POLARIS MINE

POST-RECLAMATION MONITORING REPORT

3rd QUARTER 2011

FOR THE NUNAVUT WATER BOARD

&

ABORIGINAL AFFAIRS AND NORTHERN DEVELOPMENT CANADA

December 28, 2011

Teck

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December 28, 2011

Nunavut Water Board
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Attention: Phyllis Beaulieu, Manager of Licensing

Aboriginal Affairs & Northern Development Canada
969 Qimugjuk Building, 2nd Floor
Iqaluit, Nunavut
X0A 0H0

Attention: Mr. Jeff Mercer, Manager, Lands Administration

Dear Ms. Beaulieu and Mr. Mercer;

Re: <u>Polaris Mine 2011 3rd Quarter Water Licence NWB1POL0311 and Decommissioning and Reclamation Monitoring Report</u>

Please find attached the Polaris Mine 2011 3rd Quarter Water Licence Report / Decommissioning and Reclamation Plan (DRP) Report. This is being submitted electronically and followed by a paper copy. The paper copy has attached in Appendix 12 a CD containing the electronic file of the document in pdf format.

During the 3rd Quarter of 2011, the key annual monitoring requirements for the Polaris Mine were undertaken, as the site was snow free during July and August. From July 16th to 21st, 6 people were on site to conduct the geotechnical inspection, surveying, preparing for final removal of equipment from site, retrieving thermistor data and collecting other miscellaneous samples. A site inspection was conducted by 4 representatives from Aboriginal Affairs and Northern Development Canada (AANDC) on July 17th. The group consisted of Ian Parsons (Water Resources), Kevin Robertson (Lands Inspector), Holger Hartmaier, consulting Geotechnical Engineer from BGC Engineering; Christine Berube (summer student, Water Resources). The AANDC representatives spent all day on site and inspected all areas of significant reclamation activities.

No reclamation activities occurred on site during July or August other than the final organizing and removal of the temporary camp and remaining equipment and supplies. These had been prepared in August 2010 for demobilizing in 2011. On September 1st, all remaining materials were removed by sealift from the site (excluding a wood shed which was left for a local Inuit).

The attached report details the following items that were inspected and/or sampled during the 3rd Quarter:

- Water quality samples of effluent discharge from Garrow Lake were taken weekly during periods of flow.
- Surface water sampling of the reference area (Garrow Bay)
- Topographic surveys:
    a. The former subsidence area over the mine
    b. The marine foreshore area adjacent the former mill area
- Measured the water elevation at Garrow Lake.
- In late August (minimum ice conditions), the water chemistry of the water column of Garrow Lake was sampled from two different sampling sites.

- A geotechnical inspection of the site
- Wind speeds at Resolute were reviewed during open water periods of Garrow Lake when the site was not occupied.
- Surface water TSS samples of were taken at Frustration Lake
- The surface water observed at Little Red Dog Landfill was sampled for zinc content.
- Three soil samples from the former Concentrate Storage Building area were collected.
- The annual geotechnical inspection of the site by a Golder Associates professional geotechnical engineer was conducted.
- Retrieved the temperature data from all eight thermistor strings that monitor the temperature conditions within the two landfills.
- Monitoring final demobilization activities and shipping of all remaining equipment and supplies off the site by an environmental consultant.

If there are any questions related to this report, please contact me at any time.

Yours truly,

Bruce Donald
Reclamation Manager
Environment and Corporate Affairs
Teck Resources Limited

Enclosure:

- 2011 3rd Quarter Polaris Mine Site Monitoring Report

CC: Ian Parsons, INAC

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1. EXECUTIVE SUMMARY IN INUKTITUT

Refer to Appendix 1 for an executive summary of the contents of this report translated into Inuktitut by Susan Salluviniq of Resolute Bay, Nunavut which will be submitted with the paper copy of this report.

2. INTRODUCTION

This is the **final** data that will be collected and reported under the current Water Licence (during the 4th quarter there are no sampling requirements) as it expires on December 31, 2011.

Detailed site monitoring has been done at this site since the mine began operations in 1981 and has continued on an on-going basis including since reclamation activities were completed in September 2004. The mine was regulated by the Metal Mining Effluent Regulations (MMER) during its final years in operation and successfully completed its Environmental Effects Monitoring program leading to obtaining the status of a Closed Mine under the MMER. MMER sampling and water quality requirements were written into the current Water Licence and the Polaris Mine site has been consistently been compliant with all effluent permit limits; with one single and minor exception (TSS was measured in excess of MMER limits on one occurrence during a spring freshet. However, there all metals concentrations remained compliant and a concurrent test for acute lethality verified there were no acute lethality effects).

During the 3rd Quarter of 2011, the key annual monitoring requirements for the Polaris Mine were undertaken, as the site was snow free during July and August. From July 16th to 21st, 6 people were on site to conduct a geotechnical inspection, topographical monitoring by surveying, retrieving thermistor data from landfills, and collecting other miscellaneous samples. A contractor also had two people on site making final preparations for removal of all remaining equipment and supplies from the site. A site inspection was conducted by 4 AANDC representatives on July 17th. The group consisted of Ian Parsons, (AANDC, Water Resources); Kevin Robertson (Lands Inspector, AANDC), Holger Hartmaier, consulting Geotechnical Engineer from BGC Engineering; and Christine Berube (summer student, Water Resources). The AANDC representatives spent all day on site and inspected all areas of significant reclamation activities. They also collected water samples from Garrow Creek, Garrow Lake, Frustration Lake and LRD Quarry Landfill.

No reclamation activities occurred on site 2011, other than on September 1st, the final removal of Teck's camp site materials, equipment, and supplies was done by sea lift. A wood shed was left for a local Inuit at his request. Two quads, a boat and miscellaneous equipment remained on site until September 2nd for the Garrow Lake sampling event. After the Garrow Lake sampling was completed, this equipment was also removed.

3. WATER QUALITY MONITORING

During the 3rd Quarter, water quality monitoring was undertaken within the water column of Garrow Lake and from Garrow Creek at the "Final Discharge Point" (Garrow Lake effluent).

3.1. Garrow Lake Effluent

The Water Licence and the DRP requires weekly sampling of the Final Discharge Point from Garrow Lake during periods of effluent discharge. Sampling started on July 2nd and continued through until September 9th. Appendix 2 presents all of the water quality monitoring data conducted at the Final Discharge Point. The water quality program was overseen by Azimuth Consulting Group (lab coordination) in combination with contracted experienced sampling personnel. Azimuth Consulting Group received all the data and compiled the report attached in Appendix 2.

All water quality results were compliant with the parameters specified in the Water Licence. Table 1 summarizes the primary parameters of interest for the Garrow Lake effluent and the associated Water Licence regulatory limits.

	Concentration - mg/L		
	LEAD	ZINC	TSS[1]
Water Licence Limits			
Monthly Mean	0.07	0.50	15.00
Maximum Grab	0.14	1.00	30.00
Sample Results from:			
02-Jul-11	0.0030	0.011	1.0
12-Jul-11	0.0002	0.025	1.0
18-Jul-11	0.0002	0.057	1.0
23-Jul-11	0.0001	0.062	3.0
16-Aug-11	0.0002	0.041	1.0
26-Aug-11	0.0002	0.041	1.0
02-Sep-11	0.0002	0.041	1.0
09-Sep-11	0.0003	0.051	1.0

Note - Analysis less than dection limit

TABLE 1

There were no adverse effects observed in the two acute toxicity testing events for both rainbow trout and Daphnia magna (all had LC50 values > 100% effluent). Of the 3 sublethal tests, sublethal effects were observed in the Echinoderm fertilization and Champia reproduction tests, but not the 7 day topsmelt growth and survival test. In the Echinoderm fertilization test, only the full strength effluent concentration produced a significantly lower fertilization ratio relative to the control group. For the Champia test, there was 43% impairment to cystocarp production at the IC25 level.

3.2. Garrow Lake Water Column

The Water Licence requires that comprehensive sampling of Garrow Lake water column is conducted at two monitoring stations (Water Licence Station 262-3 and 262-3A) during the period of maximum ice melt conditions. Sampling was undertaken on September 2nd, 2011.

In summary, the key results from the testing are as expected:

- The structure of Garrow Lake remains stable due to the salinity differences (i.e. increasing density with depth) in the water column.
- The profile of chemistry through the water column remains consistent with previous sampling events.
- Both the chemistry and density data between the two sampling locations (262-3 and 262-3A) are virtually identical and continue to confirm that there is strong horizontal uniformity within layers of the lake.

Appendix 3 contains the field data collected with the Hydrolab through the water column which includes; pH, temperature, dissolved oxygen, conductivity and Redox potential. The data collected is consistent with previous data and demonstrates that the increase in water density with depth in the lake (as indicated by conductivity) remains strong as predicted and verifies the continued stability of the meromictic nature of the lake. Comparing the data from both Station 262-3 and 262-3A continue to

confirm that both sample stations result in virtually identical data from the depth profiles being measured.

Appendix 4 contains the sample chemistry results for data collected at various depths of the water column from both Stations 262-3 (located near the lake centre) and 262-3A (located near the outlet of the lake) on September 2nd including QA/QC data. While not required by the Water Licence, the lake centre station (262-3) was also sampled and analyzed for dissolved analysis from samples taken from various depths below surface (3M, 7M, 9M, 10M, 11M, and 15M).

No unusual results were noted and the chemistry continues to show:

- The surface waters to contain total zinc concentrations below 0.2 mg/L (at 9M and shallower),
- Increasing concentrations at 9M (0.221 mg/L total zinc) and peaking at 10M depth (0.376 mg/L total Zn), and
- Then decreasing by 11M depth (0.153 mg/L total Zn), and
- By 12M depth total zinc concentrations are down to 0.026 mg/L, and to less than 0.010 mg/L total Zn by 15M deep.

It is important to note that even at the peak in zinc concentrations at the 10M depth, the zinc concentrations are below the 0.5 mg/L parameter in the Water Licence for effluent from the lake. Appendix 5 contains longer term graphs showing decreasing zinc concentration trends by depth since 2005.

3.3. Other Surface Waters

Approvals under the DRP require sampling of surface waters at two additional locations each year. These were collected during the 3rd Quarter when summer conditions permitted the sampling to occur (Refer to Appendix 6 for laboratory reports). The results are discussed below.

3.3.1. Little Red Dog Quarry Landfill

The Little Red Dog Quarry landfill (LRDQL) cover was placed with a low angle slope so that any water from rainfall or from melting snow will drain from the quarry area through the notch cut in the quarry wall. The DRP approval permitting the placement of metals contaminated soils in LRDQL require that any surface waters are sampled annually. This is intended to confirm that no unacceptable concentrations of metals are being leached from the capped soils.
On July 19th, 2011 a small area with water slowly flowing on surface in the notch of LRD Quarry was sampled. The surface water was only flowing a short distance from where a small puddle was observed to where the water re-entered the coarse ground surface materials and disappeared. This is the same as was observed in previous years.

The metal concentrations were low confirming that there are no concerns with uptake of metals into surface water flowing from this area. Results were:

- Lead was 0.0006 mg/L (total),
- Zinc was 0.012 mg/L (total)

3.3.2. Frustration Lake

The approval under the DRP to decommission the freshwater system at Frustration Lake required that on an annual basis during the ice free period in the summer, a water sample of the lake is taken adjacent to

the jetty. The intent of the sample is to monitor TSS as an additional indicator that the jetty is not being eroded at an unacceptable rate. The inspection of the jetty is also included in the annual geotechnical inspection in Appendix 8 of this report. The jetty continues to be stable and there was no evidence of significant erosion. The lake water was clear, the laboratory report of the sample collected on July 19th, 2011 had a TSS of < 4.0 mg/L.

