prior to liner installation the subgrade shall be moisture conditioned and proof rolled, by Others, as directed, in accordance with the specifications. All surfaces to be lined shall be smooth, free of all foreign and organic material, sharp objects, or debris of any kind. The subgrade shall provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade. Standing water or excessive moisture shall not be allowed.

2. The Installer, on a daily basis, shall approve the surface on which the liner will be installed. After the supporting surface has been approved, it shall be the Installer's responsibility to indicate to the Owner any changes to its condition that may require repair work.

3. The anchor trench shall be excavated to the lines, grade, and width shown on the drawings, prior to liner placement. Slightly rounded corners shall be provided in the trench to avoid sharp bends in the liner.

3.3. LINER INSTALLATION

1. Seams shall be welded in accordance with manufacturer's recommendations. If resin is used for seam welding, the physical properties of the resin shall be the same as, or better than, those used in the manufacture of the liner.

2. Liner panel placement and seaming shall not occur when ambient temperatures are below -5°C or above 40°C, during precipitation, in the presence of excessive moisture (e.g. fog, dew), or in the presence of high winds.

3. Liner shall be protected from displacement, damage, or deterioration before, during and after placement.

4. Damaged, torn, or permanently twisted panels shall be rejected. Rejected panels shall be removed from the site.

5. Seaming shall be kept to a minimum. Seams shall be preferentially orientated up and down slopes. Horizontal seams shall be more than 2 m down slope from the toe of any slope.

6. Seam areas shall be kept clean and free of moisture, dust, dirt, debris and foreign material.

7. Minor tears and pinholes in the liner shall be repaired by patching until non-destructive testing is successful. Patches shall be round or oval in shape, made of the same liner material, and extend a minimum of 75 mm beyond the edge of the defect.

3.4. LINER QUALITY CONTROL

1. Liner seams shall be tested by non-destructive methods over their full length and the results shall be documented as the seaming work progresses. Seams which do not pass non-destructive testing shall be repaired. The seam between the failed location and any passed test location shall be reconstructed until non-destructive testing is successful.

2. Seams shall be tested and documented in strength and peel at the beginning of each seaming period, and at least once every 4 hours for each seaming apparatus and seamer used that day. At least two samples taken from extra material from each panel shall be tested, such that the panel is not damaged and the blanket geometry is not altered.

3. If the seam test specimen fails in seam, the test shall be repeated on a new specimen. If the new specimen fails in seam, the material shall not be used for seaming until deficiencies are corrected and two consecutive successful test seams are achieved.

4. Seams shall be tested by non-destructive methods over their full length, using a vacuum test unit or an air pressure test.

5. Test results shall be provided to the Owner for each shift's production, including documentation of non-destructive testing and repairs at the end of each shift.

3.5. FILL PLACEMENT ON LINER

1. The method of placing fill directly on the liner, if required, shall not damage the liner and shall be subject to approval. No construction equipment or machinery shall operate directly on the liner and only approved light weight equipment shall be allowed to place fill within 2 m of the liner.

2. Only approved fine grained soil free of foreign and organic material, sharp objects, or debris of any kind, which could potentially damage the liner shall be placed against the liner and within 0.5 m of the liner.

3. The use of approved lightweight machinery (i.e., generator, etc.) with low ground pressure is allowed on the liner.

4. The anchor trench shall be backfilled by the earthwork contractor. Trench backfill material shall be placed and compacted in accordance with the earthworks specifications.

5. Care shall be taken when backfilling the trenches to prevent damage to the liner. If damage occurs, it shall be repaired prior to backfilling.

3.6. LINER ACCEPTANCE

The Installer shall retain ownership and responsibility for the liner until accepted by the Owner.

Final acceptance is when all of the following conditions are met:

- Installation is finished.

- Verification of the adequacy of all field seams and repairs, including associated testing, is complete.

END OF SECTION 2 - LINER

YUKON ZINC CORPORATION
WOLVERINE PROJECT

TECHNICAL SPECIFICATIONS

Tailings Storage Facility

Starter Dam Construction

February 5, 2009

Klohn Crippen Berger

YUKON ZINC CORPORATION
Wolverine Tailings Storage Facility
Starter Dam Construction
Technical Specifications

February 5, 2009

Section 1 General

Section 2 Excavation and Fills

Section 3 Channel Erosion Protection

Section 4 Pipe Culverts

SECTION 1 – GENERAL

1.1 SCOPE OF WORK

The Yukon Zinc Corporation (YZC) Wolverine Project is an underground mine located off the Robert Campbell Highway in southeast Yukon, approximately 190 km northwest of Watson Lake and 180 km southeast of Ross River. These specifications cover construction of the mine ore tailings starter dam, diversion ditches, emergency spillway, seepage recovery dam and spillway. The construction work includes the following:

1. Work Summary:

   a) clear, grub, strip work areas;

   b) produce specified fill materials;

   c) construct the starter dam and seepage recovery dam;

   d) prepare liner foundation;

   e) install liner underdrains;

   f) excavate seepage collection pond and spillway;

   g) assist Others to install a geosynthetic liner;

   h) install barge access ramp;

   i) construct the spillway channel with culvert segment; and

   j) complete post-construction survey of as-built conditions.

2. Drawings comprise the following:

DRAWING NO.	REV.	TITLE
D-4001	0	General Site Arrangement
D-4002	0	Starter Impoundment – Excavation and Fill Plan
D-4003	0	Starter Impoundment – Excavation and Fill Typical Sections
D-4004	0	Seepage Dam – Plan and Section
D-4011	0	Starter Spillway – Plan, Profile and Section

3. Reference drawings comprise the following:

DRAWING NO.	REV.	TITLE
D-4012	0	Diversion Ditch A – Plan, Profile and Sections
D-4013 (Sheet 1 of 2)	0	Diversion Ditch B – Plan and Profile
D-4013 (Sheet 2 of 2)	0	Diversion Ditch B – Sections and Details

4. Technical Specification Sections are as follows:

Section 1 General
Section 2 Excavation and Fills
Section 3 Channel Erosion Protection
Section 4 Pipe Culverts

1.2 DEFINITIONS

The following definitions and interpretations shall apply to the Technical Specifications:

1. ASTM: American Society for Testing and Materials Standard Test Methods.

2. Construction Project Manager is Clive Creaney or his designate.

3. Contract Documents means, as applicable,

- the Letter of Acceptance;
- the executed Agreement Form;
- Instructions to Bidders, completed Bid Form, Schedule of Prices, and Supplements to Bid Form;
- Information Documents specifically incorporated into the Contract Documents;
- Definitions and Interpretation, Payment Conditions, Security Conditions, Insurance Conditions, General Conditions, Supplementary Conditions, conditions related to Public Works Act claims;
- the Specifications;
- the Drawings;
- Addenda; and
- such other documents as may be identified as Contract Documents.

and shall include amendments thereto made pursuant to the provisions of the Contract.

4. Contractor means the company to whom the Owner has awarded the construction contract.

5. Drawings, mean all drawings, plans, sketches and maps issued with the Specifications or subsequently as provided for in the Contract and includes any drawings submitted by the Contractor if signed as approved by the Engineer.

6. Engineer means Klohn Crippen Berger Ltd. or any person duly authorized by the Owner to act on its behalf.

7. Environmental Management Plan (EMP) means the Owner's environmental standards and procedures for management, reporting and compliance with applicable environmental regulations.

8. Others means any person, firm or corporation employed by or having a separate contract with the Owner for work related to the project other than that required by the Contract Documents.
9. Owner, and Corporation shall have common meaning and refer to Yukon Zinc Corporation.

10. The Project means the total construction contemplated of which the Work may be the whole or part.

11. Site means the place where the work is being performed and the immediate vicinity thereof.

12. Specifications mean the Technical Specifications.

13. Where the words shown, indicated, detailed, specified, or words of a similar nature are used such words shall refer to the Specifications and/or Drawings unless expressly stated otherwise.

14. Where the words directed, permitted, approved, accepted, required, rejected, satisfactory, or words of similar nature are used such words shall refer to the direction, permission, approval, acceptance, requirements, rejection or satisfaction, of the Owner unless expressly stated otherwise.

15. The Work means the total construction and related services required by the Contract Documents.

1.3 HAUL ROADS

The Contractor shall be responsible for the maintenance of haul roads, including regular grading and dust control. The Contractor shall immediately notify the Owner if other users of the roads have caused excessive damage which cannot be easily repaired using the Contractor's routine maintenance methods. The access road to the site is the responsibility of the Owner.

1.4 SURVEY

1. The Owner will provide survey benchmarks with coordinates and elevations near the work areas. The Contractor shall be solely responsible for providing other survey control including layout of the work, confirmation of compliance with required lines and grades, quantity measurements for payment purposes, and final survey of as-built conditions.

2. The Contractor shall provide survey information, in three-dimensional AutoCAD 2005 or newer format, and a summary of Northing, Easting, and Elevations for all survey points in Excel. The Contractor shall submit this information routinely and upon request during the Work and upon completion and as outlined under Submittals.

1.5 OWNER SUPPLIED ITEMS

The Owner will provide the following items, at site, to the Contractor:

1. Processed fills (rip rap, filters, drain rock, and culvert bedding) that require crushing and/or screening. Processed fills will be provided at the Owner's quarry or relevant borrow source as applicable. (Processed fills do not include General Fill.)

1.6 QUALITY ASSURANCE BY THE ENGINEER

1. The Engineer will conduct random tests on fill materials. The Contractor shall cooperate in obtaining samples. Testing by the Engineer shall in no way relieve the Contractor of its sole responsibility for meeting specification requirements.

2. The Engineer's test results will be final in determining compliance with the Specifications. The Contractor shall perform any remedial work necessary to rectify deficiencies at no additional cost.

1.7 SITE POLICIES

Without limiting Contractor responsibilities described elsewhere in the Contract Documents, the Contractor agrees to comply with Wolverine Project Environmental Protection Plan (EPP) requirements and Site procedures:

1. All safety policies of the Owner outlined elsewhere in the Contract Documents shall be followed, including the use of personal protective equipment (steel toed boots/shoes, hard hats, safety glasses and others as required). All Contractor employees shall receive site specific training before entering the work site to ensure familiarity with Owner standards and policies.

2. The Owner maintains high environmental and safety standards. The Contractor will receive Owner training on the Environmental Protection Plans and site specific safety aspects at the Site. The Contractor is responsible to have all personnel trained in the environmental and safety standards before commencement of the Work.

3. The Contractor shall have an established Safety, Health, and Environment Action Plan (SHEAP) that complies with all Owner HSE standards and EPPs. Safety aspects of the days work shall be part of the daily tool box meetings. Safety interactions shall be held daily with the Owner. Weekly documented safety meetings shall be held with the Owner in a predetermined area.

4. The Contractor shall obey all Owner vehicle and driving standards when driving on Site.

5. Any spills are to be dealt with immediately utilizing appropriate containment and clean up procedures in accordance with the Owner Spill Contingency Plan. Any release to the environment is to be reported immediately to the Owner. The Owner may be required to make notification to Government environmental authorities. No mixing of spilled materials is permitted. The Contractor's shop area shall be maintained and kept free of waste build up and have covered waste barrels to limit accumulating rain water in any containers, as per the Waste Management Plan.

6. The Contractor shall only clean equipment in contained and designated areas.

7. The Contractor shall be responsible for implementing sediment control measures, to the satisfaction of the Owner. Run-off from upstream slopes and all areas in the Work shall be managed or collected for

settling/screening-out of any solids before release of discharges from the Site. Discharges of any kind outside of the work area containment system will not be allowed under any circumstances.

8. Natural conditions such as extreme storm events should be anticipated and corrective measures taken to mitigate the effects on the Work area drainage systems. Additional monitoring for safety and the environment may be required. Loss of production time as a direct result of wind, precipitation, freezing, or other adverse weather conditions (as determined by the Owner) and the related costs are the Contractor's responsibility and deemed to be included in the unit prices for the Work.

9. The Owner will have a representative/designate on Site during the period of the project who will oversee environmental monitoring as required under the relevant permits and Project specific sediment control measures. The Owner will schedule any necessary sample collection and provide regular assessments of the performance of sediment control measures. The Contractor is responsible for compliance with all Owner standards and regulatory requirements.

10. The removal of trees is prohibited outside of the Project claim boundaries.
11. Drip pans shall be used whenever oil, diesel fuel, gasoline, hydraulic fluid and other such items may leak or spill, and are to be emptied on a regular basis into designated waste disposal containers only.

12. All oil or liquid fuel shall be kept in tightly closed labelled containers designated for that use at all times to eliminate spillage. All fuel and oil storage shall have an impervious natural or man-made containment berm/sump to enable storage of 110% of the capacity of the containers stored within. Construction or purchase of such equipment will be the responsibility and expense of the Contractor.

13. The Contractor shall provide waste oil totes and several empty drums for oil filters, oily rags, etc. These are to be maintained and kept closed during the Project by the Contractor. At completion, or as required, the totes and drums shall be removed from the Work site by the Contractor for approved disposal. Different waste types (i.e., fuel, oil, glycol) shall be stored in separate containers – mixing is not permitted.

14. The Contractor shall provide equipment for and satisfactorily carry out dust abatement, if directed.

15. The Contractor's shop, lay-down and office areas shall be kept clean and tidy. Garbage generated by the Project shall be disposed of in the appropriate locations as directed by the Owner, including:
    a) Clean non-hazardous debris and putrescible (food) garbage shall be disposed of daily in a location specified by the Owner;

    b) Sanitary discharge shall not be allowed to flow onto the ground or into a fresh watercourse. Portable Toilets shall be supplied and maintained by the Contractor, in an approved manner.

16. All Work sites shall be kept clean and cleaned-up prior to completing the job. Normal cleanup will include:

    a) Cleanup of all work areas, haulage routes, lay-down areas, etc.

    b) Removal of all garbage, cans, drums, hose, pipe, used oil filters and other such items to approved locations.

    c) Emptying, removal and cleanup of any contaminated run-off control systems and surrounding areas into approved disposal areas.

17. If extra precautions beyond those agreed upon, prior to the start of Work, are required to prevent environmental damage the actual and reasonable cost of providing such precautions will be at the Owner's expense.

18. In the case of an emergency condition, the Owner reserves the right to enter the Work area and perform the necessary cleanup at the Owner's expense. If the said emergency condition occurs as a result of the negligence or wilful misconduct of the Contractor, the Contractor shall bear the cost of the cleanup and all fines or penalties levied by Government agencies for the condition.

19. From time to time the Work will require the coordination of activities between the Contractor and the Owner or Others. Notwithstanding any policies, contracts, agreements or the like, the Contractor shall cooperate fully with the Owner or Others, as directed by the Owner, to execute cooperative work in a timely manner and achieve the desired result for the Owner.

1.8 SUBMITTALS

Without in any way limiting submittal requirements contained elsewhere in the Contract Documents, the Contractor shall submit the following information for the Owner's approval. Work shall not start until applicable approvals are obtained in writing.

BEFORE WORK STARTUP

1. Construction Schedule showing the critical path.

2. Certification of hazard communication training.

3. List of all employees proposed for the Work, including name, age, and number of years working experience, social security number and position (title).

4. List of all plant, equipment, and materials proposed for the Work including size, weight, and axle loads if required.

5. Copy of site specific safety plan, JSA's (Job Safety Analysis) and SHEAP.

6. Signed company safety training forms for all employees. Contractor must comply with relevant regulatory personnel safety requirements.

7. Documentation indicating that all construction equipment meets regulatory minimum operating standards.

8. Contractor's predicted fuel and oil consumption requirements.

9. The Contractor shall be responsible for construction survey and grade work for the Work and shall submit survey methodology, equipment list, and qualifications of surveyor. Owner will confirm software compatibility with the Contractor to produce Owner formatted as-built drawings. Survey information shall be electronically collected and backed up, to ensure efficiency, accuracy and compatibility with Owner's survey software.

10. The Owner will supply the Contractor with AutoCAD format electronic drawing files of the grading plan. The Contractor shall produce shop drawings that include layout points for use during construction. The construction layout produced by the Contractor shall conform to the final grading plan in the Drawings, except where prior written approval of any change is received from the Owner.

11. Layout of access roads and work points for construction.

12. Sediment control plan.

13. A dust abatement plan.

DURING THE WORK

1. Copies of Daily Contractor Tool Box Safety meeting notes and Daily Equipment Pre-shift cards.

2. Copies of employee's incident reports of injury or property damage. Notification to the Owner is required immediately following any incident, with a written incident report submitted to the Owner as soon as practical, but no later than the end of shift.

3. Updates of medical reports for incident status as received.

4. Written property damage reports (by end of shift) with immediate notification to the Owner.

5. Written near miss incident reports (by end of shift) with immediate notification to the Owner.

6. Copies of completed required work permits, including excavation, hot work, confined space entry, etc., as applicable.

7. Copies of completed spill reports as per Owner Spill Contingency Plan with immediate notification to Owner and initiation of spill cleanup as a priority over the Work.

8. Copies of Daily load count reports and equipment used. Monthly reports of total man-hours on site (due on the first of every month).

9. Timely Change Order requests.

10. Daily Contractor completion/manpower sheets, showing labour and equipment hours worked on each task as well as details on any delays or breakdowns, signed and submitted to the Owner by noon the following work day.

11. Baseline surveys before starting and upon completing each component of the Work, in a timely fashion, to demonstrate compliance with design requirements and for payment and record purposes.

12. Weekly Report submitted with the weekly Construction Schedule update showing Work Completed, Work Planned, Problems Encountered, and Plans for Resolution.

13. Timely submission of invoices for all work completed, submitted within 30 days of completion of work to avoid late billing issues. This includes all progress payments and final payments.

14. Copies of all equipment safety and site specific training records.

AT COMPLETION OF THE WORK

1. As-built survey information of all aspects of the completed Work for as-built drawings and final payment.

2. Timely submission of Final Invoice.

3. Request for release for site cleanup.

END OF SECTION 1 – GENERAL

SECTION 2 - EXCAVATION AND FILLS

PART 1 - GENERAL

1.1 DESCRIPTION

1. The Work shall include the furnishing, processing, re-processing, hauling, placement and compaction of specified fill materials, to the lines and grades shown on the Drawings.

2. The Work includes:

   - development, processing and reclamation of borrow sources;
   - foundation excavation and/or preparation;
   - excavation of collection and spillway channels;
   - fill placement;
   - installation of liner underdrains; and
   - labour and equipment assistance to Others in the placement of liner.

1.2 CODES AND STANDARDS

The latest version of the following Codes and Standards shall apply (the titles shown have been abbreviated):

ASTM D4643/D2216	Laboratory Determination of Water Content of Soil and Rock by Mass
ASTM D422	Particle Size Analysis of Soils
ASTM D5519	Standard Test Method for Particle Size Analysis of Natural and Man-made Riprap Materials.
ASTM D854	Specific Gravity of Soil Solids by Water Pycnometer
ASTM D2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D2167	Density and Unit Weight of Soil in Place by Rubber Balloon Method
ASTM D1556	Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1140	Amount of Material in Soils Finer than the No. 200 (75 μm) Sieve
ASTM D4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D2434	Permeability of Granular Soils (Constant Head)
ASTM C127	Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C535	Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D698-Method D	Standard Proctor Density Test

ASTM D6473	Specific Gravity and Absorption of Rock For Erosion Control
CAN/CSA A23.2	Concrete Materials and Construction/Test Methods

1.3 RECORDS AND SUBMITTALS

1. The Contractor shall submit the information requested in Section 1 – General and the following information for approval. Work shall not start until applicable approvals are obtained in writing from the Owner.

    a. Excavation
    The Contractor shall submit plans and descriptions of methods and sequences for common, peat and rock excavation for the dam foundation preparation and borrow area development. The Contractor shall submit a 3-week rolling schedule for its borrow operations. The schedule shall be updated and subject to approval on a weekly basis.

    b. Fills
    The Contractor shall submit plans and descriptions of methods and sequences for fill placement.

    c. Quality Control
    The Contractor shall submit its plan for quality control of all fill materials and the qualifications of QC personnel.

    d. The Contractor shall submit a safety plan for encountering hazardous gases, such as hydrogen sulphide during construction.

1.4 SURVEY LAYOUTS

Fill layout surveys shall be accurate to +/- 100 mm for plan locations and +/- 20 mm for elevations.

PART 2 - PRODUCTS

2.1 GENERAL

1. Sources of fill materials shall be those described herein and as shown on the Drawings or as approved.

2. Materials from required excavations, which are suitable for construction, either directly or by selective excavation, shall be used for construction.

3. Fill materials shall be free of organic matter or other deleterious materials.

4. Fill materials shall be within the gradation limits indicated on the Drawings and as stated herein.

5. Fill materials shall be non-acid generating.

6. Liner Bedding shall be natural or screened silty sand or silty sand and gravel with maximum 20 mm particle size and less than 15 percent passing the # 200 sieve.

2.2 LINER UNDERDRAIN MATERIALS

1. The liner underdrain pipes shall consist of 200 mm diameter perforated and un-perforated corrugated pipe as indicated on the Drawings.

2. The liner underdrain filter fabric shall consist of non-woven needle punched polypropylene geotextile (Propex 4510 or equivalent).

3. Drain Rock shall be free draining 20-5 mm concrete coarse aggregate or approved equivalent.

PART 3 - EXECUTION

3.1 BORROW AREAS

1. The Contractor shall obtain fill materials from the excavations required for the Work, designated borrow areas and other sources which may be proposed by the Contractor and approved by the Owner.

2. Borrow excavations within the impoundment shall not exceed specified lines and grades, unless as directed.

3. Approved borrow areas are shown on the Drawings and are listed below. The Contractor shall not remove material from any source without the prior approval of the Owner.

STRUCTURE	FILL MATERIAL	BORROW AREA
Starter Dam	General Fill Liner Bedding Drain Rock for Underdrain	Impoundment area Quarry Quarry
Seepage Dam	General Fill	Impoundment area
Spillways & Diversions	Riprap and bedding layers Culvert bedding/backfill	Quarry Selective borrow or Quarry

4. Borrow operations by the Contractor shall adhere to the approved exploitation plans.

5. Any pioneering work that the Contractor considers necessary to improve extraction of specified materials shall be subject to approval.

6. The Contractor shall not extract material from borrow areas until the Owner has sufficiently sampled and tested it to characterize the properties and approves the material for placement.

7. The Contractor shall be wholly responsible for supplying materials which conform to the specifications for each zone of fill and shall take whatever measures and precautions are necessary to achieve this objective. Such measures shall include, but not be limited to, separating material into various sizes,

blending one material with another, removing oversize material and crushing or selective excavation of materials.

8. The Contractor's borrow operations shall avoid waste of suitable material therein. The Contractor shall clear, strip and grub borrow areas, and stockpile topsoil which, in the Owner's opinion, can be salvaged before starting production. Borrow area development shall provide drainage, prevent erosion of adjacent terrain and minimize exposure of the material to precipitation. Before being abandoned, borrow area slopes and waste piles shall be brought to stable profiles that are rounded and shaped to prevent ponding or concentrations of runoff and to provide a natural appearance. Rubbish, Contractor's equipment and structures shall be removed from these areas. Runoff shall be directed to sediment ponds or designated areas.

9. Waste material from preparation of borrow areas, excavation for the Work or processing in a borrow area shall be disposed of in an approved area and in an approved manner.

3.2 EQUIPMENT

The Contractor shall provide suitable loading, transporting, spreading and compaction equipment sufficient to meet the requirements of the construction schedule.

Compaction equipment shall conform to the following:

1. Vibratory Roller

   a) Smooth drum vibratory rollers shall be equipped with a cleaning device to prevent accumulation of material on the drum during rolling. The roller shall have a static weight of not less than 10 tonnes at the drum, on level ground. The drum shall be not less than 1.5 m diameter and not more than 3 m width. Vibratory frequency of the drum during operation shall be from 1100 to 1500 vibrations per minute and the centrifugal force developed by the roller at 1250 vibrations per minute shall not be less than 18 tonnes.

   b) Power shall be sufficient to maintain the specified performance under the most adverse condition that may be encountered during compaction of the fill and to operate at speeds up to 6 km/h.

2. Small Compactors

   Hand guided vibratory compactors shall be used to compact fill in trenches, around structures, instrumentation devices and in other confined areas. Such compactors shall be capable of compacting the material to the same density as that achieved by the larger vibratory roller.

3.3 FOUNDATION PREPARATION

1. Unsuitable material shall be brought to the Owner's attention and disposed of as directed.

2. Over-excavation of soft soil, sand lenses, dental rock excavation, removal of embedded boulders, and the like shall be carried out as directed.

3. The tailings basin and dam footprints shall be stripped of organic soils and the material stockpiled for future site reclamation.

4. Foundations require approval before proof rolling and placement of fills. Approved surfaces shall be dry, firm, and compacted as indicated on the drawings. The Contractor shall adjust the number of passes and moisture condition the soil as necessary, and as directed, to achieve the required compaction.

3.4 CONTROL OF WATER

The Contractor shall install dewatering ditches to direct water away from the fill areas, and excavate sumps, if required, to allow pumping. The dewatering works will be integrated with the liner underdrain, as directed by the Engineer in the field, to provide passive drainage of the area upstream of the dam during construction.

3.5 LINER UNDERDRAIN CONSTRUCTION

The purpose of the underdrain is to relieve uplift pressure on the liner due to groundwater. The extent of the liner underdrain will be determined by the Engineer in the field. The Contractor shall manage the works to prevent contamination and plugging of the underdrain with sediment.

3.6 LINER GRADE PREPARATION

1. Grade shall be prepared to the lines shown on the Drawings. With prior approval, grade lines may be adjusted in the field to suit bedrock topography, ground conditions or to minimize the use of backfill material, provided final grades are flatter than 2.5H:1V and are free of abrupt or sharp changes unless otherwise specified. In general, adjustments to grade lines which increase the tailings or water storage capacity of the area will be acceptable provided there are no additional costs to the Owner.

2. The prepared surfaces at the required grade lines, whether on original ground or on structural fill, shall be free of ruts formed by vehicular traffic and shall be compacted to provide a firm unyielding foundation for the liner. All final liner foundation surfaces shall be smooth and free of foreign and organic matter, angular particles larger than 20 mm, any sharp objects and abrupt changes in foundation surface profile. Smooth rounded bedrock or boulder surfaces may be acceptable, as approved. Gravel and cobble bed surfaces may also be acceptable if surficial voids are infilled with sand, as directed. The liner foundation surface shall be protected from flooding, standing water, erosion and freezing.

3. Foundation surfaces shall be proof rolled and compacted with a minimum of 6 overlapping passes of a 10-tonne vibratory compactor, or as directed by the Engineer.

4. Fill used to raise excavation surfaces to required grades shall consist of General Fill, placed in the specified manner unless otherwise directed. The final lift of liner foundation fill shall consist of finer General Fill with 20 mm maximum particle size.

5. The liner foundation surface shall be raked free of sharp, angular and oversize materials. If raking does not provide an acceptable liner foundation surface Liner Bedding material shall be placed over such zones, as directed.

6. The Contractor shall be prepared to de-water the liner grade by pumping or other approved methods to provide a grade surface free of standing water.

7. Finished surfaces shall have gradual and smooth grade transitions as required for the installation of the liner.

3.7 SPILLWAYS AND DIVERSIONS

1. The spillway and diversion channel footprints shall be stripped of organic soils and the material stockpiled for future site reclamation.

2. The spillway and diversion channels shall be excavated to the lines and grades shown on the Drawings. Where erosion protection, such as riprap is required, the channels shall be over-excavated to accommodate the riprap and granular filter(s) to ensure that the finished channels have the dimensions shown on the Drawings.

3. Unsuitable material along the channel alignments shall be brought to the Owner's attention and disposed of as directed.

4. Over-excavation of soft soil, sand lenses, dental rock excavation, removal of embedded boulders, and the like shall be carried out as directed.

5. Refer to Section 3 for installation of Channel Erosion Protection.

6. Refer to Section 4 for Pipe Culvert specifications.

3.8 FILL PLACEMENT

1. All fills shall be placed in dry conditions.

2. The Contractor shall use materials efficiently and minimize waste.

3. Fills shall be placed incrementally in horizontal lifts starting from the lowest ground levels, unless otherwise approved.

4. The Contractor shall use placing and spreading methods that prevent segregation, or provide an approved method of repairing segregation before compacting the materials.
5. Hand operated compactors shall be used within 0.6 m of buried conduits, utilities, instrumentation or similar sensitive structures.

6. The Contractor shall prevent erosion of placed fills, and shall immediately repair any erosion damage, at no cost to the Owner.

7. Materials in permanent works and in stockpiles shall be stable and shall have a smooth final surface that sheds runoff.

8. Fill tolerances:

a) level tolerance +100/-25 mm;

b) horizontal tolerance +200/-100 mm.

9. The fill surface shall be sloped only to the extent required for surface drainage.

10. Moisture conditioning equipment shall apply water uniformly and at controlled rates to achieve the required moisture content. Positive shut-off valves shall be used to prevent leakage when the equipment is not operating. Moisture conditioning shall be carried out in a manner that will minimize flow of water between zones.

11. Moisture conditioning shall be carried out during or immediately before compacting each lift, with the water content of the placed material being as uniform as practicable throughout the layer.

12. The Contractor shall take necessary precautions, when operating compaction equipment, to avoid damage to adjacent structures and instrumentation, and to avoid disturbing the foundation. Damage shall be repaired by the Contractor at its expense.

13. Fills shall be placed to the following specifications:

FILL DESCRIPTION	AS PLACED MOISTURE CONTENT (1)	MAX. LOOSE LIFT THICKNESS (2) (mm)	MIN. STANDARD PROCTOR DENSITY (%)	COMPACTION METHODOLOGY (minimum)
General Fill	-4% to +2% of Optimum Standard Proctor	300	95%	6 passes of a 10-tonne vibratory roller

(1) Moisture content refers to 19 mm minus fraction of fill.
(2) Fills within 0.6 m of sensitive structures, as determined by the Owner, shall be hand compacted with lift thickness reduced accordingly.

14. A minimum 300 mm overlap shall be maintained between adjacent passes of the roller drum. The roller shall not exceed 3 km/h when compacting fill.

15. If the quantity of oversize cobbles or boulders in the General Fill borrow materials is less than 10% and the material otherwise meets the specified gradation (except for oversize material), it may be placed without screening provided the oversize material is selectively removed prior to compaction and is approved.

16. The fill shall be dried or water conditioned as required. Should the surface of the fill become rutted or uneven subsequent to compaction, it shall be re-graded and re-compacted, at the expense of the Contractor, before the next layer of fill is placed.

17. Fill that becomes too wet or dry for proper compaction shall be removed or moisture conditioned by approved methods to an acceptable value.

3.9 FILL PLACEMENT ON LINER

1. The method of placing fill directly on the liner, if required, shall not damage the liner and shall be subject to approval. No construction equipment or machinery shall operate directly on the liner and only approved light weight equipment shall be allowed to place fill within 2 m of the liner.

2. Only approved fine grained soil free of foreign and organic material, sharp objects, or debris of any kind, which could potentially damage the liner shall be placed against the liner and within 0.5 m of the liner.

3. The use of approved lightweight machinery (i.e., generator, etc.) with low ground pressure is allowed on the liner.

4. The anchor trench shall be backfilled by the earthwork contractor. Trench backfill material shall be placed and compacted in accordance with the earthworks specifications.

5. Care shall be taken when backfilling the trenches to prevent damage to the liner. If damage occurs, it shall be repaired prior to backfilling.

3.10 SURVEY CONTROL

1. The Contractor shall conduct regular topographic surveys to demonstrate the placement of fill to the specified lines, levels and tolerances. Survey results shall be reported within 24 hours of completion. The Owner may conduct check surveys.

3.11 COMPLIANCE TESTING

1. The Contractor shall be responsible for quality control aspects of construction to ensure compliance with the Specifications. However the Owner will conduct periodic testing to verify construction quality.

2. Owner testing or the time taken to interpret the results shall not constitute grounds for a claim for additional compensation or an extension of time.

3. As a minimum, the Contractor shall carry out the following tests:

FILL TYPES	TESTS AND MINIMUM FREQUENCY (1 Test Per)			
	Gradation	Moisture Content	In Situ Density	Standard Proctor [(a)]
General Fill	2,000 m^3	1,000 m^3	1,000 m^3	5,000 m^3
Riprap	As required [(b)]			

a) A Standard Proctor test will be performed on each new material type.
b) Riprap gradation tests, if required, will be conducted on random truckloads of stone. The Contractor, at no additional cost, shall provide equipment, a sorting site, and labour to assist the Owner in checking gradation.

4. Testing shall be carried out across the full length, width and depth of the fill zones so as to represent the overall quality of the structure.

5. Test results shall be referenced as to date, fill type, location, borrow source, and elevation. Test results shall be reported within 24 hours of completion.

6. Fill that does not meet the specified requirements, shall be removed and replaced with conforming material at no cost to the Owner. Rejection of fill material may be made at source, on transporting vehicles, or in place.

7. Final acceptance of fills will be made only after materials have been dumped, spread, moisture conditioned, compacted and quality control tests and surveys have demonstrated compliance with specified requirements.

3.12 INSTRUMENTATION

The Contractor shall assist the Owner and/or Others to protect and extend instrumentation through the placed fill (if applicable). Damage caused by the Contractor shall be repaired at its cost.

3.13 RESTRICTIONS DUE TO WEATHER

1. The Contractor shall not place fill when conditions for such operations are unsatisfactory due to rainfall, snow, freezing temperatures, fire hazard, or any other reason.

2. Where operations have been discontinued by the Contractor or suspended by the Owner, the effects of snow, rain, low temperatures, desiccation, or other adverse conditions shall be assessed by the Owner and the surficial layers of fill or foundation treated or replaced to the satisfaction of the Owner before resumption of fill placement.

3. The Contractor shall not place frozen fill, incorporate snow or place fill on frozen surfaces.

4. Unless otherwise directed by the Owner, the Contractor shall:

   a) Not commence placing fill in air temperatures below 0°C;

   b) Cease placing fill if air temperature drops below -3°C; and

   c) Remove frozen fill and scarify the fill or foundation surface and re-compact the surface prior to placing additional material.

5. Compaction requirements shall be maintained.

END OF SECTION 2 – EXCAVATION AND FILLS

SECTION 3 – CHANNEL EROSION PROTECTION

PART 1 - GENERAL

1.1. DESCRIPTION

The Work includes hauling, placement, compaction and dressing of filters and riprap for the diversion and collection ditches and spillway channels.

1.2. CODES AND STANDARDS

The latest version of the following Standard Test Methods shall apply (the titles shown have been abbreviated):

ASTM D4643/D2216	Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D422	Particle Size Analysis of Soils
ASTM D854	Specific Gravity of Soil Solids by Water Pycnometer
ASTM D2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D2167	Density and Unit Weight of Soil in Place by Rubber Balloon Method
ASTM D1556	Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1140	Amount of Material in Soils Finer than the No. 200 (75 μm) Sieve
ASTM D2434	Permeability of Granular Soils (Constant Head)
ASTM C127	Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
ASTM C535	Resistance to Degradation of Large-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D5519	Particle Size Analysis of Natural and Man-made Riprap Materials.
ASTM D6473	Specific Gravity and Absorption of Rock For Erosion Control

1.3. RECORDS AND SUBMITTALS

For requirements refer to Section 1 – General.

1.4. SURVEY LAYOUTS

Unless otherwise specified, fill layout surveys shall be accurate to +/- 100 mm for plan locations and +/- 20 mm for elevations.

PART 2 - PRODUCTS

2.1. GENERAL

1. Sources of fill materials shall be those described herein and as shown on the Drawings or as approved.

2. Materials from required excavations, which are suitable for construction, either directly or by selective excavation, shall be used for construction.

3. Fill materials shall be free of organic matter or other deleterious materials.

4. Fill materials shall be well graded within the specified gradation limits shown on the Drawings, and have an even distribution of all particle sizes from the coarsest to the finest. The specified gradation limits shall apply to the fill materials following placement and compaction.

5. Fill materials shall be durable, resistant to breakdown during handling, and shall not, except as otherwise specified, contain more than 5% proportion of thin, flat or elongated particles i.e. those with a length to minimum width ratio greater than 3, and shall be free from organic and other deleterious materials.

6. Fill materials shall be non-acid generating.

2.2. RIPRAP

1. Riprap and filter materials will be produced, by the Owner, at the quarry.

2. Riprap and filter materials shall be well graded and have an even distribution of all particle sizes from the coarsest to the finest. The specified gradation limits shall apply to the materials following placement and compaction.

3. Fill materials shall be durable, resistant to breakdown during handling, and shall not contain more than 5% proportion of thin, flat or elongated particles (i.e. those with a length to minimum width ratio greater than 3) and shall be free from organic and other deleterious materials.

4. Riprap and filter rock shall be non acid generating (NAG) and non-metal leaching, clean, dense, and durable quarry stone free from cracks, seams and other defects.

5. Riprap shall have a minimum specific gravity of 2.60 and less than 40% loss by weight after 500 revolutions in a Los Angeles Abrasion Test (ASTM C535).

6. Riprap and filter gradation and layer thickness shall be as follows:

Gradation and Layer Thickness

MATERIAL	PARTICLE SIZE (mm)				LAYER THICKNESS (mm)	
	D_{100}	D_{85}	D_{50}	D_{15}	Riprap	Filter
Riprap A	300	260	200	120	400	200 Filter 1
Riprap B	450	390	300	180	600	200 Filter 1
Riprap C	525	455	350	210	700	300 Filter 1
Riprap D	675	585	450	270	900	300 Filter 1
Riprap E	1200	1040	800	480	1600	300 Filter 1 + 400 Filter 2
Riprap F	1500	1300	1,000	600	2000	400 Filter 1 + 400 Filter 2
Filter 1	75	60 to 70	35 to 50	23 to 28	-	-
Filter 2	300	260	200	120	-	-

- Riprap gradation shall be within –5% to +10% of the specified D_{15}, D_{50}, and D_{85} sizes.
- Filter 1 shall be well graded between the 75 mm and 19 mm screen sizes.
- Filter 2 shall be the same gradation as Riprap A.
- Filter 1 grading is based on the subsoil being a silty sand and gravel.

PART 3 - EXECUTION

3.1. SURFACE PREPARATION

1. Areas where erosion protection is to be installed shall be graded to uniform planar surface.

2. All depressions shall be filled with approved material and compacted to provide firm bedding.

3. Wave or surface water induced erosion of the prepared bed shall be graded out as directed by the Engineer prior to placement of filter and riprap materials.

3.2. GRANULAR FILTER PLACEMENT

1. Placement of granular filter shall commence at the bottom of the channel and continue upslope.

2. Granular filter shall be placed to a tolerance of +50 mm to -0 mm of specified thickness.

3.3. RIPRAP PLACEMENT

1. Placement of riprap shall commence at the bottom of the channel and continue upslope.

2. Riprap shall be placed to grade in a manner to prevent segregation of the materials, and to ensure that the larger rock fragments are uniformly distributed and the smaller rock fragments serve to fill the

spaces between the larger rock fragments. The final riprap zone shall be a well-keyed, densely placed, uniform layer.

3. Riprap shall be placed to its full zone thickness in one operation and in such a manner as to avoid displacing the filter bedding material. Placing of riprap in layers, or by dumping into chutes, or by similar methods likely to cause segregation will not be permitted.

4. One sample of each riprap class shall be prepared by sorting, weighing and remixing in proper proportions. The samples shall be placed at a convenient location and used as a frequent reference for judging the riprap gradation.

5. Equipment shall not run over finished riprap surfaces.

6. Finished riprap shall be within + 100 mm to - 0.0 mm of specified thickness and within +/- 2 degrees of specified slope.

3.4. COMPLIANCE TESTING

1. The Contractor shall be responsible for quality control aspects of construction to ensure compliance with the Specifications. However the Owner will conduct periodic testing to verify construction quality.

2. Owner testing or the time taken to interpret the results shall not constitute grounds for a claim for additional compensation or an extension of time.

3. As a minimum, the Contractor shall conduct the following tests:

   - **Granular Filters**: 1 gradation test per 100 m^3 per filter class, and
   - **Riprap**: Riprap gradation tests, if required, will be conducted on random truckloads of stone. The Contractor, at no additional cost, shall provide equipment, a sorting site, and labour to assist the Owner in checking gradation.

4. Test results shall be referenced as to date, fill type, location, borrow source, and elevation.

5. Fill that does not meet the specified requirements, shall be removed and replaced with conforming material at no cost to the Owner. Rejection of fill material may be made at source, on transporting vehicles, or in place.

6. Final acceptance of fills will be made only after materials have been placed, graded and dressed, and tests and surveys have demonstrated compliance with specified requirements.

END OF SECTION 3 – CHANNEL EROSION PROTECTION

SECTION 4 – PIPE CULVERTS

PART 1 - GENERAL

1.1. DESCRIPTION

The Work includes the supply and installation of pipe culverts to the lines and grades shown on the Drawings.

1.2. CODES AND STANDARDS

The latest version of the following Standards shall apply:

ASTM D698-Method D	Standard Proctor Density Test
CAN/CSA G401	Corrugated Steel Pipe Products

1.3. RECORDS AND SUBMITTALS

For general requirements refer to Section 1 – General.

1.4. SURVEY LAYOUTS

Layout surveys shall be accurate to +/- 50 mm for plan locations and +/- 10 mm for elevations.

PART 2 - PRODUCTS

2.1 CORRUGATED STEEL PIPE

1. Corrugated steel pipe (CSP) shall be to CAN/CSA G401.

2. Pipes shall have interior and exterior galvanized coating.

3. Pipes 600 mm diameter and smaller shall have 68 mm x 13 mm corrugations and 2.0 mm coated thickness.

4. Pipes larger than 600 mm diameter shall have 125 mm x 28 mm corrugations and 2.8 mm coated thickness.

2.2 CULVERT BEDDING/BACKFILL

Refer to the Drawings for material description.

PART 3 - EXECUTION

3.1 EXCAVATION, TRENCHING AND BACKFILLING

1. Excavation, trenching and backfilling shall be carried out in accordance with Section 2.
2. The Engineer's approval of trench line and depth shall be obtained prior to placing bedding material or pipe.
3. Backfill shall not be placed until pipe grade and alignment is accepted by the Engineer.