4. PHYSICAL STABILITY OF THE SITE

The physical stability of the site was monitored by a geotechnical inspection the site and topographical surveys.

4.1. Subsidence Survey

Annually, Teck contracts a topographic survey of this area to monitor for any settlement compared to previous years. In 2011 as in previous years, this survey was conducted using a Trimble 5700/5800 Trimark 3 high accuracy GPS system. This system allows a large number of data points to be collected so that a detailed and accurate topographic map can be drawn. The resulting topographic contour map is included in Appendix 7. It is apparent from the cross sections comparing data collected in 2005, 2010 and 2011 that there is no evidence of any significant movement in this area since the topographic surveys were initiated. The data from other years have been previously submitted are not shown as they clutter up the drawing but they do not show any different results (Refer to previous year's submitted reports to view those results). The 2011 to 2005 comparison shows the longer term and the 2011 to 2010 data shows any potential changes from the previous year.

It is apparent that cracks seen one year are not necessarily identified the following year. Surveys from one year to the next do not consistently identify the same cracks as seen in previous survey drawings. It is not because they have disappeared, but because they can be easily missed. Conversely there were two short cracks identified in 2010 that had not been previously surveyed. It is believed that:

- One existed previously and was just small enough to not have been previously surveyed, and
- Based on the shape of the second crack, it likely represents a small area where snow/ice has melted causing localized settling of the soils.

As the detailed topographic survey does not indicate any significant movement, it reinforces that there should not be any new tension cracks appearing.

In addition to the detailed surveys being done, a Golder Associates professional geotechnical engineer his annual inspection of this area. The geotechnical engineer did not identify any areas of change from previous inspections or of concern (refer to the geotechnical report in Appendix 8).

The primary purpose of this monitoring is to confirm that the ground surface is stable, and that there are no public safety hazards or hazards to wildlife of the ground surface over the underground mine workings. Since 2005, both the survey data and the visual inspections verify that there are no concerns evident.

4.2. Marine Foreshore Survey

Annually, Teck contracts a survey along three lines oriented perpendicular to the marine shoreline in the area of the former product storage shed, barge area, and dock. These areas were re-profiled to a nearly flat slope near the waters edge to minimize the rates of erosion from wave action along the shoreline in this area.

The results of the survey are included in Appendix 7. The topography is continually being reworked by ice that is pushed up against the shoreline and this is apparent in the topographic sections in Appendix 7 that compares surveys from 2011, 2010, 2009, 2008 and 2005. While the ice action against and beneath the shoreline area have altered the look of the foreshore, there is no evidence of any significant erosion of the shoreline occurring. A discussion of this area is included in the geotechnical inspection below in the section identified as Area 8.

4.3. Annual Geotechnical Inspection

There is little detail in either the Water Licence or the DDRP approval as to the specific requirements for the annual geotechnical inspection. Each year, a comprehensive inspection is conducted by an independent professional geotechnical engineer. The 2011 inspection report is included in Appendix 8. The inspection included all of the engineered structures constructed or altered during the reclamation process including:

- Garrow Lake, Creek and Dam
- Frustration Lake Jetty and Access Road
- New Quarry Area
- Subsidence Area
- Operational Landfill
- Little Red Dog quarry Landfill
- Mine Portals
- Marine Foreshore Adjacent to Former Dock

Excerpts and comments from the Golder Associates report are summarized (below in the order previously reported in Water Licence 3rd Quarter reports):

Area 1 – Garrow Lake, Creek and Dam

- "Minor thaw settlement of the crest of the breached dam has been unchanged during recent post-closure annual geotechnical inspections. The sideslopes of the dam breach were observed to be free of erosion or indications of slope instability during the July 2011 inspection."
- "Rip-rap at the base of the breach slopes appears to be in good condition and effectively protects the breach slopes from channel erosion."
- "Since decommissioning, a ridge of gravel has been accumulating across the breached wave break outlet channel. The ridge or berm of gravel across the breached outlet has been increasing in size (i.e. elevation and width) each year as a result of additional gravel accumulation. The mechanism creating the ridge of gravel is considered to be ice and wave action that relocates gravel from the shallow water near the south shore of Garrow Lake. This appears to be a natural process that likely also occurred prior to mine site development. The relatively coarse nature of the gravel permits a steady flow of water through the gravel ridge from the lake into the creek channel during the summer. However, the gravel ridge appears to be retaining some water and

may be influencing the lake water level (it should be noted that Golder does not review the lake level survey data collected by others which indicates the water level has remained essentially unchanged since 2008).

Area 2 – Frustration Lake Jetty and Access Road

- "The Frustration Lake access road remains in good condition, with some self-armouring erosion at drainage crossings. Previously repaired erosion gullies were all observed to be stable during the July 2011 inspection and should not require further attention."
- "Displacement of some jetty rockfill due to ice being pushed up onto the end of the jetty was observed during the time of the inspection. Lake water around the jetty was observed to be clear during the July 2011 inspection."

Area 3 – New Quarry Area

- Only minor natural erosion features were noted but none were of concern. Side slopes of the quarry continue to appear stable. There were no concerns noted.

Area 4 – Subsidence Area

- "There were no significant visual changes to the mine subsidence area observed during the July 2011 geotechnical inspection compared to previous post-closure inspections. No features were observed in the subsidence area during the July 2011 inspection that present a risk to either humans or wildlife."
- "Annual topographic surveying indicates that no significant settlement has occurred during the post closure monitoring period (i.e., since 2005)."

Area 5 – Operational Landfill

- The geotechnical report states "No indications of slope instability or exposed waste were observed. No tension cracks or settlement depressions were observed on the landfill crest. No indications of erosion or slope instability were observed on the landfill slopes." There were no concerns identified in the report.

Area 6 – Little Red Dog Quarry Landfill

- "No protruding waste, tension cracks or settlement depressions were observed on the Little Red Dog quarry Landfill cover during the July 2011 inspection." The report also comments on the burial in 2010 of miscellaneous debris collected during the post-closure monitoring period, and that thermal monitoring done by Teck shows that the active layer remains within the thickness of the cover cap.

Area 7 – Mine Portals

- "All four portals were observed to be in good condition and frees of any signs of instability or erosion during the July 2011 inspection".
- "The slope in front of the main portal that was regarded and flattened in 2009 to repair a slope failure was observed to be in good condition."

Area 8 – Marine Foreshore Adjacent to Former Dock

- "The slopes adjacent to the former dock structure were observed to be stable. No active erosion features discharging sediment were observed in the foreshore area during the July 2011

inspection. The water adjacent to the shoreline has been clear during the current and previous geotechnical inspections indicating that sediment is not being discharged to the ocean from the reclaimed foreshore area."

- "Thaw settlement and the formation of gravel bars in response to ocean wave and ice action has been observed along the shoreline during previous post-closure inspections." "Overall the foreshore area appears to be stable and is not expected to require further attention."

The complete geotechnical inspection report is included in Appendix 8.

4.4. Garrow Lake Elevations

Annual surveys of the elevation of Garrow Lake are done. In August 2006, a coarse gravel berm was noted at the outlet of Garrow Lake due to ice action. This was occurring as the up to 3.5 m thick ice sheet that forms on the lake each winter moves around due to area winds. The moving ice sheet scrapes the shallow lake bottom near the edge of the lake and pushes materials up onto the shoreline. This material has formed a ridge or berm that is made of coarse lake bottom materials. Water discharges from the lake through the berm and results in low flow rates early in the summer with increasing flow rates as the warm weather persists. After the lake was lowered (for decommissioning of the dam), the coarse berm on the shore increased in size due to ice action. As a result the elevation of the lake increased between 2005 and 2008 along with the elevation of the lake. Surveys of the berm show significant changes to its profile from year to year due to the on-going ice action (refer to topographic drawing in Appendix 7). Surveys of the lake elevation are taken during the mid to late July when personnel are at the site for its annual inspection. While the elevation of water increased by 0.67 m from 2005 to 2008, it has now stabilized with the mid to late July lake elevation fluctuating less than 0.1 m.

TABLE 2
GARROW LAKE ELEVATIONS (Metres)

DATE	Survey Station 352 Elev. (m)	INSTRUMENT HEIGHT	ROD READING	LAKE ELEVATION (m)	Comments
27-Jun-05	1006.71	0.55	1.96	1005.30	
24-Aug-05	1006.71	0.55	2.00	1005.26	Low flow in creek as getting colder
29-Jun-06	1006.71	0.435	1.46	1005.69	
09-Jul-06	1006.71	0.438	1.53	1005.62	Water flowing through gravel berm
20-Aug-06	1006.71	0.305	1.52	1005.50	Water still flowing at a low rate
31-Jul-07	1006.71	0.655	1.738	1005.60	Water flowing through gravel berm
19-Jul-08	1006.95			1005.97	Used precise GPS
29-Aug-08					Unable to measure due to waves
24-Jul-09	1006.95			1006.09	Used precise GPS
14-Jul-10				1006.04	Used precise GPS
19-Jul-11	1006.95			1006.10	Used precise GPS

Note: Pre-Dam lake elevation at end of discharge season was reported to be 1005.7m
Survey Station #352 location is -878.338, 3679.594 (local grid)
NAD83 UTM 14 561585E, 8367439N

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5. OTHER SITE MONITORING

In addition to monitoring the chemical and physical stability of the site, monitoring of wind speeds at Resolute Bay, monitoring of internal landfill temperatures, and monitoring of metals concentrations of soils in the former Concentrate Storage Building were undertaken during the 3rd Quarter of 2011.

5.1. Resolute Bay Wind Monitoring

The Water Licence and the DRP requires that during open water periods on Garrow Lake when personnel are not stationed on site, that wind speeds are monitored at Resolute Bay. The purpose is to identify if there were any wind storm events with sufficient energy to potentially cause mixing of the surface layers of Garrow Lake. If this were to occur, then Teck is required to conduct a sampling of the water column of Garrow Lake as soon as practical to identify if there had been mixing of the mixolimnion with the halocline.

Monitoring data is collected from the weather station at Resolute. The data provided is the 2 minute mean wind speed taken at the top of each hour. While this data is not the "average wind speed for the hour", it is the only data available and is used as a surrogate for this average. For monitoring purposes, if there are several hours where the wind speed recorded is equal or above 50 km/hr, then this data is reviewed. The detailed wind speed data is provided in Appendix 9.

Garrow Lake was sampled on September 2nd, 2011 and so Environment Canada weather records were examined for the month of September which would be the last month at Polaris where Garrow Lake would have some ice free days. On September 22nd and 23rd, at Resolute Bay, wind speeds exceeded 50 km/hr for 34 hours consecutively (averaged 66 km/hr). As Garrow Lake is over 80 km from Resolute Bay there is no way of knowing if similar conditions occurred at Garrow Lake.

However, there are two reasons why this is not a concern:

- At the time that the wind mixing issue evaluated, the halocline was expected to be 7.5 m deep. Currently the surface layer is 2.5 m thicker (i.e. the halocline is 10 m deep). Mixing calculations done by Paul Erickson of AXYS Environmental Consulting in the report titled "Garrow Lake Dam – Effect of Removal on lake Stability and Outflow Water Quality" dated March 12th, 2001 (refer to Polaris Mine Decommissioning and Reclamation Plan, Volume 2, Appendix 3) states that "The results show that a 13.5 m/s wind (49 km/h) blowing for 1 day could mix the upper 1m of the halocline into the surface layer, making it 8.5 m deep. Another 8 days of the same wind would be required to further deepen the surface layer by 2 m to 10.5 m. Stronger winds would accomplish the same mixing in shorter times." While the wind speed in September was higher than the 49 km/hr used in Mr. Erickson's calculations, it lasted for less than 1 ½ days, which would not be sufficient to mix the surface layer 10 m deep.
- If some of the halocline were to mix with the surface layer, the concentrations of total zinc in the surface layer is now less than 0.2 mg/L, and the maximum concentration of total zinc at the top of the halocline (in a layer less than 1m thick) is now only 0.376 mg/L. Both the surface layer and below the halocline, are both compliant with zinc permit criteria for the Water Licence even if this water were to discharge directly as undiluted effluent.

5.2. Landfill Thermistor Monitoring

Four thermistor strings were installed in each of the Little Red Dog Quarry (LRDQ) Landfill and the Operational Landfill. The thermistor strings each have a series of thermistors located at various depths through the cover cap and deep into the landfills to monitor the temperature conditions. Originally, the thermistor data was recorded once annually when personnel were on site. To provide more useful and detailed information, in 2006 the installations were improved and data loggers were installed. Each summer, the data from these loggers has been collected providing daily temperature readings from all of the thermistor sensors.

In June 2010 new batteries for the data loggers were mailed to Resolute so that the batteries in the data loggers could be replaced in July. The batteries were lost in the mail and didn’t arrive in time. As the batteries are sized to provide a two year service life at Polaris, the one year old batteries that were in service we left in place. However, over the winter from 2010 to 2011 the batteries in both data loggers failed. New batteries were installed in July 2011 during the annual site inspection. The data collected prior to the battery failures was retained in the data loggers and so the summer peak temperatures from 2010 were recovered. The temperatures through the winter were of less interest, which fortunately is the period of time when the data was not collected. As the new batteries were replaced in July 2011, the peak temperatures in the cover cap which typically occur in August of each year were able to be retrieved on September 2nd, 2011. Temperatures for deeper thermistor bulbs did not yet reach their peak summer temperatures as there is a time delay for the surface heat to penetrate deeper into the ground. However, it is the near surface temperatures (i.e. in the cover cap) that are of primary interest.

The data from July 14, 2010 to September 2, 2011 is included in Appendix 10. The complete data set from 2006 to 2011 is included in the electronic files that are submitted with this report. Due to the volume of data collected from 2006, the complete data set is too large to include in paper format. The data has been plotted to show the long term variations in temperature on a daily basis at varying depths within both landfills.

Table 3 presents the key data for 2010 and 2011 showing the shallowest depth of soil confirmed to remain frozen during the summer.

TABLE 3
SHALLOWEST LANDFILL THERMISTORS TO REMAIN FROZEN ALL YEAR

LANDFILL	THERMISTOR	DEPTH	DATE	MAX. TEMPERATURE (Celsius) DURING THE YEAR 2010	2011
OPERATIONAL LANDFILL					
	#OL1	0.75	12-Aug-10	-0.590	
		0.75	13-Aug-11		-0.533
	#OL2	1.25	4-Aug-10	-0.459	
		1.50	29-Aug-11		-0.796
	#OL3	1.00	3-Aug-10	-0.550	
		1.00	13-Aug-11		-0.090
	#OL4[1]	2.92	19-Sep-10	-2.726	
		2.92	2-Sep-11		-2.713
LITTLE RED DOG QUARRY LANDFILL					
	#LRD1	1.00	4-Aug-10	-0.432	
		1.00	14-Aug-11		-0.217
	#LRD2	1.00	1-Aug-10	-0.301	
		1.25	14-Aug-11		-0.733
	#LRD3	1.20	4-Aug-10	-0.303	
		1.20	15-Aug-11		-0.237
	#LRD4	1.06	2-Aug-10	-0.593	
		1.06	14-Aug-11		-0.088

Note 1 - Thermistor #OL4

The next shallowest thermistor is at 0.92 M

Thermistor bulbs between these two depths have failed.

At 0.92M depth the maximum temperatures recorded:

In 2010 was +0.368 ^{0}C

In 2011 was +1.777 ^{0}C

5.2.1. Operational Landfill Thermistors

The cover cap at the Operational Landfill is performing as designed. Excluding Thermistor String #OL4, the deepest the cover cap thawed in the summer of 2010 was less than 1.25 m (-0.459 ^{0}C) and in 2011 was less than 1.50 m deep (-0.796 ^{0}C). Thermistor String #OL4 has a functioning thermistor at 0.92 m deep and then thermistors between it and the one at 2.92 m deep have failed so there is not data available between these two depths in this hole.

As the minimum cap thickness is 1.8m, the landfill contents remain well below the active layer that briefly thaws in the summer. Graphs showing longer term trends of thermistor temperatures for the four thermistors in the Operational Landfill are presented in the following pages.

FIGURE 1
OPERATIONAL LANDFILL THERMISTOR #OL1
Temperature By Depth Below Surface VS Date

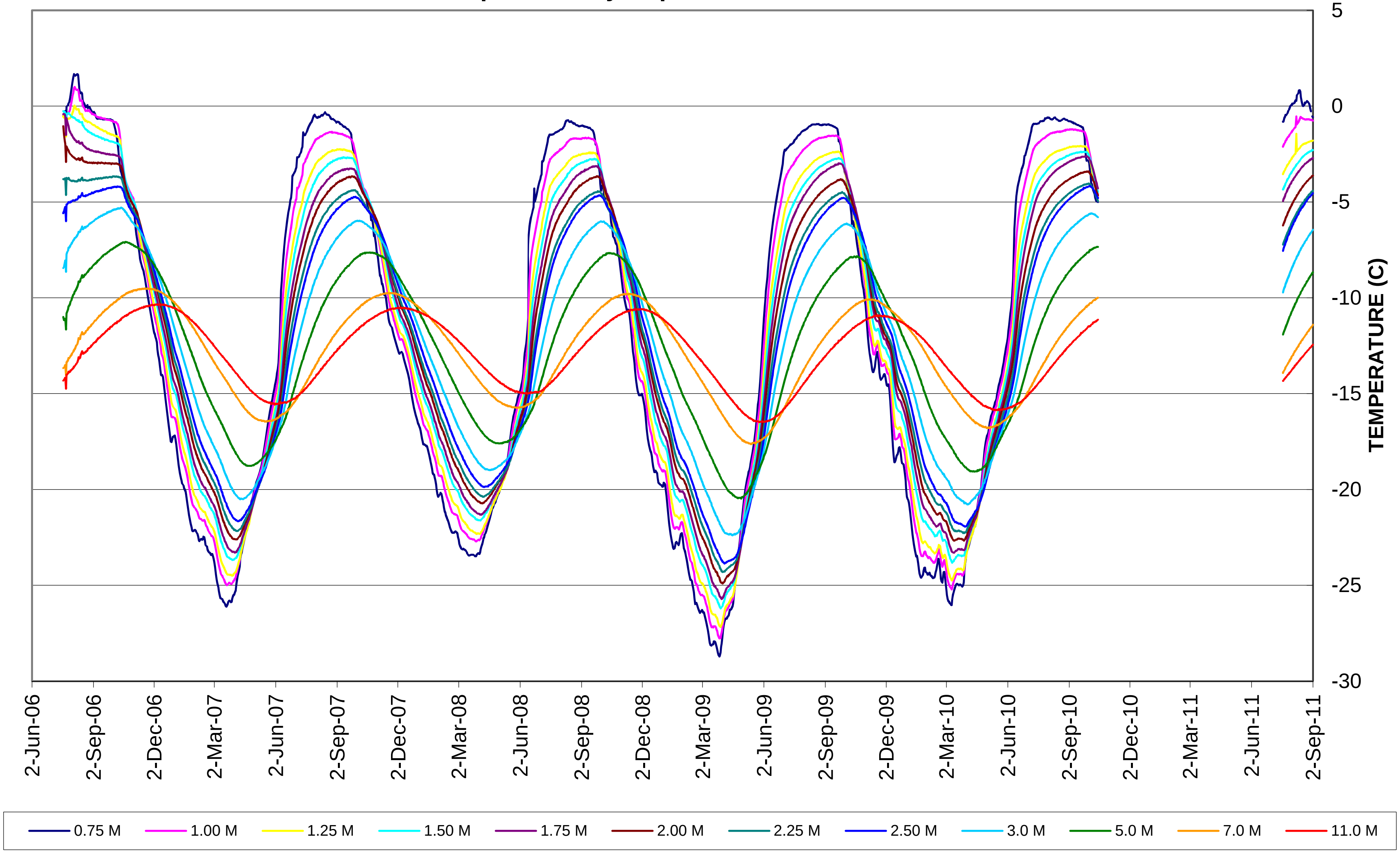


FIGURE 2
OPERATIONAL LANDFILL THERMISTOR #OL2
Temperature By Depth Below Surface VS Date