3.2 BEDDING

1. The excavation shall be dewatered, as necessary, to allow placement of culvert bedding in the dry.
2. A minimum thickness of 100 mm of approved granular material shall be placed on the bottom of the excavation and compacted to minimum of 95% Standard Proctor density.
3. The bedding shall be shaped to provide close contact with the pipe along the lower quarter segment (haunch) of the pipe.

3.3 LAYING PIPE CULVERTS

1. Pipe placement shall commence at the downstream end.
2. The Contractor shall ensure that the bottom of the pipe is in contact with the shaped bed or that compacted fill is placed in the haunch area throughout its length.
3. Water shall not be allowed to flow through the pipes during construction except as permitted by the Engineer.

3.4 JOINTS IN CORRUGATED STEEL PIPES

1. Coupler corrugations shall be matched with pipe corrugations before tightening coupler bolts.
2. The couplers shall be tapped firmly as they are being tightened, to take up slack and ensure a snug fit.
3. Damaged pipe coating shall be repaired by applying two coats of zinc rich paint.

3.5 BACKFILL

1. Backfill material shall be placed in maximum 150 mm layers to full width, alternately on each side of the culvert, so as not to displace it.

2. Each layer shall be compacted to minimum 95% Standard Proctor density taking special care to obtain required density under the haunches.

3. The installed culvert shall be protected with a minimum 600 mm cover of compacted General Fill before heavy equipment is permitted to cross during construction. Required depth of cover depends on culvert diameter and traffic axle load and therefore is subject to separate approval for each culvert installation.

END OF SECTION 4 – PIPE CULVERTS

YUKON ZINC CORPORATION
WOLVERINE PROJECT

TECHNICAL SPECIFICATIONS

Tailings Storage Facility

Starter Dam Construction

February 5, 2009

Klohn Crippen Berger

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Measurement and Payment

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 DOCUMENTS

This section of the Specifications forms part of the Contract Documents, and shall be read, interpreted and coordinated with all other parts.

Measurement and payment for all items in Schedule 1 - Quantities and Prices are covered by this section of the Specifications.

1.2 DEFINITIONS

The following words and terms, in all Contract Documents, shall have the meanings set out below, unless the context requires otherwise:

Extra Work shall mean the furnishing of labour, materials, Contractor's plant or any of them, and the doing of work not directly or by implication called for in the Contract Documents.

Standby Time shall mean non-working time spent by manned Contractor's plant or labour. Standby Time will only apply to time pre-approved in writing by the Owner as a result of a delay requested by the Owner.

Stand-down Time shall mean an extended period of non-working time by non-manned Contractor's plant. Stand-down Time will only apply to time pre-approved in writing by the Owner as a result of a delay requested by the Owner.

Downtime shall mean a period of time when the Contractor’s plant or work force is unavailable due to weather delays, breakdowns, or the like.

Schedule 1 shall mean Schedule 1 – Quantities and Prices.

1.3 OWNER SUPPLIED ITEMS

The Owner will provide the following items, at site, to the Contractor:

- Processed fills (rip rap, filters, drain rock, and culvert bedding) that require crushing and/or screening. Processed fills will be provided at the Owner’s quarry or relevant borrow source as applicable. (Processed fills do not include General Fill.)

1.4 MEASUREMENT AND PAYMENT

1. Measurement and payment applies only to final approved construction of permanent works. Temporary works will not be measured for payment.

2. Work measured under one pay item shall not be measured again under another pay item.

3. Except as otherwise specifically provided, the prices entered in Schedule 1 – Quantities and Prices for the various items of Work shall constitute full compensation for supplying, operating and maintaining temporary works, material, Contractor's plant, labour, supervision, environmental controls, safety, public impact mitigation measures, cooperating with Others and all other costs for performing all the Work required by the Contract.

4. Any Work called for in the Contract Documents, or which is necessary for completion of the Work or which is not specifically listed as a separate pay item in Schedule 1 shall be deemed incidental to the Work and no separate measurement or payment will be made for such Work, but the cost of all such incidental Work shall be included in the prices entered for the various pay items appearing in Schedule 1.

5. The amount of Work to be performed with respect to each unit price pay item has been estimated as set out in Schedule 1. Notwithstanding, the Owner reserves the right to increase or decrease the amount of Work of any Work item as required and the Contractor shall make no claim for anticipated profit, for damages or for any extra payment whatsoever, except as provided for in the Contract.

6. If quantities are stated on the Drawings, they are provided as information only.

7. Where an item has been measured as a lump sum, the Contractor is responsible for determining all related costs necessary to complete the lump sum item including that of labour, materials and Contractor’s plant.

8. Where an item has been measured as a unit quantity, the quantity is subject to re-measurement after the item under consideration has been satisfactorily completed.

9. The Contractor shall be responsible for all aspects of measurement for payment. The methods of measurement shall be in accordance with standards normally accepted by the construction industry and in accordance with the relevant section of the Specifications for the respective types of Work.

10. A given type of Work shall not proceed until relevant initial surveys are approved in writing and signed quality approval certificates have been obtained for work completed.

11. Signed quality approval certificates will be prepared and issued by the Owner for all materials and construction. Quality approval shall apply to the actual nature and condition of materials used in the Work and their compliance with specified requirements.

12. No Work shall be undertaken that would preclude verification of any initial condition surveys or that would cover any unapproved work.

13. The Contractor shall prepare monthly estimates and a final statement of Work performed, in an approved format, and shall submit same together with signed quality approval certificates for relevant materials and completed construction and other supporting data and computations as required by the Owner to determine the accuracy and validity of the estimates.

14. The Contractor also shall submit Daily Reports containing a complete and accurate account of the previous day's progress to help support quantity estimates for progress payments.

1.5 MEASUREMENT

All quantity measurements will be made to the design lines shown on the Drawings, as applicable, unless otherwise directed or approved.

Measurement of excavations will be made of bank volume. (Bank volume means in-situ volume.)

Measurement of fills will be made of materials satisfactorily placed and compacted. Measurement will reflect in-place volumes after compaction unless otherwise specified.

Measurement of pipes and culverts will be made of length.

Filter fabric for liner underdrains will not be measured for payment and shall be considered incidental to the Work.

1.6 PAYMENT

Payment for the Work will be made at the respective lump sums and unit rates stated in Schedule 1 – Quantities and Prices.

Payment under the various pay items will only be made for Work satisfactorily completed in accordance with the Contract Documents.

Payment of mobilization and demobilization will be at the respective lump sum prices stated in Schedule 1, on the following basis:

1. Fifty percent (50%) of the mobilization lump sum price will be paid upon mobilization of Contractor's plant and personnel to the Work Site, but only after acceptance of the construction schedule, the safety program, the environmental protection plan, and the quality control program.

2. The remainder of the mobilization lump sum price will be paid on a pro-rata basis over the Contract period, reflecting delivery of required liner materials and making adjustments for any advanced monies.

3. The demobilization lump sum price will only be paid once upon complete demobilization and submission of all deliverables.

1.7 MOBILIZATION AND DEMOBILIZATION

The lump sum prices tendered shall be relative to the costs involved for each item.

The total amount of all items related to mobilization and demobilization shall not exceed 20% of the Total Contract Price. The demobilization lump sum price shall be at least twenty-five percent (25%) of the mobilization lump sum price.

Mobilization or re-mobilization if specified and approved, shall be to the Work Site and shall include all costs required to:

1. Mobilize plant, labour, supervision, technical personnel, materials and other services required for the Work;

2. Insurance and permits;

3. Set up and assemble Contractor's plant and move to the first specific Work location; and

4. Attend ongoing Work Site safety orientations for every new worker.

Demobilization will be considered complete when all labour, Contractor's plant, temporary facilities and surplus and waste materials resulting from the Contractor's operations have been removed from the Work Site, and the Work Site has been cleaned and restored to the satisfaction of the Owner.

1.8 CHANGES IN THE WORK

The Owner, without invalidating the Contract, may order Extra Work, or make changes by altering, deleting or adding to the Work, and the Contract Price shall be adjusted accordingly. All such Extra Work shall be executed under the conditions of the Contract, except that any claim for extension of time caused thereby shall be adjusted at the time that the Change Order or Field Order for Extra Work is prepared.

In giving instructions, the Owner shall have the authority to make minor changes to the Work not involving extra costs, and not inconsistent with the purposes of the construction, and such changes shall not be considered as Extra Work.

No changes in the Work shall proceed without a written order issued by the Owner and no request for a change in the Contract Price or change in the Contract time may be made unless such an order has been made.

A change order may or may not result in a change in the amount of the Work or in the cost of the Work. If a change order does result in an increase in the cost of the Work or a decrease in the cost of the Work, unless the parties agree otherwise, that increase or decrease in cost shall be calculated as set out below in the Extra Work or Work And Materials Omitted clauses below.

When a change in the Work is proposed by the Contractor, it shall present a request to the Owner, for review, for a change in the Contract Price or change in Contract time with appropriate documentation in a form acceptable to the Owner.
Within 15 days of receipt of the Contractor's request, the Owner will in writing advise the Contractor of its decision to accept or reject the request.

When the Owner requests a substantial change in the Work, the Contractor shall present a proposal to the Owner for review, for a change in the Contract Price or change in the Contract time, if the Contractor considers the change to materially affect price or schedule. The proposal for the extra compensation shall be made within 48 hours of such change; otherwise the claim need not be considered. The proposal shall include appropriate documentation in a form acceptable to the Owner.

The Owner will make a written decision within 14 days of receipt of the Contractor's proposal.

The value of the Work performed in a change order shall be included for payment with regular progress payments.

The change in the Contract Price stated in a change order shall be deemed to be the total cost of all work required by the change order. A change in the Contract time stated in a change order is the only change to be made to the Contract time. No other request or claim by the Contractor for additional costs or time may be made by the Contractor or will be considered by the Owner.

The Contractor shall be conclusively deemed to have waived any right it may have for an adjustment of the amount to be paid for the Work under this section or elsewhere under the Contract if the Contractor does not make the request within the required time.

The Contractor shall keep accurate records, as agreed upon, of quantities or costs and present an account of the cost of the change in the Work, together with vouchers where applicable.

Request for Change
If the Contractor intends to make a request for a change in the Contract Price or a change in the Contract time under this section, it must, within 15 days after receipt of a written change order or the furnishing of a written notice, submit to the Owner a written statement setting forth the general nature and monetary extent of such request. Nevertheless, the giving of such a written statement to the Owner shall not relieve the Contractor of its obligations to carry out and obey such orders and instructions.

1.9 EXTRA WORK

Extra work means the furnishing of materials and equipment or the doing of Work not directly or implicitly called for in the Contract. If the Owner requires extra work it may do it itself or by the employment of others or it may direct the Contractor to do the extra work by the issuance of a change order on the following basis:

(1) Unit prices from Schedule 1 or otherwise as agreed;

(2) Mutually agreed lump sum, or

(3) Force Account (time and materials).

Unit Prices
For extra work carried out under unit prices, the unit price shall be all inclusive and no other payment whatsoever will be made on this account.

Mutually Agreed Lump Sum
For extra work carried out on an agreed lump sum basis, the allowance for overhead, profit, general superintendence, use of plant and equipment, subcontractor's costs for work performed by a subcontractor, and any other cost or expense associated with the extra work shall be fifteen (15) percent. No other payment will be made on this account.

Force Account (Time and Materials)
For extra work carried out on a time and materials basis, the Contractor shall keep an accurate record in a manner approved by the Owner of all the actual necessary and reasonable expenses pertaining thereto and make such records available to the Owner for inspection and verification daily while the work is taking place. The extra work will be paid for on the basis of the actual necessary expense to the Contractor of doing the extra work plus an allowance of fifteen (15) percent of the actual necessary expense to cover overhead, profit, general superintendence, use of plant and equipment, subcontractor's costs for work

performed by a subcontractor, and any other cost or expense associated with the extra work. No other payment will be made on this account.

Actual Necessary and Reasonable Expense
In this clause, "actual necessary and reasonable expense" means the sum of the following items:

Materials and Equipment: Actual and reasonable costs for materials and equipment provided by the Contractor and necessarily used in the Work and shall include applicable taxes;

Labour: The cost of labour shall be the sum of actual wages, labour surcharge, and subsistence and travel allowances. Actual wages paid shall include employer payments to or on behalf of the worker for health and welfare, pension, vacation and similar purposes. The labour surcharge includes applicable labour related taxes, and Workers' Compensation assessments, and other legally required costs directly related to labour. Where subsistence and travel allowance are required for performance of extra work, the charges shall consist of the actual and reasonable amount paid to each worker for these items.

Supervision: If, in the Owner's judgement, full-time supervision of the extra work is required, it will be authorized in writing by the Owner and included as an actual necessary expense.

Construction Equipment: Charges for construction equipment shall be based on rental rates set forth in the Contract Documents, and if not set out will be according to the latest edition of the local government Roadbuilder's Rental Rates. For equipment not listed, the rental rate will be mutually agreed upon in writing between the Contractor and the Owner. The reasonable cost of moving equipment onto and off the Work Site shall be included. If equipment is transported to the Work Site, the rental cost of the transporting of the equipment only shall be charged. Equipment rental shall not be paid when the equipment is inoperative due to breakdowns. Individual pieces of equipment or small tools having a replacement value of $1000 or less shall be considered expendable and no payment therefore shall be made. When equipment is used on the extra work for less than five days, hourly rates shall be used. When equipment is used on the extra work for more than five days, daily rates shall apply. Hourly and daily rates shall be prorated for fractional time worked.
Professional Services: Professional services shall be included only if the Owner has determined that such services are necessary and has provided written authorization.

Other Costs: Charges for items not included in the foregoing may be included if authorized in advance and in writing by the Owner.

1.10 WORK AND MATERIALS OMITTED

The Contractor shall, when ordered by change order, omit Work to be done or material to be furnished under the Contract and the value of the omitted work or material will be deducted from the total Contract Price. The value of omitted work or material will be based on tendered unit rates or as otherwise agreed.

1.11 CHANGE ORDER PROCEDURES

Changes in the Work will be documented by the Owner, using the following forms:

1. "Field Order" will be used when an instruction is given to the Contractor in the field, which may result in an adjustment to the Contract Price. A signed Field Order is authorization to proceed with the Work

on a Unit Price, Lump Sum or Force Account/Time and Material basis as stipulated on the Field Order form.

2. "Field Memo" will be used as an instruction in situations where the change is not anticipated to result in an adjustment to the Contract Price.

3. "Change Order" will be used for additions or deletions to the Work which originate as revisions to Drawings and Specifications, and which may result in a change to the Contract Price or Contract Time.

Contemplated Change Order

Where Extra Work is contemplated, the Owner will issue a Contemplated Change Order for a cost quotation. The Contractor shall submit, within the time specified on the form, either a lump sum quotation or an estimate based on quantities and unit prices from Schedule 1 and/or other proposed unit prices. The Contractor's quotation shall:

1. Be set out in sufficient detail with backup, acceptable to the Owner;

2. Indicate the proposed methodology and resources;

3. Indicate the schedule and cost or credit to complete the Extra Work;

4. Indicate any incremental cost impact included in Contractor’s quotation to maintain the Completion Date; and

5. Indicate that the quotation will remain open for acceptance for thirty (30) days.

The Owner will determine whether the quotation is acceptable, requires re-submittal or should be rejected. The Contractor shall provide additional data if requested to support the price quotation.

When the quotation is deemed acceptable, the Owner will prepare a Change Order entering the quotation adjustments to the Contract Price and Completion Date. Both parties shall sign the Change Order.

Unit Price Orders

1. These Orders will be based on either prior agreed quantities or a survey of completed Work.

2. When quantities can be determined prior to start of Work, the Owner will prepare the Order based on unit prices and known total quantities and adjust the Contract Price and the construction schedule as required.

3. When quantities cannot be determined prior to start of Work, the Owner will issue a Field Order authorizing the Work to proceed on the basis of the unit prices and estimated quantities. Upon completion, the Owner will complete the Field Order based on measured quantities and adjust the Contract Price and Completion Date as applicable.

Lump Sum Orders

1. These Orders will be based on an agreed quotation from the Contractor.

2. The Contractor shall submit all necessary backup and the quotation shall be broken down as required by the Owner.

Force Account/Time and Material Orders

1. When a change in the Work cannot be agreed upon by the Unit Price and Lump Sum methods, the Owner may authorize the Work to be carried out on a Force Account/Time and Material basis.

2. The Owner will issue a Field Order, authorizing the Extra Work to proceed on a Force Account/Time and Material basis.

3. The Contractor shall submit all required Force Account records daily, in approved detail and format.

4. Upon completion of Work, the Owner will complete the Field Order entering the final approved cost, and adjust the Contract Price and Completion Date as applicable.

Any dispute arising under this Section shall be governed by dispute resolution procedures set out elsewhere in the Contract Documents.

1.12 CONTRACTOR'S PAYMENT TO THE OWNER

The Contractor shall reimburse the Owner for costs incurred due to:

1. Overtime work performed by Owner’s site staff in excess of the standard shifts, to suit the convenience of the Contractor.

2. Employment of Owner’s site staff, after the approved completion date, if necessary due to failure of the Contractor to complete the Work by the approved Contract Time.

3. Redesign of any portion of the Work made necessary by a Contractor's error.

4. Any fines levied by any government jurisdiction due to the Contractor's failure to abide by the Contract Documents.

5. Rental rates on equipment borrowed from the Owner.

6. Materials purchased from the Owner.

   Up to $_____per key employee transferred from site without Owner approval, if, in the Owner’s opinion, the change of personnel has a significant delay or cost impact to the Work.

   $_____ per day or portion thereof for any uncontrolled fuel or petroleum by-product spill.

   $_____/hr for all survey work or quantity documentation work.

1.13 STANDBY TIME AND STANDDOWN TIME

Any payment to the Contractor for Standby Time or Stand-down Time will require approval and will apply only during delays caused by or requested by the Owner. The sum of Work hours and Standby Time and/or Stand-down Time due to approved delays shall not exceed eight hours per day and will not include Sundays or statutory holidays.

During Standby Time, the Contractor shall clean the Work Site and engage in any other Work as approved and directed.

END OF MEASUREMENT AND PAYMENT

APPENDIX III

Manufacturer's Specifications and Data Sheets

- Geotextile Specifications
- Geomembrane Specifications

Geotextiles - Nonwoven

Non-woven needle-punched geotextiles offer excellent water flow properties for drainage and other applications.

Needle-punched non-woven geotextiles are made from polypropylene fibres that are tangled together in a needle-punching process. The fibres may be made in continuous or short lengths and achieve their strength by interlocking. Needle-punched non-woven geotextiles have excellent water flow rates and are used for filtration of soil fines. Needle-punched non-woven geotextiles have been used in drainage applications including trench drains, as a wrapping for perforated pipe, for erosion protection, and combined with three-dimensional structures to create prefabricated drains. They are also commonly used with geomembranes to provide a protective cushion. Needle-punched non-woven primary functions: filtration; separation; protection; drainage. Secondary functions: reinforcement.



19 Nov 2007	Non-Woven Needle-Punched Geotextiles - US Values									
	ASTM	**LP3.5**	**LP4**	**LP4.5**	**LP6**	**LP7**	**LP8**	**LP10**	**LP12**	**LP16**
Grab Tensile (lbs)	D4632	90	100	120	160	180	205	250	300	380
Elongation (%)	D4632	50	50	50	50	50	50	50	50	50
Tear (lbs)	D4533	40	50	50	65	75	85	100	115	145
Puncture (lbs)	D4833	60	65	70	90	105	130	160	180	240
AOS (sieve)	D4751	50	70	70	70	70	80	100	100	100
Permittivity (sec-1)	D4491	2.2	2.0	1.8	1.6	1.5	1.4	1.2	1.0	0.7
Water Flow (gpm/ft^2)	D4491	150	140	120	110	100	90	80	75	50
Weight[1] (oz/yd^2) Nominal	D5261	3.5	4.0	4.5	6.0	7.0	8.0	10.0	12.0	16.0
Thickness[1] (mil) Nominal	D5199	40	45	50	70	85	85	100	110	165
UV (500 hrs)	D4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Roll Size (ft)		15 x 360	15 x 360	15 x 360	15 x 300[2]	15 x 300[2]	15 x 300[2]	15 x 300	15 x 300	15 x 150
Roll Weight[1] (lbs)		160	172	190	202	220	250	308	400	250

Note[1]: Typical values. All other values are minimum average roll values (MARV).
Note[2]: LP6, LP7, and LP8 may be 15 x 360 ft depending on inventory

Layfield Geosynthetics and Industrial Fabrics Ltd.
www.geomembranes.com
service@geomembranes.com

Geosynthetics, North America
Toll Free: 800-840-2884
Tel: 780-453-6731
Fax: 780-455-5218

Geosynthetics, US West Coast
Toll Free: 800-796-6868
Tel: 425-254-1075
Fax: 425-254-1575

19 Nov 2007	Non-Woven Needle-Punched Geotextiles - Metric Values									
	ASTM	**LP3.5**	**LP4**	**LP4.5**	**LP6**	**LP7**	**LP8**	**LP10**	**LP12**	**LP16**
Grab Tensile (N)	D4632	401	445	533	711	800	911	1,110	1,330	1,690
Elongation (%)	D4632	50	50	50	50	50	50	50	50	50
Tear (N)	D4533	178	222	222	289	333	378	444	511	644
Puncture (N)	D4833	267	289	311	400	467	578	711	800	1,070
AOS (microns)	D4751	300	212	212	212	212	180	150	150	150
Permittivity (sec-1)	D4491	2.2	2.0	1.8	1.6	1.5	1.4	1.2	1.0	0.7
Water Flow ($l/min/m^2$)	D4491	6,095	5,689	4,885	4,480	4,074	3,657	3,251	3,055	2,035
Weight[1](g/m^2) Typical	D5261	119	136	153	203	237	271	339	407	542
Thickness[1] (mm) Nominal	D5199	1.0	1.1	1.3	1.7	2.1	2.1	2.9	3.0	4.1
UV (500 hrs)	D4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Roll Size (m)		4.57 x 110	4.57 x 110	4.57 x 110	4.57 x 91.4[2]	4.57 x 91.4[2]	4.57 x 91.4[2]	4.57 x 91.4	4.57 x 91.4	4.57 x 45.7
Roll Weight[1](kg)		73	78	86	92	99	113	140	181	112

TECHNICAL DATA SHEET

Geomembrane HDPE Smooth

Solmax International Inc., 2801 Boul. Marie-Victorin, Varennes, Qc, Canada, J3X 1P7
Tel.: (450) 929-1234 Fax: (450) 929-2550 www.solmax.com

PROPERTY	TEST METHOD	FREQUENCY (1)	UNIT Metric	Solmax 480-2000
SPECIFICATIONS				
Thickness (min. avg.)	ASTM D-5199	Every roll	mm	2.0
Thickness (min.)	ASTM D-5199	Every roll	mm	1.8
Resin Density	ASTM D-1505	1/Batch	g/cc	> 0.932
Melt Index - 190/2.16 (max.)	ASTM D-1238	1/Batch	g/10 min.	1.0
Sheet Density	ASTM D-1505	Every 2 rolls	g/cc	> 0.94
Carbon Black Content	ASTM D-4218	Every 2 rolls	%	> 2.0 / < 3.0
Carbon Black Dispersion	ASTM D-5596	Every 6 rolls	Category	Cat. 1 / Cat. 2
Oxidation Induction Time (min. ave)	ASTM D-3895	1/Batch	min.	100
Tensile Properties (min. avg) (2)	ASTM D-6693	Every 2 rolls		
Strength at Yield			kN/m	31
Elongation at Yield			%	13
Strength at Break			kN/m	57
Elongation at Break			%	700
Tear Resistance (min. avg.)	ASTM D-1004	Every 6 rolls	N	250
Puncture Resistance (min. avg.)	ASTM D-4833	Every 6 rolls	N	695
Dimensional Stability	ASTM D-1204	Every 6 rolls	%	± 2
Stress Crack Resistance (SP-NCTL)	ASTM D-5397	1/Batch	hr.	300
Oven Aging - % retained after 90 days	ASTM D-5721	Per formulation		
HP OIT (min. avg.)	ASTM D-5885		%	80
UV Resistance - % retained after 1600 hr	GRI-GM-11	Per formulation		
HP-OIT (min. avg.)	ASTM D-5885		%	50
SUPPLY SPECIFICATIONS *(Roll dimensions may vary ±1%)*				
Roll Dimension - Width			m	6.80
Roll Dimension - Length			m	121.9
Area (Surface/Roll)			m^2	829

NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.

* All values are nominal test results, except when specified as minimum or maximum.
* The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsability of the user. SOLMAX assumes no liability in connection with the use of this information.

TECHNICAL DATA SHEET

Geomembrane LLDPE Smooth

Solmax International Inc., 2801 Boul. Marie-Victorin, Varennes, Qc, Canada, J3X 1P7
Tel.: (450) 929-1234 Fax: (450) 929-2550 www.solmax.com

PROPERTY	TEST METHOD	FREQUENCY (1)	UNIT Metric	Solmax 840-2000
SPECIFICATIONS				
Thickness (min. avg.)	ASTM D-5199	Every roll	mm	1.0
Thickness (min.)	ASTM D-5199	Every roll	mm	0.9
Resin Density	ASTM D-1505	1/Batch	g/cc	< 0.926
Melt Index - 190/2.16 (max.)	ASTM D-1238	1/Batch	g/10 min.	1.0
Sheet Density	ASTM D-1505	Every 2 rolls	g/cc	< 0.939
Carbon Black Content	ASTM D-4218	Every 2 rolls	%	>2.0 / <3.0
Carbon Black Dispersion	ASTM D-5596	Every 6 rolls	Category	Cat. 1 / Cat. 2
Oxidation Induction Time (min. ave)	ASTM D-3895	1/Batch	min.	100
Tensile Properties (min. avg) (2)	ASTM D-6693	Every 2 rolls		
Strength at Break			kN/m	28
Elongation at Break			%	800
2% Modulus (max.)	ASTM D-5323	Per formulation	kN/m	420
Tear Resistance (min. avg.)	ASTM D-1004	Every 6 rolls	N	100
Puncture Resistance (min. avg.)	ASTM D-4833	Every 6 rolls	N	276
Dimensional Stability	ASTM D-1204	Every 6 rolls	%	± 2
Multi-Axial Tensile (min.)	ASTM D-5617	Per formulation	%	30
Oven Aging - % retained after 90 days	ASTM D-5721	Per formulation		
STD OIT (min. avg.)	ASTM D-3895		%	35
HP OIT (min. avg.)	ASTM D-5885		%	60
UV Resistance - % retained after 1600 hr	GRI-GM-11	Per formulation	%	
HP-OIT (min. avg.)	ASTM D-5885			35
SUPPLY SPECIFICATIONS *(Roll dimensions may vary ±1%)*				
Roll Dimension - Width			m	6.80
Roll Dimension - Length			m	237.8
Area (Surface/Roll)			m^2	1617

NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.

* All values are nominal test results, except when specified as minimum or maximum.
* The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsability of the user. SOLMAX assumes no liability in connection with the use of this information.

TECHNICAL DATA SHEET

Geomembrane LLDPE Smooth

Solmax International Inc., 2801 Boul. Marie-Victorin, Varennes, Qc, Canada, J3X 1P7
Tel.: (450) 929-1234 Fax: (450) 929-2550 www.solmax.com

PROPERTY	TEST METHOD	FREQUENCY (1)	UNIT Metric	Solmax 830-2000
SPECIFICATIONS				
Thickness (min. avg.)	ASTM D-5199	Every roll	mm	0.75
Thickness (min.)	ASTM D-5199	Every roll	mm	0.675
Resin Density	ASTM D-1505	1/Batch	g/cc	< 0.926
Melt Index - 190/2.16 (max.)	ASTM D-1238	1/Batch	g/10 min.	1.0
Sheet Density	ASTM D-1505	Every 2 rolls	g/cc	< 0.939
Carbon Black Content	ASTM D-4218	Every 2 rolls	%	>2.0 / <3.0
Carbon Black Dispersion	ASTM D-5596	Every 6 rolls	Category	Cat. 1 / Cat. 2
Oxidation Induction Time (min. ave)	ASTM D-3895	1/Batch	min.	100
Tensile Properties (min. avg) (2)	ASTM D-6693	Every 2 rolls		
Strength at Break			kN/m	20
Elongation at Break			%	750
2% Modulus (max.)	ASTM D-5323	Per formulation	kN/m	315
Tear Resistance (min. avg.)	ASTM D-1004	Every 6 rolls	N	70
Puncture Resistance (min. avg.)	ASTM D-4833	Every 6 rolls	N	200
Dimensional Stability	ASTM D-1204	Every 6 rolls	%	± 2
Multi-Axial Tensile (min.)	ASTM D-5617	Per formulation	%	30
Oven Aging - % retained after 90 days	ASTM D-5721	Per formulation		
STD OIT (min. avg.)	ASTM D-3895		%	35
HP OIT (min. avg.)	ASTM D-5885		%	60
UV Resistance - % retained after 1600 hr	GRI-GM-11	Per formulation	%	
HP-OIT (min. avg.)	ASTM D-5885			35
SUPPLY SPECIFICATIONS *(Roll dimensions may vary ±1%)*				
Roll Dimension - Width			m	6.80
Roll Dimension - Length			m	304.8
Area (Surface/Roll)			m^2	2073

NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.

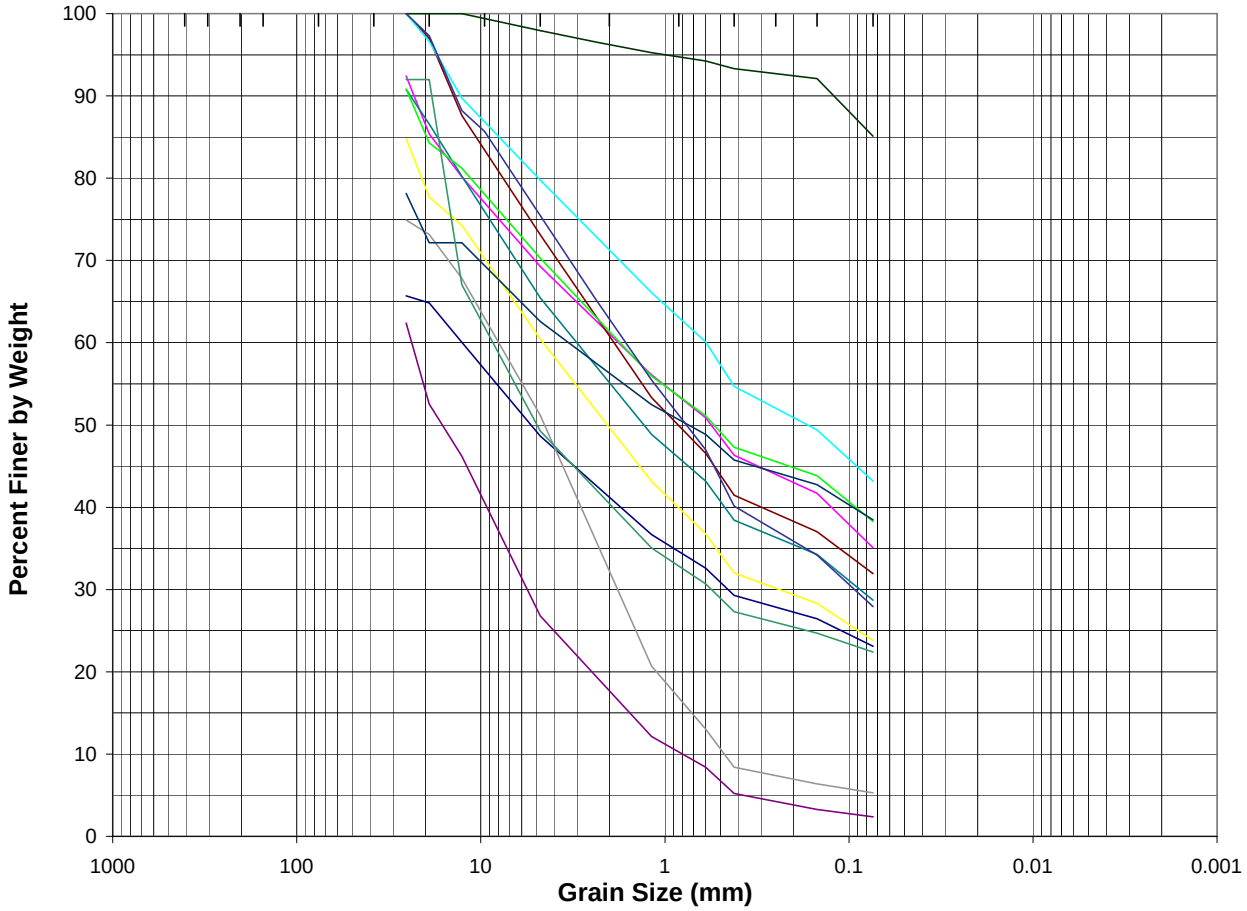
* All values are nominal test results, except when specified as minimum or maximum.
* The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsability of the user. SOLMAX assumes no liability in connection with the use of this information.

APPENDIX IV

Earthworks Quality Assurance

- Figure IV.1 2009 General Dam Fill Gradation Curves
- Figure IV.2 2009 Pipe Bedding Gradation Curves
- Figure IV.3 2009 Borrow Material Proctor Gradation Curves
- Figure IV.4 2009 Drain Rock Gradation Curves
- Figure IV.5 2009 Mapping Gradation Curves
- Figure IV.6 2009 General Dam Fill Std. Proctor Curves
- Table IV.1 2009 General Dam Fill Field Density Tests

GRAIN SIZE DISTRIBUTION

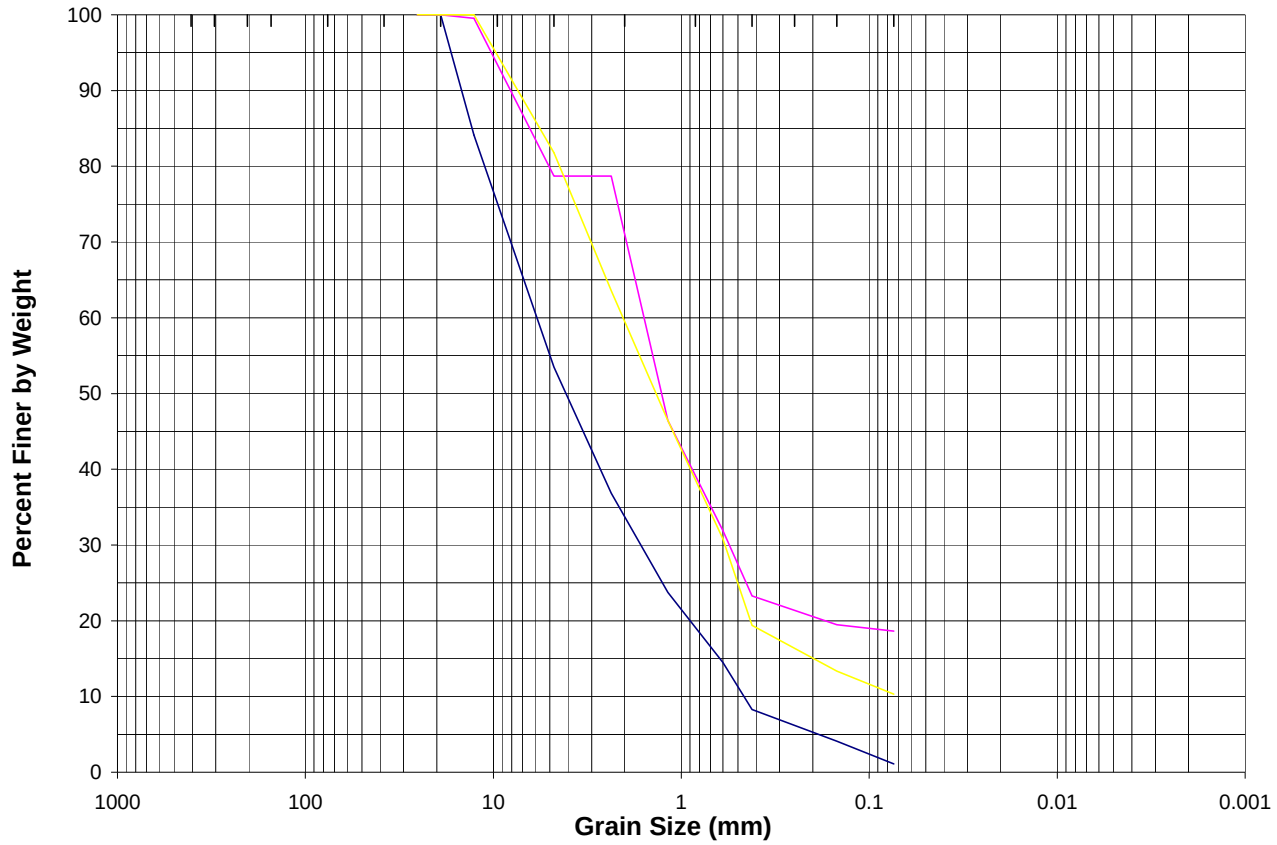


	Sample Name	Material	Location	Sample Date	Test Date
	Test 1	General Dam Fill	TP-09-01	03-Jun-09	05-Jun-09
	Test 2	General Dam Fill	TP-09-02	03-Jun-09	05-Jun-09
	Test 3	General Dam Fill	TP-09-02	03-Jun-09	04-Jun-09
	Test 4	General Dam Fill	Dam Footprint	03-Jun-09	04-Jun-09
	Test 5	General Dam Fill	East Ridge	06-Jun-09	07-Jun-09
	Test 6	General Dam Fill	Northwest Corner	06-Jun-09	07-Jun-09
	Test 7	General Dam Fill	North End	08-Jun-09	08-Jun-09
	Test 8	General Dam Fill	North End	08-Jun-09	08-Jun-09
	Test 9	General Dam Fill	North End	08-Jun-09	09-Jun-09
	Test 10	General Dam Fill	East Abutment	08-Jun-09	09-Jun-09
	Test 11	General Dam Fill	Sta. 0+140 m, El. 1286 m	15-Jun-09	16-Jun-09
	Test 15	General Dam Fill	Sta. 0+100 m, El. 1294 m	05-Jul-09	05-Jul-09
	Test 16	General Dam Fill	E442345 N6808419	10-Jul-09	10-Jul-09

Klohn Crippen Berger

PROJECT No:	M09234A05		
PROJECT:	Wolverine Tailings Storage Facility Dam Fill		
TITLE:	2009 General Dam Fill Gradation Curves		
DATE:			
DRAWN BY:	LC	FIGURE No.	IV.1

GRAIN SIZE DISTRIBUTION

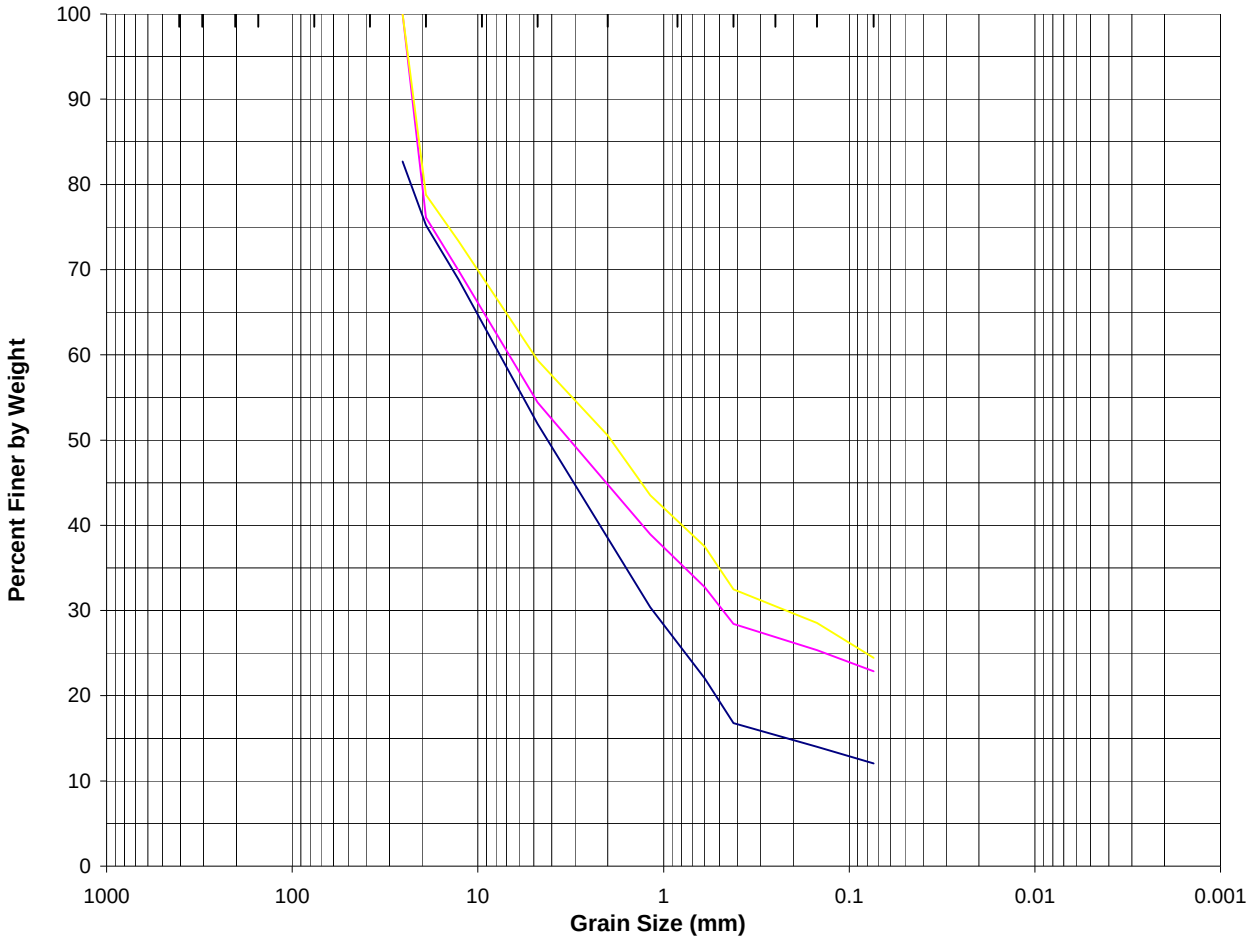


	Sample Name	Material	Location	Sample Date	Test Date
	Test 12	Sand and Gravel	Km 17	20-Jun-09	22-Jun-09
	Test 13	Sand and Gravel	Km 17	14-Jun-09	14-Jun-09
	Test 14	Sand and Gravel	Km 17	20-Jun-09	22-Jun-09