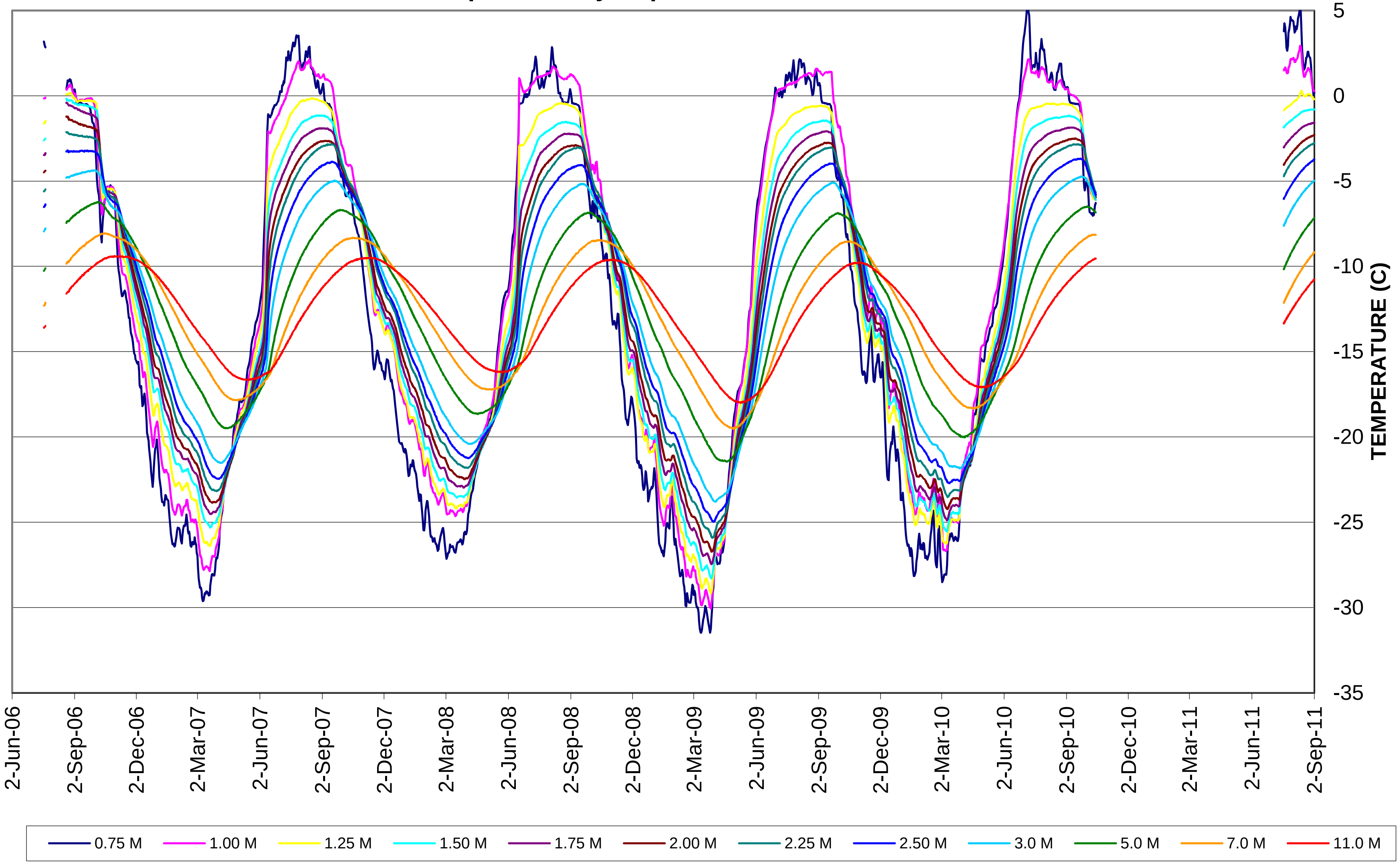


FIGURE 3
OPERATIONAL LANDFILL THERMISTOR #OL3
Temperature By Depth Below Surface VS Date

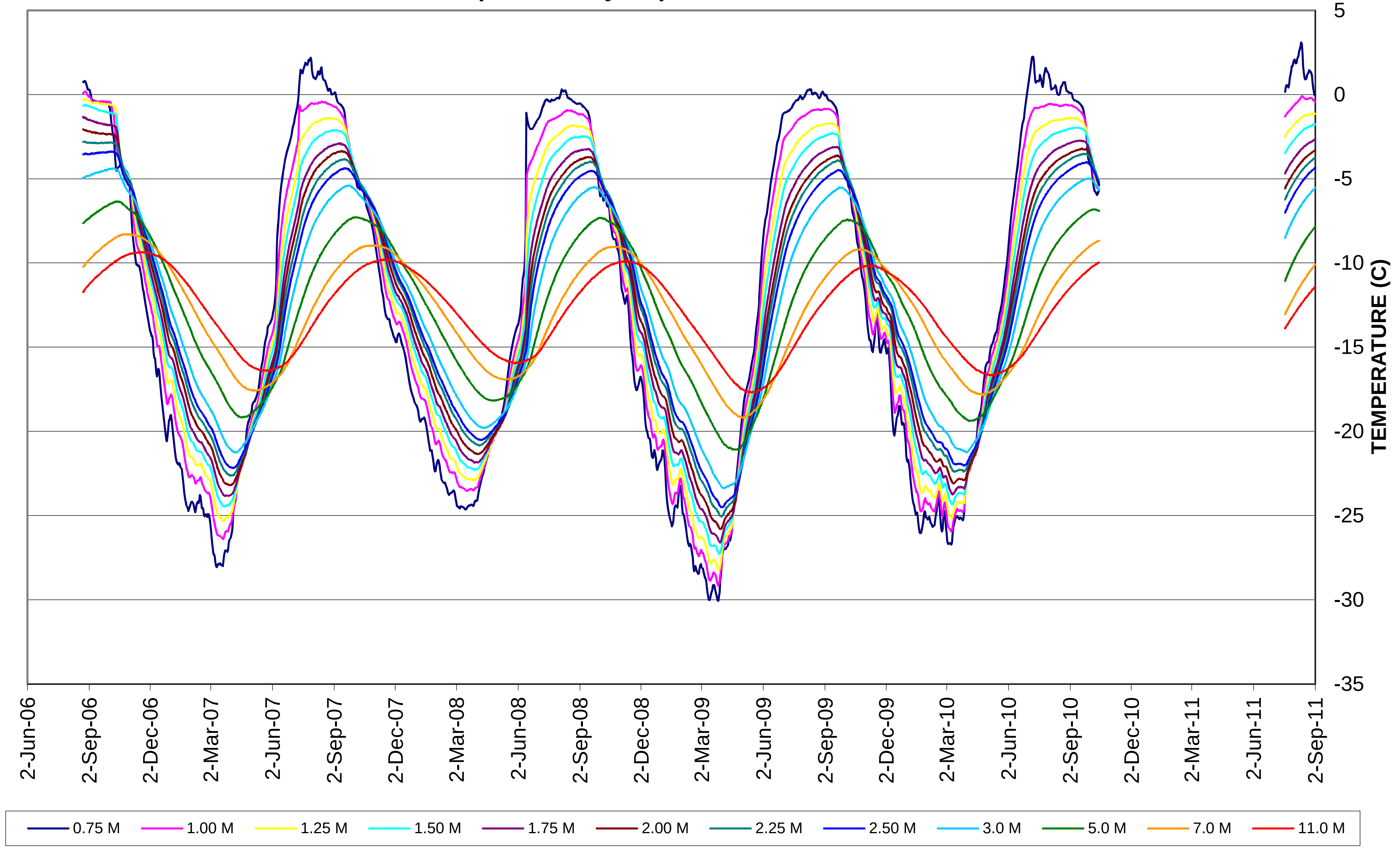
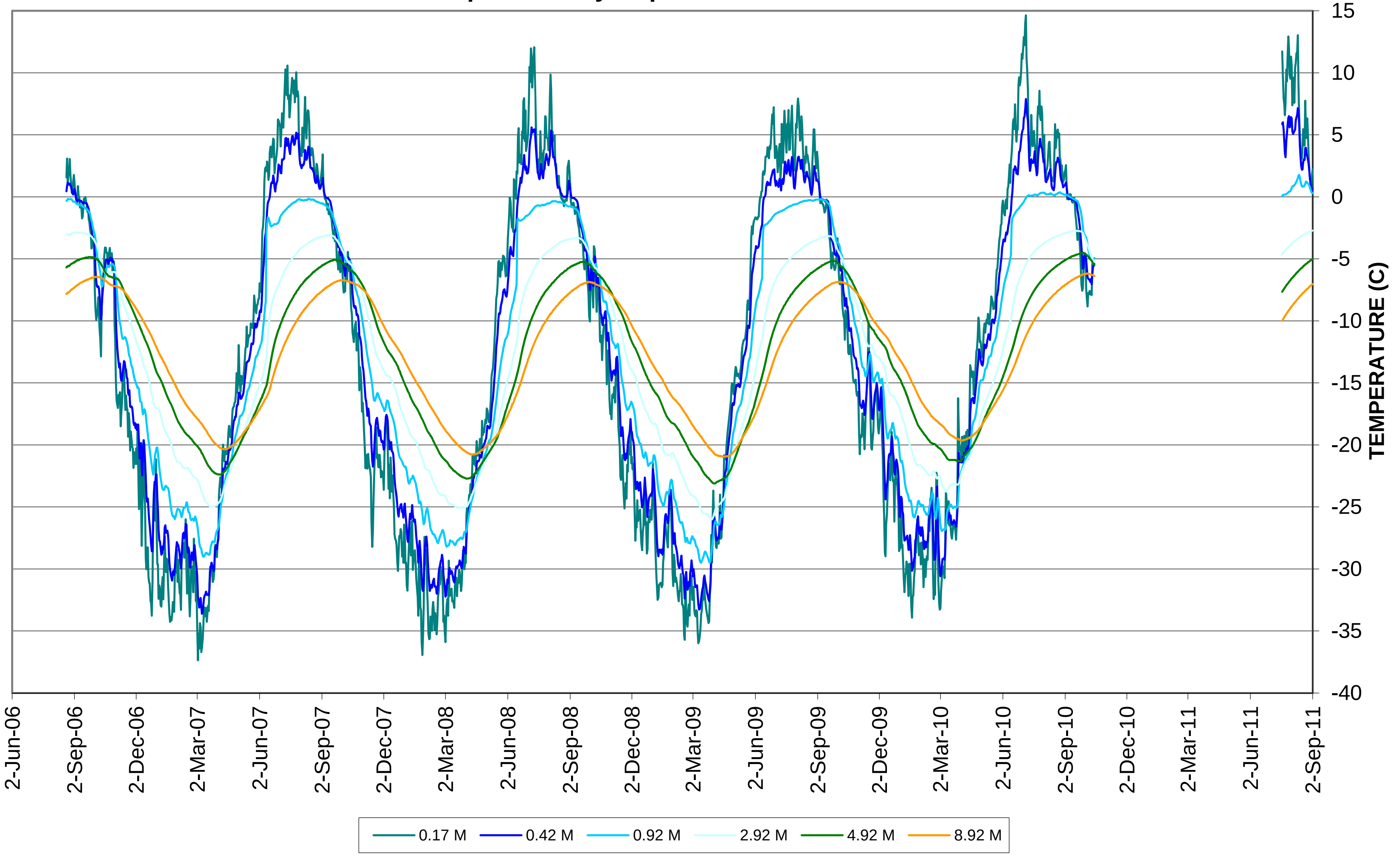


FIGURE 4
OPERATIONAL LANDFILL THERMISTOR #OL4
Temperature By Depth Below Surface VS Date



5.2.2. LRDQ Landfill Thermistors

The cover cap at the Little Red Dog Quarry (LRDQ) Landfill is performing as designed. The deepest the cover cap thawed in the summer of 2010 was less than 1.20 m deep (thermistor #LRD3 which warmed up to a maximum of -0.303 ^{0}C). In 2011 the deepest the cover cap thawed was less than 1.25 m (Thermistor #LRD2) which warmed up to -0.733 ^{0}C. As the minimum cap thickness is 1.8m, the landfill contents remain well below the active layer that briefly thaws in the summer.

The longer term trends for temperatures from the four thermistors in the LRDQ Landfill are presented on the following pages in Figures 5 to 8.

FIGURE 5
LRD LANDFILL - THERMISTOR #LRD1
Temperature By Depth Below Surface VS Date

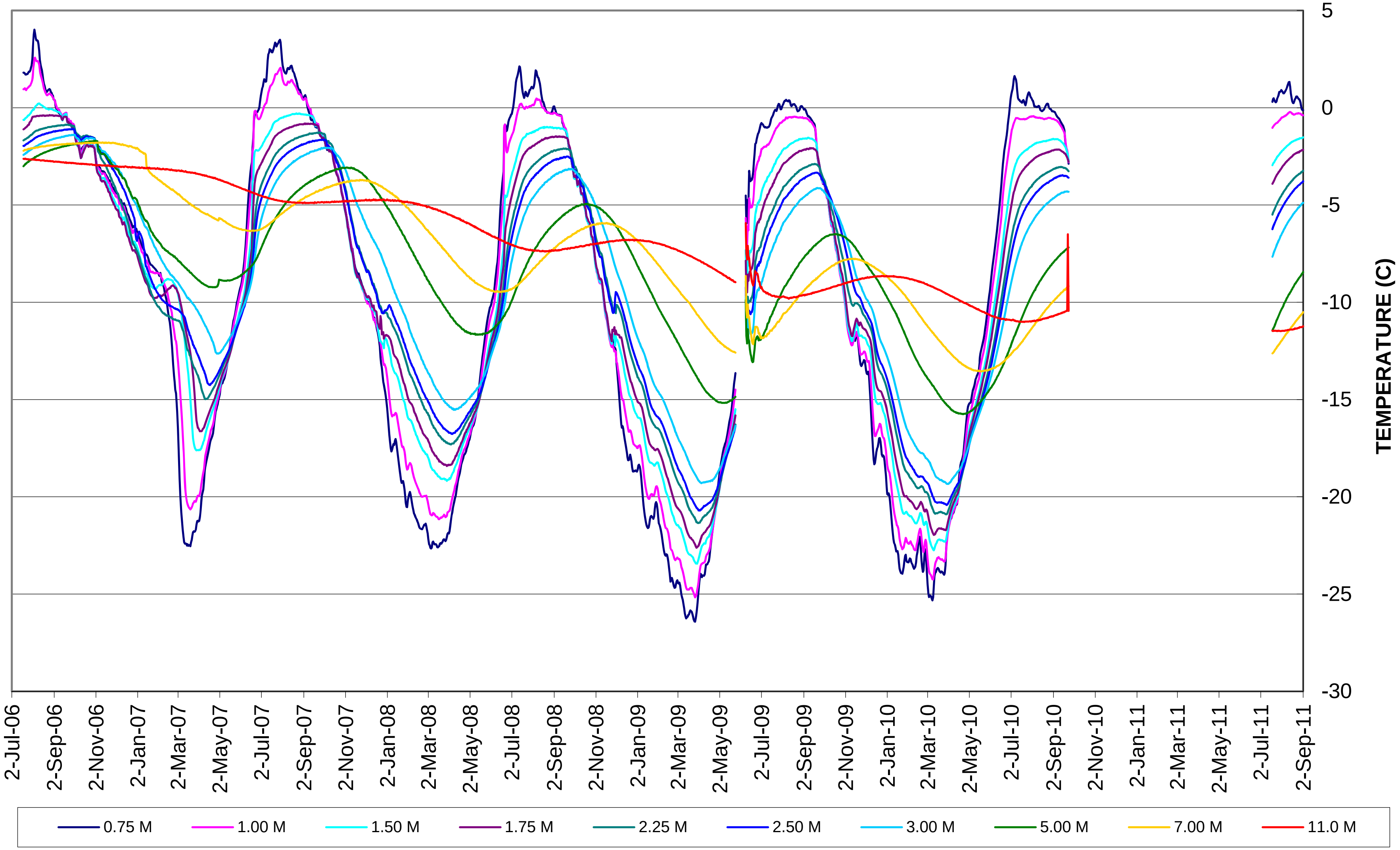


FIGURE 6
LRD LANDFILL - THERMISTOR #LRD2
Temperature By Depth Below Surface VS Date

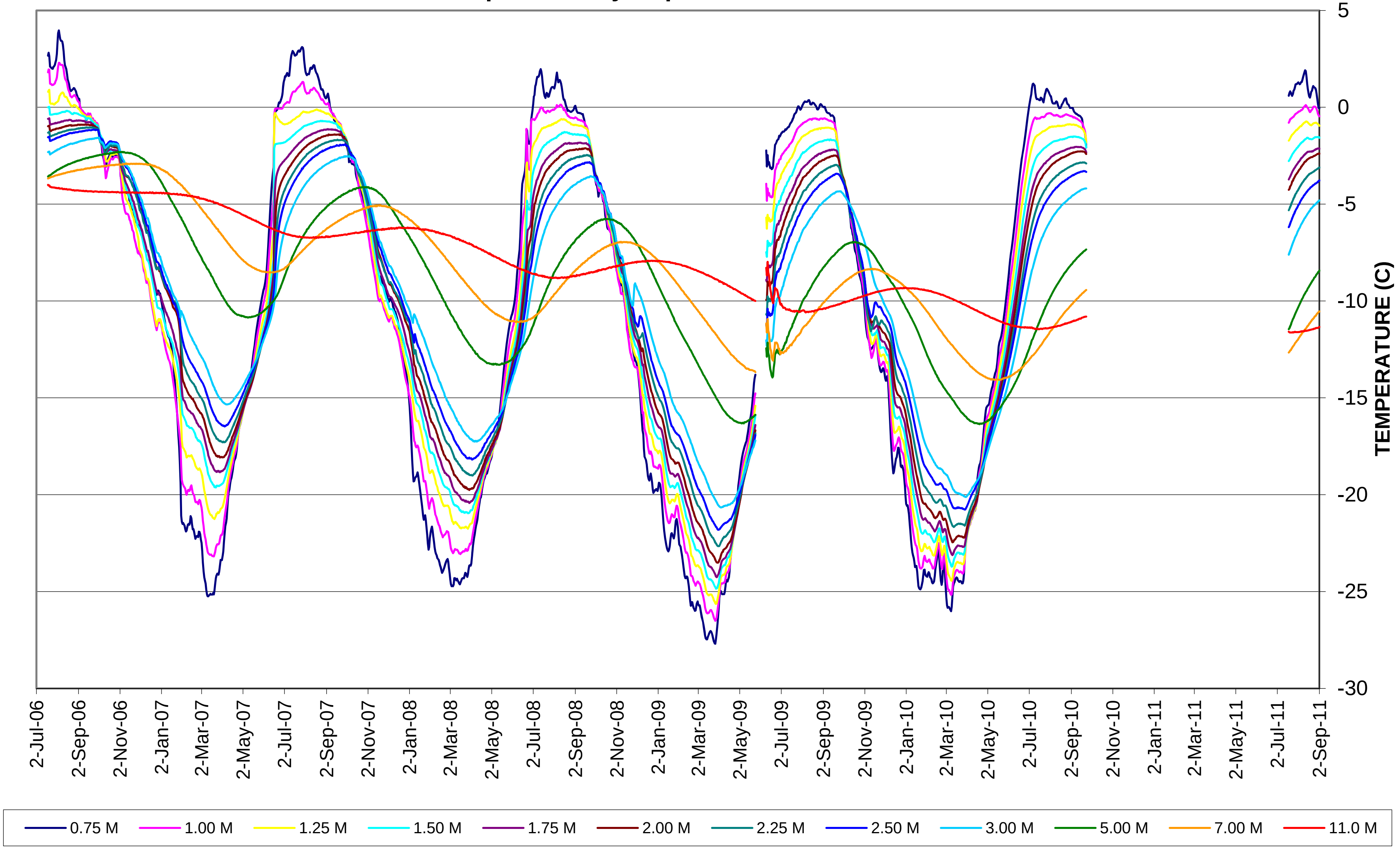


FIGURE 7
LANDFILL - THERMISTOR #LRD3
Temperature By Depth Below Surface VS Date

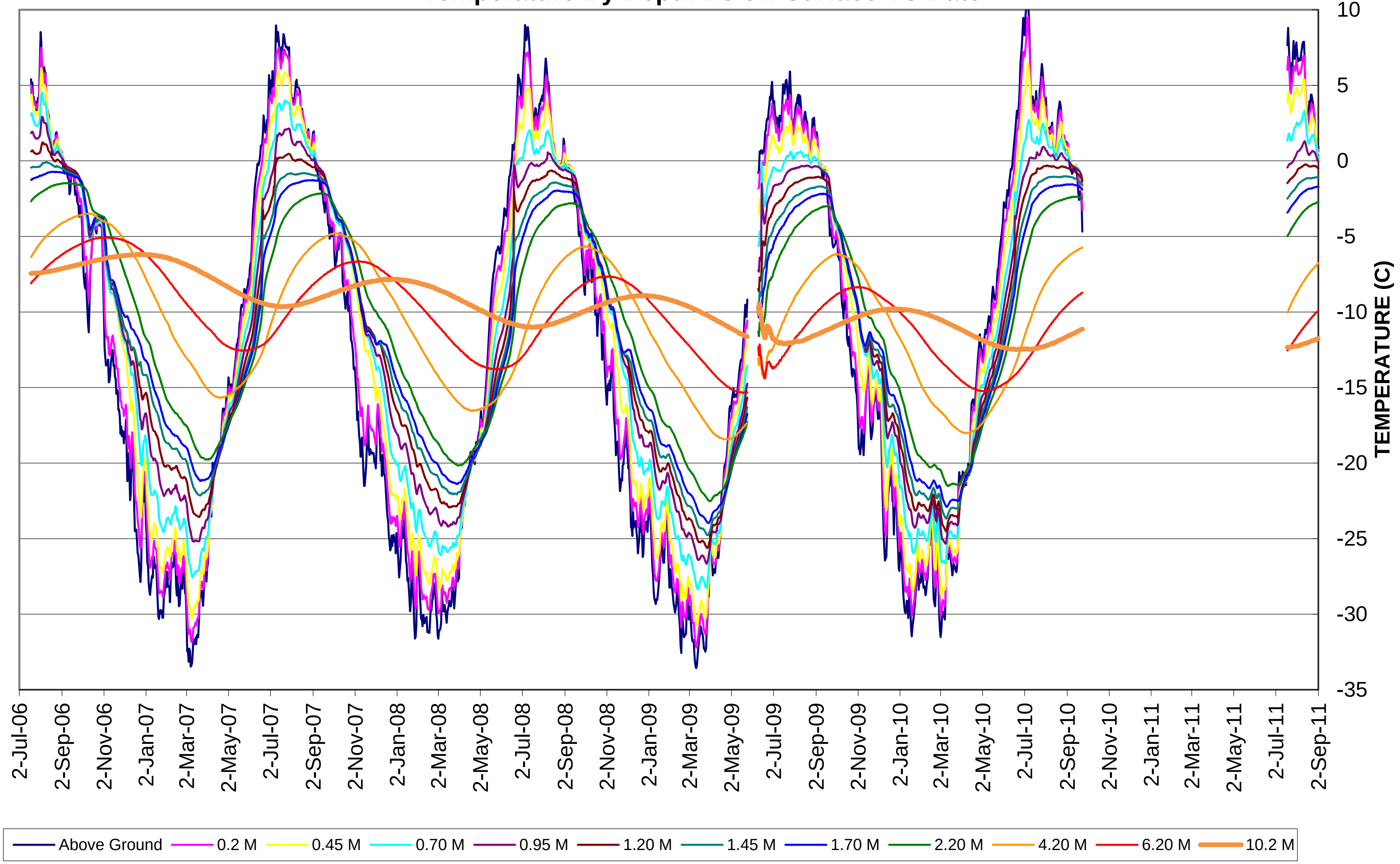
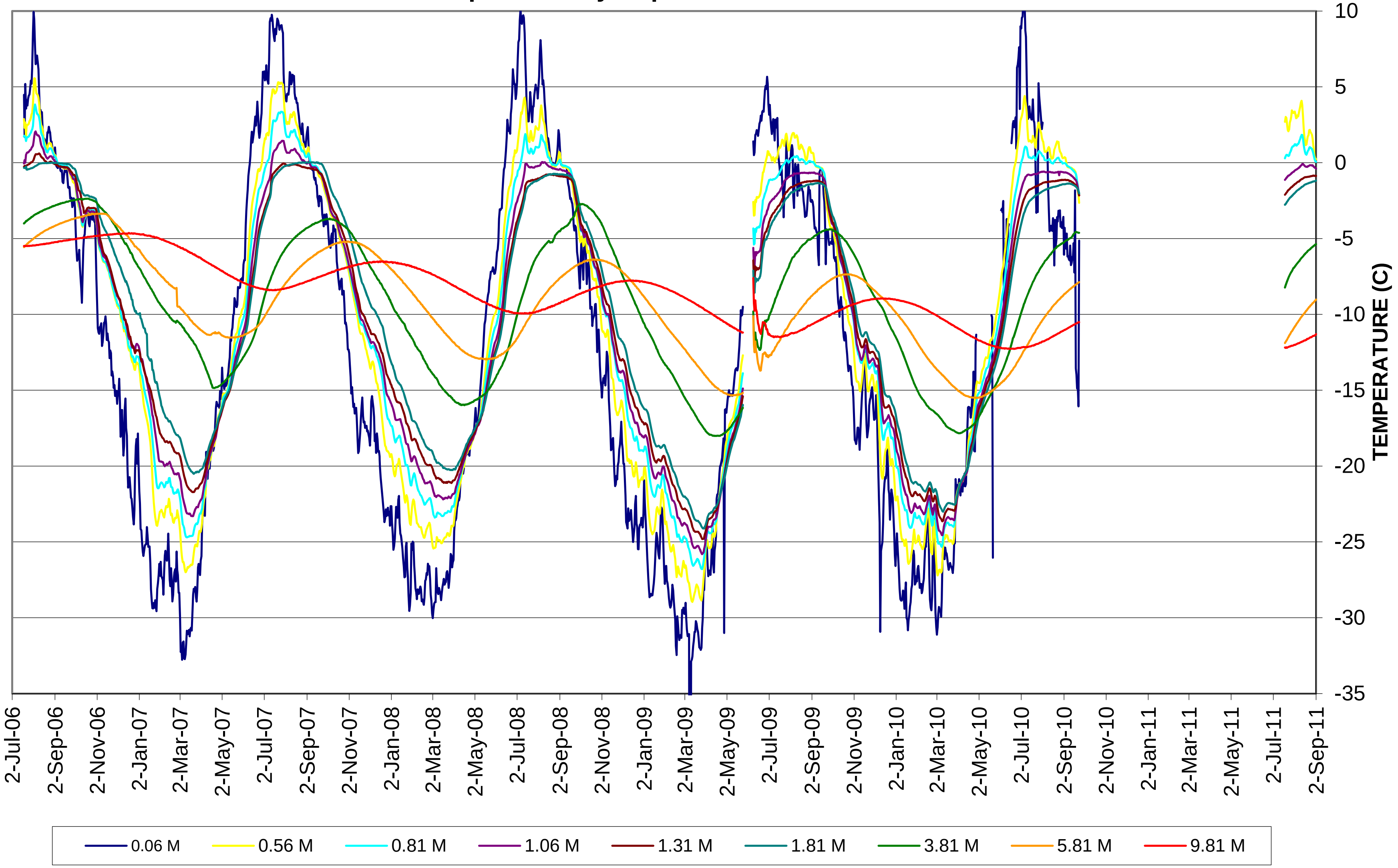