Klohn Crippen Berger

PROJECT No:	M09234A05		
PROJECT:	Wolverine Tailings Storage Facility Dam Fill		
TITLE:	2009 Pipe Bedding Gradation Curves		
DATE:			
DRAWN BY:	JL	FIGURE No.	IV.2

GRAIN SIZE DISTRIBUTION

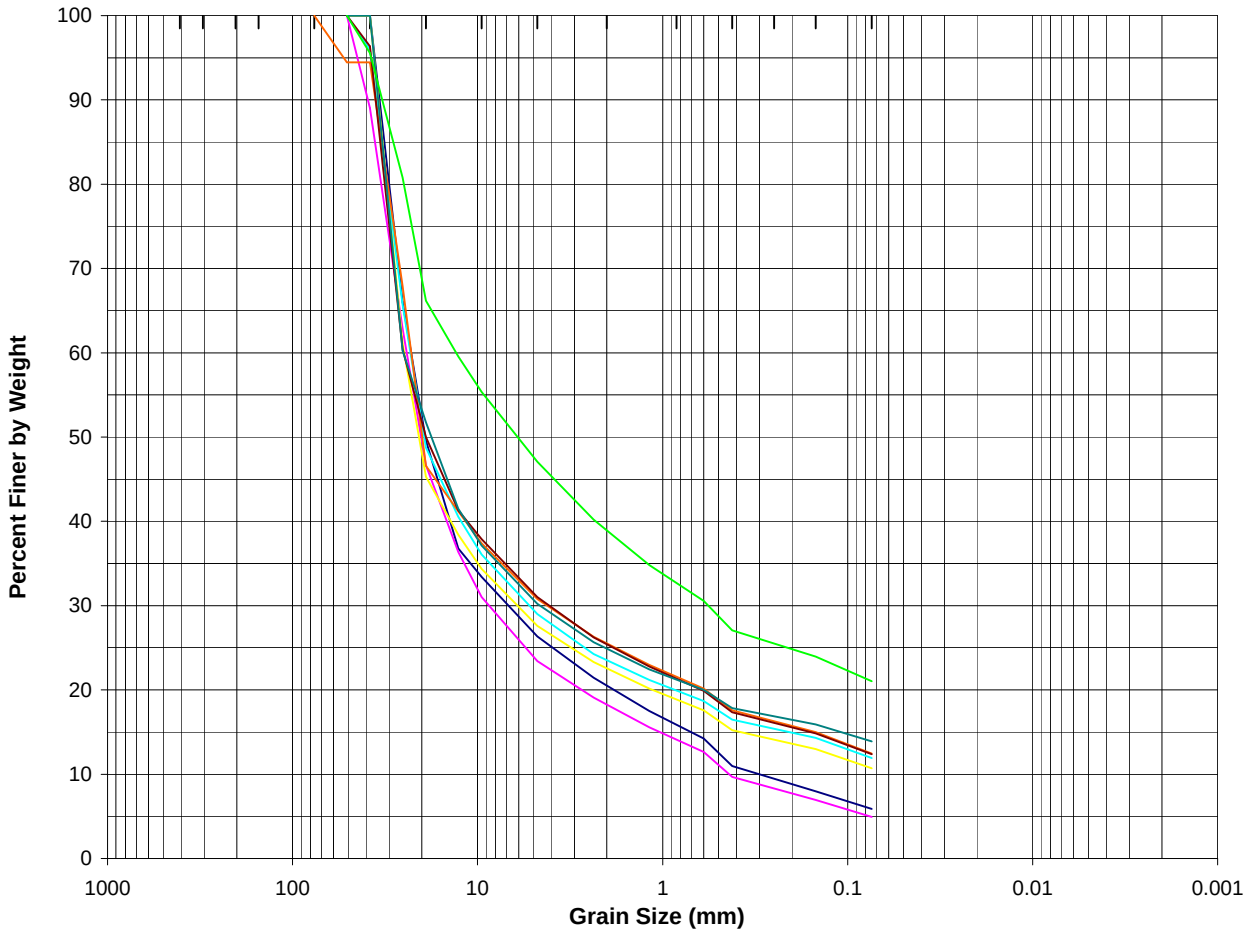


	Sample Name	Material	Location	Sample Date	Test Date
	Test P01	Proctor Sample	442403E 6808384N	13-Jun-09	13-Jun-09
	Test P02	Proctor Sample	442385E 6808423N	15-Jun-09	15-Jun-09
	Test P03	Proctor Sample	10m from Test P02	18-Jun-09	18-Jun-09

Klohn Crippen Berger

PROJECT No:	M09234A05		
PROJECT:	Wolverine Tailings Storage Facility Dam Fill		
TITLE:	2009 Borrow Material Proctor Gradation Curves		
DATE:			
DRAWN BY:	JL	FIGURE No.	IV.3

GRAIN SIZE DISTRIBUTION

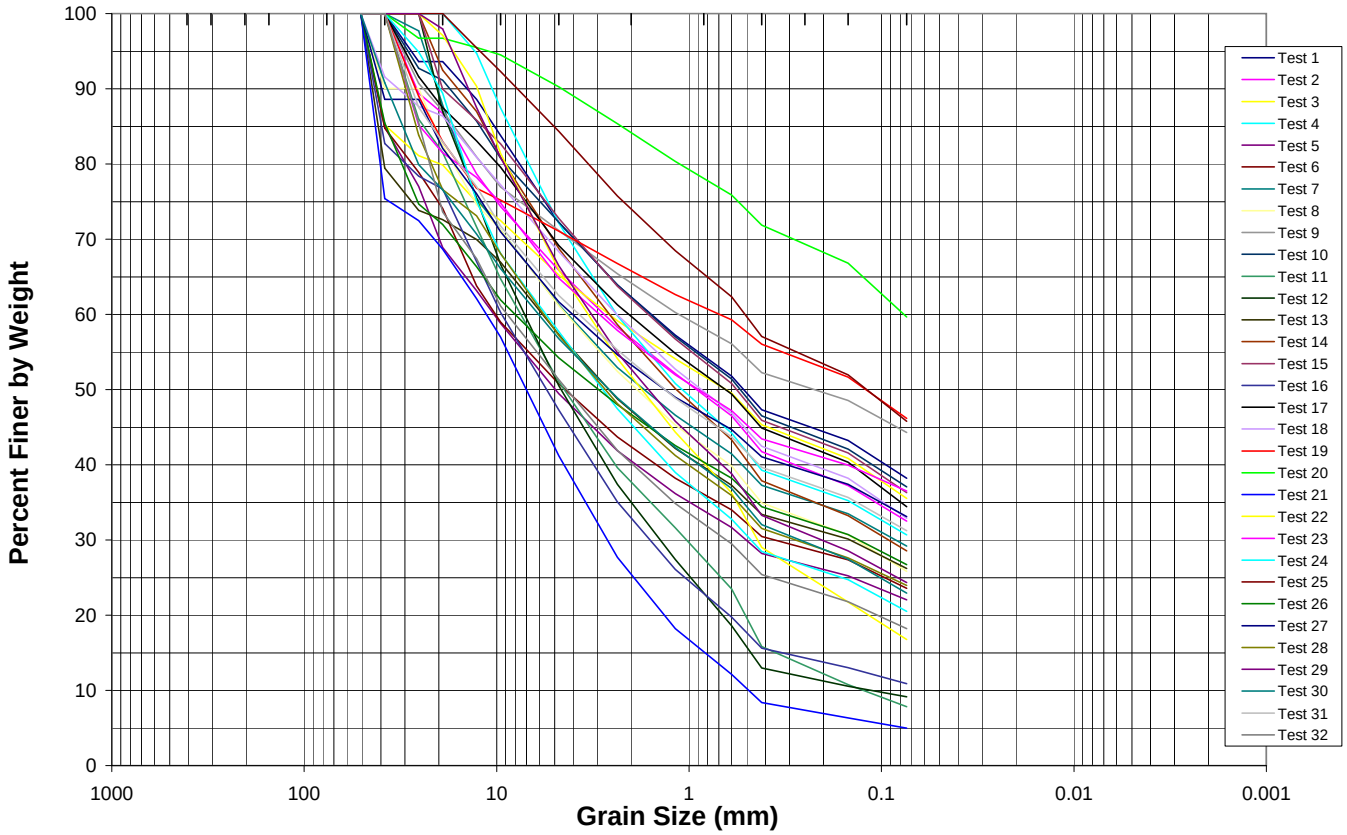


	Sample Name	Material	Location	Sample Date	Test Date
	Test 1	Drain Rock	Drain Rock Pile	22-Jul-09	23-Jul-09
	Test 2	Drain Rock	Drain Rock Pile	22-Jul-09	23-Jul-09
	Test 3	Drain Rock	Drain Rock Pile	22-Jul-09	23-Jul-09
	Test 4	Drain Rock	Drain Rock Pile	22-Jul-09	23-Jul-09
	Test 5	Drain Rock	Drain Rock Pile	22-Jul-09	23-Jul-09
	Test 6	Drain Rock	Drain Rock Pile	22-Jul-09	23-Jul-09
	Test 7	Drain Rock	Drain Rock Pile	22-Jul-09	23-Jul-09
	Test 8	Drain Rock	Drain Rock Pile	22-Jul-09	23-Jul-09

Klohn Crippen Berger

PROJECT No:	M09234A05		
PROJECT:	Wolverine Tailings Storage Facility Dam Fill		
TITLE:	2009 Drain Rock Gradation Curves		
DATE:			
DRAWN BY:	KW	FIGURE No.	IV.4

GRAIN SIZE DISTRIBUTION



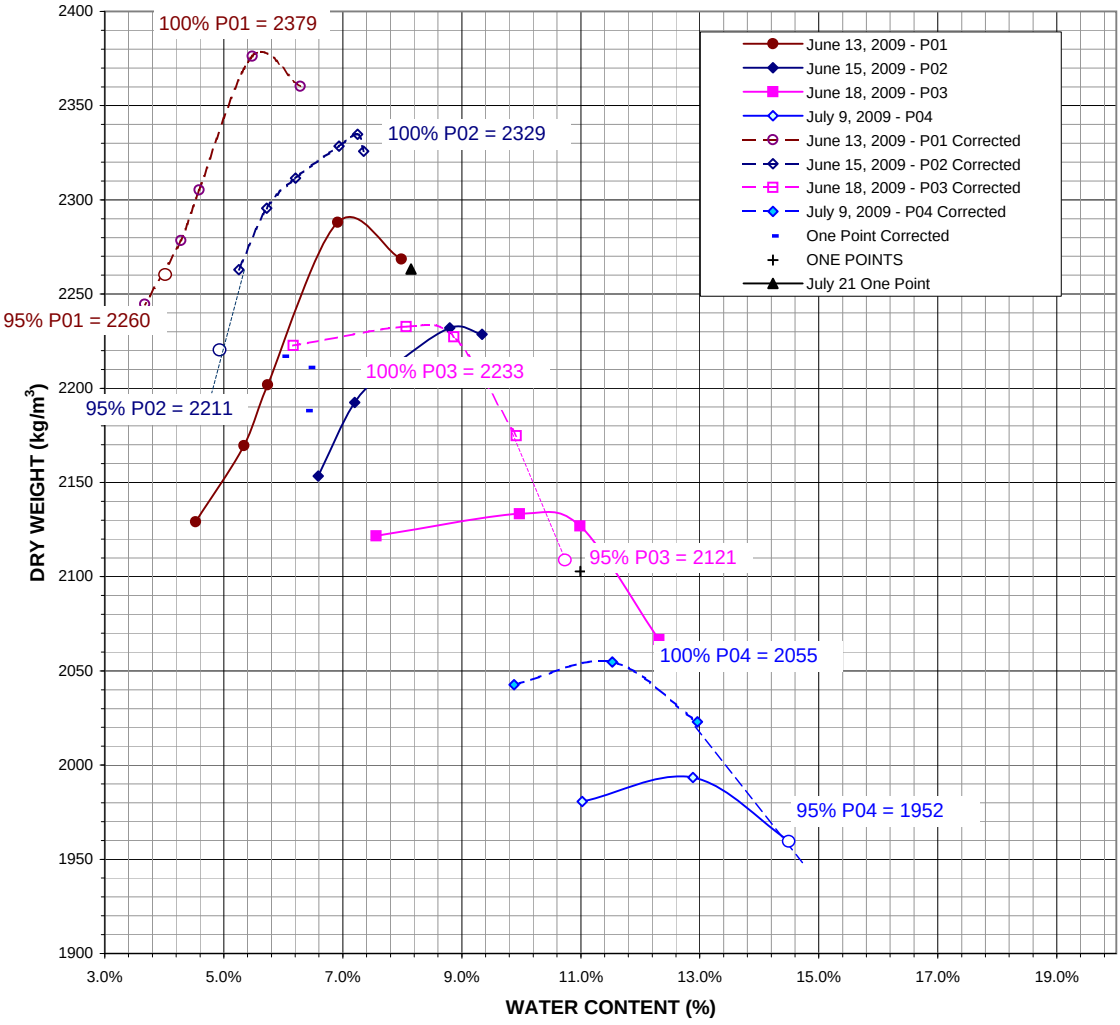
	Sample Name	Location	Sample Date	Test Date
	Test 1	6808742N 442247E	442247 E	25-Jul-09
	Test 2	6808705N 442246E	25-Jul-09	25-Jul-09
	Test 3	6808705N 442267E	25-Jul-09	26-Jul-09
	Test 4	6808705N 442299E	25-Jul-09	26-Jul-09
	Test 5	6808670N 442339E	25-Jul-09	26-Jul-09
	Test 6	6808670N 442309E	25-Jul-09	26-Jul-09
	Test 7	6808670N 442279E	25-Jul-09	26-Jul-09
	Test 8	6808670N 442249E	25-Jul-09	26-Jul-09
	Test 9	6808600N 442273E	25-Jul-09	26-Jul-09
	Test 10	6808600N 442313E	25-Jul-09	27-Jul-09
	Test 11	6808600N 442363E	25-Jul-09	27-Jul-09
	Test 12	6808600N 442410E	25-Jul-09	27-Jul-09
	Test 13	6808550N 442455E	25-Jul-09	27-Jul-09
	Test 14	6808550N 442405E	25-Jul-09	27-Jul-09
	Test 15	6808550N 442355E	25-Jul-09	27-Jul-09
	Test 16	6808550N 442305E	25-Jul-90	27-Jul-09

	Sample Name	Location	Sample Date	Test Date
	Test 17	6808500N 442250E	25-Jul-09	28-Jul-09
	Test 18	6808500N 442300E	25-Jul-09	28-Jul-09
	Test 19	6808500N 442350E	25-Jul-09	28-Jul-09
	Test 20	6808500N 442400E	25-Jul-09	28-Jul-09
	Test 21	6808500N 442440E	25-Jul-09	28-Jul-09
	Test 22	6808500N 442490E	25-Jul-09	28-Jul-09
	Test 23	6808500N 442490E	25-Jul-09	28-Jul-09
	Test 24	6808450N 442480E	26-Jul-09	28-Jul-09
	Test 25	6808450N 442420E	26-Jul-09	29-Jul-09
	Test 26	6808450N 442370E	26-Jul-09	29-Jul-09
	Test 27	6808450N 442320E	26-Jul-09	29-Jul-09
	Test 28	6808400N 442320E	26-Jul-09	29-Jul-09
	Test 29	6808400N 442370E	26-Jul-09	29-Jul-09
	Test 30	6808400N 442320E	26-Jul-09	29-Jul-09
	Test 31	6808350N 442410E	26-Jul-09	29-Jul-09
	Test 32	6808380N 442540E	26-Jul-09	29-Jul-09

Klohn Crippen Berger

PROJECT No:	M09234A05		
PROJECT:	Wolverine Tailings Storage Facility Dam Fill		
TITLE:	Figure IV.1 - 2009 Mapping Gradation Curves		
DATE:			
DRAWN BY:	KW	FIGURE No.	IV.5

MOISTURE - DENSITY RELATIONSHIP



PROJECT No.:	**M09234A05**
PROJECT:	**Wolverine**
TITLE:	**General Dam Fill Std. Proctor Curves**
DATE:	10-Jul-09
DRAWN BY:	**JL** **FIGURE No** IV.6

Ta ble IV-1 General Dam Fill - Field Density Tests

Test No.	Date	Wet Density (kg/m³)	Dry Density (kg/m³)	Std. Proctor Density (kg/m³)	Moisture Content	% Std. Proctor	Area	Elevation (m)	Location	Comments
1	15-Jun-09	2508.0	2370.5	2379	5.8%	99.6%	Starter Dam Fill	1285	Sta. 0+140 m, 20 m D/S	
2	15-Jun-09	2485.0	2344.3	2379	6.0%	98.5%	Starter Dam Fill	1285	Sta. 0+140 m, 25 m U/S	
3	15-Jun-09	2478.0	2337.7	2379	6.0%	98.3%	Starter Dam Fill	1285	Sta. 0+140 m, 30 m U/S	
4	15-Jun-09	2447.0	2291.2	2379	6.8%	96.3%	Starter Dam Fill	1285	Sta. 0+140 m, 1 m D/S	
5	18-Jun-09	2428.0	2260.7	2329	7.4%	97.1%	Starter Dam Fill	1285.5	Sta. 0+140 m, 15 m D/S	
6	18-Jun-09	2425.0	2239.2	2329	8.3%	96.1%	Starter Dam Fill	1285.5	Sta. 0+140 m, 30 m D/S	
7	20-Jun-09	2443.0	2313.4	2329	5.6%	99.3%	Starter Dam Fill	1285.5	Sta. 0+150 m, 20 m D/S	
8	20-Jun-09	2483.0	2335.8	2329	6.3%	100.3%	Starter Dam Fill	1285.5	Sta. 0+150 m, 25 m D/S	
9	20-Jun-09	2367.0	2185.6	2329	8.3%	93.8%	Starter Dam Foundation	1287	Sta. 0+125 m, 15 m U/S	Foundation Area Wet Spot 1 m diam.
10	20-Jun-09	2373.0	2247.2	2329	5.6%	96.5%	Starter Dam Foundation	1287	Sta. 0+125 m, 15 m D/S	Foundation, not req. to meet proctor
11	25-Jun-09	2531.0	2363.2	2379	7.1%	99.3%	Starter Dam Fill	1288	Sta. 0+140 m, 20 m U/S	meets spec but material is wet
12	25-Jun-09	2554.0	2371.4	2379	7.7%	99.7%	Starter Dam Fill	1288	Sta. 0+135 m, CL	meets spec but material is wet
13	25-Jun-09	2453.0	2301.1	2379	6.6%	96.7%	Starter Dam Fill	1288	Sta. 0+125 m, 10 m D/S	meets spec but material is wet
14	25-Jun-09	2574.0	2432.9	2379	5.8%	102.3%	Starter Dam Fill	1288	Sta. 0+150 m, 20 m D/S	meets spec but material is wet
15	25-Jun-09	2465.0	2271.9	2379	8.5%	95.5%	Starter Dam Fill	1288	Sta. 0+125 m, 15 m D/S	meets spec but material is wet
16	28-Jun-09	2420.0	2216.1	2233	9.2%	99.2%	Starter Dam Fill	1288	Sta. 0+140 m, 40 m D/S	meets spec but material is wet
17	28-Jun-09	2430.0	2233.5	2233	8.8%	100.0%	Starter Dam Fill	1288	Sta. 0+135 m, CL	meets spec but material is wet
18	28-Jun-09	2512.0	2334.6	2379	7.6%	98.1%	Starter Dam Fill	1288	Sta. 0+135 m, 40 m U/S	meets spec but material is wet
19	28-Jun-09	2437.0	2277.6	2379	7.0%	95.7%	Starter Dam Fill	1288	Sta. 0+130 m, 40 m U/S	meets spec but material is wet
20	28-Jun-09	2532.0	2370.8	2379	6.8%	99.7%	Starter Dam Fill	1288	Sta. 0+125 m, 40 m U/S	meets spec but material is wet
21	28-Jun-09	2484.0	2304.3	2379	7.8%	96.9%	Starter Dam Fill	1288	Sta. 0+125 m, 40 m U/S	meets spec but material is wet
22	28-Jun-09	2456.0	2238.8	2233	9.7%	100.3%	Starter Dam Fill	1288.5	Sta. 0+140 m, 40 m U/S	meets spec but material is wet
23	28-Jun-09	2485.0	2311.6	2233	7.5%	103.5%	Starter Dam Fill	1288.5	Sta. 0+130 m, 40 m U/S	meets spec but material is wet
24	28-Jun-09	2447.0	2267.8	2233	7.9%	101.6%	Starter Dam Fill	1288.5	Sta. 0+125 m, 40 m U/S	meets spec but material is wet
25	28-Jun-09	2356.0	2208.1	2233	6.7%	98.9%	Starter Dam Fill	1288.5	Sta. 0+125 m, CL	meets spec but material is wet
26	28-Jun-09	2437.0	2205.4	2233	10.5%	98.8%	Starter Dam Fill	1288.5	Sta. 0+135 m, CL	meets spec but material is wet
27	28-Jun-09	2479.0	2299.6	2233	7.8%	103.0%	Starter Dam Fill	1288	Sta. 0+140 m, CL	
28	28-Jun-09	2397.0	2199.1	2233	9.0%	98.5%	Starter Dam Fill	1288	Sta. 0+135 m, 30 m D/S	
29	28-Jun-09	2396.0	2178.2	2233	10.0%	97.5%	Starter Dam Fill	1288	Sta. 0+125 m, 30 m D/S	
30	28-Jun-09	2413.0	2267.9	2233	6.4%	101.6%	Starter Dam Fill	1288.5	Sta. 0+140 m, 25 m U/S	night shift
31	28-Jun-09	2373.0	2187.1	2233	8.5%	97.9%	Starter Dam Fill	1288.5	Sta. 0+140 m, CL	night shift
32	28-Jun-09	2419.0	2231.5	2233	8.4%	99.9%	Starter Dam Fill	1288.5	Sta. 0+135 m, 30 m D/S	night shift
33	29-Jun-09	2487.0	2302.8	2233	8.0%	103.1%	Starter Dam Fill	1289	Sta. 0+140 m, 25 m U/S	
34	29-Jun-09	2434.0	2253.7	2233	8.0%	100.9%	Starter Dam Fill	1289	Sta. 0+140 m, 35 m U/S	
35	29-Jun-09	2396.0	2206.3	2233	8.6%	98.8%	Starter Dam Fill	1289	Sta. 0+135 m, 35 m U/S	
36	29-Jun-09	2391.0	2232.5	2233	7.1%	100.0%	Starter Dam Fill	1289	Sta. 0+125 m, 30 m U/S	
37	29-Jun-09	2386.0	2211.3	2233	7.9%	99.0%	Starter Dam Fill	1289	Sta. 0+120 m, 30 m U/S	
38	29-Jun-09	2471.0	2252.0	2233	9.7%	100.9%	Starter Dam Fill	1289	Sta. 0+120 m, 30 m U/S	east ditch fill
39	29-Jun-09	2429.0	2251.2	2233	7.9%	100.8%	Starter Dam Fill	1289	Sta. 0+120 m, 30 m U/S	east ditch fill
40	30-Jun-09	2445.0	2302.3	2233	6.2%	103.1%	Starter Dam Fill	1289.5	Sta. 0+150 m, 40 m U/S	
41	30-Jun-09	2465.0	2280.3	2233	8.1%	102.1%	Starter Dam Fill	1289.5	Sta. 0+135 m, 20 m U/S	Collected one point proctor
42	30-Jun-09	2427.0	2232.8	2233	8.7%	100.0%	Starter Dam Fill	1289.5	Sta. 0+120 m, 30 m U/S	
43	30-Jun-09	2366.0	2176.6	2233	8.7%	97.5%	Starter Dam Fill	1287	Sta. 0+160 m, 30 m U/S	west ditch fill, night shift
44	30-Jun-09	2407.0	2226.6	2233	8.1%	99.7%	Starter Dam Fill	1287	Sta. 0+160 m, 5 m U/S	west ditch fill, night shift
45	30-Jun-09	2404.0	2207.5	2233	8.9%	98.9%	Starter Dam Fill	1288	Sta. 0+160 m, 15 m D/S	west ditch fill, night shift
46	30-Jun-09	2349.0	2197.4	2233	6.9%	98.4%	Starter Dam Fill	1288	Sta. 0+160 m, 35 m D/S	west ditch fill, night shift
47	30-Jun-09	2488.0	2301.6	2233	8.1%	103.1%	Starter Dam Fill	1290	Sta. 0+160 m, 30 m U/S	west ditch fill, night shift
48	30-Jun-09	2428.0	2233.7	2233	8.7%	100.0%	Starter Dam Fill	1290	Sta. 0+160 m, 5 m U/S	west ditch fill, night shift
49	30-Jun-09	2440.0	2255.1	2233	8.2%	101.0%	Starter Dam Fill	1290	Sta. 0+160 m, 15 m D/S	west ditch fill, night shift
50	30-Jun-09	2384.0	2179.2	2233	9.4%	97.6%	Starter Dam Fill	1290	Sta. 0+160 m, 35 m D/S	west ditch fill, night shift
51	1-Jul-09	2463.0	2251.4	2233	9.4%	100.8%	Starter Dam Fill	1290	Sta. 0+90 m, 35 m U/S	
52	1-Jul-09	2515.0	2337.4	2233	7.6%	104.7%	Starter Dam Fill	1290	Sta. 0+130 m, 35 m U/S	
53	1-Jul-09	2452.0	2245.4	2233	9.2%	100.6%	Starter Dam Fill	1290	Sta. 0+175 m, 35 m U/S	
54	1-Jul-09	2413.0	2205.7	2233	9.4%	98.8%	Starter Dam Fill	1290	Sta. 0+175 m, 35 m U/S	
55	1-Jul-09	2434.0	2255.8	2233	7.9%	101.0%	Starter Dam Fill	1290.5	Sta. 0+170 m, 30 m U/S	night shift
56	1-Jul-09	2436.0	2255.6	2233	8.0%	101.0%	Starter Dam Fill	1290.5	Sta. 0+130 m, 30 m U/S	night shift
57	1-Jul-09	2484.0	2297.9	2233	8.1%	102.9%	Starter Dam Fill	1290.5	Sta. 0+90 m, 30 m U/S	night shift
58	1-Jul-09	2248.0	2054.8	2233	9.4%	92.0%	Starter Dam Fill	1290.5	Sta. 0+160 m, 25 m U/S	night shift, retested in the morning
59	1-Jul-09	2454.0	2237.0	2233	9.7%	100.2%	Starter Dam Fill	1290.5	Sta. 0+135 m, 20 m U/S	night shift
60	1-Jul-09	2421.0	2181.1	2233	11.0%	97.7%	Starter Dam Fill	1290.5	Sta. 0+90 m, 30 m U/S	night shift
61	1-Jul-09	2492.0	2280.0	2233	9.3%	102.1%	Starter Dam Fill	1290.5	Sta. 0+90 m, 25 m U/S	night shift
62	1-Jul-09	2430.0	2225.3	2233	9.2%	99.7%	Starter Dam Fill	1290.5	Sta. 0+90 m, 20 m U/S	night shift
63	1-Jul-09	2395.0	2183.2	2233	9.7%	97.8%	Starter Dam Fill	1290.5	Sta. 0+90 m, 5 m U/S	night shift
64	1-Jul-09	2440.0	2242.6	2233	8.8%	100.4%	Starter Dam Fill	1290.5	Sta. 0+130 m, 10 m U/S	night shift, one point proctor collected
65	1-Jul-09	2410.0	2219.2	2233	8.6%	99.4%	Starter Dam Fill	1290.5	Sta. 0+170 m, 20 m U/S	night shift
66	1-Jul-09	2431.0	2282.6	2233	6.5%	102.2%	Starter Dam Fill	1290.5	Sta. 0+170 m, 5 m U/S	night shift
67	1-Jul-09	2435.0	2233.9	2233	9.0%	100.0%	Starter Dam Fill	1291	Sta. 0+170 m, 30 m U/S	night shift
68	1-Jul-09	2449.0	2230.4	2233	9.8%	99.9%	Starter Dam Fill	1291	Sta. 0+130 m, 20 m U/S	night shift
69	1-Jul-09	2240.0	2021.7	2233	10.8%	90.5%	Starter Dam Fill	1291	Sta. 0+95 m, 35 m U/S	night shift, retested in the morning
70	1-Jul-09	2310.0	2075.5	2233	11.3%	92.9%	Starter Dam Fill	1291	Sta. 0+95 m, 30 m U/S	night shift, retested in the morning
71	1-Jul-09	2318.0	2120.8	2233	9.3%	95.0%	Starter Dam Fill	1291	Sta. 0+95 m, 25 m U/S	night shift, retested in the morning
72	2-Jul-09	2336.0	2143.1	2233	9.0%	96.0%	Starter Dam Fill		Sta. 0+460 m, 20.5 m U/S	
73	2-Jul-09	2329.0	2136.7	2233	9.0%	95.7%	Starter Dam Fill		Sta. 0+500 m, Centerline	
74	2-Jul-09	2422.0	2222.0	2233	9.0%	99.5%	Starter Dam Fill	1291	Sta. 0+165 m, 10 m U/S	night shift
75	2-Jul-09	2346.0	2192.5	2233	7.0%	98.2%	Starter Dam Fill	1291	Sta. 0+165 m, Centerline	night shift
76	2-Jul-09	2448.0	2275.1	2233	7.6%	101.9%	Starter Dam Fill	1291	Sta. 0+155 m, 5 m U/S	night shift
77	2-Jul-09	2403.0	2233.3	2233	7.6%	100.0%	Starter Dam Fill	1291	Sta. 0+130 m, 5 m U/S	night shift
78	2-Jul-09	2323.0	2195.7	2233	5.8%	98.3%	Starter Dam Fill	1291	Sta. 0+95 m, 10 m U/S	night shift
79	2-Jul-09	2338.0	2185.0	2233	7.0%	97.9%	Starter Dam Fill	1291	Sta. 0+95 m, Centerline	night shift

Ta ble IV-1 General Dam Fill - Field Density Tests

Test No.	Date	Wet Density (kg/m³)	Dry Density (kg/m³)	Std. Proctor Density (kg/m³)	Moisture Content	% Std. Proctor	Area	Elevation (m)	Location	Comments
80	2-Jul-09	2487.0	2302.8	2233	8.0%	103.1%	Starter Dam Fill	1290.5	Sta. 0+175 m, 5 m D/S	night shift
81	2-Jul-09	2438.0	2278.5	2233	7.0%	102.0%	Starter Dam Fill	1290.5	Sta. 0+175 m, 20 m D/S	night shift
82	2-Jul-09	2403.0	2192.5	2233	9.6%	98.2%	Starter Dam Fill	1290.5	Sta. 0+175 m, 35 m D/S	night shift
83	2-Jul-09	2457.0	2270.8	2233	8.2%	101.7%	Starter Dam Fill	1290.5	Sta. 0+135 m, 35 m D/S	night shift
84	2-Jul-09	2461.0	2313.0	2233	6.4%	103.6%	Starter Dam Fill	1290.5	Sta. 0+135 m, 20 m D/S	night shift
85	2-Jul-09	2285.0	2107.9	2233	8.4%	94.4%	Starter Dam Fill	1290.5	Sta. 0+135 m, 5 m D/S	night shift
86	2-Jul-09	2388.0	2231.8	2233	7.0%	99.9%	Starter Dam Fill	1290.5	Sta. 0+134 m, 5 m D/S	night shift, retested
87	2-Jul-09	2349.0	2147.2	2233	9.4%	96.2%	Starter Dam Fill	1290.5	Sta. 0+95 m, Centerline	night shift
88	2-Jul-09	2379.0	2225.4	2233	6.9%	99.7%	Starter Dam Fill	1290.5	Sta. 0+95 m, 20 m D/S	night shift
89	2-Jul-09	2456.0	2308.3	2233	6.4%	103.4%	Starter Dam Fill	1290.5	Sta. 0+95 m, 35 m D/S	night shift
90	3-Jul-09	2468.0	2285.2	2379	8.0%	96.1%	Starter Dam Fill	1291	Sta. 0+90 m, 8 m U/S	
91	3-Jul-09	2424.0	2232.0	2233	8.6%	100.0%	Starter Dam Fill	1291	Sta. 0+125 m, 25 m U/S	
92	3-Jul-09	2279.0	2112.1	2233	7.9%	94.6%	Starter Dam Fill	1292.5	Sta. 0+185 m, 15 m U/S	night shift, repacked after this test
93	3-Jul-09	2420.0	2242.8	2233	7.9%	100.4%	Starter Dam Fill	1292.5	Sta. 0+180 m, 15 m U/S	night shift
94	3-Jul-09	2420.0	2216.1	2233	9.2%	99.2%	Starter Dam Fill	1292.5	Sta. 0+185 m, 10 m D/S	night shift
95	3-Jul-09	2415.0	2197.5	2233	9.9%	98.4%	Starter Dam Fill	1292.5	Sta. 0+130 m, Centerline	night shift
96	3-Jul-09	2459.0	2258.0	2233	8.9%	101.1%	Starter Dam Fill	1292.5	Sta. 0+95 m, 10 m D/S	night shift
97	3-Jul-09	2391.0	2195.6	2233	8.9%	98.3%	Starter Dam Fill	1292.5	Sta. 0+95 m, 15 m U/S	night shift
98	3-Jul-09	2408.0	2201.1	2233	9.4%	98.6%	Starter Dam Fill	1290.5	Sta. 0+170 m, 35 m D/S	night shift, smooth drum 2 passes
99	3-Jul-09	2391.0	2205.7	2233	8.4%	98.8%	Starter Dam Fill	1290.5	Sta. 0+165 m, 15 m D/S	night shift, smooth drum 2 passes
100	3-Jul-09	2362.0	2155.1	2233	9.6%	96.5%	Starter Dam Fill	1290.5	Sta. 0+140 m, 15 m D/S	night shift, smooth drum 2 passes
101	3-Jul-09	2399.0	2194.9	2233	9.3%	98.3%	Starter Dam Fill	1290.5	Sta. 0+130 m, 35 m D/S	night shift, smooth drum 2 passes
102	3-Jul-09	2387.0	2158.2	2233	10.6%	96.7%	Starter Dam Fill	1290.5	Sta. 0+95 m, 35 m D/S	night shift, smooth drum 2 passes
103	3-Jul-09	2399.0	2198.9	2233	9.1%	98.5%	Starter Dam Fill	1290.5	Sta. 0+95 m, 5 m D/S	night shift, smooth drum 2 passes
104	3-Jul-09	2413.0	2203.7	2233	9.5%	98.7%	Starter Dam Fill	1290.5	Sta. 0+90 m, 35 m D/S	night shift, smooth drum 2 passes
105	3-Jul-09	2339.0	2155.8	2233	8.5%	96.5%	Starter Dam Fill	1293	Sta. 0+170 m, 5 m U/S	night shift, sheepsfoot drum 4 passes
106	3-Jul-09	2301.0	2118.8	2233	8.6%	94.9%	Starter Dam Fill	1293	Sta. 0+165 m, 35 m U/S	night shift, sheepsfoot drum 4 passes
107	3-Jul-09	2390.0	2190.7	2233	9.1%	98.1%	Starter Dam Fill	1293	Sta. 0+135 m, 30 m U/S	night shift, sheepsfoot drum 4 passes
108	3-Jul-09	2359.0	2217.1	2233	6.4%	99.3%	Starter Dam Fill	1293	Sta. 0+100 m, 5 m U/S	night shift, sheepsfoot drum 4 passes
109	3-Jul-09	2447.0	2297.7	2233	6.5%	102.9%	Starter Dam Fill	1293	Sta. 0+90 m, 35 m U/S	night shift, sheepsfoot drum 4 passes
110	4-Jul-09	2360.0	2201.5	2233	7.2%	98.6%	Starter Dam Fill	1293.5	Sta. 0+90 m, 30 m D/S	
111	4-Jul-09	2405.0	2224.8	2233	8.1%	99.6%	Starter Dam Fill	1293.5	Sta. 0+190 m, 25 m D/S	
112	4-Jul-09	2399.0	2211.1	2233	8.5%	99.0%	Starter Dam Fill	1294	Sta. 0+220 m, 0 m U/S	
113	4-Jul-09	2453.0	2238.1	2233	9.6%	100.2%	Starter Dam Fill	1301.5	Sta. 0+380 m, 5 m U/S	
114	4-Jul-09	2403.0	2192.5	2233	9.6%	98.2%	Starter Dam Fill	1301.5	Sta. 0+460 m, 20 m U/S	
115	4-Jul-09	2392.0	2206.6	2233	8.4%	98.8%	Starter Dam Fill	1295.4	Sta. 0+250 m, 20 m U/S	
116	4-Jul-09	2454.0	2274.3	2233	7.9%	101.9%	Starter Dam Fill	1293.9	Sta. 0+300 m, 20 m U/S	
117	4-Jul-09	2403.0	2279.9	2233	5.4%	102.1%	Starter Dam Fill	1298.3	Sta. 0+350 m, 15 m U/S	
118	4-Jul-09	2461.0	2308.6	2233	6.6%	103.4%	Starter Dam Fill	1294	Sta. 0+185 m, 30 m D/S	night shift, smooth drum 2 passes
119	4-Jul-09	2484.0	2304.3	2233	7.8%	103.2%	Starter Dam Fill	1294	Sta. 0+165 m, 20 m D/S	night shift, smooth drum 2 passes
120	4-Jul-09	2481.0	2312.2	2233	7.3%	103.5%	Starter Dam Fill	1294	Sta. 0+140 m, 25 m D/S	night shift, smooth drum 2 passes
121	4-Jul-09	2469.0	2271.4	2233	8.7%	101.7%	Starter Dam Fill	1294	Sta. 0+120 m, 20 m D/S	night shift, smooth drum 2 passes
122	4-Jul-09	2408.0	2240.0	2233	7.5%	100.3%	Starter Dam Fill	1294	Sta. 0+95 m, 35 m D/S	night shift, smooth drum 2 passes
123	5-Jul-09	2216.0	1947.3	1835	13.8%	106.1%	Starter Dam Fill	1300	Sta. 0+460 m, CL	Soft silty sand material: STD pr value from Arctic
124	5-Jul-09	2490.0	2312.0	2233	7.7%	103.5%	Starter Dam Fill	1293.5	Sta. 0+190 m, 35 m U/S	night shift
125	5-Jul-09	2463.0	2276.3	2233	8.2%	101.9%	Starter Dam Fill	1293.5	Sta. 0+3170 m, 25 m U/S	night shift
126	5-Jul-09	2244.0	2066.3	2233	8.6%	92.5%	Starter Dam Fill	1293.5	Sta. 0+130 m, 30 m U/S	night shift, retested
127	5-Jul-09	2428.0	2241.9	2233	8.3%	100.4%	Starter Dam Fill	1293.5	Sta. 0+131 m, 30 m U/S	night shift, retested
128	5-Jul-09	2411.0	2257.5	2233	6.8%	101.1%	Starter Dam Fill	1293.5	Sta. 0+87.5 m, 35 m U/S	night shift
129	5-Jul-09	2428.0	2256.5	2233	7.6%	101.1%	Starter Dam Fill	1293.5	Sta. 0+80 m, 30 m U/S	night shift
130	5-Jul-09	2410.0	2273.6	2233	6.0%	101.8%	Starter Dam Fill	1293.5	Sta. 0+190 m, 15 m U/S	night shift
131	5-Jul-09	2361.0	2182.1	2233	8.2%	97.7%	Starter Dam Fill	1293.5	Sta. 0+180 m, Centerline	night shift
132	5-Jul-09	2433.0	2284.5	2233	6.5%	102.3%	Starter Dam Fill	1293.5	Sta. 0+130 m, 5 m U/S	night shift
133	5-Jul-09	2432.0	2268.7	2233	7.2%	101.6%	Starter Dam Fill	1293.5	Sta. 0+100 m, Centerline	night shift
134	5-Jul-09	2336.0	2131.4	2233	9.6%	95.4%	Starter Dam Fill	1293.5	Sta. 0+90 m, 20 m U/S	night shift
135	5-Jul-09	2359.0	2210.9	2233	6.7%	99.0%	Starter Dam Fill	1293.5	Sta. 0+180 m, 15 m D/S	night shift
136	5-Jul-09	2363.0	2165.9	2233	9.1%	97.0%	Starter Dam Fill	1293.5	Sta. 0+170 m, 35 m D/S	night shift
137	5-Jul-09	2408.0	2237.9	2233	7.6%	100.2%	Starter Dam Fill	1293.5	Sta. 0+140 m, 20 m D/S	night shift
138	5-Jul-09	2401.0	2223.1	2233	8.0%	99.6%	Starter Dam Fill	1293.5	Sta. 0+95 m, 20 m D/S	night shift
139	5-Jul-09	2370.0	2221.2	2233	6.7%	99.5%	Starter Dam Fill	1293.5	Sta. 0+87.5 m, 30 m D/S	night shift
140	6-Jul-09	2471.0	2281.6	2233	8.3%	102.2%	Starter Dam Fill	1298.7	Sta. 0+350 m, 9 m U/S	
141	6-Jul-09	2416.0	2212.5	2233	9.2%	99.1%	Starter Dam Fill	1296.8	Sta. 0+312 m, 16 m U/S	
142	6-Jul-09	2447.0	2247.0	2233	8.9%	100.6%	Starter Dam Fill	1296.1	Sta. 0+287 m, 3 m U/S	
143	6-Jul-09	2473.0	2266.7	2233	9.1%	101.5%	Starter Dam Fill	1302.5	Sta. 0+477 m, 5 m D/S	
144	6-Jul-09	2324.0	2040.4	1995	13.9%	102.3%	Starter Dam Fill	1303	Sta. 0+410 m, CL	
145	6-Jul-09	2164.0	1886.7	1860	14.7%	101.4%	Starter Dam Fill	1303	Sta. 0+410 m, 2 m U/S	
146	6-Jul-09	2462.0	2320.5	2233	6.1%	103.9%	Starter Dam Fill	1292.2	Sta. 0+185 m, 5 m U/S	
147	6-Jul-09	2356.0	2233.2	2233	5.5%	100.0%	Starter Dam Fill	1292.2	Sta. 0+150 m, 24 m U/S	
148	6-Jul-09	2565.0	2449.9	2379	4.7%	103.0%	Starter Dam Fill	1293.3	Sta. 0+125 m, 4 m U/S	
149	6-Jul-09	2415.0	2242.3	2233	7.7%	100.4%	Starter Dam Fill	1293.8	Sta. 0+8100 m, 22 m U/S	
150	6-Jul-09	2322.0	2112.8	2185	9.9%	96.7%	Starter Dam Fill	1296.6	Sta. 0+290 m, 19 m U/S	
151	6-Jul-09	2307.0	2114.6	2185	9.1%	96.8%	Starter Dam Fill	1297.5	Sta. 0+320 m, 12 m U/S	
152	6-Jul-09	2379.0	2127.9	2185	11.8%	97.4%	Starter Dam Fill	1297.6	Sta. 0+340 m, 12 m U/S	
153	6-Jul-09	2359.0	2229.7	2233	5.8%	99.9%	Starter Dam Fill	1292.5	Sta. 0+160 m, 25 m D/S	night shift
154	6-Jul-09	2397.0	2225.6	2233	7.7%	99.7%	Starter Dam Fill	1292.5	Sta. 0+120 m, 25 m D/S	night shift
155	6-Jul-09	2438.0	2196.4	2233	11.0%	98.4%	Starter Dam Fill	1295.5	Sta. 0+200 m, 25 m U/S	night shift
156	6-Jul-09	2340.0	2111.9	2233	10.8%	94.6%	Starter Dam Fill	1295.5	Sta. 0+162.5 m, 15 m U/S	night shift, recompacted later and passed

Ta ble IV-1 General Dam Fill - Field Density Tests

Test No.	Date	Wet Density (kg/m³)	Dry Density (kg/m³)	Std. Proctor Density (kg/m³)	Moisture Content	% Std. Proctor	Area	Elevation (m)	Location	Comments
157	6-Jul-09	2410.0	2177.1	2233	10.7%	97.5%	Starter Dam Fill	1295.5	Sta. 0+135 m, 20 m U/S	night shift
158	6-Jul-09	2390.0	2168.8	2233	10.2%	97.1%	Starter Dam Fill	1295.5	Sta. 0+110 m, 15 m U/S	night shift
159	6-Jul-09	2413.0	2197.6	2233	9.8%	98.4%	Starter Dam Fill	1295.5	Sta. 0+87.5 m, 25 m U/S	night shift
160	6-Jul-09	2436.0	2202.5	2233	10.6%	98.6%	Starter Dam Fill	1295.5	Sta. 0+62.5 m, 15 m U/S	night shift
161	6-Jul-09	2438.0	2263.7	2233	7.7%	101.4%	Starter Dam Fill	1295.5	Sta. 0+205 m, 20 m U/S	night shift, retested at test #155 location
162	6-Jul-09	2390.0	2200.7	2233	8.6%	98.6%	Starter Dam Fill	1295.5	Sta. 0+85 m, 5 m D/S	night shift
163	6-Jul-09	2416.0	2255.8	2233	7.1%	101.0%	Starter Dam Fill	1295.5	Sta. 0+110 m, 5 m U/S	night shift
164	6-Jul-09	2381.0	2145.0	2233	11.0%	96.1%	Starter Dam Fill	1295.5	Sta. 0+130 m, 5 m D/S	night shift
165	6-Jul-09	2443.0	2266.2	2233	7.8%	101.5%	Starter Dam Fill	1295.5	Sta. 0+160 m, 5 m U/S	night shift
166	6-Jul-09	2450.0	2270.6	2233	7.9%	101.7%	Starter Dam Fill	1295.5	Sta. 0+180 m, 5 m U/S	night shift
167	7-Jul-09	2472.0	2303.8	2233	7.3%	103.2%	Starter Dam Fill	1293	Sta. 0+185 m, 5 m D/S	night shift
168	7-Jul-09	2395.0	2242.5	2233	6.8%	100.4%	Starter Dam Fill	1293	Sta. 0+190 m, 20 m D/S	night shift
169	7-Jul-09	2573.0	2364.9	2233	8.8%	105.9%	Starter Dam Fill	1293	Sta. 0+135 m, 10 m D/S	night shift
170	7-Jul-09	2288.0	2091.4	2233	9.4%	93.7%	Starter Dam Fill	1293	Sta. 0+105 m, 20 m D/S	night shift, retested and passed after 2 more passes
171	7-Jul-09	2309.0	2099.1	2233	10.0%	94.0%	Starter Dam Fill	1293	Sta. 0+105 m, 20 m D/S	night shift, retested and passed after 2 more passes
172	7-Jul-09	2400.0	2179.8	2233	10.1%	97.6%	Starter Dam Fill	1293	Sta. 0+85 m, 5 m D/S	night shift
173	7-Jul-09	2346.0	2146.4	2233	9.3%	96.1%	Starter Dam Fill	1293	Sta. 0+105 m, 20 m D/S	night shift, retest
174	7-Jul-09	2385.0	2164.2	2233	10.2%	96.9%	Starter Dam Fill	1294.3	Sta. 0+075 m, 15 m U/S	night shift
175	7-Jul-09	2288.0	2097.2	2233	9.1%	93.9%	Starter Dam Fill	1294.3	Sta. 0+105 m, 5 m U/S	night shift, to be remediated during day shift
176	7-Jul-09	2342.0	2104.2	2233	11.3%	94.2%	Starter Dam Fill	1294.3	Sta. 0+105 m, 5 m U/S	night shift, to be remediated during day shift
177	7-Jul-09	2180.0	1903.9	2055	14.5%	92.6%	Starter Dam Fill	1294.3	Sta. 0+140 m, 15 m U/S	night shift, one point proctor collected
178	7-Jul-09	2220.0	1992.8	2055	11.4%	97.0%	Starter Dam Fill	1294.3	Sta. 0+180 m, 5 m U/S	night shift, to be remediated during day shift
179	8-Jul-09	2267.0	2006.0	2055	13.0%	97.6%	Starter Dam Fill	1294.3	Sta. 0+130 m, 19 m U/S	night shift, to be remediated during day shift
180	8-Jul-09	2204.0	1941.0	2055	13.5%	94.5%	Starter Dam Fill	1294.3	Sta. 0+135 m, 15 m U/S	night shift, to be remediated during day shift
181	8-Jul-09	2473.0	2275.0	2233	8.7%	101.9%	Starter Dam Fill	1293.3	Sta. 0+75 m, 10 m D/S	
182	8-Jul-09	2310.0	2181.0	2233	5.9%	97.7%	Starter Dam Fill	1293.3	Sta. 0+100 m, 5 m D/S	
183	8-Jul-09	2398.0	2237.0	2233	7.2%	100.2%	Starter Dam Fill	1293.3	Sta. 0+150 m, 20 m D/S	
184	8-Jul-09	2409.0	2247.0	2233	7.2%	100.6%	Starter Dam Fill	1293.3	Sta. 0+183 m, 20 m D/S	
185	8-Jul-09	2229.0	2069.0	2233	7.7%	92.7%	Starter Dam Fill	1294.6	Sta. 0+120 m, 20 m U/S	night shift, retested and passed after 2 more passes
186	8-Jul-09	2284.0	2146.0	2233	6.4%	96.1%	Starter Dam Fill	1294.6	Sta. 0+100 m, 25 m U/S	night shift
187	8-Jul-09	2328.0	2206.0	2233	5.6%	98.8%	Starter Dam Fill	1294.6	Sta. 0+80 m, 20 m U/S	night shift
188	8-Jul-09	2330.0	2193.0	2233	6.2%	98.2%	Starter Dam Fill	1294.6	Sta. 0+120 m, 20 m U/S	night shift
189	8-Jul-09	2376.0	2160.0	2233	10.0%	96.7%	Starter Dam Fill	1293.6	Sta. 0+180 m, 15 m D/S	night shift
190	8-Jul-09	2470.0	2246.0	2233	10.0%	100.6%	Starter Dam Fill	1293.6	Sta. 0+160 m, 25 m D/S	night shift
191	8-Jul-09	2447.0	2219.0	2233	10.3%	99.4%	Starter Dam Fill	1293.6	Sta. 0+130 m, 20 m D/S	night shift
192	8-Jul-09	2292.0	2028.0	2233	13.0%	90.8%	Starter Dam Fill	1293.6	Sta. 0+110 m, 5 m D/S	night shift, mixed with dry material, repacked and passed
193	8-Jul-09	2271.0	1983.0	2233	14.5%	88.8%	Starter Dam Fill	1293.6	Sta. 0+110 m, 5 m D/S	night shift, mixed with dry material, repacked and passed
194	8-Jul-09	2361.0	2191.0	2233	7.8%	98.1%	Starter Dam Fill	1293.6	Sta. 0+85 m, 25 m D/S	night shift
195	8-Jul-09	2433.0	2227.0	2233	9.3%	99.7%	Starter Dam Fill	1293.6	Sta. 0+110 m, 10 m D/S	night shift
196	8-Jul-09	2475.0	2297.0	2233	7.8%	102.9%	Starter Dam Fill	1293.6	Sta. 0+110 m, 7 m D/S	night shift
197	8-Jul-09	2275.0	2130.0	2233	6.8%	95.4%	Starter Dam Fill	1293.6	Sta. 0+110 m, 5 m D/S	night shift
198	8-Jul-09	2429.0	2241.0	2233	8.4%	100.4%	Starter Dam Fill	1294.9	Sta. 0+200 m, 25 m U/S	night shift
199	8-Jul-09	2381.0	2180.0	2233	9.2%	97.6%	Starter Dam Fill	1294.9	Sta. 0+175 m, 15 m U/S	night shift
200	8-Jul-09	2448.0	2239.0	2233	9.3%	100.3%	Starter Dam Fill	1294.9	Sta. 0+135 m, 20 m U/S	night shift
201	8-Jul-09	2433.0	2271.0	2233	7.1%	101.7%	Starter Dam Fill	1294.9	Sta. 0+100 m, 25 m U/S	night shift
202	8-Jul-09	2346.0	2165.0	2233	8.4%	97.0%	Starter Dam Fill	1294.9	Sta. 0+63.5 m, 15 m U/S	night shift
203	9-Jul-09	2456.0	2234.0	2233	10.0%	100.0%	Starter Dam Fill	1294.9	Sta. 0+130 m, 25 m U/S	
204	9-Jul-09	2411.0	2203.0	2233	9.5%	98.7%	Starter Dam Fill	1294	Sta. 0+100, 20 m D/S	
205	9-Jul-09	2462.0	2240.0	2233	9.9%	100.3%	Starter Dam Fill	1294	Sta. 0+90, 10 m D/S	
206	10-Jul-09	2421.0	2237.0	2233	8.3%	100.2%	Starter Dam Fill	1305	Sta. 0+480, CL	
207	10-Jul-09	2388.0	2181.0	2233	9.4%	97.7%	Starter Dam Fill	1295.2	Sta. 0+180, 18 m U/S	
208	10-Jul-09	2455.0	2307.0	2233	7.7%	103.3%	Starter Dam Fill	1295.7	Sta. 0+150, 22 m U/S	
209	10-Jul-09	2304.0	2041.0	2233	12.6%	91.4%	Starter Dam Fill	1294.3	Sta. 0+170, 22 m D/S	night shift, mixed with dry material, repacked and retested
210	10-Jul-09	2258.0	2016.0	2233	12.0%	90.3%	Starter Dam Fill	1294.3	Sta. 0+170, 22 m D/S	night shift, mixed with dry material, repacked and retested
211	10-Jul-09	2540.0	2429.0	2233	4.6%	108.8%	Starter Dam Fill	1294.3	Sta. 0+150, 17 m D/S	night shift
212	10-Jul-09	2495.0	2340.0	2233	6.6%	104.8%	Starter Dam Fill	1294.3	Sta. 0+112.5, 22 m D/S	night shift
213	10-Jul-09	2472.0	2282.0	2233	8.3%	102.2%	Starter Dam Fill	1294.3	Sta. 0+080, 15 m D/S	night shift
214	10-Jul-09	2407.0	2290.0	2233	5.1%	102.6%	Starter Dam Fill	1296	Sta. 0+70, 15 m U/S	night shift
215	10-Jul-09	2446.0	2301.0	2233	6.3%	103.0%	Starter Dam Fill	1296	Sta. 0+87.5, 22 m U/S	night shift
216	10-Jul-09	2481.0	2363.0	2233	5.0%	105.8%	Starter Dam Fill	1296	Sta. 0+112.5, 12 m U/S	night shift
217	10-Jul-09	2400.0	2226.0	2233	7.8%	99.7%	Starter Dam Fill	1296	Sta. 0+150, 22 m U/S	night shift
218	10-Jul-09	2476.0	2320.0	2233	6.7%	103.9%	Starter Dam Fill	1296	Sta. 0+190, 20 m U/S	night shift
219	10-Jul-09	2382.0	2238.0	2233	5.5%	100.2%	Starter Dam Fill	1294.3	Sta. 0+170, 22 m D/S	night shift
220	10-Jul-09	2394.0	2231.0	2233	7.3%	99.9%	Starter Dam Fill	1302.6	Sta. 0+387.5, CL	night shift
221	10-Jul-09	2490.0	2299.0	2233	8.3%	103.0%	Starter Dam Fill	1301.2	Sta. 0+357.5, CL	night shift
222	10-Jul-09	2559.7	2430.3	2233	5.3%	108.8%	Starter Dam Fill	1299.3	Sta. 0+312.5, CL	night shift
223	10-Jul-09	2351.0	2215.0	2233	6.1%	99.2%	Starter Dam Fill	1295	Sta. 0+067.5, 8 m U/S	night shift
224	10-Jul-09	2433.0	2320.0	2233	4.9%	103.9%	Starter Dam Fill	1295	Sta. 0+087.5, 8 m D/S	night shift
225	10-Jul-09	2283.0	2152.0	2233	6.1%	96.4%	Starter Dam Fill	1295	Sta. 0+105, 5 m U/S	night shift
226	10-Jul-09	2459.0	2317.0	2233	6.1%	103.8%	Starter Dam Fill	1295	Sta. 0+120, CL	night shift
227	10-Jul-09	2421.0	2294.0	2233	5.5%	102.7%	Starter Dam Fill	1295	Sta. 0+190, 7 m D/S	night shift
228	10-Jul-09	2292.0	2137.0	2233	7.2%	95.7%	Starter Dam Fill	1294.6	Sta. 0+187.5, 22 m D/S	night shift
229	10-Jul-09	2440.0	2266.0	2233	7.7%	101.5%	Starter Dam Fill	1294.6	Sta. 0+162.5, 7 m D/S	night shift
230	10-Jul-09	2390.0	2202.0	2233	8.6%	98.6%	Starter Dam Fill	1294.6	Sta. 0+125, 15 m D/S	night shift
231	10-Jul-09	2513.0	2327.0	2233	8.0%	104.2%	Starter Dam Fill	1294.6	Sta. 0+095, 7 m D/S	night shift
232	10-Jul-09	2561.0	2381.0	2233	7.5%	106.6%	Starter Dam Fill	1294.6	Sta. 0+072.5, 22 m D/S	night shift
233	11-Jul-09	2551.7	2374.3	2354	7.5%	100.9%	Starter Dam Fill	1296.4	Sta. 0+120, 20 m U/S	

Ta ble IV-1 General Dam Fill - Field Density Tests

Test No.	Date	Wet Density (kg/m³)	Dry Density (kg/m³)	Std. Proctor Density (kg/m³)	Moisture Content	% Std. Proctor	Area	Elevation (m)	Location	Comments
234	11-Jul-09	2546.5	2359.0	2354	8.0%	100.2%	Starter Dam Fill	1296.4	Sta. 0+100, 18 m U/S	
235	11-Jul-09	2460.8	2331.0	2354	5.6%	98.7%	Starter Dam Fill	1295.3	Sta. 0+185, 16 m D/S	
236	11-Jul-09	2382.3	2256.0	2354	5.6%	95.8%	Starter Dam Fill	1295.1	Sta. 0+160, CL	
237	11-Jul-09	2453.1	2323.0	2354	5.6%	98.7%	Starter Dam Fill	1297	Sta. 0+040, 21 m D/S	
238	11-Jul-09	2432.0	2340.0	2354	5.5%	99.4%	Starter Dam Fill	1300	Sta. 0+312.5, 9 m U/S	night shift
239	11-Jul-09	2316.0	2213.0	2312	4.7%	95.7%	Starter Dam Fill	1302.2	Sta. 0+375, 6.5 m U/S	night shift
240	11-Jul-09	2437.0	2271.0	2271	7.3%	100.0%	Starter Dam Fill	1296.7	Sta. 0+205, 22 m U/S	night shift
241	11-Jul-09	2415.0	2247.0	2271	7.5%	98.9%	Starter Dam Fill	1296.7	Sta. 0+162.5, 5 m U/S	night shift
242	11-Jul-09	2424.0	2187.0	2271	9.9%	96.3%	Starter Dam Fill	1296.7	Sta. 0+125, 15 m U/S	night shift
243	11-Jul-09	2451.0	2266.0	2271	8.1%	99.8%	Starter Dam Fill	1296.7	Sta. 0+100, 5 m U/S	night shift
244	11-Jul-09	2331.0	2193.0	2271	6.3%	96.6%	Starter Dam Fill	1296.7	Sta. 0+65, 22 m U/S	night shift
245	12-Jul-09	2403.0	2221.7	2271	8.2%	97.8%	Starter Dam Fill	1295.6	Sta. 0+180, 22 m D/S	
246	12-Jul-09	2468.7	2241.3	2271	10.1%	98.7%	Starter Dam Fill	1295.7	Sta. 0+160, 10 m D/S	sample taken to confirm moisture in the lab
247	12-Jul-09	2411.0	2191.0	2271	10.1%	96.5%	Starter Dam Fill	1296	Sta. 0+200, 22 m D/S	night shift
248	12-Jul-09	2469.0	2265.0	2271	8.9%	99.7%	Starter Dam Fill	1296	Sta. 0+175, 5 m D/S	night shift
249	12-Jul-09	2398.0	2245.0	2271	6.8%	98.9%	Starter Dam Fill	1296	Sta. 0+137.5, 15 m D/S	night shift
250	12-Jul-09	2409.0	2203.0	2271	9.4%	97.0%	Starter Dam Fill	1296	Sta. 0+087.5, 5 m D/S	night shift
251	12-Jul-09	2326.0	2181.0	2271	6.7%	96.0%	Starter Dam Fill	1299.2	Sta. 0+050, 22 m D/S	night shift
252	13-Jul-09	2481.0	2322.7	2312	6.8%	100.5%	Starter Dam Fill	1296.5	Sta. 0+200, CL	
253	13-Jul-09	2389.0	2200.3	2354	8.4%	93.5%	Starter Dam Fill	1296.5	Sta. 0+170, 10 m D/S	
254	13-Jul-09	2460.0	2279.5	2312	7.9%	98.6%	Starter Dam Fill	1296.5	Sta. 0+130, 20 m D/S	
255	13-Jul-09	2427.0	2287.0	2271	6.1%	100.7%	Starter Dam Fill	1305.3	Sta. 0+464.5, 3 m U/S	night shift
256	13-Jul-09	2479.0	2297.0	2271	7.9%	101.1%	Starter Dam Fill	1303.6	Sta. 0+382.5, 4 m U/S	night shift
257	13-Jul-09	2346.0	2233.0	2271	5.0%	98.3%	Starter Dam Fill	1300	Sta. 0+300, 7 m U/S	night shift
258	13-Jul-09	2116.0	1968.0	2271	7.5%	86.7%	Starter Dam Fill	1297	Sta. 0+125, 15 m D/S	night shift, retested after 2 more passes
259	13-Jul-09	2203.0	2063.0	2271	6.8%	90.8%	Starter Dam Fill	1297	Sta. 0+125, 15 m D/S	night shift, retested after 2 more passes
260	13-Jul-09	2410.0	2294.0	2271	5.0%	101.0%	Starter Dam Fill	1298	Sta. 0+87.5, CL	night shift
261	13-Jul-09	2299.0	2100.0	2232	9.5%	94.1%	Starter Dam Fill	1299	Sta. 0+50, 15 m D/S	night shift, retested after 2 more passes
262	13-Jul-09	2331.0	2175.0	2232	7.2%	97.4%	Starter Dam Fill	1299	Sta. 0+50, 15 m D/S	night shift
263	13-Jul-09	2338.0	2169.0	2232	6.8%	97.2%	Starter Dam Fill	1297	Sta. 0+125, 15 m D/S	night shift
264	13-Jul-09	2335.0	2129.0	2232	9.7%	95.4%	Starter Dam Fill	1297	Sta. 0+100, 15 m D/S	night shift
265	13-Jul-09	2441.0	2325.0	2271	5.0%	102.4%	Starter Dam Fill	1298	Sta. 0+187.5, 22 m U/S	night shift
266	13-Jul-09	2583.0	2457.0	2354	5.2%	104.4%	Starter Dam Fill	1298	Sta. 0+150, 5 m U/S	night shift
267	13-Jul-09	2395.0	2291.0	2271	4.5%	100.9%	Starter Dam Fill	1298.2	Sta. 0+112.5, 15 m U/S	night shift
268	13-Jul-09	2440.0	2214.0	2271	10.2%	97.5%	Starter Dam Fill	1298.2	Sta. 0+100, 15 m U/S	night shift
269	13-Jul-09	2340.0	2187.0	2271	7.0%	96.3%	Starter Dam Fill	1299.5	Sta. 0+62.5, 20 m U/S	night shift
270	13-Jul-09	2521.0	2364.0	2271	6.6%	104.1%	Starter Dam Fill	1297.5	Sta. 0+200, 22 m D/S	night shift
271	13-Jul-09	2367.0	2222.0	2271	6.5%	97.8%	Starter Dam Fill	1297.5	Sta. 0+155, 5 m D/S	night shift
272	13-Jul-09	2483.0	2296.0	2271	8.1%	101.1%	Starter Dam Fill	1297.5	Sta. 0+110, 15 m D/S	night shift
273	13-Jul-09	2332.0	2110.0	2271	10.5%	92.9%	Starter Dam Fill	1298.5	Sta. 0+75, 22 m D/S	night shift, retested
274	13-Jul-09	2409.0	2236.0	2271	7.7%	98.5%	Starter Dam Fill	1298.5	Sta. 0+75, 22 m D/S	night shift
275	13-Jul-09	2426.0	2253.0	2271	7.7%	99.2%	Starter Dam Fill	1299.7	Sta. 0+45, 5 m D/S	night shift
276	14-Jul-09	2408.3	2216.3	2271	8.6%	97.6%	Starter Dam Fill	1304.9	Sta. 0+450, 2 m D/S	
277	14-Jul-09	2447.0	2252.0	2354	8.7%	95.7%	Starter Dam Fill	1297.9	Sta. 0+110, 10 m D/S	night shift
278	14-Jul-09	2418.0	2289.0	2354	5.7%	97.2%	Starter Dam Fill	1299.9	Sta. 0+075, 4 m U/S	night shift
279	14-Jul-09	2362.0	2344.0	2312	5.0%	101.4%	Starter Dam Fill	1298.2	Sta. 0+225, 10 m U/S	night shift
280	14-Jul-09	2505.0	2356.0	2312	6.3%	101.9%	Starter Dam Fill	1298.6	Sta. 0+162.5, 15 m U/S	night shift
281	14-Jul-09	2499.0	2336.0	2312	7.0%	101.0%	Starter Dam Fill	1298.9	Sta. 0+125, CL	night shift
282	14-Jul-09	2289.0	2073.0	2312	10.4%	89.7%	Starter Dam Fill	1299.5	Sta. 0+095, 5 m U/S	night shift, retested after 2 more passes
283	14-Jul-09	2440.0	2245.0	2312	8.7%	97.1%	Starter Dam Fill	1300.3	Sta. 0+075, 5 m U/S	night shift
284	14-Jul-09	2325.0	2114.0	2312	10.0%	91.4%	Starter Dam Fill	1301.2	Sta. 0+037.5, 18 m U/S	night shift, retested after 2 more passes
285	14-Jul-09	2393.0	2176.0	2271	9.9%	95.8%	Starter Dam Fill	1301.2	Sta. 0+037.5, 18 m U/S	night shift
286	14-Jul-09	2401.0	2215.0	2312	8.4%	95.8%	Starter Dam Fill	1299.5	Sta. 0+095, 5 m U/S	night shift
287	14-Jul-09	2500.0	2313.0	2312	8.1%	100.0%	Starter Dam Fill	1298	Sta. 0+200, 18 m D/S	night shift
288	14-Jul-09	2330.0	2105.0	2312	10.7%	91.0%	Starter Dam Fill	1298	Sta. 0+190, 18 m D/S	night shift, retested at the same location
289	14-Jul-09	2432.0	2261.0	2312	7.6%	97.8%	Starter Dam Fill	1298	Sta. 0+190, 18 m D/S	night shift
290	14-Jul-09	2425.0	2255.0	2312	7.5%	97.5%	Starter Dam Fill	1298.2	Sta. 0+137.5, 10 m D/S	night shift
291	14-Jul-09	2496.0	2345.0	2312	6.5%	101.4%	Starter Dam Fill	1298.5	Sta. 0+087.5, 15 m D/S	night shift
292	14-Jul-09	2395.0	2371.0	2312	5.2%	102.6%	Starter Dam Fill	1300.6	Sta. 0+050, 10 m D/S	night shift
293	15-Jul-09	2540.7	2430.0	2354	6.6%	103.2%	Starter Dam Fill	1298.2	Sta. 0+150, 11 m D/S	retest
294	15-Jul-09	2604.7	2459.0	2354	5.9%	104.5%	Starter Dam Fill	1301	Sta. 0+045, 15 m D/S	retest
295	15-Jul-09	2489.0	2279.0	2354	9.2%	96.8%	Starter Dam Fill	1298.9	Sta. 0+172, 13 m U/S	night shift, retest
296	15-Jul-09	2481.0	2257.0	2354	9.9%	95.9%	Starter Dam Fill	1299.4	Sta. 0+150, 13 m U/S	night shift, retest
297	15-Jul-09	2454.0	2267.0	2354	8.3%	96.3%	Starter Dam Fill	1304.7	Sta. 0+425, 3 m D/S	night shift
298	15-Jul-09	2442.0	2256.0	2354	8.2%	95.8%	Starter Dam Fill	1304.4	Sta. 0+387.5, CL	night shift
299	15-Jul-09	2450.0	2271.0	2354	7.9%	96.5%	Starter Dam Fill	1302.7	Sta. 0+325, CL	night shift
300	15-Jul-09	2566.0	2376.0	2354	8.0%	100.9%	Starter Dam Fill	1298.2	Sta. 0+150, 18 m D/S	night shift, retest
301	15-Jul-09	2322.0	2110.0	2354	10.0%	89.6%	Starter Dam Fill	1300.1	Sta. 0+240, 10 m U/S	night shift, retested after 2 more passes
302	15-Jul-09	2281.0	2065.0	2354	10.4%	87.7%	Starter Dam Fill	1300.1	Sta. 0+240, 10 m U/S	night shift, retested after 2 more passes
303	15-Jul-09	2274.0	2081.0	2354	8.4%	88.4%	Starter Dam Fill	1299.5	Sta. 0+195, 13 m U/S	night shift, retested after 2 more passes
304	15-Jul-09	2370.0	2200.0	2312	7.7%	95.2%	Starter Dam Fill	1302	Sta. 0+045, 5 m U/S	night shift
305	15-Jul-09	2397.0	2205.0	2312	8.8%	95.4%	Starter Dam Fill	1301.3	Sta. 0+075, 12 m U/S	night shift
306	15-Jul-09	2426.0	2268.0	2312	7.0%	98.1%	Starter Dam Fill	1300.1	Sta. 0+090, 5 m U/S	night shift
307	15-Jul-09	2377.0	2167.0	2271	9.7%	95.4%	Starter Dam Fill	1300.1	Sta. 0+150, CL	night shift
308	15-Jul-09	2416.0	2199.0	2312	9.9%	95.1%	Starter Dam Fill	1300.1	Sta. 0+220, 13 m U/S	night shift
309	15-Jul-09	2338.0	2101.0	2312	11.3%	90.9%	Starter Dam Fill	1300.1	Sta. 0+240, 7 m U/S	night shift, mixed with dry material, repacked and retested
310	15-Jul-09	2382.0	2157.0	2312	10.5%	93.3%	Starter Dam Fill	1300.1	Sta. 0+240, 7 m U/S	night shift, mixed with dry material, repacked and retested

Ta ble IV-1 General Dam Fill - Field Density Tests

Test No.	Date	Wet Density (kg/m³)	Dry Density (kg/m³)	Std. Proctor Density (kg/m³)	Moisture Content	% Std. Proctor	Area	Elevation (m)	Location	Comments
311	15-Jul-09	2414.0	2248.0	2312	7.4%	97.2%	Starter Dam Fill	1300.1	Sta. 0+240, 7 m U/S	night shift
312	16-Jul-09	2418.3	2283.7	2312	5.9%	98.8%	Starter Dam Fill	1302.6	Sta. 0+030, 7 m U/S	
313	16-Jul-09	2342.7	2128.7	2271	10.1%	93.7%	Starter Dam Fill	1300	Sta. 0+115, 15 m D/S	
314	16-Jul-09	2488.0	2294.3	2312	8.5%	99.2%	Starter Dam Fill	1299.5	Sta. 0+140, 5 m D/S	
315	16-Jul-09	2366.0	2159.3	2312	9.6%	93.4%	Starter Dam Fill	1301.2	Sta. 0+280, 3 m U/S	scarified and recompacted after testing
316	16-Jul-09	2453.3	2310.3	2354	6.2%	98.1%	Starter Dam Fill	1300.4	Sta. 0+087.5, 11 m D/S	
317	16-Jul-09	2310.7	2193.0	2312	5.3%	94.9%	Starter Dam Fill	1301	Sta. 0+115, 13.2 m U/S	
318	16-Jul-09	2392.0	2224.0	2312	7.5%	96.2%	Starter Dam Fill	1300.4	Sta. 0+240, 13 m U/S	night shift
319	16-Jul-09	2358.0	2189.0	2312	7.7%	94.7%	Starter Dam Fill	1301.8	Sta. 0+300, 3 m U/S	night shift, more compaction after testing
320	16-Jul-09	2353.0	2158.0	2312	9.0%	93.3%	Starter Dam Fill	1303.4	Sta. 0+350, 2 m U/S	night shift, 2 more passes received after testing
321	16-Jul-09	2436.0	2283.0	2312	6.7%	98.7%	Starter Dam Fill	1305.1	Sta. 0+412.5, 1 m D/S	night shift
322	16-Jul-09	2361.0	2163.0	2271	9.2%	95.2%	Starter Dam Fill	1303.4	Sta. 0+350, 2 m U/S	night shift
323	16-Jul-09	2286.0	2132.0	2312	7.2%	92.2%	Starter Dam Fill	1299.6	Sta. 0+187.5, 12 m D/S	night shift, retested
324	16-Jul-09	2473.0	2301.0	2312	7.5%	99.5%	Starter Dam Fill	1299.8	Sta. 0+162.5, 2 m D/S	night shift
325	16-Jul-09	2278.0	2135.0	2312	6.7%	92.3%	Starter Dam Fill	1299.9	Sta. 0+125, 4 m D/S	night shift
326	16-Jul-09	2412.0	2241.0	2312	7.6%	96.9%	Starter Dam Fill	1299.9	Sta. 0+125, 4 m D/S	night shift
327	16-Jul-09	2609.0	2469.0	2354	5.7%	104.9%	Starter Dam Fill	1301	Sta. 0+075, 11 m D/S	night shift
328	16-Jul-09	2406.0	2240.0	2312	7.4%	96.9%	Starter Dam Fill	1302.5	Sta. 0+037.5, 5 m D/S	night shift
329	16-Jul-09	2294.0	2126.0	2312	7.9%	92.0%	Starter Dam Fill	1299.6	Sta. 0+187.5, 12 m D/S	night shift, 2 more passes received after testing
330	16-Jul-09	2454.0	2259.0	2312	8.6%	97.7%	Starter Dam Fill	1299.6	Sta. 0+187.5, 12 m D/S	night shift
331	16-Jul-09	2389.0	2201.0	2312	8.6%	95.2%	Starter Dam Fill	1306	Sta. 0+462, 2 m U/S	night shift
332	16-Jul-09	2442.0	2296.0	2312	6.4%	99.3%	Starter Dam Fill	1305	Sta. 0+425, 1 m D/S	night shift
333	16-Jul-09	2536.0	2370.0	2312	7.0%	102.5%	Starter Dam Fill	1304.4	Sta. 0+375, 5 m U/S	night shift
334	16-Jul-09	2446.0	2295.0	2312	6.6%	99.3%	Starter Dam Fill	1302.8	Sta. 0+312.5, 2 m U/S	night shift
335	17-Jul-09	2412.7	2244.7	2354	7.5%	95.4%	Starter Dam Fill	1300.5	Sta. 0+162.5, 11 m U/S	
336	17-Jul-09	2471.0	2311.5	2354	7.0%	98.2%	Starter Dam Fill	1301	Sta. 0+245, CL	
337	17-Jul-09	2463.7	2358.0	2354	4.5%	100.2%	Starter Dam Fill	1300.5	Sta. 0+225, 12.8 m D/S	
338	17-Jul-09	2572.7	2432.0	2354	4.9%	103.3%	Starter Dam Fill	1300.4	Sta. 0+150, 10 m D/S	
339	17-Jul-09	2540.0	2417.3	2354	5.1%	102.7%	Starter Dam Fill	1300.8	Sta. 0+113, 5 m D/S	
340	17-Jul-09	2403.0	2228.0	2312	7.8%	96.4%	Starter Dam Fill	1302.9	Sta. 0+037.5, CL	night shift
341	17-Jul-09	2582.0	2417.0	2354	6.8%	102.7%	Starter Dam Fill	1302.1	Sta. 0+062.5, 11 m U/S	night shift
342	17-Jul-09	2502.0	2366.0	2354	5.8%	100.5%	Starter Dam Fill	1302.1	Sta. 0+100, 10 m U/S	night shift
343	17-Jul-09	2561.0	2416.0	2354	6.0%	102.6%	Starter Dam Fill	1301.3	Sta. 0+137.5, 10 m U/S	night shift
344	17-Jul-09	2568.0	2447.0	2354	5.0%	104.0%	Starter Dam Fill	1300.8	Sta. 0+200, CL	night shift
345	17-Jul-09	2541.0	2379.0	2354	6.8%	101.1%	Starter Dam Fill	1303.1	Sta. 0+037.5, 8 m D/S	night shift
346	17-Jul-09	2519.0	2386.0	2354	5.6%	101.4%	Starter Dam Fill	1301.8	Sta. 0+075, 2 m D/S	night shift
347	17-Jul-09	2583.0	2434.0	2354	6.1%	103.4%	Starter Dam Fill	1301	Sta. 0+112.5, 5 m D/S	night shift
348	17-Jul-09	2516.0	2310.0	2354	8.9%	98.1%	Starter Dam Fill	1300.6	Sta. 0+162.5, 13 m D/S	night shift
349	17-Jul-09	2593.0	2462.0	2354	5.3%	104.6%	Starter Dam Fill	1300.4	Sta. 0+200, 3 m D/S	night shift
350	18-Jul-09	2572.7	2437.0	2354	5.6%	103.5%	Starter Dam Fill	1303.3	Sta. 0+313, CL	
351	18-Jul-09	2452.7	2265.7	2354	8.3%	96.2%	Starter Dam Fill	1302.8	Sta. 0+310, CL	
352	18-Jul-09	2411.0	2181.0	2354	10.5%	92.7%	Starter Dam Fill	1305.5	Sta. 0+362.5, 1 m D/S	night shift, too wet, to be remediated during day shift
353	18-Jul-09	2401.0	2168.0	2354	10.8%	92.1%	Starter Dam Fill	1305.2	Sta. 0+227.5, 1 m U/S	night shift, too wet, to be remediated during day shift
354	19-Jul-09	2377.0	2266.0	2354	7.7%	96.3%	Starter Dam Fill	1301.6	Sta. 0+088, 9m D/S	
355	19-Jul-09	2433.7	2273.3	2354	7.1%	96.6%	Starter Dam Fill	1303	Sta. 0+050, 7 m D/S	
356	19-Jul-09	2487.3	2319.3	2354	7.3%	98.5%	Starter Dam Fill	1302.5	Sta. 0+100, 7 m U/S	
357	19-Jul-09	2385.0	2177.0	2354	9.6%	92.5%	Starter Dam Fill	1303.7	Sta. 0+050, 4 m U/S	night shift, mixed with dry material, repacked and retested
358	19-Jul-09	2380.0	2160.0	2354	10.2%	91.8%	Starter Dam Fill	1303.2	Sta. 0+060, 5 m U/S	night shift, mixed with dry material, repacked and retested
359	19-Jul-09	2467.0	2241.0	2354	10.1%	95.2%	Starter Dam Fill	1302.5	Sta. 0+070, 2 m D/S	night shift, mixed with dry material, repacked and retested
360	19-Jul-09	2513.0	2325.0	2354	8.0%	98.8%	Starter Dam Fill	1306.1	Sta. 0+380, CL	night shift
361	19-Jul-09	2515.0	2325.0	2354	8.2%	98.8%	Starter Dam Fill	1306.1	Sta. 0+425, 2 m D/S	night shift
362	19-Jul-09	2411.0	2192.0	2354	10.0%	93.1%	Starter Dam Fill	1305	Sta. 0+337.5, 2 m D/S	night shift, mixed with dry material, repacked and retested
363	19-Jul-09	2429.0	2218.0	2354	9.5%	94.2%	Starter Dam Fill	1305	Sta. 0+335, 2 m D/S	night shift, mixed with dry material, repacked and retested
364	19-Jul-09	2537.0	2378.0	2354	6.7%	101.0%	Starter Dam Fill	1302	Sta. 0+187.5, 9 m U/S	night shift
365	19-Jul-09	2453.0	2271.0	2354	8.0%	96.5%	Starter Dam Fill	1302.2	Sta. 0+150, 5 m U/S	night shift
366	19-Jul-09	2513.0	2375.0	2354	5.8%	100.9%	Starter Dam Fill	1302.5	Sta. 0+100, 5 m U/S	night shift
367	19-Jul-09	2492.0	2311.0	2354	7.8%	98.2%	Starter Dam Fill	1302.7	Sta. 0+075, 2 m U/S	night shift
368	19-Jul-09	2501.0	2355.0	2354	6.2%	100.0%	Starter Dam Fill	1305.1	Sta. 0+015, 1 m D/S	night shift
369	19-Jul-09	2520.0	2354.0	2354	7.0%	100.0%	Starter Dam Fill	1304.6	Sta. 0+020, 3 m D/S	night shift
370	19-Jul-09	2552.0	2388.0	2354	6.9%	101.4%	Starter Dam Fill	1304	Sta. 0+045, 4 m D/S	night shift
371	19-Jul-09	2560.0	2376.0	2354	7.8%	100.9%	Starter Dam Fill	1302.9	Sta. 0+065, 4 m D/S	night shift
372	19-Jul-09	2593.0	2422.0	2354	7.1%	102.9%	Starter Dam Fill	1301.9	Sta. 0+137.5, 4 m D/S	night shift
373	19-Jul-09	2512.0	2358.0	2354	6.5%	100.2%	Starter Dam Fill	1301.9	Sta. 0+187.5, 4 m D/S	night shift
374	20-Jul-09	2479.0	2320.0	2354	6.9%	98.6%	Starter Dam Fill	1306.1	Sta. 0+437.5, 1.5 m D/S	night shift
375	20-Jul-09	2500.0	2328.0	2354	7.4%	98.9%	Starter Dam Fill	1306.1	Sta. 0+400, 1 m D/S	night shift
376	20-Jul-09	2553.0	2408.0	2354	6.0%	102.3%	Starter Dam Fill	1305.5	Sta. 0+350, 2 m D/S	night shift
377	20-Jul-09	2575.0	2376.0	2354	8.4%	100.9%	Starter Dam Fill	1304.2	Sta. 0+300, 3 m D/S	night shift
378	20-Jul-09	2574.0	2366.0	2354	8.8%	100.5%	Starter Dam Fill	1302.4	Sta. 0+200, 7 m D/S	night shift
379	20-Jul-09	2467.0	2305.0	2354	7.0%	97.9%	Starter Dam Fill	1302.6	Sta. 0+150, 8 m U/S	night shift
380	20-Jul-09	2484.0	2300.0	2354	8.0%	97.7%	Starter Dam Fill	1303	Sta. 0+100, CL	night shift
381	20-Jul-09	2524.0	2353.0	2354	7.3%	100.0%	Starter Dam Fill	1303	Sta. 0+075, 3 m U/S	night shift
382	20-Jul-09	2242.0	2011.0	2312	11.5%	87.0%	Starter Dam Fill	1305	Sta. 0+025, CL	night shift, to be remediated during day shift
383	20-Jul-09	2330.0	2091.0	2312	11.5%	90.4%	Starter Dam Fill	1305	Sta. 0+025, 1 m U/S	night shift, to be remediated during day shift
384	20-Jul-09	2263.0	2033.0	2312	11.3%	87.9%	Starter Dam Fill	1305.5	Sta. 0+012.5, CL	night shift, to be remediated during day shift
385	20-Jul-09	2532.0	2338.0	2354	8.3%	99.3%	Starter Dam Fill	1304.4	Sta. 0+050, 2 m U/S	night shift
386	21-Jul-09	2557.3	2413.3	2354	5.9%	102.5%	Starter Dam Fill	1303.8	Sta. 0+275, 7 m D/S	
387	21-Jul-09	2609.0	2441.0	2354	6.9%	103.7%	Starter Dam Fill	1304	Sta. 0+240, 2 m D/S	