FIGURE 8
LRD LANDFILL - THERMISTOR #LRD4
Temperature By Depth Below Surface VS Date



5.3. Former Concentrate Storage Building Soil Contamination

During site reclamation, metals contaminated soils within the footprint of the former Concentrate Storage Building were excavated. Considerable effort was expended to recover the maximum quantities of this contamination, but upon completion of remedial efforts, a thin veneer of concentrate dusts remained trapped in the underlying fractured bedrock in a portion of the building footprint. Remediation was completed and a minimum 0.5 metre thick cover of local materials was placed over this area as a cover. Questions regarding the potential for this material to migrate to the surface of the cover materials were posed by regulators. As a result, Teck agreed to sample surface metals concentrations in the area during the annual site inspection.

Several soil samples are being taken annually to demonstrate that the metals concentrations in the soil cover are below remedial objectives and that there are no trends of increasing metals concentrations over time. The samples below were taken on July 19th, 2011 (Laboratory data is in Appendix 6). All soil metals concentrations analyzed continue to be substantially below the approved site remedial targets.

TABLE 4

POLARIS MINE FORMER CONCENTRATE STORAGE SHED SOIL SAMPLES				
	Sample ID	CSHED- N	CSHED- C	CSHED- S
	Coordinates	558043 E	558090 E	558131 E
		8367787 N	8367725 N	8367664 N
	Date Sampled	19-Jul-2011	19-Jul-2011	19-Jul-2011
Parameter	**Units**			
pH	pH	8.80	8.67	8.72
Lead	mg/kg	186	108	87.8
Zinc	mg/kg	403	362	763

6. RECLAMATION ACTIVITIES

There were no reclamation activities in 2011. On September 1st, 2011 the remaining equipment and supplies were removed from site by ship and transported to southern Canada. At the end of the 3rd Quarter, there were no Teck owned materials left on site. A single wooden building remains for a local Inuit who will tow it onto Inuit owned lands over the winter.

7. ESTIMATED REMAINING FINANCIAL LIABILITIES

Included in Appendix 11 is the 3rd Quarter update of the Polaris Mine Decommissioning, Reclamation and Monitoring – Actual Expenditures for the project. Expenditures in 2011 to the end of the 3rd Quarter were estimated to be $474,500. Of this approximately $250,000 relate to the final removal of equipment and materials from the site (based on contracts but work not invoiced at the end of the 3rd Quarter). No significant expenditures will occur in the 4th Quarter of 2011 as all physical work and monitoring

required under the DDRP are now complete. The Water Licence and the DDRP approvals require that the original budget estimate form the basis for this cost report and so details of the 2011 expenditures are not provided.

Based on the requirements of the current Water Licence, (which expires as of December 31, 2011), in Teck's view all requirements of the Water Licence will have been met. It is Teck's view that there are no further outstanding liabilities associated with the site as required under the terms of the current Water Licence.

Teck has had discussions with regard to potential application of a Type B Water Licence to provide for long term low intensity monitoring of the site going forward beyond the end of 2011. This is yet to be resolved. Teck is not currently requesting return of its remaining $3,539,000 reclamation security pending the outcome of these discussions.

APPENDIX 1

Executive Summary of 2011 3rd Quarter Report

Translated into Inuktitut

1. ᓯᕗᓕᕐᑎᓄᖅᑲᖅ ᓇᐃᓈᕐᓯᒪᔭᖅ ᐅᓂᒃᑳᖅ ᐃᓄᒃᑎᑐᑦ

ᐅᓇ ᐅᓂᒃᑳᖅ ᓇᐃᓈᕐᓯᒪᔪᓂᒃ ᐅᓂᒃᑳᓂᐅᔪᖅ ᐱᖓᔪᕆᔭᖓ ᑎᓴᒪᐃᓕᖅᑲᖓᔪᑦ ᐃᒪᒧᑦ ᐱᔪᓇᐅᑎᒧᑦ ᐅᓂᒃᑳᖅ ᐃᓄᒃᑎᑑᓕᕐᑎᑕᐅᓯᒪᔪᖅ.

2. ᑭᓱᒨᖓᒪᖔᑦ

ᐅᓇ ᐅᓂᒃᑳᖅ ᑭᖑᓪᓕᕐᕚᖅ ᓄᐊᑕᐅᓯᒪᔪᓂᑦ ᐊᒻᒪᓗ ᐅᓂᒃᑲᓕᐊᕆᔭᕗᑦ ᒪᓕᒡᓗᒋᑦ ᒪᓇᐅᔪᖅ ᐊᑐᕐᑕᐅᔪᖅ ᐃᒪᕐᒧᑦ ᐱᔪᓇᐅᑎᒧᑦ ᐃᓱᓕᓂᖃᓛᕐᒪᑦ ᑎᓯᐱᕆ 31, 2011ᒥ ᐊᒻᒪᓗ ᑕᐃᒪᐃᓂᖓᓄᑦ ᐅᐊᓯᔭᕆᐊᖅᔮᔪᓂᕐᑕ ᑎᓴᒪᕆᒐᔭᕐᑕᖓᓂ ᑎᓴᒪᐃᓕᖅᑲᖓᔪᓂ.

ᐅᓂᒃᑳᓯᒪᑎᐊᕐᑐᖅ ᓄᓇᓕᖓᓂ ᐅᐊᓯᓂᖅ ᑳᔪᓯᓚᐅᑐᖅ ᒪᕿᓕᕈᒥ ᑕᐃᒪᖓᓂ ᒪᕿᓕᕈ ᐱᒋᐊᓕᓚᐅᓯᒪᒪᑦ 1981ᒥ ᐊᒻᒪᓗ ᑳᔫᓇᕐᓗᓂ ᑕᐃᒪᖓᓂᑦ ᖃᓄᐃᑐᓂᕕᓂᖓᓄᑦ ᐅᑎᑎᑕᐅᓇᓱᓕᕐᓂᖓᓚᐅᑕᖓᓂᑦ ᐱᔭᕇᑕᐅᓚᐅᕐᑐᑦ ᓯᑎᐱᕆ 2004ᒥ. ᐊᕐᕋᒍ ᑕᒫᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᐅᖃᑦᑐᑦ ᒪᕿᓕᕈᒥ ᑳᔪᓯᓚᐅᑐᑦ ᐊᒻᒪᓗ ᒐᕙᒪᑯᑦ ᖃᐅᔨᓴᕐᓂᖓᑦ ᐊᕐᕋᒍᑕᒫᑦ ᑳᔪᖃᑦᑕᓚᐅᑐᑦ ᓄᓇᖅᖃᖅᓯᒪᔪᑦ ᐅᐊᓇᕐᒥᐅᓗ ᐱᕙᓕᐊᔪᓕᕆᔨᖏᓂᑦ ᑲᓇᑕᒥ ᐃᓚᐅᓗᓂ ᐊᐅᔭᖓᓂ 2011ᒥ.

ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᑎᓇᓱᓂᖅ ᑳᔪᓯᓚᐅᖕᒥᑐᖅ ᒪᕿᓕᕈᒥ 2011ᖑᑎᓗᒍ ᑭᓯᐊᓂ ᓯᑎᐱᕆ 1ᒥᑐᐊᖅ, ᑭᖑᓪᓕᕐᕚᖅ ᑰᒃᑯᑦ ᐱᕐᑯᑎᖕᒋᑦ ᑕᐃᑲᖓ ᓄᑕᐅᓚᐅᑐᑦ ᓯᓂᕐᑕᐅᑎᕈᔪᖕᒋᑦ, ᐱᕐᑯᑎᖕᒋᑦ ᐊᓯᖕᒋᓗ ᐅᒥᐊᕐᔪᐊᑯᑦ ᐅᓯᔭᐅᓗᑎᒃ. ᕿᔪᓗᓂ ᓯᕐᓗᐊᖅ ᑕᐃᑯᖓ ᕿᒪᒃᑕᐅᓚᐅᑐᖅ ᓄᓇᓕᒥᐅᓄᑦ ᐃᓄᖕᒋᓄᑦ ᑕᐃᑯᖓ ᕿᒪᒃᑕᐅᕐᑯᔭᐅᓚᐅᒪᑦ. ᒪᕈᒃ ᑎᓴᒪᓖᒃ, ᐅᒥᐊᖅ ᐊᓯᕈᓗᔭᖕᒋᓗ ᐱᕐᑰᑦ ᓱᓕ ᒪᕿᓕᕈᒥᓚᐅᑐᑦ ᓯᑎᐱᕆ 2ᖑᕋᑦᓯᒃᓂᖓᓂ ᒥᐊᕈ ᑕᓯᖓᓂ ᖃᐅᔨᓴᕈᑎᒃᓴᐅᓗᑎᒃ. ᒥᐊᕈ ᑕᓯᖓ ᖃᐅᔨᓴᕐᑕᐅᔭᕆᒪᑦ, ᑕᐃᑯᐊ ᐃᖕᒋᕋᔪᑎᕈᔪᐃᑦ ᑕᐃᑲᖓ ᓅᑕᐅᓚᐅᒥᔪᑦ.