Ta ble IV-1 General Dam Fill - Field Density Tests

Test No.	Date	Wet Density (kg/m³)	Dry Density (kg/m³)	Std. Proctor Density (kg/m³)	Moisture Content	% Std. Proctor	Area	Elevation (m)	Location	Comments
388	21-Jul-09	2419.7	2180.7	2271	11.0%	96.0%	Starter Dam Fill	1305.7	Sta. 0+012, 1 m U/S	
389	21-Jul-09	2513.5	2372.0	2312	6.0%	102.6%	Starter Dam Fill	1305	Sta. 0+040, 3 m D/S	
390	21-Jul-09	2533.3	2368.7	2354	7.0%	100.6%	Starter Dam Fill	1303.9	Sta. 0+090, 4 m D/S	Collected one point proctor
391	21-Jul-09	2506.0	2367.0	2379	5.9%	99.5%	Starter Dam Fill	1303.8	Sta 0+113, 2 m D/S	
392	21-Jul-09	2266.0	1974.0	2312	14.8%	85.4%	Starter Dam Fill	1305.3	Sta. 0+025, CL	night shift, mixed with dry material, repacked and retested
393	21-Jul-09	2498.0	2260.0	2312	10.5%	97.8%	Starter Dam Fill	1305.7	Sta. 0+013, 1 m U/S	night shift, mixed with dry material, repacked and retested
394	21-Jul-09	2436.0	2237.0	2312	8.9%	96.8%	Starter Dam Fill	1305.3	Sta. 0+025, CL	night shift
395	21-Jul-09	2469.0	2271.0	2312	8.7%	98.2%	Starter Dam Fill	1305.7	Sta. 0+013, 1 m U/S	night shift
396	21-Jul-09	2456.0	2269.0	2312	8.3%	98.1%	Starter Dam Fill	1303	Sta. 0+200, 3 m D/S	night shift
397	21-Jul-09	2380.0	2190.0	2312	8.7%	94.7%	Starter Dam Fill	1304	Sta. 0+150, 2 m D/S	night shift, mixed with dry material, repacked and retested
398	21-Jul-09	2360.0	2157.0	2312	9.4%	93.3%	Starter Dam Fill	1304	Sta. 0+150, 2 m D/S	night shift, mixed with dry material, repacked and retested
399	21-Jul-09	2423.0	2202.0	2312	10.0%	95.2%	Starter Dam Fill	1304	Sta. 0+112.5, 1 m D/S	night shift, mixed with dry material, repacked and retested
400	21-Jul-09	2494.0	2319.0	2354	7.6%	98.5%	Starter Dam Fill	1305.3	Sta. 0+045, 2 m D/S	night shift
401	21-Jul-09	2460.0	2295.0	2354	7.2%	97.5%	Starter Dam Fill	1305.3	Sta. 0+037.5, 1 m D/S	night shift
402	21-Jul-09	2457.0	2257.0	2354	8.9%	95.9%	Starter Dam Fill	1305.3	Sta. 0+055, 2 m U/S	night shift
403	21-Jul-09	2437.0	2256.0	2354	8.0%	95.8%	Starter Dam Fill	1305	Sta. 0+070, 1 m U/S	night shift
404	21-Jul-09	2508.0	2324.0	2354	7.9%	98.7%	Starter Dam Fill	1304	Sta. 0+112.5, 1 m D/S	night shift
405	22-Jul-09	2507.0	2394.0	2354	6.1%	101.7%	Starter Dam Fill	1305.5	Sta. 0+310, 3 m D/S	
406	22-Jul-09	2485.3	2333.0	2354	6.8%	99.1%	Starter Dam Fill	1305.1	Sta. 0+085, CL	
407	22-Jul-09	2458.3	2302.3	2354	6.8%	97.8%	Starter Dam Fill	1304.5	Sta. 0+240, 4 m D/S	
408	22-Jul-09	2436.7	2289.3	2354	6.4%	97.3%	Starter Dam Fill	1304.7	Sta. 0+190, 4 m D/S	
409	22-Jul-09	2591.0	2411.0	2354	7.5%	102.4%	Starter Dam Fill	1305.6	Sta. 0+025, CL	night shift
410	22-Jul-09	2481.0	2312.0	2354	7.3%	98.2%	Starter Dam Fill	1305.2	Sta. 0+050, 1 m D/S	night shift
411	22-Jul-09	2479.0	2322.0	2354	6.8%	98.6%	Starter Dam Fill	1305.1	Sta. 0+087.5, 2 m U/S	night shift
412	22-Jul-09	2376.0	2166.0	2271	9.7%	95.4%	Starter Dam Fill	1306.2	Sta. 0+400, 2 m U/S	night shift
413	22-Jul-09	2476.0	2324.0	2354	6.6%	98.7%	Starter Dam Fill	1306.2	Sta. 0+400, 2 m U/S	night shift
414	22-Jul-09	2502.0	2436.0	2354	6.0%	103.5%	Starter Dam Fill	1306.2	Sta. 0+350, 3 m D/S	night shift
415	22-Jul-09	2471.0	2299.0	2354	7.5%	97.7%	Starter Dam Fill	1305.6	Sta. 0+312.5, CL	night shift
416	22-Jul-09	2542.0	2365.0	2354	7.5%	100.5%	Starter Dam Fill	1304.8	Sta. 0+250, 1 m D/S	night shift
417	22-Jul-09	2439.0	2267.0	2354	7.6%	96.3%	Starter Dam Fill	1305	Sta. 0+212.5, 2 m D/S	night shift
418	22-Jul-09	2450.0	2285.0	2354	7.2%	97.1%	Starter Dam Fill	1305.9	Sta. 0+025, 1 m U/S	night shift
419	22-Jul-09	2461.0	2268.0	2354	8.5%	96.3%	Starter Dam Fill	1305.5	Sta. 0+050, 1 m D/S	night shift
420	22-Jul-09	2464.0	2277.0	2354	8.2%	96.7%	Starter Dam Fill	1305.5	Sta. 0+087.5, 1 m U/S	night shift
421	22-Jul-09	2456.0	2274.0	2354	8.0%	96.6%	Starter Dam Fill	1305.4	Sta. 0+125, 2 m D/S	night shift
422	22-Jul-09	2383.0	2196.0	2312	8.6%	95.0%	Starter Dam Fill	1305.3	Sta. 0+150, 2 m U/S	night shift
423	22-Jul-09	2395.0	2177.0	2271	10.0%	95.9%	Starter Dam Fill	1304.8	Sta. 0+175, 1 m D/S	night shift
424	22-Jul-09	2407.0	2201.0	2312	9.3%	95.2%	Starter Dam Fill	1304.8	Sta. 0+175, 1 m D/S	night shift
425	23-Jul-09	2434.0	2279.0	2354	6.8%	96.8%	Starter Dam Fill	1305.2	Sta. 0+105, 10 m D/S	
426	23-Jul-09	2545.0	2311.5	2354	10.1%	98.2%	Starter Dam Fill	1305.2	Sta. 0+300, 1 m U/S	
427	23-Jul-09	2494.0	2311.4	2354	7.9%	98.2%	Starter Dam Fill	1305.6	Sta. 0+370, 5 m U/S	
428	23-Jul-09	2500.0	2349.6	2354	6.4%	99.8%	Starter Dam Fill	1305.6	Sta. 0+70, 3 m U/S	
429	23-Jul-09	2468.0	2283.1	2354	8.1%	97.0%	Starter Dam Fill	1305.6	Sta. 0+125, 4 m D/S	
430	24-Jul-09	2494.0	2326.5	2354	7.2%	98.8%	Starter Dam Fill	1306.1	Sta. 0+280, 1 m D/S	
431	24-Jul-09	2578.0	2360.8	2354	9.2%	100.3%	Starter Dam Fill	1306.1	Sta. 0+350, 1 m D/S	
432	24-Jul-09	2636.0	2436.2	2354	8.2%	103.5%	Starter Dam Fill	1306.1	Sta. 0+450, 4 m U/S	
433	24-Jul-09	2492.0	2335.5	2354	6.7%	99.2%	Starter Dam Fill	1306.5	Sta. 0+50, 1 m D/S	
434	24-Jul-09	2498.0	2347.7	2354	6.4%	99.7%	Starter Dam Fill	1306.5	Sta. 0+200, 1 m U/S	
435	24-Jul-09	2567.0	2372.5	2354	8.2%	100.8%	Starter Dam Fill	1306.5	Sta. 0+450, 1 m D/S	

APPENDIX V

Geomembrane Construction Quality Assurance

- Geomembrane Lab QA Results
- Geomembrane Lab Seam Test Results
- Geomembrane Field Seam Test Results

August 18, 2009

Mail To:

Attn: Mr. Jeff Lam
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CANADA

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Bill To:

Attn: Mr. Nathaniel Laxten
YukonZinc Corporation
#701 - 475 Howe Street
Vancouver, B.C. V6C 2B3
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P.O. # : M100585

Dear Mr. Lam:

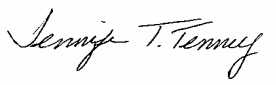
Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Wolverine Project - 190 KM NW Watson Lake**
TRI Job Reference Number:	E2333-37-01
Material(s) Tested:	2 Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,



Jennifer Tenney
Project Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax: 512 263 2558

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Khlon Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2333-37-01

	PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN
Sample ID:	**TSF Sample-1**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	13	12	13
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	12	12	12	13	12	12
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	16	15	16	16	16
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID:	**TSF Sample-2**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	13	13	13
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	13	13	12	12	13	12
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	15	15	15	15	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

GeosyntheticTesting.com
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August 20, 2009

Mail To:

Attn: Mr. Jeff Lam
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CC E-mail: nlaxten@yukonzinc.com

Bill To:

Attn: Mr. Nathaniel Laxten
YukonZinc Corporation
#701 - 475 Howe Street
Vancouver, B.C. V6C 2B3
CANADA

P.O. # : M100585

Dear Mr. Lam:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Wolverine Project - 190 KM NW Watson Lake**
TRI Job Reference Number:	E2333-43-02
Material(s) Tested:	3 Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax: 512 263 2558

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Khlon Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2333-43-02

	PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN
Sample ID:	**DS-3**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	14	12	12	13	13
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	12	13	12	13	13	12
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	15	16	15	15	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID:	**DS-4**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	14	13	14	13	13
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	14	13	13	13	12	13
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	15	15	16	16	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Khlon Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2333-43-02

	PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN
	Sample ID: **DS-5**						
	Weld: **Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	14	12	13	13	13	13
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	12	13	12	13	13	13
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	16	15	15	16	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

The testing is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

GeosyntheticTesting.com
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September 9, 2009

Mail To:

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CC E-mail: nlaxten@yukonzinc.com

Bill To:

Attn: Mr. Nathaniel Laxten
YukonZinc Corporation
#701 - 475 Howe Street
Vancouver, B.C. V6C 2B3
CANADA

P.O. # : M100585

Dear Mr. Lam:

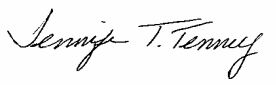
Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Wolverine Project - 190 KM NW Watson Lake**
TRI Job Reference Number:	E2333-85-08
Material(s) Tested:	4 Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,



Jennifer Tenney
Project Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax: 512 263 2558

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2333-85-08

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-6**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	12	13	*	13
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Peel B
Side B	Peel Strength (kN/m)	13	12	12	12	*	12
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Shear
	Shear Strength (kN/m)	15	15	15	15	*	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50		
Sample ID:	**DS-7**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	12	12	12	11	*	12
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Peel B
Side B	Peel Strength (kN/m)	12	11	13	12	*	12
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Shear
	Shear Strength (kN/m)	16	15	15	16	*	16
	Shear Elongation @ Break (%)	>50	>50	>50	>50		

*Note: Insufficient amount of material to test required number of specimens.

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TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2333-85-08

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-8**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	12	12	12	*	*	12
	Peel Incursion (%)	<10	<10	<10			
	Peel Locus of Failure Code	SE	SE	SE			
	Peel NSF Failure Code	FTB	FTB	FTB			
							Peel B
Side B	Peel Strength (kN/m)	13	13	12	*	*	13
	Peel Incursion (%)	<10	<10	<10			
	Peel Locus of Failure Code	SE	SE	SE			
	Peel NSF Failure Code	FTB	FTB	FTB			
							Shear
	Shear Strength (kN/m)	15	15	15	*	*	15
	Shear Elongation @ Break (%)	>50	>50	>50			
Sample ID:	**DS-9**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	14	13	13	13	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	12	12	13	11	12	12
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	16	16	16	16	16
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

*Note: Insufficient amount of material to test required number of specimens.

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September 3, 2009

Mail To:

Attn: Mr. Jeff Lam
Klohn Crippen Berger
105 Lodestar Lane
Whitehouse, YT Y1A 6E6
CANADA

E-mail: jlam@klohn.com
CC E-mail: llebedoff@yukonzinc.com
CC E-mail: nlaxten@yukonzinc.com

Bill To:

Attn: Mr. Nathaniel Laxten
YukonZinc Corporation
#701 - 475 Howe Street
Vancouver, B.C. V6C 2B3
CANADA

P.O. # : M100585

Dear Mr. Lam:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Wolverine Project - 190 KM NW Watson Lake**
TRI Job Reference Number:	E2333-77-10
Material(s) Tested:	6 Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2333-77-10

	PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN
Sample ID:	**DS-10**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	12	12	12	11	13	12
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	12	13	12	13	13	13
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	16	16	15	16	15	16
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID:	**DS-11**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	12	13	13
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	13	13	13	13	13	13
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10	
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	15	15	15	16	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2333-77-10

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-12**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	11	13	11	12	12	12
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	13	13	12	13	13	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	16	16	15	15	15	16
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID:	**DS-13**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	11	11	12	12	12	12
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	12	13	12	13	12	12
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	15	15	16	16	16
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2333-77-10

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-14**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	12	12	12	12	13	12
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	13	13	12	13	12	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	*	15	15	15	15	15
	Shear Elongation @ Break (%)	*	>50	>50	>50	>50	
	Note: Insufficient amount of material to test required number of specimens.						
Sample ID:	**DS-15**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	12	12	13	12	13	12
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	13	12	13	13	12	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	*	15	16	16	15	16
	Shear Elongation @ Break (%)	*	>50	>50	>50	>50	
	Note: Insufficient amount of material to test required number of specimens.						

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September 18, 2009

Mail To:

Attn: Mr. Jeff Lam
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Whitehouse, YT Y1A 6E6
CANADA

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CC E-mail: nlaxten@yukonzinc.com

Bill To:

Attn: Mr. Nathaniel Laxten
YukonZinc Corporation
#701 - 475 Howe Street
Vancouver, B.C. V6C 2B3
CANADA

P.O. # : M100585

Dear Mr. Lam:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Wolverine Project - 190 KM NW Watson Lake**
TRI Job Reference Number:	E2334-06-09
Material(s) Tested:	10 Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378.

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2334-06-09

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-16**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	14	14	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	13	12	11	12	13	12
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	16	16	15	15	16	16
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID:	**DS-17**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	13	*	13
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Peel B
Side B	Peel Strength (kN/m)	13	13	13	13	*	13
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Shear
	Shear Strength (kN/m)	15	15	15	*	*	15
	Shear Elongation @ Break (%)	>50	>50	>50			

*Note: Insufficient amount of material to test required number of specimens.

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2334-06-09

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-18**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	13	14	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	12	12	12	13	14	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	15	15	15	*	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50		
Sample ID:	**DS-19**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	14	13	13	13	14	14
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	13	13	13	13	12	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	15	15	15	15	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

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Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2334-06-09

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-20**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	12	14	13	12	*	13
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Peel B
Side B	Peel Strength (kN/m)	12	13	12	13	*	12
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Shear
	Shear Strength (kN/m)	15	15	15	15	*	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50		
Sample ID:	**DS-21**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	12	12	*	12
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Peel B
Side B	Peel Strength (kN/m)	12	13	12	11	*	12
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Shear
	Shear Strength (kN/m)	15	15	15	*	*	15
	Shear Elongation @ Break (%)	>50	>50	>50			

*Note: Insufficient amount of material to test required number of specimens.

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2334-06-09

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-22**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	*	*	13
	Peel Incursion (%)	<10	<10	<10			
	Peel Locus of Failure Code	SE	SE	SE			
	Peel NSF Failure Code	FTB	FTB	FTB			
							Peel B
Side B	Peel Strength (kN/m)	13	12	12	*	*	12
	Peel Incursion (%)	<10	<10	<10			
	Peel Locus of Failure Code	SE	SE	SE			
	Peel NSF Failure Code	FTB	FTB	FTB			
							Shear
	Shear Strength (kN/m)	15	15	15	*	*	15
	Shear Elongation @ Break (%)	>50	>50	>50			
Sample ID:	**DS-23**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	13	13	13
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Peel B
Side B	Peel Strength (kN/m)	12	12	11	13	12	12
	Peel Incursion (%)	<10	<10	<10	<10	<10	
	Peel Locus of Failure Code	SE	SE	SE	SE	SE	
	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
							Shear
	Shear Strength (kN/m)	15	15	15	15	15	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

*Note: Insufficient amount of material to test required number of specimens.

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DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Klohn Crippen Berger

Project: Wolverine Project - 190 KM NW Watson Lake

Material: 40 LLDPE

SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

TRI Log #: E2334-06-09

		TEST REPLICATE NUMBER					
PARAMETER		**1**	**2**	**3**	**4**	**5**	**MEAN**
Sample ID:	**DS-24**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	13	*	13
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Peel B
Side B	Peel Strength (kN/m)	13	13	13	12	*	13
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Shear
	Shear Strength (kN/m)	16	15	15	15	*	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50		
Sample ID:	**DS-25**						
Weld:	**Heat Fusion**						
							Peel A
Side A	Peel Strength (kN/m)	13	13	13	13	*	13
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Peel B
Side B	Peel Strength (kN/m)	12	12	12	12	*	12
	Peel Incursion (%)	<10	<10	<10	<10		
	Peel Locus of Failure Code	SE	SE	SE	SE		
	Peel NSF Failure Code	FTB	FTB	FTB	FTB		
							Shear
	Shear Strength (kN/m)	16	15	16	15	*	15
	Shear Elongation @ Break (%)	>50	>50	>50	>50		

*Note: Insufficient amount of material to test required number of specimens.

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August 19, 2009
August 25, 2009 Updating LTB Results

Mail To:

Mr. Jeff Lyon
Klohn Crippen Berger
105 Lodestar Lane
Whitehorse, YT
Y1A - 6E6

email: jlam@klohn.com
cc email: llebedoff@yukonzinc.com

Bill To:

Yukon Zinc Corp.
PO Box M100 424
190 km NW Watson Lake

Proj # M09234 A05
P.O. # 100585

Dear Mr. Lyon:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Wolverine Project**
TRI Job Reference Number:	E2333-31-04
Material(s) Tested:	2 Smooth 40 mil LLDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D 5994)
	Density (ASTM D 1505)
	Carbon Content (ASTM D 1603 mod.)
	Carbon Dispersion (ASTM D 5596)
	Tensile (ASTM D 638/GRI GM13)
	Puncture Strength (ASTM D 4833)
	Tear Resistance (ASTM D 1004)
Updating==>	Low Temperature Brittleness (ASTM D 746)

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

MPatel

Dr. Mansukh Patel
Sr. Laboratory Coordinator
Geosynthetic Services Division
www.GeosyntheticTesting.com

cc: Sam R. Allen, Vice President and Division Manager

GeosyntheticTesting.com
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GEOMEMBRANE TEST RESULTS

TRI Client: Klohn Crippen Berger
Project: Wolverine Project

Material: Smooth 40 mil LLDPE Geomembrane
Sample Identification: 8190527
TRI Log #: E2333-31-04

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5199)												
Thickness (mils)	40	39	40	39	39	39	39	40	41	40	**40**	1
											39	<< min
Density (ASTM D 1505)												
Density (g/cm3)	0.938	0.938	0.938								**0.938**	0.000
Carbon Black Content (ASTM D 1603 mod.)												
% Carbon Black	2.48	2.53									**2.51**	0.04
Carbon Black Dispersion (ASTM D 5596)												
Rating - 1st field view	1	1	1	1	1							
Rating - 2nd field view	1	1	1	1	1							
Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen)												
MD Yield Strength (ppi)	68	72	70	73	74						**71**	2
TD Yield Strength (ppi)	74	77	78	78	77						**77**	2
MD Break Strength (ppi)	199	202	178	190	186						**191**	10
TD Break Strength (ppi)	203	202	197	206	203						**202**	3
MD Yield Elongation (%)	22	22	22	22	22						**22**	0
TD Yield Elongation (%)	18	18	18	18	18						**18**	0
MD Break Elongation (%)	949	919	813	854	815						**870**	62
TD Break Elongation (%)	1124	1020	974	1044	1016						**1036**	55
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	92	91	90	90	91						**91**	1
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	30	33	32	29	38	29	30	28	28	29	**31**	3
TD Tear Strength (lbs)	30	29	30	28	29	29	29	26	27	28	**29**	1
Low Temperature Brittleness (ASTM D 746, NSF 54, -70C/)												
											% passing	
MD (Pass/Fail)	Pass	Pass	Pass	Pass	Pass						**100**	
TD (Pass/Fail)	Pass	Pass	Pass	Pass	Pass						**100**	

MD Machine Direction TD Transverse Direction

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GEOMEMBRANE TEST RESULTS

TRI Client: Klohn Crippen Berger
Project: Wolverine Project

Material: Smooth 40 mil LLDPE Geomembrane
Sample Identification: 8190528
TRI Log #: E2333-31-04

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.
	1	2	3	4	5	6	7	8	9	10		
Thickness (ASTM D 5199)												
Thickness (mils)	39	41	40	38	39	43	42	38	39	40	**40**	2
											38	<< min
Density (ASTM D 1505)												
Density (g/cm3)	0.937	0.937	0.937								**0.937**	0.000
Carbon Black Content (ASTM D 1603 mod.)												
% Carbon Black	2.56	2.53									**2.55**	0.02
Carbon Black Dispersion (ASTM D 5596)												
Rating - 1st field view	1	1	1	1	1							
Rating - 2nd field view	1	1	1	1	1							
Tensile Properties (ASTM D 638/GRI GM 13, 2 ipm strain rate, Type IV specimen)												
MD Yield Strength (ppi)	80	76	76	76	78						**77**	2
TD Yield Strength (ppi)	82	79	80	80	80						**80**	1
MD Break Strength (ppi)	166	181	198	196	195						**187**	14
TD Break Strength (ppi)	196	163	196	166	204						**185**	19
MD Yield Elongation (%)	21	21	21	21	21						**21**	0
TD Yield Elongation (%)	18	18	18	18	18						**18**	0
MD Break Elongation (%)	730	826	905	881	878						**844**	70
TD Break Elongation (%)	946	819	996	819	1105						**937**	122
Puncture Resistance (ASTM D 4833)												
Puncture Strength (lbs)	95	93	93	91	89						**92**	2
Tear Resistance (ASTM D 1004)												
MD Tear Strength (lbs)	29	29	29	30	29	29	30	30	32	30	**30**	1
TD Tear Strength (lbs)	26	31	29	27	29	28	27	30	30	29	**29**	2
Low Temperature Brittleness (ASTM D 746, NSF 54, -70C/)											**% passing**	
MD (Pass/Fail)	Pass	Pass	Pass	Pass	Pass						**100**	
TD (Pass/Fail)	Pass	Pass	Pass	Pass	Pass						**100**	

MD Machine Direction TD Transverse Direction

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ROCÉDURES DE SOUDURE

Soudure No.	Date jj / mm	Heure	Longueur* avant	Longueur* après	Essai No.	Soudeur
13	11/08	9:25	46.0		F1	E-W R.B.
3/6	"	11:00	53.0		"	E-W "
1/7	"	11:35	33.0		"	E-W "
6/8	"	12:00	59.0		"	E-W "
8/9	"	13:50	61.0		F3	"
9/10	"	14:21	63.0		F2	E-W J-S.G
11/7	"	14:40	11.5		F3	S-N R.B.
1/11	"	14:45	11.5		"	E-W "
12/11	"	15:53	8.5		"	"
13/7	"	15:30	24.0		"	"
12/17	"	16:30	6.5		"	"
17/16	"	16:05	7.0		"	"
16/15	"	16:00	6.5		"	"
15/14	"	15:55	7.0		"	"
14/18	"	16:17	7.0		"	"

404.5

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
11/08	9:47	9:51	A	30	29	COMPLETE EE-WE
11/08	11:15	11:18	A	30	29	INCOMPLETE AT RETEST EEOS 3m.
"	11:58	12:01	A	30	29	EE-WE COMPLETE
"	13:22	13:25	A	30	28	EE-WE COMPLETE
"	14:14	14:18	A	30	29	INCOMPLETE (PI) RETEST. →
"	14:47	14:50	A	30	29	EE-WE COMPLETE
"	15:14	15:17	A	30	29	EE-WE COMPLETE
"	15:12	15:15	A	30	28	EE-WE COMPLETE
"	16:02	16:05	A	30	28	INCOMPLETE AT EEOS RETEST 3M
"	15:49	15:52	A	30	28	INCOMPLETE RETEST. (EE-WE)
"	16:35	16:38	A	29	27	COMPLETE
"	16:17	16:20	A	29	27	INCOMPLETE PATCH EXT.
"	16:13	16:16	A	30	28	INCOMPLETE SE OK PATCH + (EXT) NE
"	16:22	16:25	A	30	29	SE-NE COMPLETE
"	16:28	16:31	A	28	26	SE-NE COMPLETE

Note: Longueur mesurée avant et après raccordement

ICÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
/19	11/08	16:25	7.0 /	F3	S-N R.B.
/20	"	16:35	8.0 /	"	"
/21	"	16:45	11.5 /	"	"
/2	"	16:53	11.5 /	"	"
/4	"	17:15	11.5 /	"	"
/5	"	17:20	11.5 /	"	"
/22	12/08	8:00	11.5 /	F5	S-N J-S.G
2/23	"	8:10	11.5 /	"	S-N J-S.G
/24	"	8:35	68.0 /	"	"
			/		
7/25	"	9:32	59.7 /	F5	WE-EE J-S.G.
/26	"	9:25	6.5 / T	"	S-N J-S.G
7/26	"	9:48	11.0 /	"	WE-EE J-S.G
6/27	"	9:40	11.0 /	F4	W-E R.B.
5/27	"	9:45	65.0 /	F5	W-E J-S.G

298.7

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
11/08	16:31	16:34	A	28	28	SE-NE COMPLETE
"	16:44	16:47	A	30	28	SE-NE "
"	16:55	16:58	A	28	27	SE-NE "
"	16:58	17:01	A	28	27	SE-NE "
"	17:07	17:10	A	28	27	COMPLETE SE-NE
"	17:11	17:14	A	30	29	SE-NE COMPLETE
12/08	8:31	8:34	A	28	26	COMPLETE SE-NE
"	8:37	8:40	A	30	28	INCOMPLETE PATCH + EX SE-NE
"	11:20	11:23	A	30	29	EE-WE COMPLETE
12/08	11:28	11:31	A	30	29	INCOMPLETE AT EEOS RET( )
"	10:47	10:51	A	30	29	SE-NE COMPLETE
"	10:53	10:56	A	30	29	COMPLETE WE-EE
"	11:15	11:18	A	30	28	WE-EE COMPLETE
"	11:48	12:01	A	30	28	INCOMPLETE WE-EE

Note: Longueur mesurée avant et après raccordement

CÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
7/28	12/08	10:00	80.0	F5	W-E J-S.G
3/29	"	10:28	57.0	"	"
8/30	"	11:28	24.0	"	"
0/31	"	11:55	24.0	F4	R.B.
9/31	"	12:05	61.0	"	"
1/32	"	13:15	88.0	F6	J-S.G
9/30	"	13:35	6.5 T	F7	S-N R.B.
3/33	"	13:40	11.5	"	R.B.
3/34	"	13:55	11.5	"	R.B.
4/35	"	14:08	11.5	"	R.B.
5/36	"	14:17	11.5	"	R.B.
6/37	"	14:25	11.5	"	R.B.
7/38	"	14:38	11.5	"	R.B.
8/39	"	14:45	11.5	"	R.B.
9/40	"	14:55	11.5	"	R.B.

132.5

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
12/08	8:35	8:38	A	30	29	INCOMPLETE WE-EE
"	16:44	16:47	A	30	28	INCOMPLETE WE-EE
"	8:13	8:16	A	30	29	EE-WE COMPLETE
"	8:17	8:20	A	30	29	SE EE-WE " COMPLETE
"	15:01	15:03	A	30	29	INCOMPLETE EE-WE
"	17:02	17:05	A	28	27	WE-EE COMPLETE
"	8:38	8:41	A	30	29	SE-NE PATCH +EX INCOMPLETE
"	15:09	15:12	A	30	28	SE-NE COMPLETE
"	15:13	15:16	A	30	29	SE-NE "
"	15:17	15:20	A	30	29	SE-NE "
"	15:20	15:23	A	30	29	SE-NE "
"	15:24	15:27	A	30	28	SE-NE "
"	15:28	15:31	A	30	28	SE-NE "
"	15:31	15:34	A	30	28	SE-NE "
"	15:33	15:36	A	30	29	SE-NE "

Note: Longueur mesurée avant et après raccordemen

ROCEDURES DE SOUDURE

Soudure No.	Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
40/41	12/08	15:22	11.5 /	F7	E-W R.B
41/42	"	15:33	10,0 /	"	E-W R.B.
42/43	"	15:46	10,5 /	"	E-W R.B.
42/43	13/08	8:40	/	F10	S-N J-S.G
			/		
45/45A	13/08	9:09	6.5 / T	F11	S-N R,B
44/45	"	9:10	58.5 /	F11	W-E R,B
45/45A	"	9:15	/	F10	W-E J-S.G
45/46	"	9:40	/	F11	W-E R.B.
45A/46	"	10:05	32.5 /	F11	W-E R-B.
46/47	"	10:35	82.0 /	F10	W-E J-S.G
47/48	14/08	11:00	83.0 /	F15	W-E R.B.
48/49	"	11:30	89.5 /	F15	W-E R.B.
49/50	"	12:40	45.0 /	F16	W-E R.B.
50/51	"	13:15	13.0 /	F16	SWET R.B.

42.0

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
12/08	15:39	15:42	A	30	29	EE-WE complete
"	15:42	15:45	A	30	28	EE-WE COMPLETE
"	16:06	16:09	A	30	29	EE-WE COMPLETE
13/08	-	-	-	-	-	EXTRUDED T-IN
13/08	11:46	11:49	B	30	29	EE-WE COMPLETE
"	15:56	15:59	A	30	30	INComplete EE-WE
13/08	11:37	11:40	A	30	29	INCOMPLETE EE-WE
"	16:05	16:08	A		30	WE-EE COMPLETE
13/08	13:30	13:33	A	30	29	EE-WE COMPLETE
"	17:47	17:50	A	30	30	EE-WE COMPLETE
14/08	16:35	16:38	A	32	30	INCOMPLETE WE-EE
"	16:47	16:50	A	30	30	INCOMPLETE WE-EE
15/08	8:34	8:37	A	30	29	WE-EE COMPLETE
"	13:20	13:23	A	30	29	WE-EE COMPLETE

Note: Longueur mesurée avant et après raccordemen

ROCÉDURES DE SOUDURE

Soudure No.	Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
1/52	14/08	15:10	16.0 /	F16	W-E R.B.
2/53	14/08	15:30	16.5 /	"	W-E R.B.
53/54	"	15:50	18.5 /	"	W-E R.B.
54/55	"	17:01	21.0 /	"	W-E R.B.
55/56	14/08	17:15	21.0 /	"	W-E R.B.
56/57	14/08	17:30	24.5 /	"	W-E R.B.
57/58	14/08	17:50	26.5 /	"	W-E R.B.
44/32	"	18:15	78.5 /	F16	W-E R.B.
44/43	"	18:50	13.0 /	F16	W-E R.B.
49/59	14/08	7:45	45.5 /	F15	W-E R.B.
50/59	"	8:00	6.5 /	F15	W-E R.B.
60/61	14/08	10:36	6.5 /	"	S-N R.B.
59/61	"	14:00	46.5 /	F16	W-E R.B.
61/50	"	14:20	30.0 /	F16	WE-EE R.B.
60/50	"	14:35	14.5 /	F16	W-E R.B.

385.0

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
15/09	12:11	12:14	A	29	27	COMPLETE WE-EE
"	12:01	12:04	A	30	29	INCOMPLETE WE-EE
"	11:56	11:59	A	30	28	INCOMPLETE WE-EE
15/09	11:29	11:32	A	30	28	INCOMPLETE WE-EE
15/09	11:25	11:28	A	30	28	WE-EE COMPLETE
"	11:22	11:25	A	30	28	WE-EE COMPLETE
"	10:50	10:53	A	30	29	WE-EE COMPLETE
"	10:50	10:53	A	30	29	WE-EE INCOMPLETE
"	10:48	10:51	A	30	28	COMPLETE WE-EE
15/08	9:29	9:32	A	30	29	INCOMPLETE WE-EE
"	9:14	9:17	A	30	30	INCOMPLETE WE-EE
"	9:53	9:56	A	30	29	COMPLETE
"	9:34	9:37	A	30	28	COMPLETE
"	9:44	9:47	A	30	30	COMPLETE
"	9:50	9:53	A	30	29	COMPLETE

Note: Longueur mesurée avant et après raccordement

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
61/62	14/08	10:20	77,5 /	F15	S-N R.B.
62/63	〃	11:00	18.5 /	〃	〃
63/64	〃	11:20	18.5 /	〃	〃
64/65	〃	11:33	20.0 /	〃	〃
65/66	〃	11:55	19.5 /	〃	〃
66/67	〃	12:46	19.5 /	F16	〃
67/68	〃	13:00	21.0 /	〃	〃
68/69	〃	13:25	24.0 /	〃	〃
69/70	〃	13:50	28.0 /	〃	〃
70/71	〃	14:25	29.5 /	〃	〃
70/71A	〃	14:25	/	〃	〃
71A/71	〃	14:13	/	〃	〃
71/72	〃	14:55	14.0 /	〃	〃
~~71/73~~	〃	15:00	~~17.0~~ /	〃	〃
72/73	〃	14:45	15.0 /	〃	〃

305,0

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
15/08	13:36	13:39	A	30	29	W-E COMPLET
〃	15:03	15:06	A	30	30	W-E COMPLETE
〃	15:06	15:09	A	30	30	〃
〃	8:32	8:35	A	30	29	〃
〃	8:34	8:37	A	30	28	〃
〃	8:38	8:41	A	30	28	〃
〃	8:41	8:44	A	30	28	〃
〃	8:42	8:45	A	30	28	〃
〃	8:41	8:47	A	30	29	INCOMPLET
〃	9:03	9:06	A	30	29	COMPLETE
〃	8:56	8:59	A	30	29	〃
〃	9:09	9:12	A	28	27	INCOMPLET AT INT 70-71 RET
〃	17:18	17:21	A	30	29	COMPLETE
~~〃~~						
〃	17:13	17:16	A	31	30	COMPLETE

Note: Longueur mesurée avant et après raccorder

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant	Longueur* après	Essai No.	Soudeur
73/~~71~~	14/08	15:~~00~~	~~3300~~	17	F16	R.B.
73/74	11	11			F16	11
74/75		16:45	13.0		F16	R.B.
74/76		11	17.0		11	11
75/76		16:25	13.0		11	11
76/77		17:05	36.0		11	11
78/78	15/08	8:09			F18	J-S.G
78/79	11	8:25	26.5			11
79/80	11	9:55	26.5			11
80/80	11		72.0			11
80/81	11	9:30	102.0		F17	R.B.
81/82	15/08	10:30	103.5		11	11
82/83	15/08	12:00	23.0		F18	J-S.G.

16-08 ? 439.0

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
75/05	15:12	15:15	A	28	26	INCOMPLETE AT NEGS RET (5M)
11	—	—	—	—	—	INCOMPLETE AT NEGS RET. + EXT.
	16:26	16:29	A	30	29	S-N COMPLETE
	16:00	16:03	A	30	28	S-N COMPLETE
	16:14	16:17	A	30	29	SE-NE COMPLETE
	15:59	16:02	A	30	29	SE-NE COMPLETE
15/08	10:58	11:01	A	30	28	WE-EE INCOMPLETE AT NEGS RET. PATCH
11	11:02	11:05	A	30	28	WE-EE COMPLETE
15/08	11:17	11:20	A	30	28	WE-EE COMPLETE
	11:25 11:17	11:28	A	30	30	WE-EE 11
	11:35	11:38	A	30	30	WE-EE COMPLETE
15/08	11:45	11:48	A	30	29	WE-EE COMPLETE
15/08	12:00	12:03	A	32	32	WE-EE COMPLETE

16/9

Note: Longueur mesurée avant et après raccordement

PROCÉDURES DE SOUDURE

Soudure No.	Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
83/84	15/08	9:00	6.5 / 1		WE - EE J-S.G
82/84	16/08		82.0 /		J.SG
83/85	16/08	11:03	23.0 /		J-S.G
84/85	15/08	12:00	82.0 /		J-S.G.
85/86	16/08.	14:00	41.0 /		R.B
86/87	15/08	14:15	/		WE-EE R.B
85/87	15/08	14:35	69.5 /		WE-EE R.B.
86/88	16/08	8:40	41.0 /		WE-EE RB
87/88	16/08	8:40	69.5 /		WE-EE R.B.
88/89	16/08	9:00	50.0 /		WE-EE J-S.G.
89/89A	10/08	9:30	63.5 /		J-S-G
88/89A	16/08	9:38	63.5 /		J-S.G.
89A/90	16/08	12:15	~~63.5~~ / 63.5		R.B.
89A/90	16/08	12:00	51.5 /		R.B.
90/92	16/08	14:55	126.0 /	F25	R.B

832.5

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
15/08	12:11	12:14	A	29	27	~~INCOMPLETE~~ ~~WE-SE RET~~
15/08	14:16	14:19	A	30	28	COMPLETE
15/08	12:11	12:14	A	29	27	
15/09	14:46	14:49	A	30	29.	WE-EE INCOMPLETE AT EEOS RET
16/08	11:42	11:45	A	30	29	WE-EE COMPLETE
16/08	11:07	11:10	A	30	29	EE-WE COMPLETE
16/08	11:45	11:48	A	30	30	WE-EE COMPLETE
16/08	11:31	11:34	A	30	29	EE-WE INCOMPLETE AT WEOS RET.
16/08	12:13	12:16	A	30	30	WE-EE INCOMPLETE AT EEOS RET
22/08	15:52	15:55	A	30	30	COMPLETE
16/08	13:47	13:50	A	29	27	COMPLETE.
16/08	14:05	14:08	A	30	28	COMPLETE
22/08	16:16	16:19	A	30	30	INCOMPLETE AT EEOS RET. (25M)
16/08	14:14	14:17	A	30	28	COMPLETE
22/08	16:47	16:50	A	30	28	COMPLETE

Note: Longueur mesurée avant et après raccordeme

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant	Longueur* après	Essai No.	Soudeur
2/91	18/08	8:40	61.5			R.B.
1/93	19/08	12:05	42.0			WE-EE R.B
3/92	"	12:35	50.0			~~WE~~-EE R.B
2/94	"	12:25	83.0			WE-EE R.B
3/95	"	15:00	101.5			WE-EE R.B
3/94	"	9:20	61.5			NE-SE J-S.G.
4/97	"	15:10	46.5			WE-EE R-B.
5/97	"	14:45	61.5			NE-SE J-S.G.
5/98	"	14:55	142.0			NE-EE J-S.G
2/98	"	15:10	46.5			WE-EE J-S.G
8/99	"	17:00	187.5			WE-EE R.B
5/95	"	15:15	36.5			R.B.
1/100	"	17:15	44.5			WE-EE J-S.G
0/101	20/08	15:50	61.5	T		SE-NE R.B
1/101	"	16:07				WE-EE RB

94 → 95 test 8/16:10 un liner Req.D

19/08

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
17/08	8:52	8:55	A	30	29	T COMPLETE
19/08	12:31	12:34	A	30	29	INCOMPLETE EX. FROM (
22/08	17:15	17:18	A	30	28	INCOMPLETE EXT. WELDS TO INT 91-92-93 (x2)
19/08	14:49	14:52	A	30	28	INCOMPLETE WE-EE RETEST
19/08	15:32	15:35	A	30	30	WE-EE-WE COMPLETE
19/08	14:42	14:45	A	28	26	T NE-SE COMPLETE
22/08	17:54	17:57	A	30	29	complete
19/08	15:07	15:10	A	30	29	T NE-SE complete
23/08	17:08	17:11	A	30	29	INCOMPLETE AT WELDS RET. EE/WE
22/08	18:29	18:32	A	30	29	~~WE-EE~~ INCOMPLETE AT ~~EE~~ WELDS RET (12)
23/08	~~17:54~~ 17:51	~~17:57~~ 17:25	A	30	28	WE-EE INCOMPLETE RET
20/08	16:56 ~~8:31~~	16:59 ~~8:34~~	A	30	29	~~EE-WE~~ COMPLETE
~~23~~/08	8:31	8:34	A	30	29	EE-WE COMPLETE
23/09	17:23	17:26	A	30	29	SE-NE complete
23/08	~~17:23~~	~~17:26~~	A	30	29	SE-WE complete

17:32 17:35 ~~A~~ 3

Note: Longueur mesurée avant et après raccordemen

No.	Soudure Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
2/102	~~20/08~~				
~~1~~/102	"				
2/102	22/08	11:30	28.4	F35	SE-NE R.B.
2/103	"	11:54	28.7	"	SE-NE "
105	"	13:23	30.5	"	"
5/106	"	13:42	31.8	"	"
0/107	"	14:52	33.5	"	"
6/107	"	"	—	"	"
7/107	"	"	—	"	"
7/108	23/08	17:10	35.5	F	SE-NE R.B.
8/109	"	17:25	37.5	F	SE-NE R.B.
3/110	"	17:50	32.5	F	SE-NE R.B.
2/111	"	18:05	114.0	F	SE-NE R.B
~~1~~/112	"				
2/113	"	18:20	~~7~~4.0	F	EE-WE R.B

379.4

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
22/08	~~12:18~~ ~~14:18~~	~~12:21~~ ~~14:21~~	A	30	30	SE-NE 9+10+EX PATCH INCOMPLETE AT NE RET (3M)
"	12:20	11:23	A	30	30	SE-EE complete.
"	13:49	13:52	A	30	30	SE-EE Complete.
"	13:57	14:00	A	30	29	SE-EE Complete
"	14:35	14:38	A	30	29	INCOMPLETE RET (3 PATCHES) (SE-NE)
"	14:45	14:48	A	30	29	Complete
"	14:51	14:54	A	30	29	"
"	13:47	13:50	A	30	29	SE-NE "
"	13:51	13:54	A	30	28	SE-NE "
"	13:56	13:59	A	30	29	SE-NE "
"	14:01	14:04	A	30	30	SE-WE. "
"						
"	14:19	14:22	A	30	29	EE-WE COMPLETE

Note: Longueur mesurée avant et après raccordement

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
~~113~~ 114	22/08	18:35	10.0	F36	EE-WE R.B.
14/115	22/08	18:45	14.5	F36	EE-WE R.B
15/116	24/08	11:25	18.0	F37	EE-WE R.B.
16/117	11	11:40	21.0	11	EE-WE R.B.
17/118	11	11:55	25.5	11	~~WE-EE~~ EE-WE R.B
18/119	11	12:13	27.3	11	EE-WE R.B
18/119	11	11	—	11	EE-WE R.B
04/120	11	13:45	15.3	F38	EE-WE R.B
13/120		13:30	6.5 T	11	R.B.
04/109 ~~77~~	24/08	14:00	TIE IN	11	WE-EE R.B.
	108-107-106				
	105-~~103-102~~				
11/105	-103-102	SAME		11	RB.
~~120~~					
20/95	11	14:52	6.5 T	F38	WE-EE R.B.
19/121	24/08	14:14	31.1	F39	J.S.G

176.5

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Délai des essais non-destructifs
23/08	14:14	14:17	A	30	29	COMPLETE
11	14:10	14:13	A	30	28	EE-WE INCOMPLETE EX: 2 m RET
24/08	11:42	11:45	A	30	29	INCOMPLETE EE-WE ATWEDS RET 1.5
11	11:50	11:53	A	30	28	EE-WE Complete
11	12:17	12:20	A	30	29	Complete
11	12:34	12:37	A	30	29	INCOMPLETE WE ATWEDS RET
11	13:31	13:34	A	30	30	↑ INCOMPLETE EE ATWEDS RET.
11	13:55	13:58	A	30	28	WE EE Complete
11	14:06	14:09	A	30	30	SE-NE Complete
11	14:57	15:00	A	30	28	INCOMPLETE EE WE
11	15:90	15:93	A	30	29	EE-WE complete
11	15:47	15:50	A	30	28	EE-WE-EE Complete
11	16:08	16:11	A	30	29	EE-WE Complete

Note: Longueur mesurée avant et après raccordemen

ÉDURES DE SOUDURE

Soudure No.	Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
/122	24/08	14:50	34.5	F39	J-S-G
/123	"	16:13	5.6	"	"
/124	"		~~5~~6.5 T	"	SE-NE "
E-N	"	16:20		F38	SE-NE R.B.
~~2-113 114~~ 7-116-115-114-113				"	"
9-110-111					
EIN /112-113	"	"		F38	SE-NE R.B.
2/125	"	17:10	6.5 T	F39	J-S.G
2-~~125~~ 95	"	17:20		F39	EE-WE J.-S.G.
3-124 2-125	"	17:25	6.5 T	"	"
8/124 ~~125~~	"	18:30	6.5 T	"	SE-NE S-J.G.
5/125	"	17.30		F39	EE-WE J-S.G.
24/125	"	17:40		F39	EE-WE J-S.G
22/124	"	17:45		"	EE-WE "
24/126	"	17:50	7:1	"	EE-WE JSG

6617

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
24/08	16:11	16:14	A	30	29	EE-WE complete
"	16:30	16:33	A	30	29	EE-WE complete
"	17:03	17:06	A	30	29	NE-SE complete
"	16:45	16:48	A	30	28	SE-NE incomplete RE
"	16:53	16:56	A	30	29	SE-NE EXAT complete ok
"	17:26	17:29	A	30	28	NE-SE complete
"	17:31	17:34	A	30	29	WE-EE complete
"	17:03	17:06	A	30	29	NE-SE complete
"	18:34	18:37	A	~~30~~ 29	2~~9~~6	SE-NE complete
"	17:37	17:40	A	30	29	EE-WE complete
"	17:44	17:47	A	30	28	EE-WE complete
"	17:51	17:54	A	30	29	EE-WE complete
"	18:04	18:07	A	30	29	EE-WE complete

Note: Longueur mesurée avant et après raccordemen

DURES DE SOUDURE

	Soudure Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
/126	24/08	17:55	36.3 /	F39	J-S G.
0/100	11	18:10	6.5 / T	11	SE-NE 11
/25	11	18:35	6.5 / T	F39	SE-NE J-S.G.
/125	11	11	— / —	11	11
-IN	24/08	X	X	~~F38~~	~~R.B.~~
95	11 (24/08)	17:02	/	F38	A.B.
-119-	118 > 120 - 104 - 109	11	/	11	11
/127	26/08	8:50	192.5 /	F40	R.B.
/127	11	11	— / —	11	11
/129	11	10:30	6.5 / T	11	11
3/126	24/08	17:55	— / —	F39	J.S.G.
3/126	11	11	— / —	F39	EE-WE J-SG
3/126	11	11	— / —	11	11
0/131	11	11:55	6.5 / T	F42	R.B
2/133	11	14:00	/	F42	SE-NE
23/126	20/08	17:55		F39	J-F.G

TO RETEST. (254.8)

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
~~24~~ 26/08	10:58	11:01	A	30	29	EE-WE PATCH INCOMPLETE (2 mm 126)
11	18:18	18:21	A	30	29	SE-WE complete
11	18:47	18:50	A	30	30	SE-NE INCOMPLETE RET
11	18:50	18:53	A	30	29	SE-NE PATCH INCOMPLETE
26/08			A			
26/08	9:14	9:17	A	30	30	SE-NE incomplete Patch
11	9:20	9:23	A	30	29	SE-NE complete
11	17:44	17:47	A	30	29	WE-EE INCOMPLETE RET
11	18:10	18:13	A	30	30	WE-EE incomplete RET.
11	10:41	10:44	A	30	28	SE-NE complete
11	11:58	12:01	A	30	30	EE-WE PATCH incomplete
11	12:39	12:42	A	30	30	WE-EE PATCH INCOMPLETE
11	12:26	12:29	A	30	28	WE-EE INCOMPLETE PATCH
11	14:02	14:05	A	30	29	SE-NE complete
11	14:18	14:21	A	30	29	SE-NE complete

Note: Longueur mesurée avant et après raccordement

URES DE SOUDURE

Soudure Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
26/09	12:10	Small	F40	WE-EE RB
11	11		11	11
11	10:45		F40	WE-EE R.B
11	15:30	T	F43	SE-NE R.B
11	8:50		F40	R.B
11	8:50		F40	R.B.
11	9:20		11	11
11	11		11	11
27/08	8:45	T	F45	NE-SE J S G.
11	10:45		F40	WE-EE R.B
26/08	12:10		F40	WE-EE RB
11	10:00		F40	WE-EE R.B.
11	11:12		F40	11
26/08	12:20		F40	11
11	14:10		11	11

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
27/08	9:16	9:19	A	30	28	WE-EE PATCH INCOMPLETE
11						
27/08	9:01	9:04	A	30	29	WE-EE (RET) INCOMPLETE
26/08	17:18	17:21	A	30	29	NE-SE Complete
26/08	18:13	18:16	A	30	29	WE-EE RET INCOMPLETE
11	18:23	18:26	A	30	28	WE-EE RET. INCOMPLETE
11	18:48	18:51	A	30	28	WE-EE INCOMPLETE RET
11	12:03	12:06	A	30	30	WE-EE PATCH INCOMPLETE
27/08	8:47	8:50	A	30	29	NE-SE Complete
27/08	9:07	9:10	A	30	28	WE-EE PATCH INCOMPLETE
11	9:23	9:26	A	30	28	WE-EE PATCH INCOMPLETE
11	9:50	9:53	A	30	28	WE-EE RET INCOMPLETE
11	11:28	11:31	A	30	29	WE-EE PATCH RET INCOMPLETE
11	9:56	9:59	A	30	28	WE-EE Complete
	17:52	17:55	A			WE-EE

Note: Longueur mesurée avant et après raccordemen

DURES DE SOUDURE

Soudure			Longueur*		Essai	Soudeur
	Date jj / mm	Heure	avant	après	No.	
/31	26/08	12:25			F40	R.B
31	11	11			11	11
/31	26/08	11			11	11
/129	11	11:05			F40	R.B
/133	26/08	11			11	11
/33	11	11			11	11
/33	11	11			11	11
/133	11	11			11	11
3/138	11	1			11	11
/134	11	11			11	11
/134	11	11			4	11
/133	11	11			F40	R.B
/132	11	11			11	11
/133	11	11	6.5	T	11	11
/132	11	11			11	11

PROCÉDURES DE SOUDURE (suite)

Test	Heure du test		Type	Pression		Détail des essais
Date jj / mm	Début	Fin	Test	Début	Fin	non-destructifs
27/08	10:00	10:03	A	30	28	WE-EE PAT incomplete RET.
11	10:57	11:00	A	30	28	WE-EE RET incomplete
11	11:15	11:18	A	30	29	WE-EE PATCH incomplete
11	11:55	11:58	A	30	29	WE-EE incomplete
11	12:20	12:23	A	30	29	WE-EE incompleteRET
11	12:23	12:26	A	30	29	WE-EE PATCH incomplete
11	12:31	12:34	A	30	29	WE-EE RET, incomplete
11	13:46	13:49	A	30	29	WE-EE incomplete RET.
11	12:21	12:34	A	30	29	WE-EE incomplete
11	12:45	12:48	A	30	28	WE-EE RET. incomplete
11	12:52	12:53	A	30	29	EE-WE PATCH incomplete
11	13:49	13:52	A	30	30	EE-WE PATCH incomplete
11	14:00	14:03	A	30	29	WE-EE RET incomplete
11	14:48	14:51	A	30	29	SE-NE complete
11	16:07	16:10	A	30	29	EE-WE incomplete

Note: Longueur mesurée avant et après raccordemen

CÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
/134	26/08				
2/134	11				
4/135	26/08	15:30	6.5 T		R.B.
/135	11	16:15			R.B.
/136	11	18:10			R.B.
7/140	27/08	8:14	6.5 T		J-S-G
/137	11	8:40			S.J.
1/141	11	9:00			J-S.G.
/143	11	10:22	6.5 T		J-S.G
/143	11	10:58			J-S.G
/136	11	9:00			WE-EE J-S.G.
/136	11	11			11
/136	11	11			11
/143	11				
/140	11	9:00			WE-EE J-S.G
4/136	26/08	(134-136)		F43	R.B

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
27/08	14:15	14:18	A	30	29	EE-WE RET. incomplete
11	14:19	14:22	A	30	29	WE-EE PATCH incomplete
26/08	17:18	17:21	A	30	29	NE-SE complete
27/08	14:27	14:30	A	30	29	EE-WE complete
27/07	14:30	14:33	A	30	29	EE-WE complete
27/07	8:47	8:50	A	30	29	NE-SE complete
11	14:46	14:49	A	30	29	EE-WE complete
11	14:59	15:02	A	30	29	EE-WE complete
11	15:02	15:05	A	30	28	NE-SE complete
11	15:07	15:10	A	30	28	WE-EE PATCH incomplete
11	15:24	15:27	A	30	29	WE-EE RET. incomplete
11	15:30	15:33	A	30	30	WE-EE RET incomplete
11	16:14	16:17	A	30	29	WE-EE RET. incomplete
11	16:18	16:21	A	30	28	
11	16:33	16:36	A	30	28	WE-EE RET. incomplete
11	9:01	9:04	A	30	29	WE-EE complete

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
136/140	27/08				
140/143	11				
136/140	11				
38/134	11		6.5 / T		
34/139	11				
136/139	26/08	17H35	6.5 / T		NE-SE R.B
142/140	27/08	9h35	6.5 / T		NE-SE J.S.G
140/136	11	9:45			WE-EE J-SG
139/142	11	9:46			WE-EE J SG
138/139	26/08				
38/139	11				
139/142	27/08	9			
142/143	27/06				
142/143	11				
139/136	11	17:35			NE-SE ~~17~~: RB

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
27/06	17:08	17:11	A	30	29	WE-EE RET. incomplete
11	17:14	17:17	A	30	29	WE-EE PATCH incomplete.
28/08	9:16	9:19	A	30	29	EE-WE PATCH. incomplete
27/08	17:33	17:36	A	30	30	SE-NE EX. incomplete
11	17:37	17:40	A	30	30	EE-WE complete
11	17:39	17:42	A	30	29	NE-SE complete
11	17:43	17:46	A	29	26	NE-SE complete
11	—					WE-SE EXT. Inete.
11	18:03	18:06	A	30	29	WE-SE complete
11	17:49	17:52	A	30	28	WE-EE EX RET. incomplete
11	17:54	17:57	A	30	29	WE-EE PATCH INCOMPLETE.
11	18:07	18:10	A	30	29	WE-EE incomplete (EXT ~~EE~~)
11	18:12	18:15	A	30	29	WE-EE EXT incomplete.
11	17:39	17:42	A	30	29	NE-SE complete

ıURES DE SOUDURE

Soudure			Longueur*		Essai	Soudeur
	Date jj / mm	Heure	avant	après	No.	
45	27/08					WE-EE S. J.
7	27/08					WE-EE J-S.G
17	"					WE-EE J-S. G
7	"					"
17	"					"
7	"					"
47	"					"
47	"					"
147	"					"
147	"					"
147	"	15:25	6.5	T		J-S.G
146	"					
145	"	14:35	6.5	T		

PROCÉDURES DE SOUDURE (suite)

Test	Heure du test		Type	Pression		Détail des essais
Date jj / mm	Début	Fin	Test	Début	Fin	non-destructifs
28/08	9:33	9:36	A	30	29	WE-EE RET incomplete
28/08	9:41	9:44	A	30	28	WE-EE RET, incomplete
"	9:45	9:48	A	30	28	WE-EE RET incomplete
"	9:54	9:57	A	30	28	EE-WE RET incomplete.
"	9:59	10:02	A	30	29	WE-EE RET. incomplete.
"	10:01	10:04	A	30	28	EE-WE RET incomplete
"	10:05	10:08	A	30	29	EE-WE RET, incomplete
"	10:09	10:12	A	30	29	WE-EE RET incomplete
"	10:56	10:59	A	30	29	WE-EE RET incomplete.
"	11:04	11:07	A	30	28	WE-EE PATCH incomplete
"	11:12	11:15	A	30	29	NE-SE complete.
"	11:19	11:22	A	30	28	WE-EE PATCH incomplete
"	11:23	11:26	A	30	29	SE-NE complete

ES DE SOUDURE

	Soudure Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
2	27/08			F45	WE-EE J.S.G.
4	"	11:55		F45	WE-EE J-S.G
5	"			"	WE-EE J-S.G
5	"			"	WE-EE J-S.G
45	"			"	WE-EE J-S.G
49	28/08			F48	WE-EE J-S.G
49	"			"	J-S.G
49	"			"	"
149	"			"	WE-EE "
149	"			"	WE-EE J-S G
149	"			"	"
149	"			"	
149	"			"	"
149	"			"	"
149	"			"	"

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
28/08	11:30	11:33	A	30	28	WE-EE complete
"	11:42	11:45	A	30	28	WE-EE complete
"	11:50	11:53	A	30	29	EE-WE complete
"	11:55	11:58	A	30	28	WE-EE RET. incomplete
"	12:17	12:20	A	28	26	EE-WE PATCH incomplete
"	12:25	12:28	A	30	29	WE-EE PATCH incomplete
"	12:33	12:36	A	30	29	WE-EE RET incomplete
"	12:43	12:46	A	30	28	WE-EE RET incomplete
"	12:47	12:50	A	29	27	WE-EE RET incomplete
"	12:51	12:54	A	30	29	WE-EE RET. incomplete
"	14:01	14:04	A	30	30	EE-WE RET. incomplete
"	14:05	14:08	A	30	30	WE-EE RET incomplete
"	14:14	14:17	A	30	29	WE-EE RET. incomplete
"	14:15	14:18	A	30	30	WE-EE RET incomplete
"	14:27	14:30	A	30	29	EE-WE RET incomplete

ROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
17/149	28/08				WE-EE J-S G
7/149	11				11
7/149	11				11
7/148	11				11
8/149	11	8:50	6.5 / T		SE-EE 11
46/148	11	9:00			SE-EE 11
5/148	11				11
6/149	11				11
6/148	11	10:30			11
48/150	11	11:43			WE-EE J-S.G
48/150	11	~~11:43~~			WE-EE.
48/150	11	11:43			11
8/150	11	11			11
8/150	11				11
49/151	11				11

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
28/08	14:30	14:33	A	30	29	EE-WE RET. INCOMPLETE
11	14:34	14:37	A	30	30	EE-WE RET INCOMPLETE
11	14:36	14:39	A	30	28	EE-WE RET INCOMPLETE.
11	14:43	14:46	A	30	28	EE-WE PATCH INCOMPLETE
11	14:39	14:42	A	30	28	WE-SE COMPLETE
11	14:47	14:50	A	30	28	EE-WE RET INCOMPLETE
11	14:51	14:54	A	30	29	EE-WE RET INCOMPLETE.
11	14:55	14:58	A	30	29	EE-WE RET INCOMPLETE
11	14:59	15:02	A	30	29	EE-WE PATCH INCOMPLETE
11	15:02	15:05	A	29	26	~~WE~~ EE-WE RET. INCOMPLETE
11	15:09	15:12	A	30	29	WE-EE RET, INCOMPLETE
11	15:51	15:54	A	30	29	WE-EE RET INCOMPLETE
11	15:55	15:58	A	30	30	WE-EE RET INCOMPLETE.
11	15:59	16:02	A	30	28	WE-EE COMPLETE
11	16:05	16:08	A	30	30	WE-EE COMPLETE

CÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant	Longueur* après	Essai No.	Soudeur
50/151	28/08		6.5	T	F49	SE-NE J-S G
51/152	11		6.5	T	11	SE-NE 11
9/152	11				11	WE-EE 11
9/152	11				11	WE-EE 11
9/152	11				11	WE-EE 11
9/152	11				F49	WE-EE J-S.G
53/154	11	16:15			11	EE-WE J-S.G
54/155	11	16:35			11	11
55/156	11	17:20			11	11
56/157	11				11	11
50/158	29/08	8:35			F51	WE-EE J-S.G
50/159	11	9:00	6.5	T	F50	NE-EE S. J.
51/158	11	9:05			F51	WE-EE J-S.G
52/158	11	9:10			F51	11

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
28/08	16:09	16:12	A	30	28	NE-SE complete
11	16:13	16:16	A	30	28	NE-SE complete
11	16:16	16:19	A	30	30	WE-EE RET incomplete
11	16:21	16:24	A	30	29	WE-EE RET incomplete
11	16:28	16:31	A	29	27	WE-EE PATCH incomplete
						WE-EE
11	16:41	16:44	A	30	30	WE-EE PATCH incomplete
29/08						
11						
11						
11						
11	10:18	10:21	A	30	28	WE-EE complete
11	9:04	9:07	A	30	29	NE-SE complete
11	10:08	10:11	A	30	29	WE-EE complete
11	10:05	10:08	A	30	29	WE-EE Patch incomplete

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
152/159	29/08	9:30		F51	J-S.G.
152/159	〃	〃		〃	〃
52/158	〃	9:10		〃	WE-EE 〃
60/161	〃	11:10	6.5 / T	〃	SE-NE J-S.G
160/158	〃	9:35		F50	WE-EE S-J.
59/160	〃	〃		F50	WE-EE S.J
~~158~~/160	〃				
160/161	〃	11:10		F51	SE-NE J-S.G
60/162	〃	11:40		F50	WE-EE S.J
58/161	〃	10:45		F51	WE-EE J-S-G
58/161	〃	〃		〃	〃
61/162	〃	11:25		〃	J-S.G
61/162	〃	〃		〃	〃
160/162	〃	11:42		F50	WE-EE S.J.
160/162	〃	〃		F50	〃

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
29/08	9:37	9:40	A	30	29	WE-EE incomplete RET.
〃	9:48	9:51	A	30	29	~~WE-EE~~ - WE incomplete PATCH
〃	9:57	10:00	A	30	28	WE-EE RET incomplete
〃	11:32	11:35	A	30	29	SE-NE EXT incomplete
〃	11:19	11:22	A	30	28	WE-EE Complete
〃	11:09	11:12	A	30	28	WE-EE Complete
〃			A			~~WE-EE~~ PATCH
〃	~~11:27~~	11:30	A	30	28	SE-NE EXT incomplete
〃	12:13	12:16	A	30	30	EE-WE RET. incomplete
〃	11:48	11:51	A	30	29	WE-EE RET. incomplete
〃	11:53	11:56	A	30	29	WE-EE PATCH incomplete.
〃	12:04	12:07	A	30	29	WE-EE Patch. incomplete
〃	12:06	12:09	A	30	29	EE-WE ~~RET~~ incomplete
〃	12:21	12:24	A	30	29	
〃						

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
160/162	29/08	11:42		F50	WE-EE S.J
160/162	〃	〃		〃	〃
160/162	〃	〃		〃	〃
160/162	〃	〃		〃	〃
160/162	〃	〃		〃	〃
153/154	28/08	16:15		F49	EE-WE J-S-G
153/154	〃	〃		〃	〃
153/154	〃			〃	〃
154/155	〃	16:35		〃	〃
154/155	〃	〃		〃	〃
155/156	〃	17:20		〃	〃
155/156	〃	〃		〃	〃
156/157	〃	17:40		〃	〃
156/157	〃	〃		〃	〃
157/163	29/08	14:07		F52	〃

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
29/08	12:46	12:49	A	30	28	WE-EE RET INCOMPLETE
〃	12:49	12:52	A	30	29	WE-EE RET INCOMPLETE
〃	14:00	14:03	A	30	30	WE-EE RET INCOMPLETE
〃	14:07	14:10	A	30	29	EE-WE PATCH RET INCOMPLETE
〃	14:13	14:17	A	30	28	EE-WE PATCH INCOMPLETE
29/08	16:07	16:10	A	30	28	EE-WE RET INCOMPLETE
30/08	9:29	9:32	A	30	28	WE-EE RET INCOMPLETE
〃	9:35	9:38	A	30	30	EE-WE PATCH INCOMPLETE
29/08	16:25	16:28	A	30	30	EE-WE RET INCOMPLETE
〃	16:20	16:23	A	30	29	EE-WE Patch INCOMPLETE
〃	16:35	16:38	A	30	28	EE-WE RET. INCOMPLETE
30/08	9:47	9:50	A	30	29	WE-EE PATCH INCOMPLETE
29/08	16:42	16:45	A	30	28	EE-WE PATCH INCOMPLETE
〃	16:46	16:49	A	30	29	EE-WE RET INCOMPLETE.
〃	17:03	17:06	A	30	29	EE-WE RET INCOMPLETE.

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
157/163	29/08	14:07		F52	EE-WE J-S.G.
163/164	〃	14:25		〃	〃
163/164	〃	〃		〃	〃
164/165	〃	14:53		〃	〃
164/165	〃	〃		〃	〃
165/166	〃	15:35		〃	〃
165/166	〃	15:35		〃	〃
166/167	〃	15:56		〃	〃
166/167	〃	〃		〃	〃
164/165	29/08	14:53		〃	EE-WE J-S.G.
166/167	〃	15:56		〃	〃
168/169	30/08		6.5/T	F54	SE-NE J-S.G.
162/168	〃	9:40		〃	WE-EE J-S.G.
162/169	〃	10:45		〃	〃
170/171	〃	12:00		〃	NE-SE J-S.G.

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
30/08	9:55	9:58	A	30	28	WE-EE PATCH incomplete.
29/08	17:06	17:09	A	30	28	EE-WE RET. incomplete
30/08	10:04	10:07	A	30	29	WE-EE PATCH INCOMPLETE.
29/08	17:12	17:15	A	30	29	EE-WE RET incomplete
30/08	11:00	11:03	A	30	28	WE-EE RET. incomplete
29/08	17:17	17:20	A	30	29	EE-WE RET incomplete
〃	17:22	17:25	A	30	28	EE-WE PATCH incomplete
〃	17:28	17:31	A	30	29	EE-WE RET incomplete
〃	11:05	11:08	A	30	29	EE-WE PATCH incomplete
30/09	10:55	10:58	A	30	29	WE-EE PATCH INCOMPLETE
〃	11:10	11:13	A	30	29	WE-EE RET incomplete.
〃	11:22	11:25	A	30	29	NE-SE EXT. incomplete
〃	11:30	11:33	A	30	28	WE-EE complete
〃	11:58	12:01	A	30	28	EE-WE RET incomplete
〃	13:01	13:04	A	30	29	NE-SE Complete

ROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
162/169	30/08	10:45		F54	WE-EE J-J. G
162/169	"	"		"	"
162/169	"	"		"	"
162/169	"	"		"	"
169/171	"	[illegible]		"	"
169/171	"			"	"
169/171	"			"	"
169/170	"			"	"
169/170	"			F55	WE-EE J-J.G.
168/170	"	13:00		"	WE-EE J-J. G.
171/172	"	14:25		"	WE-EE J-J G.
171/172	"	"		"	"
171/172	"	"		"	"
172/173	"	15:30		F56	S.J.
173/174	"	16:00		F55	WE-EE J-S. G

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
30/08	13:31	13:34	A	30	28	EE-WE RET ~~PATCH~~ INCOMPLET
"	13:37	13:40	A	30	28	EE-WE RET INCOMPLETE
"	13:52	13:55	A	30	29	EE-WE RET INCOMPLETE
"	14:06	14:09	A	30	28	WE-EE PATCH INCOMPLETE
"	14:21	14:24	A	30	27	WE-EE RET INCOMPLETE
"	14:26	14:29	A	30	29	EE-WE RET INCOMPLETE
"	14:33	14:36	A	30	29	WE-EE RET INCOMPLETE
"	14:38	14:41	A	30	29	WE-EE ERT PATCH INCOMPLETE
"	14:43	14:46	A	30	30	EE-WE PATCH INCOMPLETE
"	14:54	14:57	A	30	28	WE-EE COMPLETE
"	15:08	15:11	A	30	29	WE-EE RET INCOMPLETE
"	15:21	15:24	A	30	29	EE-WE RET INCOMPLETE PATCH
"	15:24	15:27	A	30	29	EE-WE INCOMPLETE
"	16:00	16:03	A	30	28	WE-EE Complete
"	16:17	16:20	A	30	28	WE-E RET INCOMPLETE

URES DE SOUDURE

	Soudure .Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
74	30/08	16:00		F55	WE-EE J-S.G
5	"	17:20		F56	WE-EE S.J.
75	"	"		"	"
75	"	"		"	"
176	30/08	17:35		F55	WE-EE J-S,G
76	"			"	WE-EE
78	31/08	8:40		F57	WE-EE S.J
78	"	"		"	"
77	"	9:15		"	"
78	"	9:43		"	"
79	"	11:00		F57	WE-EE S.J.
180	"	11:13		F58	WE-EE J-S.G
181	"	11:45		F57	WE-EE S.J
182	"	13:40		F60	WE-EE J-S G
183	"	13:40		F59	WE-EE S.J.
82	"	14:00		F60	WE-EE J-S.G
184		14:15		F60	"

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
30/08	16:33	16:36	A	30	28	WE-EE PATCH ENT. A incomplete
"	18:03	18:06	A	30	30	EE-WE RET incomplete
"	17:58	18:01	A	30	30	WE-EE RET incomplete
"	18:15	18:18	A	30	28	WE-EE PATCH incomplete
31/08	8:44	8:47	A	30	29	EE-WE RET incomplete
"	8:48	8:51	A	30	29	WE-EE PATCH incomplete
"	9:17	9:20	A	30	29	WE-EE RET incomplete
"	9:04	9:07	A	30	29	WE-EE PATCH incomplete
"	9:30	9:33	A	30	28	WE-EE complete.
"	10:45	10:48	A	30	28	EE-WE complete
"	11:20	11:23	A	30	28	WE-EE complete.
"	11:53	11:56	A	30	29	WE-EE complete
"	13:04	13:07	A	30	29	WE-EE complete
"	14:13	14:16	A	30	30	WE-EE RET incomplete
"	14:15	14:18	A	30	28	WE-EE PATCH complete
"	14:34	14:37	A	30	29	EE-WE
"	14:36	14:39	A	30	28	WE-EE

DURES DE SOUDURE

Soudure		Longueur*		Essai	Soudeur
Date jj / mm	Heure	avant	après	No.	
84	31/08	14:30		F59	WE-EE S.J.
85	"	15:55		F60	WE-EE J-S.G.
86	"	16:55		F59	WE-EE S.J.
187	"	16:58		F60	WE-EE J-S.G.
87	"	"		"	"
188	"	17:10		F59	WE-EE S.J
189	01/09	8:50		F61	WE-EE S.J.
190	"	8:55		F64	WE-EE J-S.G.
190	"	"		"	"
191	"	10:40		F61	WE-EE S.J.
192	"	10:44		F64	WE-EE J-S.G
193	"	10:52		F61	WE-EE S.J.
194	"	11:05		F61	SE-NE S-J
195	"	11:15		F61	NE-SE S.J.
196	"	11:17		F61	NE-SE S.J.
179	31/08	8:40		F57	S.J

PROCÉDURES DE SOUDURE (suite)

Test	Heure du test		Type	Pression		Détail des essais
Date jj / mm	Début	Fin	Test	Début	Fin	non-destructifs
31/08	15:55	15:58	A	30	29	WE-EE COMPLETE
"	16:37	16:40	A	30	29	WE-EE complete
"	16:54	16:57	A	30	29	WE-EE complete
"	17:10	17:13	A	30	28	~~EE~~ EE-WE RET incomplete ~~PATCH~~
"	17:15	17:18	A	30	29	WE-EE PATCH INCOMPLETE
"	17:32	17:35	A	30	29	WE-EE complete
01/09	9:09	9:12	A	30	30	WE-EE complete
"	9:12	9:15	A	30	29	WE-EE RET incomplete
"	9:17	9:20	A	30	28	EE-WE PATCH incomplete
"	10:48	10:51	A	30	30	WE-EE complete
"	10:53	10:56	A	30	30	WE-EE complete
"	11:04	11:07	A	30	30	EE-WE complete
"	11:09	11:12	A	30	30	SE-NE.
"	11:19	11:22	A	30	29	NE-EE complete
"	11:23	11:26	A	30	29	NE-EE complete
31/08	14:22	14:25	A	30	30	WE-EE complete

PROCÉDURES DE SOUDURE

Soudure No.	Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
196/197	01/09	11:35		F61	NE-SE S.J.
197/198	"	11:42		"	"
198/199	"	11:50		"	"
199/200	"	12:00		"	"
199/200	"	"		"	"
200/201	"	13:33		F65	S.J.
201/202	"	13:50		"	"
201/202	"	"		"	"
202/203	"	14:10		"	"
203/204	"	15:40		"	"
204/205	"	16:20		"	"
170/206	02/09	9:00		F66	WE-EE S.J
171/206	"	9:20		"	"
171/206	"	"		"	"
172/206	"	9:47	6.5 / T	"	"

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
01/09	11:42	11:45	A	30	29	NE-SE complete
"	11:47	11:50	A	30	29	NE-SE complete
"	12:02	12:05	A	30	29	NE-SE complete
"	12:10	12:13	A	30	29	NE-SE RET incomplete
"	13:54	13:57	A	30	29	NE-EE EXT. PATCH INCOMPLETE
"	13:45	13:48	A	30		NE-SE complete
"	14:02	14:05	A	30	28	NE-SE PAT incomplete RET
"	14:07	14:10	A	30	28	NE-SE incomplete.
"	14:22	14:25	A	30	29	NE-SE complete
"	15:54	15:57	A	30	29	NE-SE complete
"	16:34	16:37	A	30	28	NE-SE complete
02/09	9:24	9:27	A	30	28	WE-EE complete
02/09	9:31	9:34	A	30	29	WE-EE-WE incomplete RET
"	10:33	10:36	A	30	28	WE-EE EXT. incomplete -PATCH
"	10:38	10:41	A	30	28	NE-SE complete.

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant	Longueur* après	Essai No.	Soudeur
07/208	02/09	10:30	6.5	T	F66	SE-NE S-J
08/209	〃	10:30			F67	WE-EE J-S. G.
06/208	〃	10:45			F66	WE-EE S. J.
06/207	〃	11:40			F66	WE-EE S. J.
72/207	〃	11:45			F66	WE-EE S. J.
07/208	〃	10:30			F66	SE-NE S. J.
210/211	〃	11:30			F67	NE-SE J-S. G
209/210	〃	12:03			F66	WE-EE S. J
209/211	〃	11:30			F66	WE-EE S. J
211/212	〃	11:45			F67	WE-EE
210/212	〃	12:12			F67	WE-EE J-S. G
210/212	〃	〃			〃	〃
209/211	〃	11:45			F66	WE-EE S. J.
205/213	02/09	14:25			F68	NE-SE S. J.
205/213	〃	〃			〃	〃
205/213	〃	〃			〃	〃

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
02/09	10:54	10:57	A	30	28	NE - SE Complete
〃	11:15	11:18	A	30	29	WE - EE Complete
〃	11:17	11:20	A	30	30	WE - EE complete
〃	11:34	11:37	A	30	28	EE - WE complete
〃	11:40	11:43	A	30	28	EE - WE Complete
〃	11:43	11:46	A	30	29	EE - WE Complete
〃	11:55	11:58	A	30	28	NE - SE complete
〃	13:20	13:23	A	30	28	WE - EE complete
〃	14:24	14:27	A	30	29	WE - EE RET. INComplete
〃	14:30	14:33	A	30	28	WE - EE Complete
〃	14:07	14:10	A	30	29	WE - EE RET. Complete
〃	14:09	14:12	A	30	30	WE-EE MATCH INComplete
〃			A			
〃	15:57	16:00	A	30	30	NE-EE RET INCOMPLETE
〃	16:33	16:36	A	30	29	NE-EE EXT. INCOMPLETE
〃	16:45	16:48	A	30	29	SE-NE MATCH INCOMPLETE

OCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
13/214	02/09	2:55		F68	NE-SE S.J.
13/214	〃	〃		〃	NE-SE S.J.
14/215	〃	16:05		〃	NE-SE S.J.
15/216	〃	16:50		〃	NE-SE S.J.
28/153	03/09	9:05		F71	SE-NE J-S-G
28/158	〃	〃		〃	〃
76/154	〃	〃		〃	〃
96/154	〃	〃		〃	〃
74/155	〃	〃		〃	〃
5-156	〃	〃		〃	〃
41-44					
57-163	〃	〃		〃	〃
11-136					
64.	〃	〃		〃	〃
36-135					
65-166	167 〃	〃		〃	〃
35-132					
67/128	〃	〃		〃	〃

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
02/09	15:31	15:34	A	30	29	NE-SE REI. incomplete
〃	15:43	15:46	A	30	29	~~NE-SE~~ SE-NE PATCH incomplete
〃	16:58	17:01	A	30	29	NE-SE complete
〃	17:04	17:07	A	30	28	NE-SE, complete
03/09	—	—	A	—	—	EXTRUDE (1.3m)
〃	14:36	14:39	A	30	28	SE-NE PATCH incomplete
〃	—	—	~~A~~	—	—	EXTRUDE (1.5m)
〃	11:15	11:18	A	30	29	NE-SE PATCH INCOMPLETE
〃	—	—	X	—	—	EXTRUDE ~~(1.5m)~~ (3.5m)
〃	10:47	10:50	A	30	28	NE-SE PATCH incomplete
〃	10:52	10:55	A	30	29	NE-SE PATCH INCOMPLETE
〃	11:00	11:03	A	30	29	NE-SE PATCH INCOMPLETE
〃	11:04	11:07	A	30	30	NE-SE REI incomplete PATCH
〃	11:06	11:09	A	30	29	SE-NE incomplete (P)

PROCÉDURES DE SOUDURE

Soudure No.	Date jj / mm	Heure	Longueur* avant / après	Essai No.	Soudeur
153/218	03/09	11:10		F71	EE-WE J-S-G
153/218	"	"		"	"
153/218	"	"		"	"
218/220	"	11:35		F71	"
220/221	"	11:50		"	"
221/222	"	12:20		"	"
222/223	"	14:00		F73	"
223/224	"	14:35		F73	"
194-195-196 192	03/09 ①	10:30		F70	EE-WE S.J.
189-190-191	" ②	"		"	"
196-197-198 199-200					
201-					
187-188 202-203	03/09 ③	10:30		F70	EE-WE S.J
	" ④	10:30		"	"

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
03/09	11:22	11:25	A	30	29	EE-WE RE incomplete
"	11:26	11:29	A	30	28	EE-WE incomplete RE
"	11:55	11:58	A	30	28	EE-WE incomplete
"	12:58	13:01	A	30	30	EE-WE complete
"	13:22	13:25	A	30	29	EE-WE complete
"	14:11	14:13	A	30	29	EE-WE complete
"	14:24	14:27	A	30	30	EE-WE complete
"	10:55	10:58	A	30	29	EE-WE complete
04/09	8:35	8:38	A	30	28	EE-WE RE incomplete
"	8:40	8:43	A	30	28	EE-WE RET. incomplete
04/09	8:55	8:58	A	30	28	EE-WE incomplete

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
224/225	04/09	8:35		F75	EE-WE J-S G.
225/226	04/09	9:00		F75	EE-WE J-S.G
226/227	04/09	9:10		F74	R.B.
226/227	11	9:18		F74	RB ~~J-S.G~~ EE-WE
227/228	11	9:48		F75	~~J-S.G~~
227/228	11	11		11	11
231/212	11	11:35		F74	EE-WE R.B
229/230	04/09	11:15		F75	EE-WE J-S.G
228/230	11	11		11	11
228/230	11	11		11	11
230/232	11	11:55		F75	EE-WE J-S.G
230/232	11	11		11	11
230/232	11	11		11	11

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
04/09	11:06	11:09	A	30	29	EE-WE complete
11			A			~~EE-WE~~
04/09	11:09	11:12	A	30	30	EE-WE complete
04/09	11:22	11:25	A	30	28	EE-WE incomplete
11	11:29	11:32	A	30	30	EE-WE incomplete
11	11:39	11:42	A	30	29	EE-WE incomplete
11	11:49	11:52	A	30	29	EE-WE PA incomplete
11	11:42	11:45	A	30	28	WE EE complete
11	13134	13:37	A	30	30	EE-WE incomplete
11	13:40	13:43	A	30	29	EE WE PA incomplete
11	13:48	13:51	A	30	30	EE-WE incomplete
11	14:14	14:17	A	30	29	~~EE~~ WE-EE incomplete
11	14:05	14:08	A	30	30	WE-EE PA incomplete

URES DE SOUDURE

Soudure Date jj / mm	Heure	Longueur* avant	Longueur* après	Essai No.	Soudeur
232 04/09	~~11:55~~			F75	EE-WE J-S G
/232 "	"			F75	"
/232 "	"			"	"
/232 "	14:00	6		F77	"
/234 "	"			"	"
/234 "	"			"	"
/34 "	"			"	"
/34 "	"			"	"
/233 "	13:00			F76	WE-EE R.B.
/229	11:20	6.5	T	F74	R.B.
/229	11:45			F74	R13
217		6.5	T		
58/239 "	16:30			F76	EE-WE R.B.
58/239 "	"			"	"
34/235 "	14:32			F77	EE-WE J-S G

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Fin	Type Test	Pression Début	Fin	Détail des essais non-destructifs
04/09	14:26	14:29	A	30	29	EE-WE PATCH INCOMPLETE.
04/09	14:34	14:37	A	30	28	EE-WE RET INCOMPLETE
"	14:43	14:46	A	30	30	EE-WE PATCH INCOMPLETE
"	15:21	15:24	A	30	28	EE-WE RET INCOMPLETE
"	15:27	15:30	A	30	30	EE-WE RET INCOMPLETE
"	15:32	15:35	A	30	29	EE-WE RET. INCOMPLETE
"	15:37	15:40	A	30	28	EE-WE PATCH INCOMPLETE EXT.
"	16:16	16:19	A	30	29	EE-WE complete
"	16:19	16:22	A	30	28	SE-NE complete
"	11:45	11:48	A	30	28	WE-EE complete.
"	16:36	16:39	A	30	30	EE-WE RET. INCOMPLETE
"	16:46	16:49	A	30	29	EE-WE PATCH INCOMPLETE
"	16:56	16:59	A	30	29	EE-WE complete

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
237-238 / 239	04/09	17:00		F76	EE-WE R.B.
239 / 241	05/09	8:15		F79	EE-WE J-S G.
236 / 240	05/09	8:00		F78	WE-EE R.B.
233 / 236	04/09	14:40		F76	WE-EE R.B.
236 / 219	04/09	15:00		F76	WE-EE R.B.
217 / 233	04/09				
217 / 219	04/09	14:50		F76	WE-EE R.B
212 / 217	04/09	229-217		? F76	WE-EE R.B
217 / 229	04/09	10:50	6.5 / T	F74	SE-NE R.B
219 / 233	04/09	13:30	6.5 / T	F76	SE-NE R.B.
217 / 233	04/09	229-233			WE-EE R.B
229 / 233	04/09	13:10		F76	WE-EE R.B.
231 / 229	11	H:20		2	~~SE-NE~~ R.B.
241 / 242	05/09	11:32		F79	WE-EE J.S.G