3. ᐃᒪᐅᑉ ᐱᐅᓂᖓᑕ ᐅᐊᓯᔭᐅᓂᖓ

ᐱᖓᔪᖓᓂ ᑎᓴᒪᐃᓕᖅᑲᖓᔪᓂ, ᐃᒪᐅᑉ ᐱᐅᓂᖓᑕ ᐅᐊᓯᔭᐅᓂᖓ ᒥᐊᕈ ᑕᓯᖓᓂ ᑳᔪᓯᓚᐅᑐᖅ ᓯᑎᐱᕆ 2ᖑᑎᓗᒍ ᐊᒻᒪᓗ ᒥᐊᕈ ᑯᖓᑕ ᑰᒃᓂᖓ ᖃᐅᔨᓴᕐᑕᐅᓚᐅᒥᔪᖅ ᐱᓇᓱᐊᕈᓯᑕᒫᑦ ᔪᓚᐃᒥ, ᐊᒋᓯᒥ ᐊᒻᒪᓗ ᓯᑎᐱᕆᐅᑉ ᐱᒋᐊᕐᓂᖓᓂ.

3.1. ᒥᐊᕈ ᑰᖓ

ᐃᒪᕐᒧᑦ ᐱᔪᓇᐅᑎᒃ ᐱᔭᕆᐊᖃᕐᑎᓯᔪᖅ ᐱᓇᓱᐊᕈᓯ ᑕᒫᑦ ᖃᐅᔨᓴᕐᑕᐅᖃᑦᑯᔨᓗᓂ ᒥᐊᕈ ᑰᖓᓂᒃ ᑰᒃᑎᓗᒍ. ᐃᓚᒋᐊᕈᑦ 2 ᐃᒪᐅᑉ ᐱᐅᓂᖓᑕ ᖃᐅᔨᓴᕈᑎᕖᑦ ᑎᑎᕋᕐᓯᒪᔪᑦ ᐊᐅᔭᐅᓚᐅᑐᖅ ᖃᐅᔨᓴᕈᑎᕕᓂᕐᓂᑦ. ᐃᒪᐅᑉ ᐱᐅᓂᖓᑕ ᖃᐅᔨᓴᕈᑎᓕᒫᑦ ᒪᓕᒃᓯᒪᔪᑦ ᒪᓕᒋᐊᖃᑦᑎᓂᒃ ᐃᒪᒧᑦ ᐱᔪᓇᐅᑎᖓᓂᑦ. ᐅᒪ ᐊᑕᓂ ᑎᑎᕋᕐᓯᒪᔪᑦ ᓇᐃᓈᕐᓯᒪᓗᒋᑦ ᑎᑎᕋᕐᓯᒪᔪᑦ ᐱᒪᕆᐅᔪᓂᒃ ᖃᐅᔨᓴᕈᑎᒥᑦ ᖃᐅᔨᔭᐅᓂᑯᐃᑦ:

	ᓴᕿᔭᒃᓴᖃᓂᖓ-ᐅᒃᑐᒧᑦ ᐃᖑᓯᔪᐊᒧᑦ		
	ᐊᕿᓂᕐᓴᖅ	ᓴᕕᒃᓴᔭᖅ	ᐊᖏᓂᖓ[1]
ᐃᒪᕐᒧ ᐱᔪᓇᐅᑎᐅᑉ ᐃᓱᓕᑦᕕᖓ			
ᑕᕿᓕᒫᕐᒧᑦ ᐊᖏᓛᖅ	0.07	0.50	15.00
ᐃᓱᓕᑦᕕᖓ ᐊᖏᓛᖑᔪᓇᑐ	0.14	1.00	30.00
ᖃᐅᔨᓴᕐᑕᐅᔪᑦ ᐅᓪᓗᖏᑦ:			
ᔪᓚᐃ/2/2011	0.0030	0.011	1.0
ᔪᓚᐃ/12/2011	0.0002	0.025	1.0
ᔪᓚᐃ/18/2011	0.0002	0.057	1.0
ᔪᓚᐃ/23/2011	0.0001	0.062	3.0
ᐊᒋᓯ/16/2011	0.0002	0.041	1.0
ᐊᒋᓯ/26/2011	0.0002	0.041	1.0
ᓯᑎᐱᕆ/2/2011	0.0002	0.041	1.0
ᓯᑎᐱᕆᔭ/09/11	0.0003	0.051	1.0

ᐅᔨᕆᓗᒍ-ᖃᐅᔨᓴᕐᑕᐅᔪᑦ ᒥᑭᓂᕐᓴᐅᔪᑦ ᐃᓱᓕᕕᓚᓂᑦ

ᖃᐅᔨᓴᕐᑕᐅᔪᑎᕕᓃᑦ 1

3.2. ᒥᐊᕈ ᑕᓯᖓᑕ ᑕᕆᐅᖑᓕᓈ

ᐃᒪᕐᔪᑦ ᐱᔪᓇᐅᑎᒃ ᐱᔭᕆᐊᖃᕐᑎᓯᔪᖅ ᖃᐅᔨᓴᕐᑕᐅᑎᐊᓗᓂ ᖃᐅᔨᓴᑕᐅᔪᑎᓴᕐᒥᒃ ᐱᕐᑯᔨᓗᑎᒃ ᒥᐊᕈ ᑕᓯᖓᑕ ᑕᕆᐅᖑᓕᕆᖕᓂᖓᓂᑦ ᒪᕈᐃᓂᑦ ᓯᑯᖃᖕᒋᑎᐊᓂᕐᕙᖑᓕᕐᕘᑦ. ᑕᒪᓇ ᖃᐅᔨᓴᕐᓂᖅ ᑳᔪᓯᓚᐅᑐᖅ ᓯᑎᐱᕆ 2, 2011ᖑᑎᓗᒍ.

ᓇᐃᓈᕐᓗᒍ, ᖃᐅᔨᓴᕐᑕᐅᓗᐊᑕᕐᓂᒧᑦ ᖃᐅᔨᔭᐅᔪᑦ ᓂᕆᐅᒋᔭᐅᓚᐅᓗᑎᒃ ᑕᐃᒪᐃᓗᑎᒃᓗ:

- ᓴᓇᒪᓂᖓ ᒋᐊᕈ ᑕᔨᖓᑕ ᓱᓕ ᐊᑕᕐᓇᑐᒥᖕᒋᑐᖅ ᐱᔪᑎᒋᓗᒍ ᑕᕆᐅᖑᓕᕆᓂᖓᑕ ᐊᔩᖏᓂᖏᑦ (ᓲᕐᓗ ᐃᑎᓕᕙᓕᐊᓗᓂ ᑕᕆᐅᖑᓕᕐᐸᓕᐊᓂᖓ) ᑕᕙᓂ ᐃᒪᖓᑕ ᑕᕆᐅᖑᓕᕇᓂᖓᓂ.
- ᖃᐅᔨᓴᕐᑕᐅᔪᓂ ᖃᐅᔨᔭᐅᔪᑦ ᖄᕐᐸᔨᐊᓂᑦᑕᔨᐅᑉ ᐃᖃᖓᓄᑦ ᑎᑭᓗᒍ ᑕᔨᐅᑉ ᐊᔭᓗᐊᖓᓂ ᖃᐅᔨᓴᕐᑕᐅᔪᑎᐅᔪᑦ ᑕᐃᒪᐃᑐᓚᐅᑐᖅ ᐊᓂᒍᕐᑐᓂ ᐊᕐᒍᔪᕐᑎᑐᑦ ᑕᐃᒪᖓᓂ ᐅᑎᑎᑕᐅᓇᓱᓂᖓ ᐱᔭᕇᕐᑕᐅᒪᑦ.

ᐃᓚᒋᐊᕈᑦ 3ᒥ ᐃᓗᓕᓕᒃ ᒪᕈᓕᕿᒥ ᖃᐅᔨᓴᕈᑎᓂᒃ ᓄᐊᓚᐅᑕᕗᑦ ᐃᒪᖓᑕ ᖃᐅᔨᓴᕐᑕᐅᕙᖓᓂᑦ ᐃᑎᓕᕆᓂᖓᓂᑦ ᐃᒪᖓᑕ ᑕᕆᐅᖑᓕᕆᓂᖓᓂᑦ. ᖃᐅᔨᓴᕐᑕᐅᔪᑎᕙᓃᑦ ᐃᓗᓕᖅᒥᔪᑦ ᐅᑯᓂᖓ: ᐃᒪᖓ, ᐅᓇᕐᓂᖓ, ᐳᓚᖃᓂᖓ, ᑕᕆᐅᖑᓕᕆᓂᖓ ᐊᒪᓗ ᐳᓚᖃᓗᐊᓕᖕᕿᑲᓗᐊᒪᖔᑦ. ᐃᓚᒋᐊᕈᑦ 4ᒥ ᐃᓗᓕᓕᒃ ᐃᒪᐅᑉ ᐃᒪᕐᓗᖃᒪᖔᑦ ᖃᐅᔨᓴᕐᑕᐅᔪᑎᕙᓂᖏᑦ ᐱᔭᐅᓚᐅᑐᑦ ᐃᑎᓕᓈᓂᖓᓂᑦ ᑕᕆᐅᖑᓕᓈᒃᑐᕐᒥᑦ ᐃᒪᕐᒥᑦ.