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
04/09	17:15	17:18	A	30	28	EE-WE Complete.
05/09	9:38	9:41	A	30	29	EE-WE Complete
05/09	10:20	10:23	A	30	29	WE-EE complete
05/09	10:28	10:31	A	30	28	WE-EE complete
05/09	10:37	10:40	A	30	29	WE-EE Complete
05/09	10:42	10:45	A	30	29	WE-EE complete
05/09	10:50	10:53	A	30	29	WE-EE complete
05/09	10:55	10:58	A	30	29	SE-NE complete
05/09	11:08	11:11	A	30	29	SE-NE EXT. INcomplete
05/09	11:13	11:16	A	30	29	WE-EE Complete
11	11:29	11:32	A	30	30	WE-EE complete
~~11~~	~~16:19~~	~~16:22~~	~~A~~			
05/09	11:53	11:56	A	30	30	~~EE~~ WE complete

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
8-220 / -	04/09	8:55		F74	SE-NE R.B.
21 / 161	"	8:50		"	"
-222 / 3-224	"	8:45		"	"
-162 / 3-	—	—		—	—
3-214 / 5	←	←			
5- / 6	03/09	10:30		F70	WE-EE S.I.
-187 / 25	"	"		"	"
7 / 205	"	"		"	"
F / 04	"	"		"	"
0 / 243	05/09	14:35		F80	NE-SE R.B.
3 / 244	"	14:50		"	"
7 / 245	"	16:05		F89	NE-SE R.B.
/ 245	"	"		"	"
245	05/09	"		"	"

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
05/09	13:02	13:05	A	30	28	NE-SE RET. incomplete
"	12:58	13:01	A	30	30	NE-SE RET INCOMPLETE. MAC
"	13:11	13:14	A	30	28	NE-SE PATCH INCOMPLETE.
05/09	13:27	13:30	A	30	28	EE-WE RET INCOMPLETE
04/09	13:43	13:46	A	30	29	WE-EE RET. INCOMPLETE
05/09	13:51	13:54	A	30	29	EE-WE RET. INCOMPLETE
05/09	13:36	13:39	A	30	28	EE-WE RET. INCOMPLETE
"	14:49	14:52	A	30	28	NE-SE complete
"	15:13	15:16	A	30	29	NE-SE complete
"	16:18	16:21	A	30	29	NE-SE RET INCOMPLETE
"	16:45	16:48	A	30	29	NE-SE RET INCOMPLETE
"	16:50	16:53	A	30	29	SE-NE Patch INCOMPLETE

PROCÉDURES DE SOUDURE

Soudure No.	Date jj / mm	Heure	Longueur" avant	Longueur" après	Essai No.	Soudeur
245/246	05/09	16:40			F80	NE-SE R.B.
246/247	06/09	8:30			F81	NE-SE R.B
247/248	"	9:00			"	"
247/248	"	9:00			"	"
248/249	"	9:25			"	"
236/250	"	11:15			"	WE-EE "
250/240	"	11:25	6.5	T	"	"
250/251	"	11:40			"	"
240/251	"	11:45			"	"
252/253	"	11:48		T	F82	SE-NE J.S. G.
251/253	"	11:55			F81	WE-EE R.B.
251/252	"	12:00			F81	WE-EE R.B.
251/254	"	13:30			F82	SE-NE J.S.G
254/250	"				F82	WE-EE J.S.G

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
05/09	17:01	17:04	A	30	28	NE-SE Complete
06/09	8:51	8:54	A	30	29	~~SE~~ -SE -NE Complete
"	9:24	9:27	A	30	30	NE-SE. Incomplete Patch
"	10:34	10:37	A	30	29	SE-EE Incomplete.
"	10:38	10:41	A	30	28	SE-NE Complete
"	11:25	11:28	A	30	28	WE-SE Complete
"	11:29	11:32	A	30	28	SE-NE Complete
"	11:52	11:55	A	30	28	WE-SE Complete
"	11:56	11:59	A	30	29	WE-SE Complete
"	12:03	12:06	A	30	29	~~NE~~-SE
"	12:56	12:59	A	30	28	WE-EE Complete
"	13:00	13:03	A	30	28	EE-WE Complete
"	13:33	13:36	A	30	29	SE-~~NE~~ Complete
"	12:42	13:45	A	30	28	EE-WE

PROCÉDURES DE SOUDURE

209 / 210 / 212 / 217 / 219 / 236 / 240 / 251 / 253

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant / après	Essai No.	Soudeur
73/207	06/09	14:20		F83	R.B.
74/209	〃	〃		〃	〃
74/209	〃	〃		〃	〃
75/210	〃	〃		〃	〃
76/212	〃	〃		〃	〃
79/212	〃	〃		〃	〃
79/217	〃	〃		〃	〃
80/217	〃	〃		〃	〃
180/219	〃	〃		〃	〃
181/219	〃	〃		〃	〃
181-182/236	〃	〃		〃	〃
182/240	〃	〃		〃	〃
183/240	〃	〃		〃	〃
183/251	〃	〃		〃	〃
184/251	〃	〃		〃	〃

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
6/09	14:29	14:32	A	30	29	NE-SE Complete
〃	14:40	14:43	A	30	29	~~SE~~ SE-NE Pat incomplete
〃	14:37	14:40	A	30	28	SE-NE Patch incomplete
〃	14:44	14:47	A	30	28	SE-NE Complete
〃	14:48	14:51	A	30	29	NE-SE Complete
〃	14:57	15:00	A	30	29	NE-SE ~~Patch~~ Complete
〃	14:59	15:02	A	30	28	NE-SE Complete
〃	14:53	14:56	A	30	29	SE-NE Complete
〃	15:09	15:12	A	30	29	SE-NE Complete
〃	15:04	15:07	A	30	28	SE-NE Complete
〃	15:57	16:00	A	30	28	SE-NE Complete
〃	16:01	16:04	A	30	29	NE-SE Complete
〃	16:06	16:09	A	30	29	SE-NE Complete
〃	16:05	16:08	A	30	28	SE-NE Complete
〃	16:18	16:21	A	30	29	SE-NE Complete

~~HEDAT SOUDE~~

PROCÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant	Longueur* après	Essai No.	Soudeur
~~[illegible]~~	~~7/08~~					
184/253	06/09	14:20			F83	NE-SE R.B.
185/253	〃	〃			〃	〃
216-243 ~~/253~~	06/09				~~F83~~	~~EE-WE R.B.~~
~~243~~	〃	〃			〃	〃
245/252	06/09	〃			〃	〃
216-243/253	06/09	15:05			F83	EE-WE R.B.
243-244/253	〃	〃			〃	〃
245/252	〃	〃			〃	〃
295/252	〃	〃			〃	〃
246/252	〃	〃			〃	〃

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
~~07/08~~						
06/09	16:15	16:18	A	30	28	SE-NE ~~RET~~ ~~Incomplete~~
〃	16:13	16:16	A	30	29	SE-NE complete.
~~06/09~~	~~17:00~~	~~17:03~~	~~A~~	~~30~~	~~28~~	~~WE-EE RET~~
〃			A			
〃	17:08	17:11	A	30	28	WE-EE INcomplete RET.
06/09	17:00	17:03	A	30	28	WE-EE RET INcomplete.
07/09	8:07	8:10	A	30	29	WE-EE complete
~~06~~/09	17:08	17:11	A	30	28	WE-EE RET INcomplete
07/09	8:14	8:17	A	30	30	EE-WE ~~EXT~~ INcomplete
〃	—	—	—	—	—	EXTRUD (2M)

CÉDURES DE SOUDURE

Soudure No.	Soudure Date jj / mm	Soudure Heure	Longueur* avant	Longueur* après	Essai No.	Soudeur
254	14/08	7H??				R.B
247 / 251	06/09	15:05			F83	R.B.
-249 / 254	06/09	"			"	"
-230 / 231	06/09	16:30			F83	SE-NE R.B.
-228 / 7-226	"	"			"	"
225 / 212						
-209 / 8-206						
252 / 254	08/09	8:00			F84	NE-SE R.B
254 / 255	"	8:25			"	"
255 / 256	"	8:55			"	"
256 / 257	"	9:20			"	"
257 / 259	"	10:35			"	"
250 / 257 / 8:00	"	11:00			"	"
260 / 259	"	11:02			"	"
260 / 261	"	11:50			"	"
						NE-SE

PROCÉDURES DE SOUDURE (suite)

Test Date jj / mm	Heure du test Début	Heure du test Fin	Type Test	Pression Début	Pression Fin	Détail des essais non-destructifs
14/08	9:24	9:38	A	30	29	Incomplet à PATCHAT WBD
07/08	8:18	8:21	A	30	29	EE-WE complete
07/08	8:38	8:41	A	30	29	EE-WE, complete
07/09	8:34	8:37	A	30	29	SE-NE complete
"	8:37	8:40	A	30	28	S2-NB
08/09	8:37	8:40	A	30	29	NE-SE complete
"	8:51	8:54	A	30	29	NE-SE complete
"	9:16	9:19	A	30	28	NE-SE complete
"	9:40	9:43	A	30	29	NE-SE, complete
"	11:05	11:08	A	30	28	NE-SE complete
"	11:34	11:37	A	30	29	NE-SE incomplete PATCH
"	11:39	11:42	A	30	28	NE-SE complete
"	12:50	12:53	A	30	28	NE-SE complete
"						

ESSAI DESTRUCTIF

Tensiomètre No.: _____

DT No.	Soudure No:	Localisation de l'échantillon	Date jj / mm	Heure	Date réparée	Date vérifiée	Labo P / E
DT-1	27 I / 28		12/08	15:30			—
DT-2	36 I / 37 O		12/08	16:30			—
DT-3	56 O / 57 I	TRANCHÉE	16/08	16:00	16/08	16/08	—
DT-4	82 O / 84 I	TRANCHÉE	16/08	16:00	16/08	16/08	—
DT-5	67 I / 68 O	TRANCHÉE	16/08	16:00	16/08	16/08	—
DT-6	94 O / 97 I	TRANCHÉE	24/08	7:30	24/08	24/08	—
DT-7	99 O / 101 I	〃	〃	7:35	〃	〃	—
DT-8	105 I / 106 O	〃	〃	7:40	〃	〃	—
DT-9	112 I / 113 O	〃	〃	7:45	〃	〃	—
DT-10	131 O / 133 I	〃	27/08	17:45	28/08	28/08	—
DT-11	127 O / 129 I	〃	〃	17:50	〃	〃	—
DT-12	139 O / 143 I	〃	〃	17:55	〃	〃	—
DT-13	143 O / 145 I	〃	28/08	18:00	28/08	28/08	—
DT-14	147 O / 149 I	〃	〃	18:05	〃	〃	—
DT-15	149 O / 152 I	〃	〃	18:10	〃	〃	—
DT-16	183 I / 184 O	〃	06/09	9:40	06/09	06/09	—
DT-17	185 O / 186 I	〃	06/09	9:45	06/09	06/09	—

ESSAI DESTRUCTIF (suite)

Résistance au pelage					Résistance au cisaillement				
OUT	IN								
72/72	75/76				83	82			
76/70	81/72				82	83			
80/84	79/82	919			91	88			
85/83	78/80				92	89			
86/83	79/80				93	94			
83/79	83/80				89	96			
79/75	78/81				95	94			
79/77	78/77				90	88			
84/80	83/80	2255			91	94			
73/76	78/78				95	93			
72/75	86/82				85	86			
79/80	85/86				99	100			
77/86	93/85				99	98			
78/77	82/81	1609			93	91			
81/79	80/82				89	91			
90/89	89/80				97	98			
90/91	82/84				95	96			

ESSAI DESTRUCTIF

Tensiomètre No.: _____

DT No.	Soudure No.	Localisation de l'échantillon	Date jj / mm	Heure	Date réparée	Date vérifiée	Labo P / E
DT-18	196 O / 197 I	TRENCH	06/09	10:50	06/09	06/09	—
DT-19	204 O / 205 I	TRENCH	06/09	10:55	06/09	06/09	—
DT-20	163 O / 164 I	TRENCH	07/09		07/09	07/09	—
DT-21	228 I / 230 O	TRENCH	07/09		07/09	07/09	—
DT-22	216 O / 243 I	TRENCH	07/09		07/09	07/09	—
DT-23	241 I / 242 O	〃	07/09		〃	〃	—
DT-24	248 I / 249 O	〃	〃		〃	〃	—

ESSAI DESTRUCTIF (suite)

Résistance au pelage OUT	Résistance au pelage IN				Résistance au cisaillement				
85 / 85	84 / 82				97	96			
89 / 87	88 / 88				98	94			
84 / 84	82 / 85				99	98			
82 / 85	78 / 73				97	97			
84 / 82	82 / 74				96	98			
80 / 80	74 / 76				97	96			
86 / 88	85 / 81				98	96			

APPENDIX VI

Key Field Correspondence

Author	Format	Title	Date
Klohn Crippen Berger	Letter	Wolverine Tailings Facility – Site Visit – H. McLeod – June 18 & 19, 2009.	June 22, 2009

Klohn Crippen Berger

June 19, 2009

Yukon Zinc Corp.
#701 – 475 Howe Street
Vancouver, BC
Canada
V6C 2B3

Clive Creaney
Construction Manager

Site Visit – H. McLeod – June 18 & 19, 2009
Wolverine Tailings Facility

Dear Clive

This letter summarizes the field observations and recommendations made during the site visit of June 19 and 20, 2009 to your Wolverine Tailings Facility. The purpose of the site visit was to review the status of the construction to date, with particular reference to the dam foundation preparation and the requirements for handling groundwater springs.

The site visit was conducted with Jeff Lam (KCBL), Larry Lebedoff, Brad Osiduik Gary McFatridge, (YZC) and discussions were held with Don Carr (Arctic Construction).

1. DAM FOOTPRINT

Observations:

- The main impoundment drain was flowing at about 13 L/s in an open channel through the dam footprint.
- Compacted fill had been placed for a width of about 35 m, and 2 m thick, parallel to the drainage ditch on the left abutment.
- Small springs were observed on the left abutment, approximately 4 m in elevation above the compacted fill – the springs were directed towards the downstream toe in a ditch. The flow was <1 L/s.
- Loose fill, derived primarily from excavation of drainage channels, blankets both the left and right abutments either in piles or loose lifts.
- The right bank had some shallow drainage ditches that indicated near surface groundwater, however no significant flows were observed.

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604.669.3800 t • 604.669.3835 f • www.klohn.com

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CANADA'S 50 BEST MANAGED COMPANIES

- The initial lift placed in the dam footprint was up to 1 m thick.

- The optimum proctor densities range from 2.0 t/m^3 to 2.25 t/m^3, with optimum moisture contents between 7% and 9%. It appears that, as long as the moisture is <10%, there is no difficulty in achieving good densities in the fills.

Recommendations:

- Placement of a thick lift is not acceptable for large areas as it will create a weak layer at the base of the dam. A maximum lift of 0.5 m may be used for the base layer in potentially saturated foundations. The compaction should not exceed 4 passes with the vibrating roller to avoid "pumping". Any thick lifts should be staggered, so as not to provide a continuous loose layer.

- The loose fill on the abutments should be graded into and mixed with the main fill, on each successive lift, and the fills "keyed" into fresh undisturbed foundation soils.

- The seep areas should be covered with fills and immediately compacted – no special drainage measures should be required. The compacted fills should leave a small v-ditch on the uphill side to direct away seepage.

  However, if, when the fill is placed, the fill areas wet up and become soft prior to compaction – then it may be necessary to place a drain. The drain could consist of fine gravel from the aggregate quarry, placed in a 200 mm lift in a shallow drainage ditch. The drain should not extend within 20 m from the upstream toe of the dam.

- Two 8" diameter drainage pipes should be placed to transfer the impoundment underdrain flow under the dam. A check on the elevations is required to confirm that the selected elevations under the dam will permit drainage of the impoundment area. It appears that a slope of 1% is available.

2. IMPOUNDMENT AREA

Observations:

- Most of the stripping was completed. Excavation of some organics near the center, on the left side of the drainage channel, was being carried out.
- The main drainage channel within 100 m of the dam is up to 2 m wide, with about 1.5 m depth of muck.
- Springs occur, mainly on the left (east) bank, with flows of <1 L/s.
- Springs occur at various locations through the entire length of the drainage channel.
- The excavated fills from the impoundment are generally of good quality for construction - silty sand and gravel with angular to sub-rounded gravels and cobbles, with 20% fines. Some areas, however, are over-wet and require some drying prior to placement/compaction.
- The liner placement is scheduled to start at the north end, August 4. Therefore, priority will be given to borrowing from the north end and preparing surfaces to allow the liner placement to start.
- Test pits were excavated within the impoundment that indicate at least 5 m of good quality fill is available for construction.

Recommendations:

- A potential source of rockfill should be sourced and costed to assess the potential for constructing a more robust French drain for a portion of the main channel.
- Placement of the main drainage piping and finger drains will require careful consideration in order to minimize the "production" of muck and to provide a firm base for the liner placement.

  The main drain could be constructed in a parallel ditch and the existing channel drained and filled in.
- The removal of organic soils is not necessarily required as long as the material has a "firm" consistency and can support the liner. The fine

organics could also be used to "cover" coarser fill areas to provide a finer base for the liner.

3. DIVERSIONS

Diversion Ditch B is constructed uphill on the left (east) side of the impoundment. No water was flowing in the ditch and it appears that most water, if present, likely seeps into the ground and emerges lower down the slope in the tailings impoundment where a number of springs were observed.

Diversion Ditch A is constructed on the north side of the impoundment and was flowing at about 1 L/s.

4. SUMMARY

Dam construction is proceeding according to the design and the actual site conditions are suitable, with no significant changes to expected conditions. The main observation is the relatively larger underdrain flow of 13 L/s, which has required an upgrade in the capacity of the underdrain pipe(s).

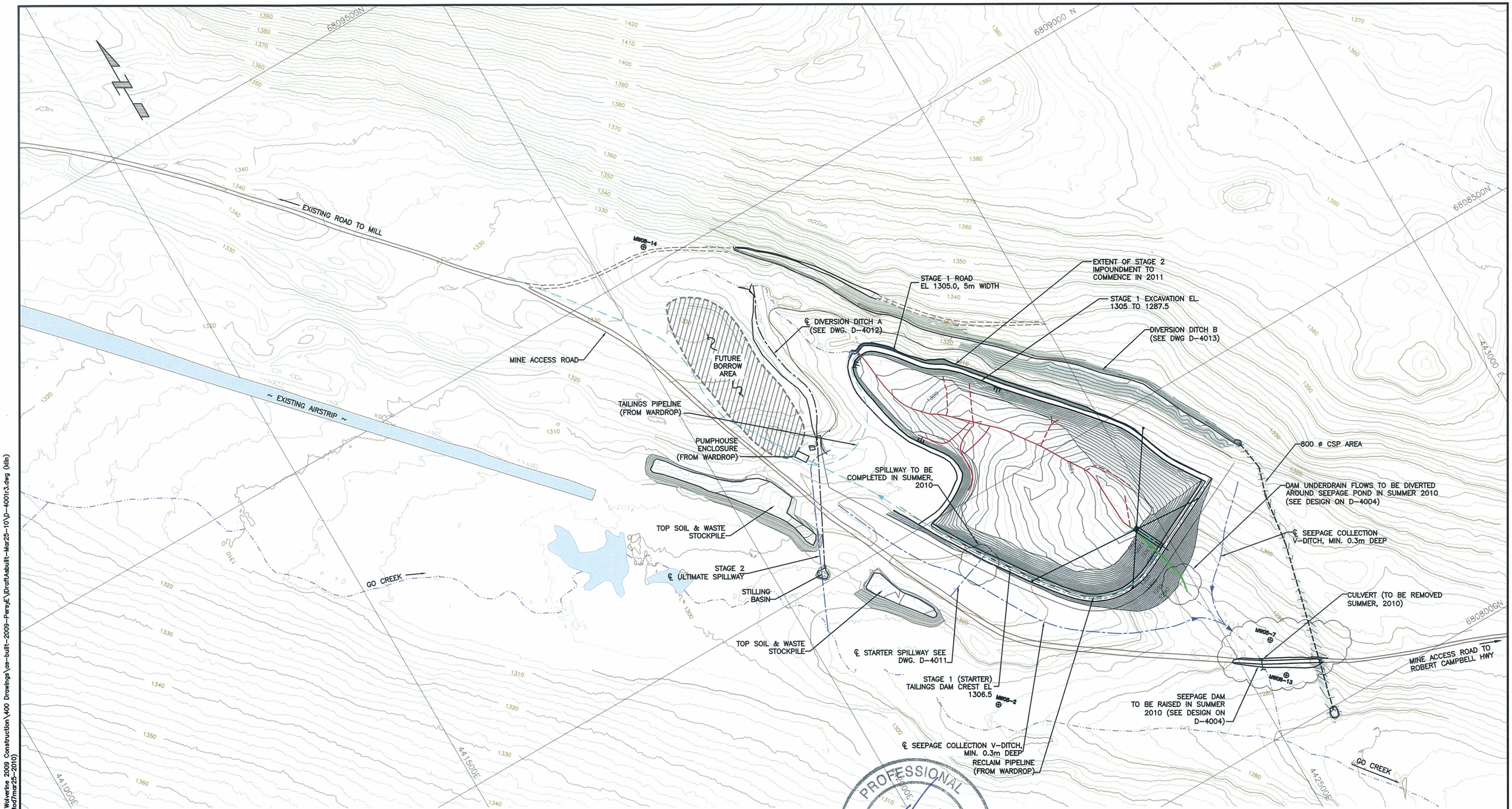
Yours truly,

KLOHN CRIPPEN BERGER LTD.

Harvey McLeod, P.Eng (Yukon)
Project Manager

DRAWINGS

D-4001	**Tailings Storage Facility General Site Arrangement**
D-4002-1	**Tailings Storage Facility Starter Impoundment**
D-4002-2	**Tailings Storage Facility Starter Impoundment Foundation Geology**
D-4003	**Tailings Storage Facility Starter Impoundment Excavation and Fill Typical Sections**
D-4004	**Tailings Storage Facility Seepage Dam Plan and Section**
D-4011	**Tailings Storage Facility Starter Spillway Plan, Profile and Sections**
D-4012	**Tailings Storage Facility Diversion Ditch A Plan Profile and Sections**
D-4013-1	**Tailings Storage Facility Diversion Ditch B Plan and Profile – Sheet 1 of 2**
D-4013-2	**Tailings Storage Facility Diversion Ditch B Sections and Details – Sheet 2 of 2**



NOTES

1. NOT ALL CULVERTS HAVE BEEN SHOWN.
2. ALL ELEVATIONS IN METRES.
3. DRAFT CONSTRUCTION RECORD DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.

PROFESSIONAL ENGINEER YUKON TERRITORY H.M. McLEOD

CONSTRUCTION RECORD

SCALE: 0 200 m

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA,STATEMENTS,CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

DWG. NO.	REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
3	CONSTRUCTION RECORD	LC	MAY 12/10
2	DRAFT CONSTRUCTION RECORD	JL	MAR 5/10
1	ISSUED FOR CONSTRUCTION	MD	MAR 13/09
0	ISSUED FOR TENDER	DK	FEB 04/09

ISSUE/REVISIONS

PROJECT · PROCESS · CIVIL · MECH. · STRUCT. · PIPING · SERVICES · ELECT. · INSTR.

SECTION:	
SCALE:	DATE
DESIGN. BY LC	MAY 12/10
DRAWN BY: KL	MAY 12/10
CHECK. BY HM	
APP. BY: HM	MAY 12/10

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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Klohn Crippen Berger

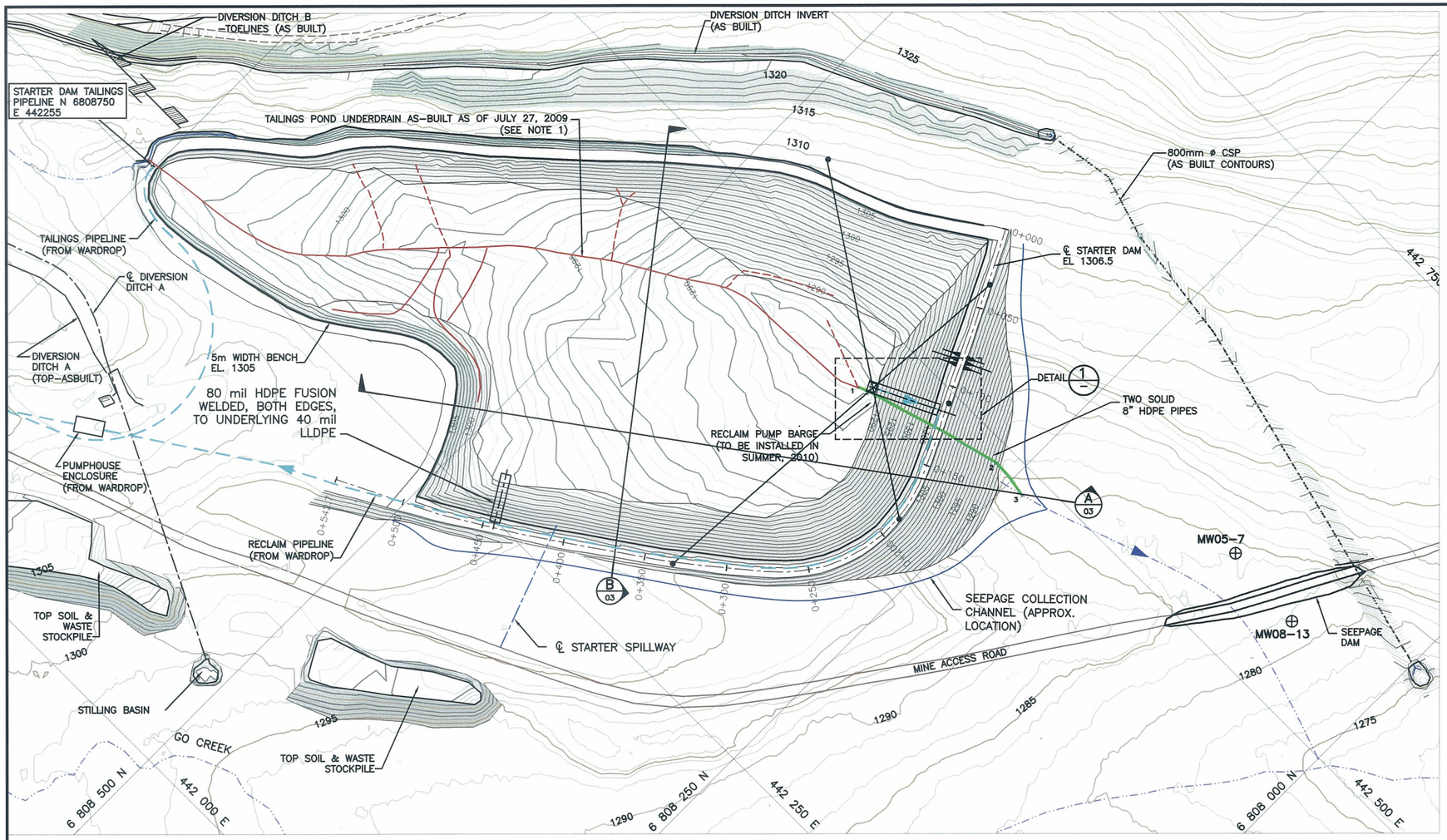
YukonZinc CORP

WOLVERINE PROJECT

TAILINGS STORAGE FACILITY
GENERAL SITE ARRANGEMENT

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Date: 4/19/2010
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Xrefs: CONT_2M_MINE_4Mgrid(Mod7mar25-2010)

3154765TD.DWG



DAM – TWO SOLID UNDERDRAIN PIPES

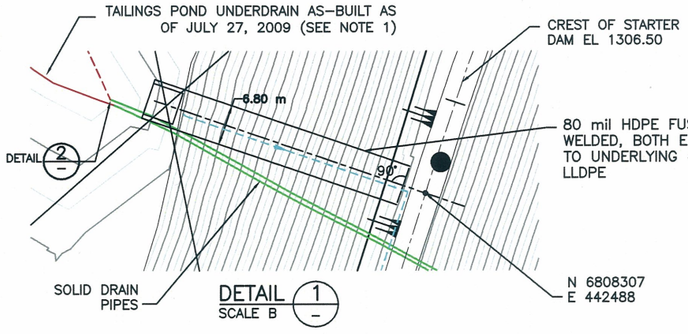
WEST PIPE				EAST PIPE			
SURVEY POINTS	NORTHING (m)	EASTING (m)	ELEVATION (m)	SURVEY POINTS	NORTHING (m)	EASTING (m)	ELEVATION (m)
1	6808355.00	442461.90	0.00	1	6808356.00	442462.20	0.00
2	6808264.06	442488.27	1284.45	2	6808263.98	442489.13	1284.44
3	6808238.83	442485.41	1284.02	3	6808239.14	442486.04	1284.08

LEGEND

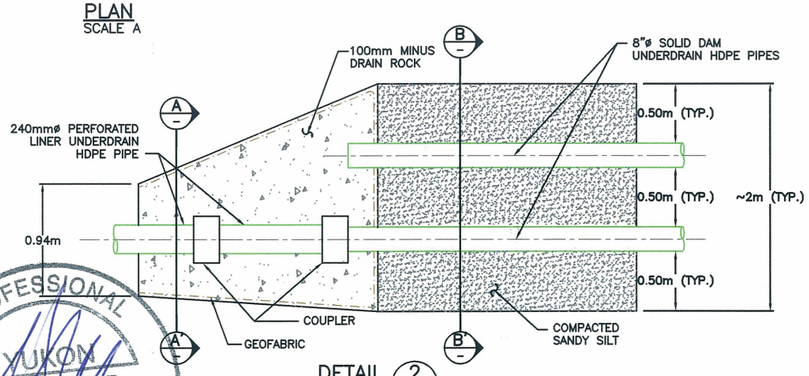
- ROADS
- CREEK
- DIVERSION OR COLLECTION DITCH, SPILLWAY
- LINER UNDERDRAIN (240 mm ø PERFORATED PIPE INSTALLED)
- LINER UNDERDRAIN (NO PIPE INSTALLED)
- LINER AREA
- ⊕MW05-7 GROUNDWATER MONITORING WELL
- SOLID DAM UNDERDRAIN PIPE
- ANCHOR BLOCKS (FROM WARDROP)

NOTES

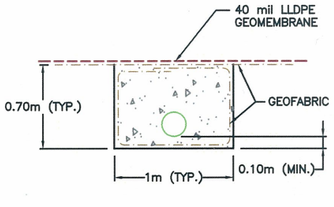
1. LOCATION AND EXTENT OF LINER UNDERDRAIN WAS DETERMINED IN THE FIELD BY SITE ENGINEER, FOLLOWING THE LOWEST EXISTING DRAINAGE COURSE. THE UNDERDRAIN REPORTS TO AN OPEN DITCH D/S OF THE DAM VIA 2-SOLID PIPES.
2. LINER FOUNDATION CONTOURS SURVEYED JULY 26, 2009. BY ACL
3. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.
4. BASIN VOLUME BELOW EL. 1304.5 = 665,127 m³
5. ELEVATIONS ARE GIVEN IN METRES UNLESS OTHERWISE STATED.



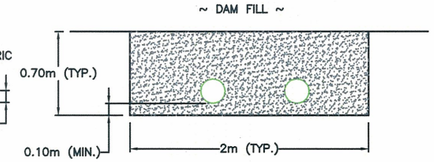
DETAIL 1 SCALE B



DETAIL 2 NTS



SECTION A NTS



SECTION B NTS

SCALE A 0 100 m

SCALE B 0 50 m

PLAN SCALE A

CONSTRUCTION RECORD

NO	DESCRIPTION	BY	DATE
6	CONSTRUCTION RECORD	LC	MAY 12/10
5	DRAFT CONSTRUCTION RECORD	JL	MAR 5/10
4	GENERAL UPDATE	HM	JUL 29/09
3	MODIFY EXCAVATION PLAN, RECLAIM PAD	HM	JUL 17/09
2	ADDED CURVE TABLE	JL	MAY 26/09
1	ISSUED FOR CONSTRUCTION	DK	MAR 13/09
0	ISSUED FOR TENDER	DK	FEB 04/09

PROJECT PROCESS CIVIL MECH. STRUCT. PIPING SERVICES ELECT. INSTR.

ISSUE/REVISIONS

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DRAWN BY: KL	MAY 12/10
CHECK. BY HM	
APP. BY: HM	MAY 12/10

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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Klohn Crippen Berger

Yukon Zinc CORP
WOLVERINE PROJECT

TAILINGS STORAGE FACILITY
STARTER IMPOUNDMENT
SHEET 1 OF 2

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DWG. NO. | REFERENCE DRAWINGS

PROFESSIONAL ENGINEER YUKON H.M. McLEOD TERRITORY

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Xrefs: CONT_2M_MINE_4Mgrid(Mod7MAR25-2010)

315478STDLDWG

TEST #	MATERIAL
TEST 1	Silt/Clay and Sand, Gravelly
TEST 2	Gravel and Sand. Silty/Clayey
TEST 3	Silt/Clay and Gravel, Sandy
TEST 4	Sand and Silt/Clay, Gravelly
TEST 5	Sandy Silty/Clayey Gravel
TEST 6	Sandy Silty/Clayey Gravel
TEST 7	Sandy Silty/Clayey Gravel
TEST 8	Gravel and Sand, Silty/Clayey
TEST 9	Gravelly Sandy Silt/Clay
TEST 10	Silty/Clayey Gravelly Sand
TEST 12	Gravel and Sand, Trace Silt/Clay
TEST 13	Sandy Silty/Clayey Gravel
TEST 14	Gravelly Silty/Clayey Sand
TEST 17	Silty/Clayey Gravelly Sand
TEST 18	Silty/Clayey Gravelly Sand
TEST 19	Gravelly Sandy Silt/Clay
TEST 20	Sandy Silt/Clay, trace Gravel
TEST 21	Gravel and Sand, trace Silt/Clay
TEST 22	Gravelly Sand, some Silt/Clay
TEST 23	Silt/Clay and Gravel, Sandy
TEST 24	Gravel and Sand, Silty/Clayey
TEST 25	Silt/Clay and Sand, some Gravel
TEST 26	Sandy Silty/Clayey Gravel
TEST 27	Gravel and Silt/Clay, Sandy
TEST 28	Sandy Silty/Clayey Gravel
TEST 29	Gravelly Silty/Clayey Sand
TEST 30	Sandy Silty/Clayey Gravel
TEST 31	Sandy Silty/Clayey Gravel
TEST 32	Sandy Gravel, some Silt/Clay

SPRING #	FLOW (L/s)
1	1.0 – 1.5
2 – 5	0.5 – 1.0
6 – 9	0.1 – 0.5

LEGEND

- ROADS
- CREEK
- LINER AREA
- LINER UNDERDRAIN (240 mm ø PERFORATED PIPE INSTALLED)
- LINER UNDERDRAIN (NO PIPE INSTALLED)
- SOLID DAM UNDERDRAIN PIPES

NOTES

1. LINER FOUNDATION CONTOURS SURVEYED JULY 26, 2009.
2. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.

SCALE: 0 100 m

CONSTRUCTION RECORD

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA,STATEMENTS,CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

DWG. NO. | REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
	ISSUE/REVISIONS		

NO	DESCRIPTION	BY	DATE
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1	DRAFT CONSTRUCTION RECORD	JE	MAR 5/10

ISSUE/REVISIONS

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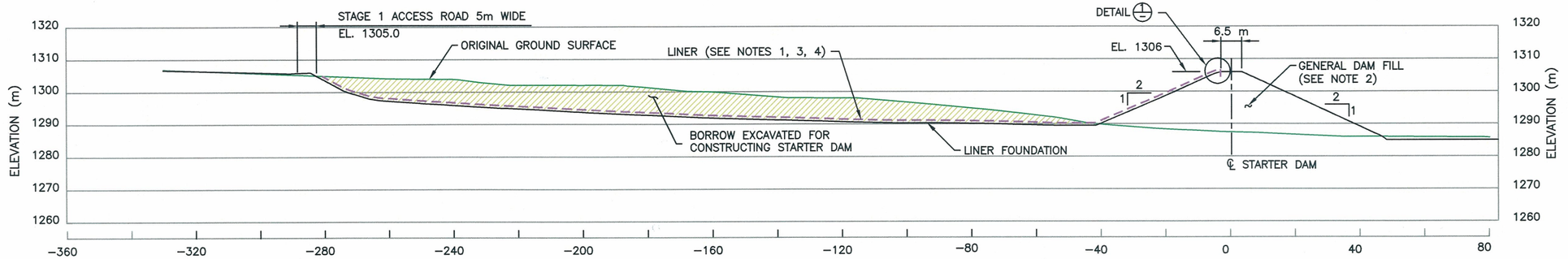
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Klohn Crippen Berger

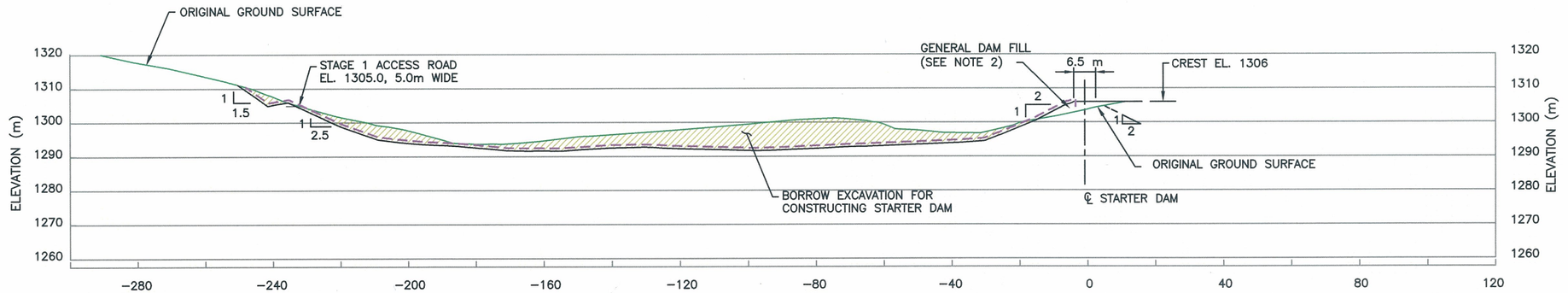
Yukon Zinc CORP
WOLVERINE PROJECT

TAILINGS STORAGE FACILITY
STARTER IMPOUNDMENT
FOUNDATION GEOLOGY
SHEET 2 OF 2

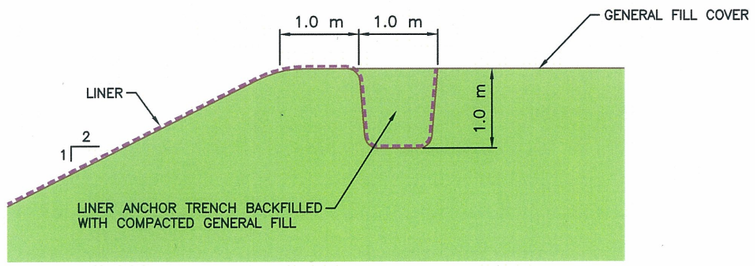
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3154765TD.DWG



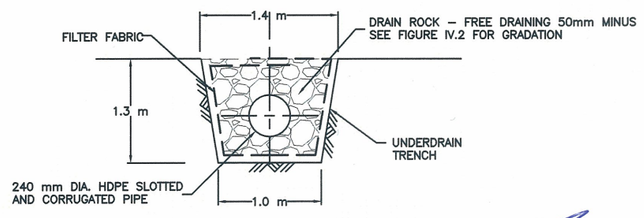
SECTION A
SCALE A



SECTION B
SCALE A



DETAIL 1 LINER ANCHOR TRENCH
NTS



DETAIL 2 LINER UNDERDRAIN
NTS

NOTES

1. LOOSE AND ORGANIC MATERIALS WERE REMOVED, AND THE FOUNDATION PROOFROLLED WITH 6 PASSES WITH A 10 TON VIBRATORY ROLLER, AS DIRECTED BY THE ENGINEER. FOUNDATION AREAS WERE DRY AND APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF GENERAL FILL OR LINER.
2. GENERAL FILL CONSISTED OF WELL–GRADED SILTY SAND AND GRAVEL BORROWED FROM IMPOUNDMENT EXCAVATION. FINER GENERAL FILL PLACED TOWARDS THE UPSTREAM SLOPE AS WELL AS ADJACENT TO THE GLACIAL TILL ZONE (STAGE 2 CONSTRUCTION) AND COARSER MATERIAL PLACED TOWARDS THE DOWNSTREAM SLOPE. MATERIAL PLACED IN 300 mm THICK LOOSE LIFTS, WATERED AS REQUIRED, AND COMPACTED TO 95% OF STANDARD PROCTOR DENSITY.
3. LINER FOUNDATION AREAS AND SLOPES WERE PROOFROLLED WITH A SMOOTH DRUM COMPACTOR. AREAS WITH COARSE ANGULAR MATERIALS WERE COVERED WITH LINER BEDDING AS DIRECTED BY THE ENGINEER.
4. A 40 mil LLDPE LINER WAS USED. THE LINER WAS ANCHORED IN THE DAM CREST AND ACCESS ROAD IN A 1.0 m DEEP TRENCH, AND BACKFILLED WITH COMPACTED FILL.
5. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.

SCALE A 0 100 m

CONSTRUCTION RECORD

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA,STATEMENTS,CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

DWG. NO. | REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
3	CONSTRUCTION RECORD	LC	MAY 12/10
2	DRAFT CONSTRUCTION RECORD	JE	MAR 5/10
1	ISSUED FOR CONSTRUCTION	DK	MAR 13/09
0	ISSUED FOR TENDER	DK	FEB 04/09

ISSUE/REVISIONS

PROJECT | PROCESS | CIVIL | MECH. | STRUCT. | PIPING | SERVICES | ELECT. | INSTR.

SECTION:
SCALE: | DATE
DESIGN. BY LC | MAY 12/10
DRAWN BY: KL | MAY 12/10
CHECK. BY HM |
APP. BY: HM | MAY 12/10

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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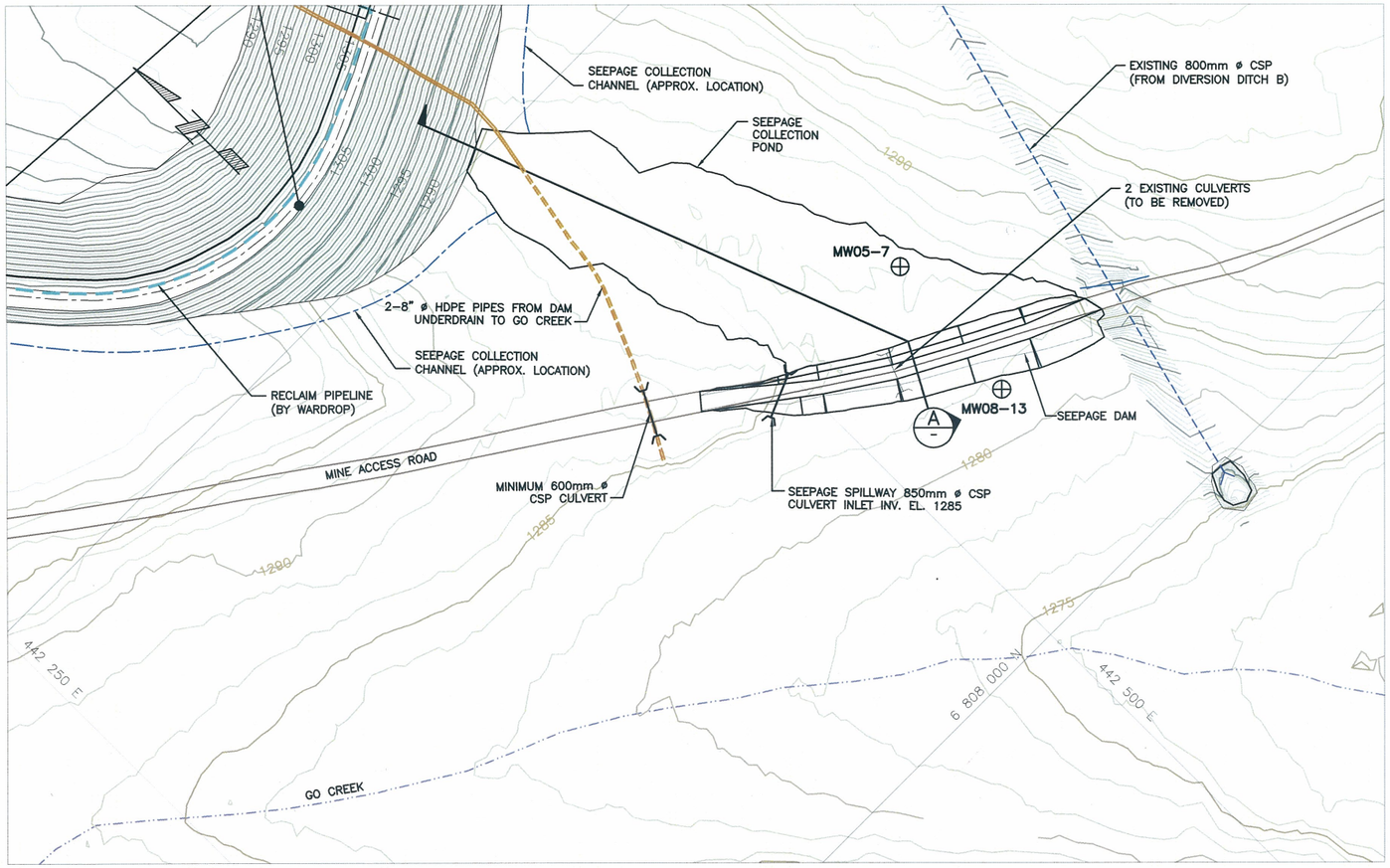
Klohn Crippen Berger

Yukon Zinc CORP
WOLVERINE PROJECT

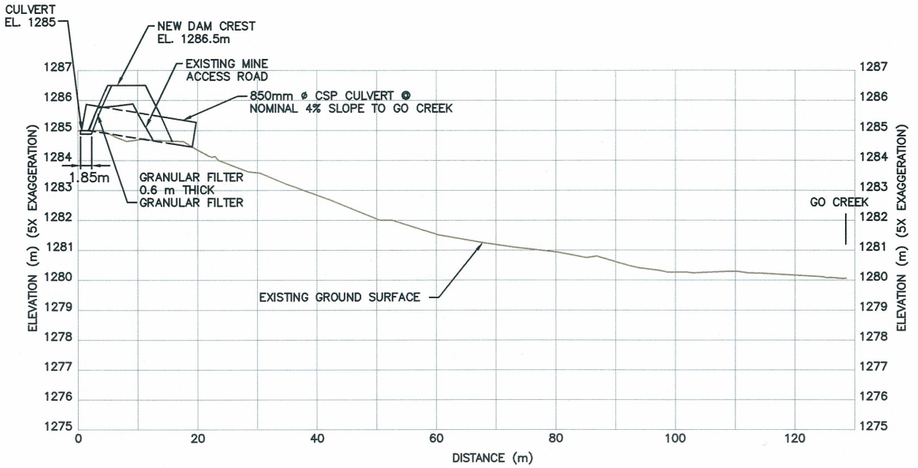
TAILINGS STORAGE FACILITY
STARTER IMPOUNDMENT
EXCAVATION AND FILL TYPICAL SECTIONS

PROFESSIONAL ENGINEER
YUKON TERRITORY
H. N. McLEOD

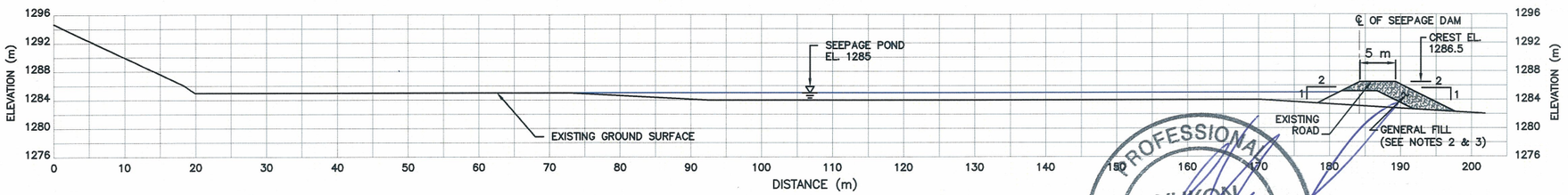
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315476STD.DWG
BORREV-9



PLAN
SCALE A



PROFILE OF SEEPAGE SPILLWAY
SCALE: C



SECTION A
SCALE B

LEGEND

- ROADS
- CREEK
- DIVERSION OR COLLECTION DITCH, SPILLWAY
- DAM UNDERDRAIN PIPES (EXISTING)
- MW05-7 ⊕ GROUNDWATER MONITORING WELL (MW08-13) TO BE RELOCATED DOWNSTREAM

NOTES

1. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.
2. ALL LOOSE AND ORGANIC MATERIALS SHALL BE REMOVED, AND THE FOUNDATION SHALL BE PROOFROLLED WITH 6 PASSES WITH A 10 TON VIBRATORY ROLLER, AS DIRECTED BY THE ENGINEER. ALL FOUNDATION AREAS SHALL BE DRY AND APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF GENERAL FILL OR LINER.
3. GENERAL FILL TO CONSIST OF WELL-GRADED SILTY SAND AND GRAVEL BORROWED FROM IMPOUNDMENT EXCAVATION. FINER GENERAL FILL SHALL BE PLACED TOWARDS THE UPSTREAM SLOPE AS WELL AS ADJACENT TO THE GLACIAL TILL ZONE (STAGE 2 CONSTRUCTION) AND COARSER MATERIAL SHALL BE PLACED TOWARDS THE DOWNSTREAM SLOPE. MATERIAL SHALL BE PLACED IN 300 mm THICK LOOSE LIFTS, WATERED AS REQUIRED, AND COMPACTED TO 95% OF STANDARD PROCTOR DENSITY.

SCALE A 0 100 m
SCALE B 0 50 m
SCALE C 0 50 m

PROFESSIONAL ENGINEER YUKON TERRITORY H.N. McLEOD

ISSUED FOR CONSTRUCTION

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA,STATEMENTS,CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

DWG. NO. | REFERENCE DRAWINGS

PROJECT | PROCESS | CIVIL | MECH. | STRUCT. | PIPING | SERVICES | ELECT. | INSTR.

NO	DESCRIPTION	BY	DATE
3	ISSUED FOR CONSTRUCTION	LC	APR 06/10
2	DRAFT CONSTRUCTION RECORD	JL	FEB /10
1	ISSUED FOR CONSTRUCTION	DK	MAR 13/09
0	ISSUED FOR TENDER	DK	FEB 04/09

ISSUE/REVISIONS

SECTION:	
SCALE:	DATE
DESIGN. BY LC	MAY 12/10
DRAWN BY: KL	MAY 12/10
CHECK. BY HM	
APP. BY: HM	MAY 12/10

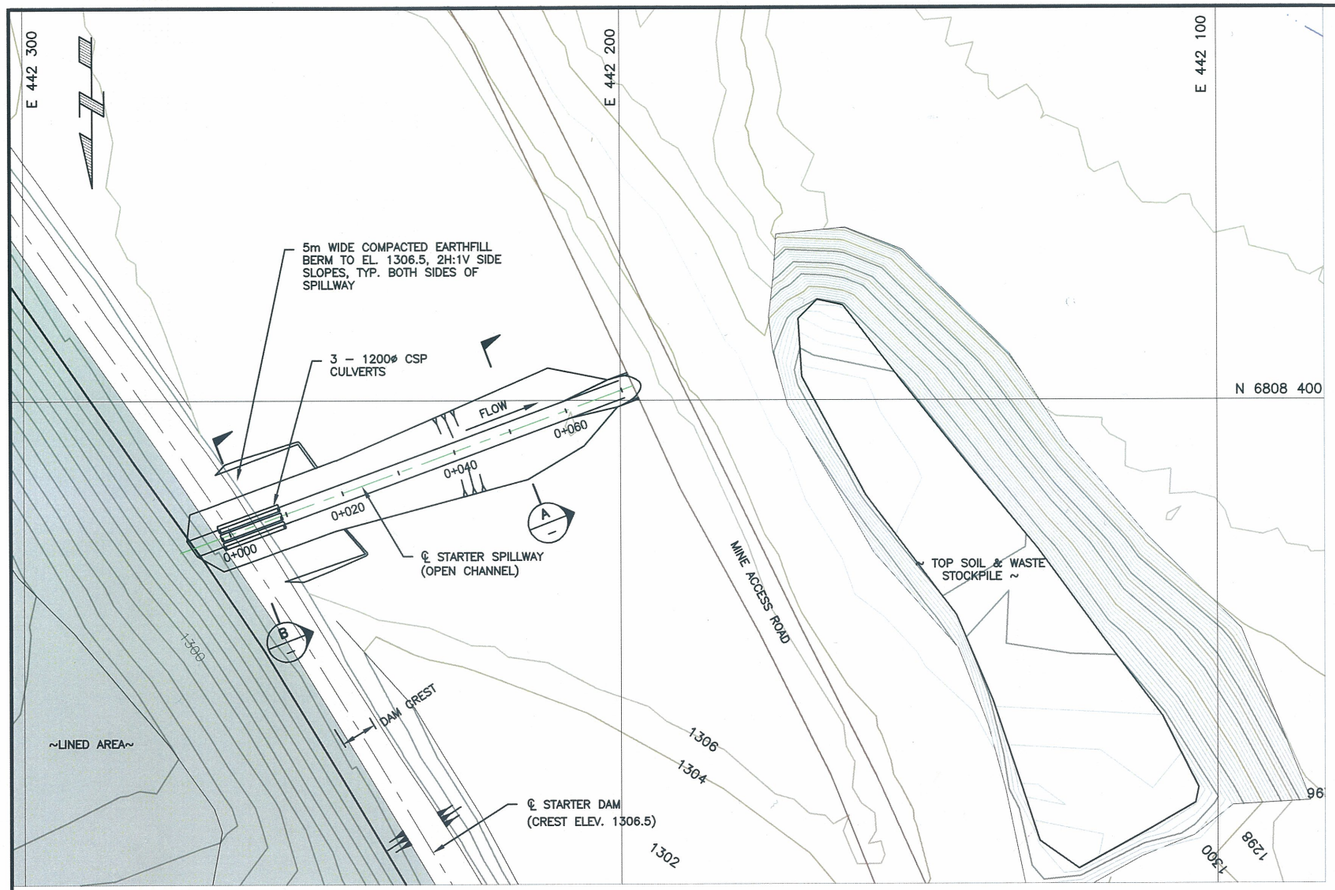
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Klohn Crippen Berger

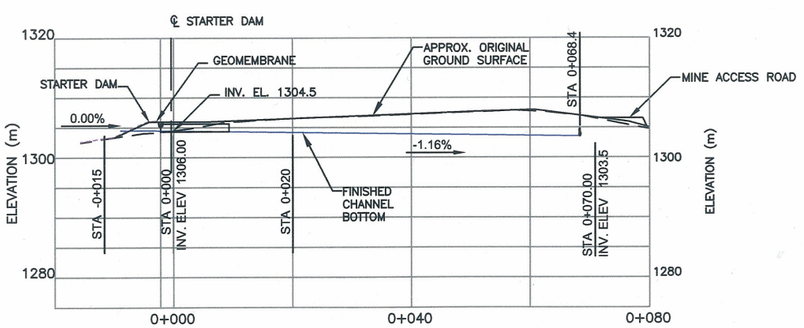
YukonZinc CORP
WOLVERINE PROJECT

TAILINGS STORAGE FACILITY
SEEPAGE DAM
PLAN AND SECTION

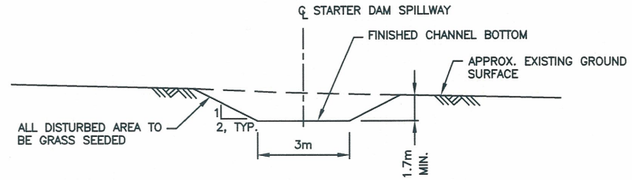
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3154765TD.DWG



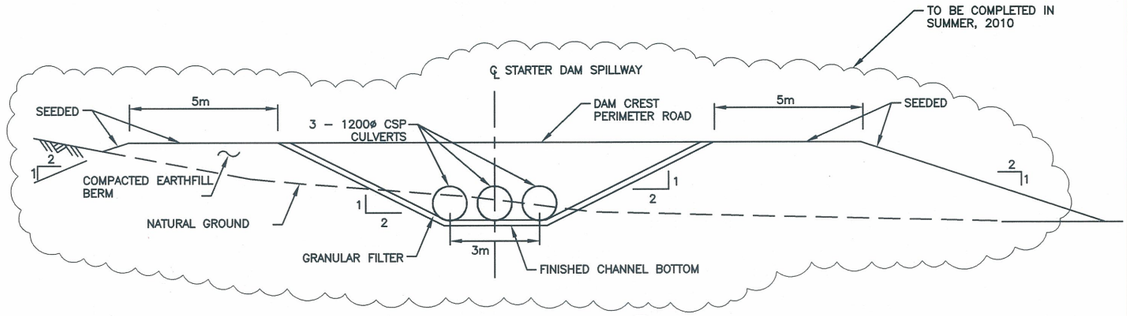
PLAN
SCALE A



PROFILE – STARTER SPILLWAY
SCALE A



TYPICAL GRASS LINED SECTION (A)
NOT TO SCALE



TYPICAL CULVERT SECTION (B)
NOT TO SCALE

NOTES

1. FOR GENERAL SITE ARRANGEMENT, SEE DWG. D–4001.
2. INVERT ELEVATIONS SHOWN ARE TO FINISHED CHANNEL BOTTOM.
3. CULVERT BEDDING/BACKFILL SHALL BE WELL GRADED 100 mm MINUS MATERIAL WITH LESS THAN 20% PASSING THE #200 SIEVE.
4. SPACING BETWEEN CULVERTS WIDTH OF COMPACTOR.
5. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.

PROFESSIONAL ENGINEER YUKON TERRITORY H.M. MOLEOD

CONSTRUCTION RECORD

SCALE A 0 50 m

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Xrefs: by-others-May11-2010, CONT_DM_MINE_Migrid(Mod7mar25-2010).dwg

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DWG. NO. | REFERENCE DRAWINGS

PROJECT | PROCESS | CIVIL | MECH. | STRUCT. | PIPING | SERVICES | ELECT. | INSTR.

NO	DESCRIPTION	BY	DATE
4	CONSTRUCTION RECORD UPDATE	LC	JUN 01/10
3	CONSTRUCTION RECORD	LC	MAY 12/10
2	DRAFT CONSTRUCTION RECORD	JL	MAR 5/10
1	ISSUED FOR CONSTRUCTION	MD	MAR 13/09
0	ISSUED FOR TENDER	MD	FEB 04/09

ISSUE/REVISIONS

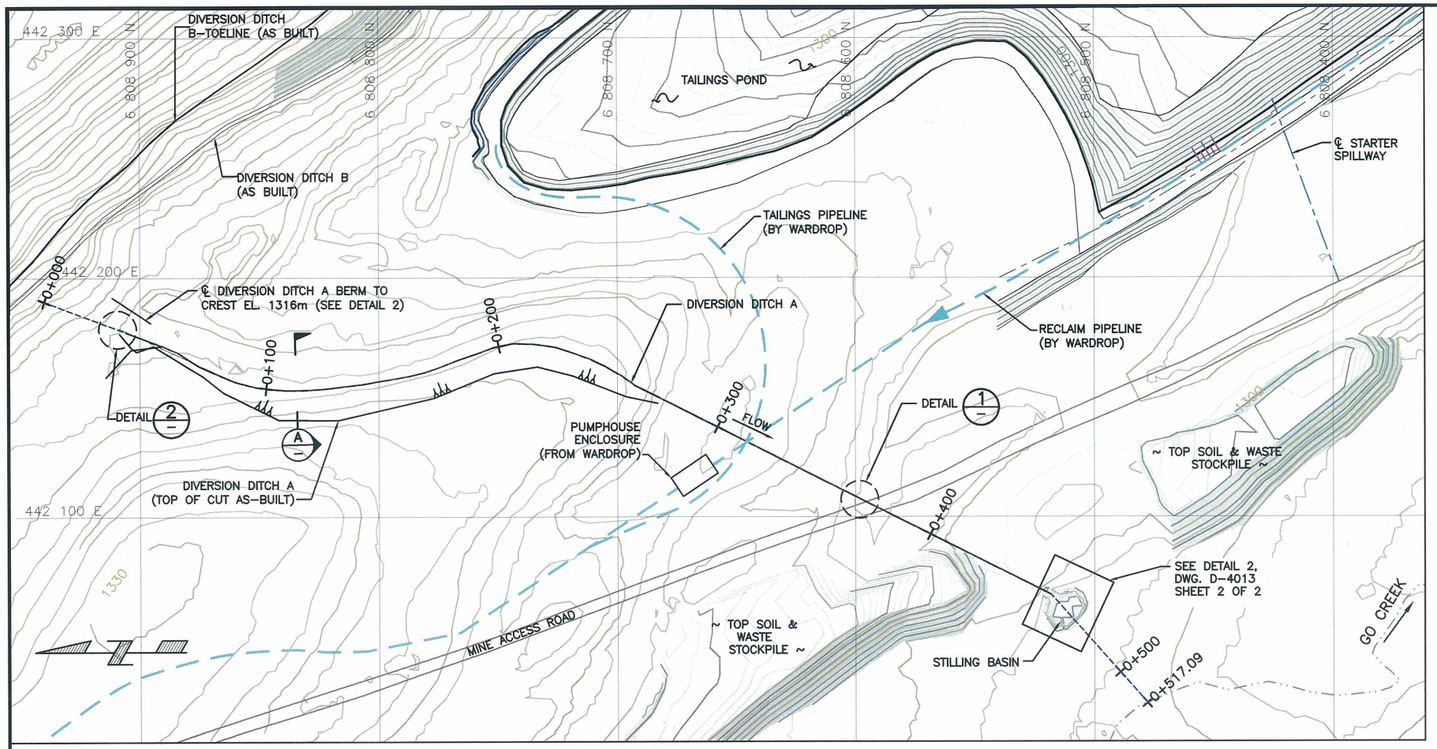
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CHECK. BY	HM	---
APP. BY:	HM	MAY 12/10

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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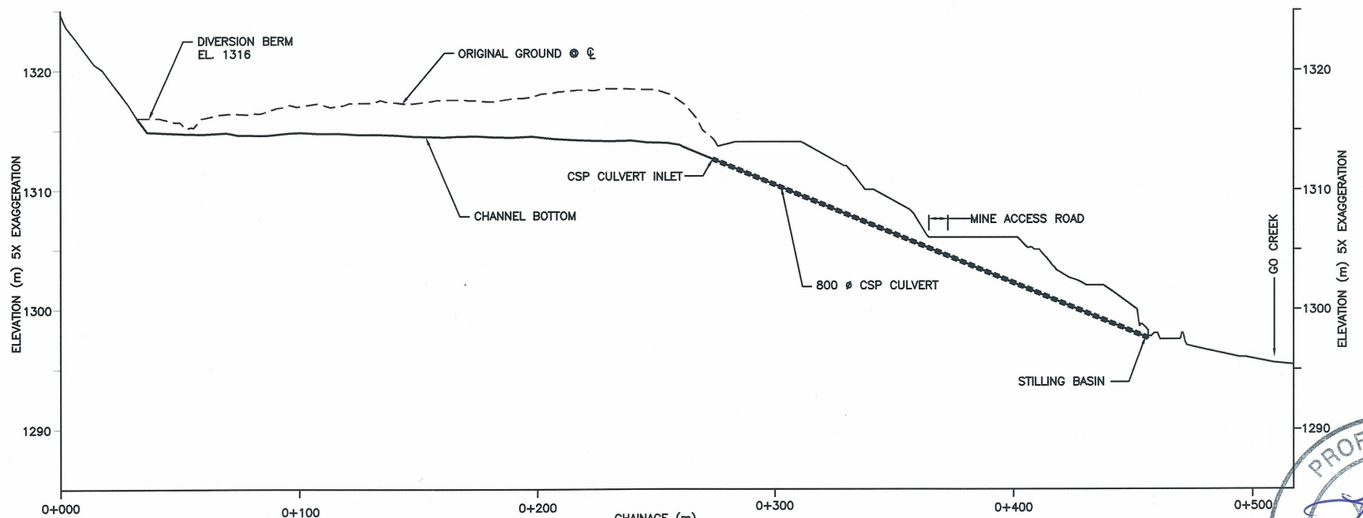
Klohn Crippen Berger

Yukon Zinc CORP
WOLVERINE PROJECT

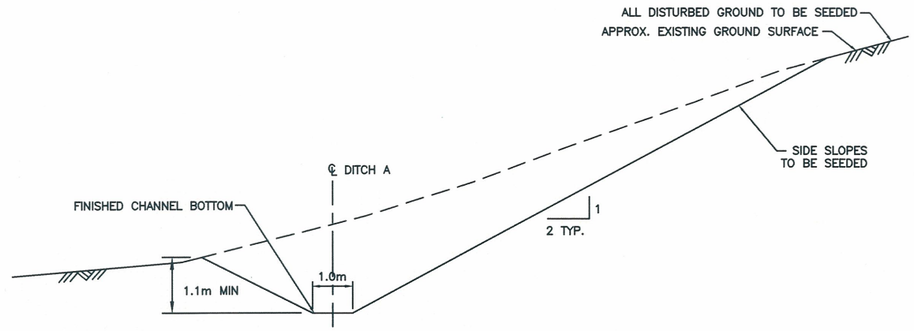
TAILINGS STORAGE FACILITY STARTER SPILLWAY PLAN, PROFILE AND SECTIONS



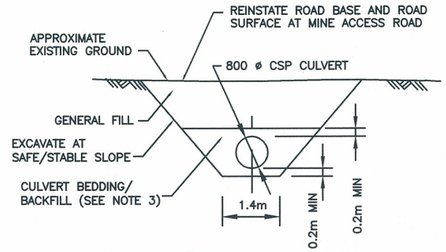
PLAN
SCALE A



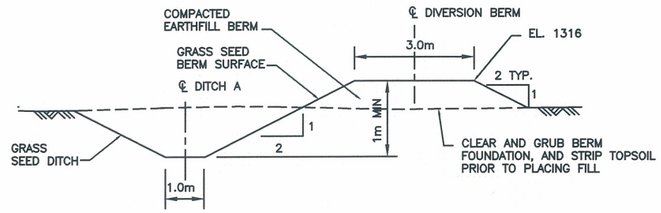
PROFILE DIVERSION DITCH A
SCALE A
VERTICAL SCALE = 5X HORIZONTAL SCALE



SECTION A TYPICAL OPEN CHANNEL SECTION
SCALE B
(NO SURVEY DATA)



DETAIL 1 TYPICAL CULVERT SECTION
NTS
(NO SURVEY DATA)



DETAIL 2 DIVERSION DITCH A BERM
NTS
(NO SURVEY DATA)

NOTES

1. FOR GENERAL SITE ARRANGEMENT SEE DWG. D–4001.
2. INVERT ELEVATIONS SHOWN ARE TO FINISHED CHANNEL BOTTOM.
3. CULVERT BEDDING/BACKFILL WELL GRADED 100 mm MINUS MATERIAL WITH LESS THAN 20% PASSING THE #200 SIEVE.
4. FOR RIPRAP AND GRANULAR FILTER GRADATION AND LAYER THICKNESS, SEE DWG. D–4013 SHEET 2 OF 2.
5. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.

SCALE A 0 100 m
SCALE B 0 6 m

CONSTRUCTION RECORD

PROFESSIONAL ENGINEER YUKON TERRITORY H. N. McLEOD

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DWG. NO.	REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
3	CONSTRUCTION RECORD	LC	MAY 12/10
2	DRAFT CONSTRUCTION RECORD	JL	MAR 5/10
1	ISSUED FOR CONSTRUCTION	MD	MAR 13/09
0	ISSUED FOR TENDER	MD	FEB 04/09

ISSUE/REVISIONS

SECTION:	
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DRAWN BY: KL	MAY 12/10
CHECK. BY HM	
APP. BY: HM	MAY 12/10

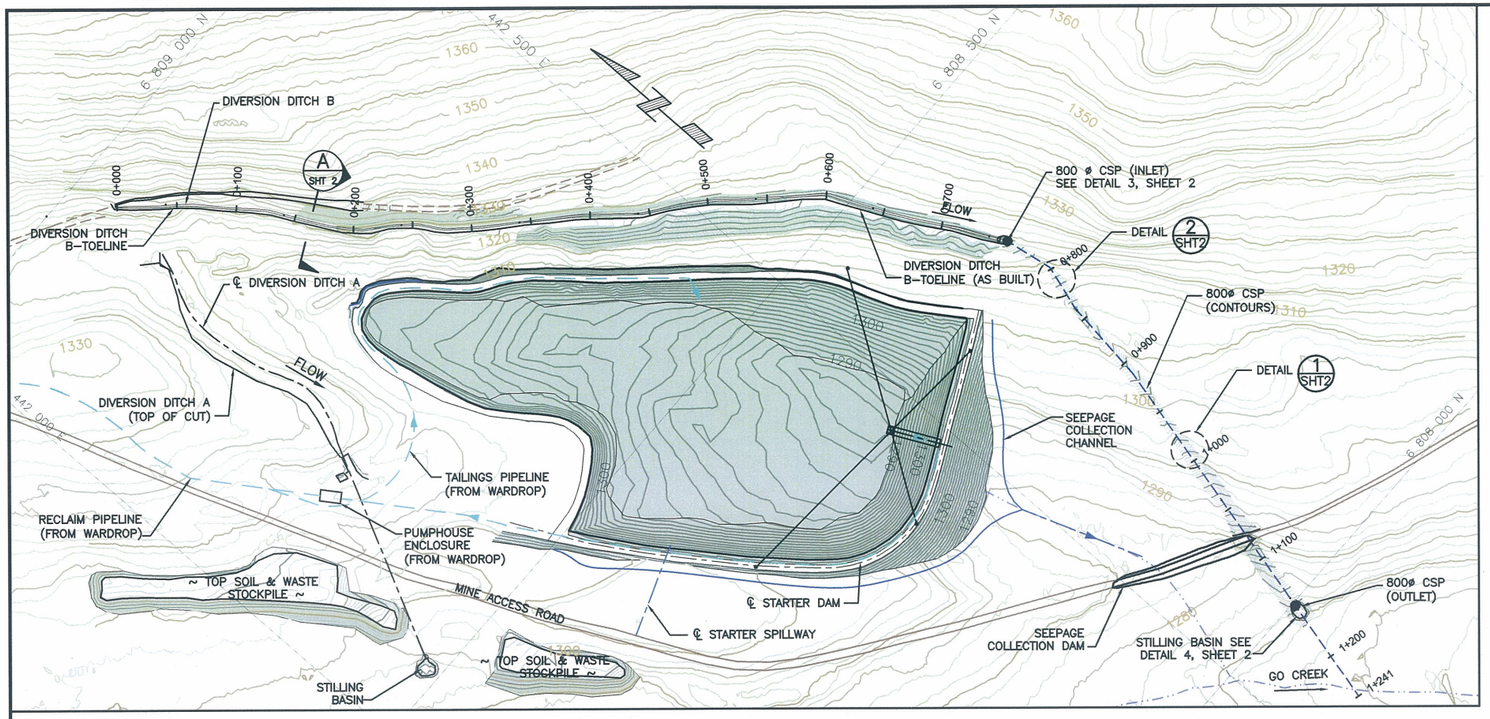
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Klohn Crippen Berger

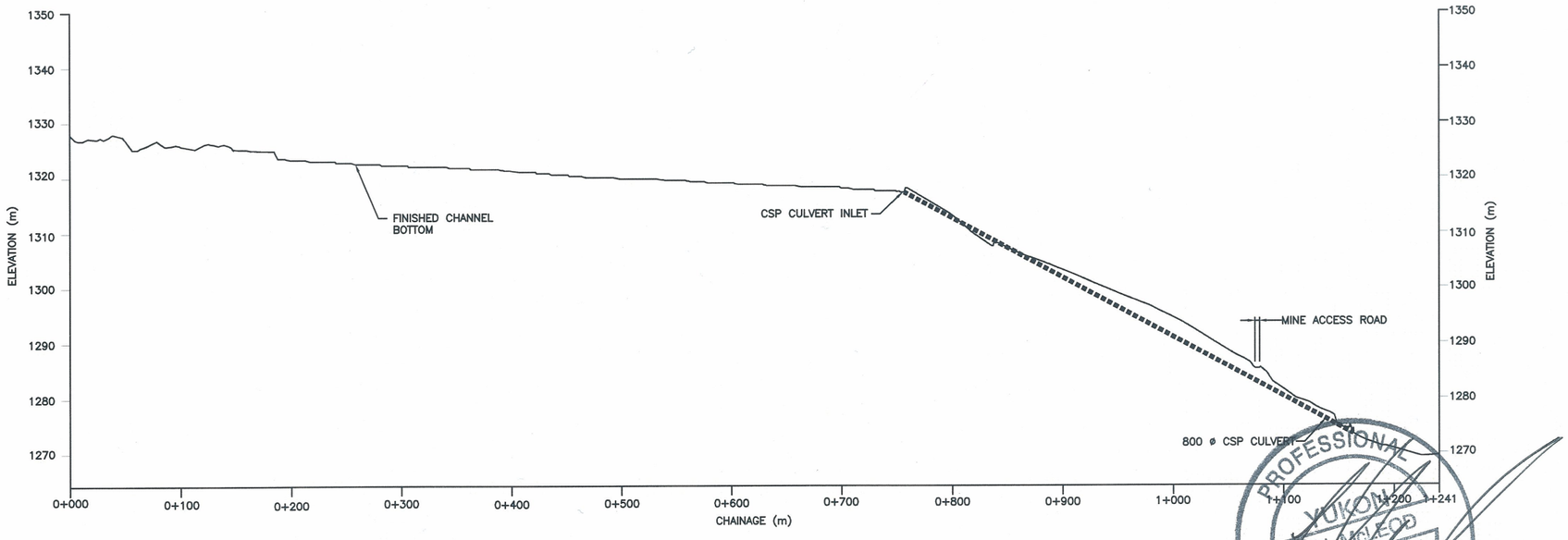
Yukon Zinc CORP
WOLVERINE PROJECT

TAILINGS STORAGE FACILITY DIVERSION DITCH A PLAN AND PROFILE AND SECTIONS

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Xrefs: by–others–May11–2010, CONT_DM_MINE_Mgrd(Mod7)(AR25–2010).dwg
3154765TD.DWG



PLAN



PROFILE DIVERSION DITCH B

VERTICAL SCALE = 5X HORIZONTAL SCALE

LEGEND

– – – – – APPROX. LOCATION OF 800 ø CSP.

NOTES:

1. FOR GENERAL SITE ARRANGEMENT SEE DWG. D–4001.
2. INVERT ELEVATIONS SHOWN ARE TO FINISHED CHANNEL BOTTOM.
3. CULVERT BEDDING/BACKFILL WELL GRADED 100 mm MINUS MATERIAL WITH LESS THAN 20% PASSING THE #200 SIEVE.
4. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.

PROFESSIONAL ENGINEER YUKON TERRITORY H. W. MACLEOD

CONSTRUCTION RECORD

SCALE 0 250 m

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DWG. NO. | REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
4	CONSTRUCTION RECORD UPDATE	LC	JUN 01/10
3	CONSTRUCTION RECORD	LC	MAY 12/10
2	DRAFT CONSTRUCTION RECORD	JL	MAR 5/10
1	ISSUED FOR CONSTRUCTION	MD	MAR 13/09
0	ISSUED FOR TENDER	MD	FEB 04/09

ISSUE/REVISIONS

PROJECT | PROCESS | CIVIL | MECH. | STRUCT. | PIPING | SERVICES | ELECT. | INSTR.

SECTION:		
SCALE:		DATE
DESIGN. BY	LC	MAY 12/10
DRAWN BY:	KL	MAY 12/10
CHECK. BY	HM	
APP. BY:	HM	MAY 12/10

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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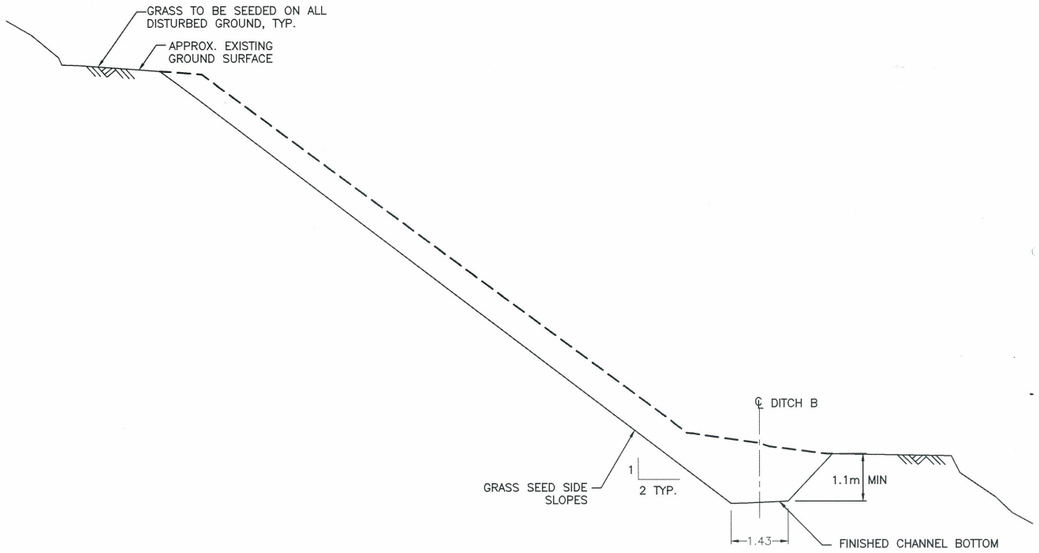
Klohn Crippen Berger

YukonZinc CORP
WOLVERINE PROJECT

TAILINGS STORAGE FACILITY
DIVERSION DITCH B
PLAN AND PROFILE – SHEET 1 OF 2

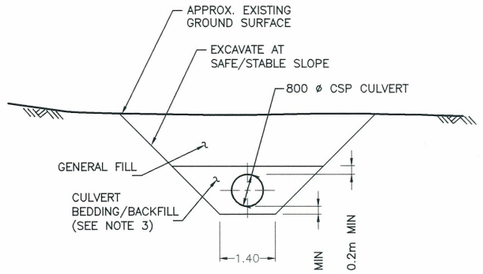
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315479STD.DWG



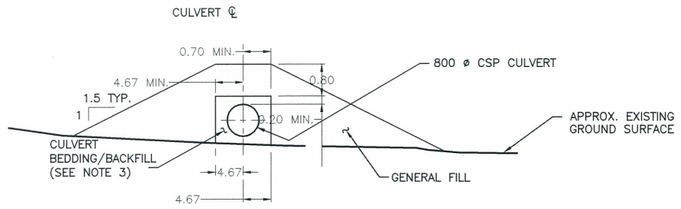
SECTION A
SCALE A
SHT 1

TYPICAL OPEN CHANNEL SECTION



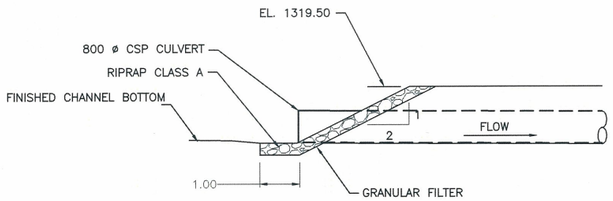
DETAIL 1
NTS
SHT 1

TYPICAL CSP CULVERT SECTION IN CUT



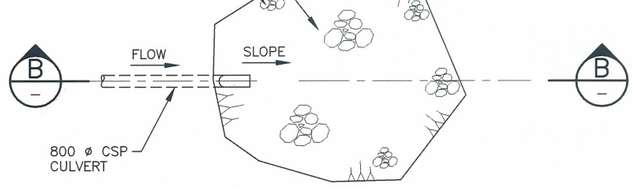
DETAIL 2
NTS
SHT 1

CSP CULVERT SECTION IN FILL



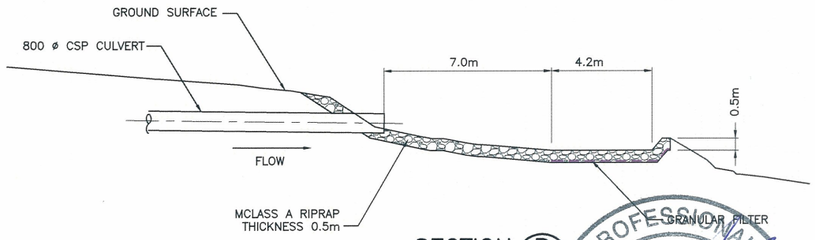
DETAIL 3
NTS
SHT 1

CSP CULVERT INLET



DETAIL 4
NTS
SHT 1

STILLING BASIN PLAN



SECTION B
SCALE B

RIPRAP AND GRANULAR FILTER GRADATION AND LAYER THICKNESS

(SEE NOTE 4)

Gradation and Layer Thickness

Material	Particle Size (mm)				Layer Thickness (mm)	
	D_{100}	D_{85}	D_{50}	D_{15}	Riprap	Filter
Riprap A	300	260	200	120	400	200 Filter 1
Riprap B	450	390	300	180	600	200 Filter 1
Riprap C	525	455	350	210	700	300 Filter 1
Riprap D	675	585	450	270	900	300 Filter 1
Riprap E	1200	1040	800	480	1600	300 Filter 1 + 400 Filter 2
Riprap F	1500	1300	1,000	600	2000	400 Filter 1 + 400 Filter 2
Filter 1	75	60 to 70	35 to 50	23 to 28	–	–
Filter 2	300	260	200	120	–	–

- Riprap gradation shall be within −5% to +10% of the specified D_{15}, D_{50}, AND D_{85} sizes
- Filter 1 shall be well graded between the 75 mm and 19 mm screen sizes.
- Filter 2 shall be the same gradation as Riprap A.
- Filter 1 grading is based on the subsoil being a silty sand and gravel

NOTES:

1. FOR GENERAL SITE ARRANGEMENT SEE DWG. D−4001.
2. INVERT ELEVATIONS SHOWN ARE TO FINISHED CHANNEL BOTTOM.
3. CULVERT BEDDING/BACKFILL SHALL BE WELL GRADED 100 mm MINUS MATERIAL WITH LESS THAN 20% PASSING THE #200 SIEVE.
4. UNLESS OTHERWISE DIRECTED BY THE ENGINEER, GRANULAR FILTER IS TO BE PLACED UNDER ALL RIPRAP.
5. RECORD ISSUE DRAWING IS BASED ON LIMITED "AS BUILT" DATA PROVIDED BY YZC, THE DRAWING MAY NOT REFLECT ALL FIELD CHANGES.

SCALE A 0 6 m

SCALE B 0 10 m

PROFESSIONAL ENGINEER YUKON H. N. McLEOD TERRITORY

CONSTRUCTION RECORD

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DWG. NO. | REFERENCE DRAWINGS

PROJECT | PROCESS | CIVIL | MECH. | STRUCT. | PIPING | SERVICES | ELECT. | INSTR.

NO	DESCRIPTION	BY	DATE
3	CONSTRUCTION RECORD	LC	MAY 12/10
2	DRAFT CONSTRUCTION RECORD	JL	MAR 5/10
1	ISSUED FOR CONSTRUCTION	MD	MAR 13/09
0	ISSUED FOR TENDER	MD	FEB 04/09

ISSUE/REVISIONS

SECTION:		
SCALE:		DATE
DESIGN. BY	LC	MAY 12/10
DRAWN BY:	KL	MAY 12/10
CHECK. BY	HM	
APP. BY:	HM	MAY 12/10

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
----------	M09234A05	D−4013	3

Klohn Crippen Berger

Yukon Zinc CORP

WOLVERINE PROJECT

TAILINGS STORAGE FACILITY
DIVERSION DITCH B
SECTIONS AND DETAILS – SHEET 2 OF 2

Time: 10:25:16
Date: 5/12/2010
Scale: 1=4(PS)
Drawing File: M09234A05 – Wolverine 2009 Construction\400 Drawings\as-built-2009-Persyst\Draft\asbuilt-Mar25-10\D-4013-Sht2r3.dwg (klin)
Xrefs: CONT_2M_MINE_4Mgrid(Mod8FEB25-2010)
315#STD.DWG