ᐅᒋᐊᓇᕐᑐᐊᓗᒥᒃ ᖃᐅᔨᔭᐅᔪᖃᓚᐅᖕᒋᑐᖅ ᐊᒪᓗ ᐃᒪᕐᓗᖓ ᓱᓕ ᑕᑯᓴᐅᔪᖅ:

- ᖄᕐᐸᔨᖓ ᐃᒪᐅᑉ ᓴᕙᕿᔭᒃᓴᖃᓂᓇᔭᖓ ᐊᑕᖕᒋᕐᑐᕐᒥᒃ ᑐᖕᖓᓂᑐᖅ 0.2 ᐆᒃᑐᕐᒧᑦ/ᐃᖕᒍᔨᔪᐊᕐᒧᑦ (9ᒥᑕᒥᒃ ᐅᒃᑐᒧᑦ ᐃᑎᓂᖓ ᐊᒪᓗ ᐃᑲᓂᕐᓴᖓᓂ), ᐊᒪᓗ
- ᓴᕙᕿᔭᒃᓴᖃᓂᖓ ᐊᖏᓂᕐᓴᕈᖃᑦᑐᖅ 9ᒦᑕᒥᒃ ᐃᑎᓂᖓᓂ (0.221 ᐆᒃᑑᒧᑦ/ᐃᖕᒍᔨᕐᔪᐊᕐᒧᑦ ᓴᕙᕿᔭᒃᓴᕐᒥᒃ) ᐊᒪᓗ 10ᒦᑕᒥᒃ ᐃᑎᓂᖓᓂ (0.376 ᐆᒃᑑᒧᑦ/ᐃᖕᒍᔨᕐᔪᐊᒧᑦ ᓴᕙᕿᔭᒃᓴᑕᖃᓂᖓ), ᐊᒪᓗ
- ᑕᐃᒪ ᓴᕙᕿᔭᒃᓴᑕᖃᓂᖓ ᒥᑭᓕᕙᓕᖓᓗᓂ 11ᒦᑕᒥᒃ ᐅᑎᓂᕐᒥᕐᑐᑦ (0.153 ᐆᒃᑑᒧᑦ/ᐃᖕᒍᔨᕐᔪᐊᕐᒧᑦ ᓴᕙᕿᔭᒃᓴᕐᒥᒃ), ᐊᒪᓗ
- 12ᒦᑕᒥᒃ ᐃᑎᓂᖓ, ᑲᑎᓗᒋᑦ ᓴᕙᕿᔭᒃᓴᖃᓂᖓ ᒥᑭᓕᕚᓕᖓᓗᓂ 0.026ᒧᑦ ᐆᒃᑐᒧᑦ/ᐃᖕᒍᔨᕐᔪᐊᒧᑦ, ᐊᒪᓗ ᒥᑭᓕᕙᓕᐊᖕᒋᓇᓕᒫᕐᓗᓂ 0.010 ᑎᑭᓗᒍ ᐆᒃᑑᒧᑦ/ᐃᖕᒍᔨᕐᔪᐊᕐᒧᑦ ᑎᑭᓗᒍ 15ᒦᑕᒥᒃ ᐃᑎᓂᖓᓄᑦ.

ᐱᒪᕆᐅᕗᖅ ᐅᔨᕆᔭᐅᔭᕆᐊᓕᒃ ᐊᖏᓂᕐᐹᖑᔪᖅ ᓴᕙᕿᔭᒃᓴᕐᑕᓕᒃ (ᑕᐃᒪᐃᑐᔪᖅ 10ᒦᑕᒥᒃ ᐃᑎᓂᖓᓂ), ᑐᖕᖓᓂᑐᖅ 0.5 ᐅᒃᒃᑐᒧᑦ/ᐃᖕᒍᔨᔪᐊᕐᒧᑦ ᑕᐃᒪᐃᑕᕆᐊᖃᑎᔪᑦ ᐃᒪᒧᑦ ᐱᔪᓇᐅᑎᒥ ᑰᖕᖓᓂ ᑕᔨᕐᒥᖕᖓᕐᑐᕐᒥᑦ. ᐃᓚᒋᐊᕈᑦ 5 ᐃᓗᓕᓕᒃ ᑎᑎᖅᑲᔨᒪᔪᓂ ᓇᓗᓇᖕᒋᐃᔨᔪᑦ ᒥᑭᓕᕙᓕᐊᓂᖓᓂᒃ ᓴᕙᕿᔭᒃᓴᐅᑉ ᑕᐃᒪᖓᓂᑦ 2005ᒥᓂᑦ.

3.3. ᐊᑎᖕᒋᑦ ᐃᒪᐅᑉ ᖄᕐᐸᔨᐊᓂᑐᑦ

ᐊᖕᒋᕐᑕᐅᔨᒪᔪᑦ ᖃᓄᐃᑐᓂᖓᓄᑦ ᐅᑎᑎᑕᐅᓇᓱᓂᒧᑦ ᐸᕐᓇᒍᑎᑎᓂ ᖃᐅᔨᓴᓇᐊᖅᑲᑎᔨᔪᖅ ᐃᒪᐅᑉ ᖄᕐᐸᔨᐊᓂᒃ ᒪᕈᐃᖕᒍᔪᓂ ᐊᕿᖕᒍ ᑕᒫᑦ. ᑕᑯᐊ ᖃᐅᔨᓴᕐᑕᐅᔪᑎᒃᓴᐃᑦ ᐱᔭᐅᓚᐅᑐᑦ ᐱᖕᓚᔪᖕᓂ ᑎᓴᒪᐃᓕᖅᖕᓚᔪᑦ ᐊᐅᔭᑯᑦ ᖃᐅᔨᓴᕈᑎᒃᓴᓂᒃ ᐱᔪᓇᕐᔨᑐᐊᕿᑕ ᐱᓚᐅᔨᒪᒪᓚᑕ (ᑕᑯᓗᒍ ᐃᓚᒋᐊᕈᑦ 6 ᖃᐅᔨᓴᕐᑕᐅᕙᓕᓇᒥ ᖃᐅᔨᓴᕈᑎᕙᓃᑦ ᐅᓂᒃᑳᖕᒋᑦ). ᖃᐅᔨᔭᐅᓂᑯᐃᑦ ᐅᒪ ᐊᑖᓂ ᑎᑎᕿᔨᒪᔪᑦ.

3.3.1. ᐊᐅᐸᕐᑐᖅ ᕿᒥᑯᓗᒥ ᓴᐅᔭᐅᔨᒪᔪᑦ

ᐊᐅᐸᕐᑐᖅ ᕿᒥᑯᓗᒥ ᓴᐅᔭᐅᔨᒪᔪᑦ ᔨᕙᖕᓕᔪᖅ ᓴᐅᔭᐅᔨᒪᓂᖓ ᖃᕐᐸᔨᐊᓄᖕᓕᐅᔪᖅ ᐃᒪᖅ ᑰᒍᓇᖅᑯᓗᒍ ᓴᐅᔨᒪᔪᕐᒥᑦ. ᐊᖕᒋᕐᑕᐅᔨᒪᓂᖕᒋᑦ ᓱᕈᕐᔨᒪᔪᑦ ᑐᐊᐸᐃ ᓴᐅᔨᒪᔪᕐᒥ ᐱᔭᓇᐊᖅᑲᑎᔨᕗᑦ ᖄᐸᔨᐊᓂᑐᑦ ᐃᒪᕈᔪᐃᑦ ᖃᐅᔨᓴᕐᑕᐅᖃᑕᓇᐊᓖᑦ ᐊᕿᒍᑕᒫᑦ. ᔪᓚᐃ 19ᖑᑎᓗᒍ, ᖄᐸᔨᐊᓂᑐᖅ ᐃᒪᖅ ᖃᐅᔨᓴᕐᑕᐅᓚᐅᑐᖅ ᐊᒪᓗ ᖃᐅᔨᔭᐅᓂᖓ ᐊᔨᐸᓗᒋᓚᐅᑕᖓ ᐊᕿᒍᔪᓂ ᐊᓂᒍᕐᑐᓂ ᑕᐃᒪᐃᑐᖅᑲᑕᓚᐅᓂᖕᖓᑐᑦ. ᓴᕙᕿᔭᒃᓴᐃᑦ ᐃᒪᕐᒥ ᐊᑎᒃᑐᔪᖅ ᓇᓴᐅᑖ ᑕᐃᒪᐃᓂᖓᓄ ᐃᓯᓖᓗᓇᖕᒋᑐᖅ ᐃᒪᐅ ᐱᐅᓂᖓ ᐱᓪᓗᒍ. ᐅᑯᐊᑕᕙ ᖃᐅᔨᔭᐅᓂᑯᐃᑦ:

- ᓴᕙᕿᔭᒃᓴᖅ ᐊᕿᓂᕐᓴᖅ 0.0006 ᐆᒃᑐᒧᑦ/ᐃᖕᒍᔨᕐᔪᐊᕐᒧᑦ (ᑲᑎᓗᒍ)
- ᓴᕙᕿᔭᒃᓴᖅ 0.012ᖑᓗᓂ ᐅᒃᑐᒧᑦ/ᐃᖕᒍᔨᕐᔪᐊᕐᒧᑦ (ᑲᑎᓗᒍ)

3.3.2. ᓱᑲᑲᖕᓕᔪᖅ ᑕᔨᖅ

ᑐᐊᐸᓕᕐᓱᕐᑕᐅᓗᓂ ᖃᑎᔨᔨᒪᔪᖅ ᓱᑲᑲᖕᓕᔪᖅ ᑕᔨᕐᒥ ᖃᐅᔨᓴᕐᑕᐅᖃᑦᑐᖅ ᐊᕿᒍ ᑕᒫᑦ ᔨᑯᖃᕈᓂᕿᖕᓕᑦ ᐊᐅᔭᑯᑦ. ᐃᒪᕐᒥ ᐱᓚᐅᑐᒧᑦ ᖃᐅᔨᓴᕐᑕᐅᔪᒃᓴᕐᒥᒃ ᖃᑎᒃᔨᔨᒪᔪᕐᒥᑦ ᓱᕈᔨᒪᕈᔪᒃᑐᕐᑕᖃᒪᖔᑦ ᐃᒪᕐᒥ. ᖃᑎᒃᔨᔨᒪᔪᖅ ᓱᓕ ᐊᑦᓇᕐᒋᑎᐊᕐᑐᖅ ᐊᒪᓗ ᑕᑯᓴᐅᔪᕐᑕᖃᕿᓂ ᑎᓲᕐᑐᕐᒥᒃ ᑐᐊᐸᖕᒥᒃ ᑕᕙᖓ ᖃᑎᒃᑐᓕᐊᓇᔭᐅᔨᒪᔪᕐᒥᑦ. ᑕᔨᐅᑉ ᐃᒪᖓ ᑲᑭᐊᑎᐊᓚᐅᑐᖅ ᑕᑯᓴᐅᓂᖓ ᒪᓕᓗᒍ ᐊᒪᓗ ᒪᕿᐳᔪᖕᒋᓗᓂ ᔨᐅᕿᐳᓇᓂᓗ ᐃᒪᖓ ᓇᓗᓇᐃᑕᐅᑲᓂᓚᐅᑐᖅ ᖃᐅᔨᓴᕈᑎᓂᑦ.

4. ᖃᓄᐃᑐᓚᑖᖑᓂᖓ ᐊᑦᓇᕐᒋᓂᖓ ᒪᕈᓕᕿᒥ

ᖃᓄᐃᑐᓚᑖᖑᓂᖓ ᐊᑦᓇᕐᒋᓂᖓ ᒪᕈᓕᕿᒥ ᐅᐊᔨᔭᐅᖃᑦᑐᖅ ᐅᔭᕿᓕᓇᔨᒪᓇᐅᑉ ᖃᐅᔨᓴᕐᑎᖕᓄᑦ ᒪᕈᓕᕿᒥ ᐊᒪᓗ ᖃᑎᓕᓇᓂᖕᒋᑕ ᕿᖕᒍᒥᓚᕐᑕᐅᓂᖕᒋᓂ.

4.1. ᓄᓇᖓᑕ ᐊᐅᓚᓂᖓᑕ ᕿᖑᓯᔭᕐᑕᐅᓂᖓ

ᓄᓇᖓᑕ ᐊᐅᓚᓂᖓᑕ ᓇᓗᓇᐃᓯᒪᑎᐊᕐᑐᓂᒃ ᕿᖑᒥᒐᕐᑕᐅᖃᑕᓚᐅᑐᖅ ᐊᕋᒍ ᑕᒫᑦ ᖃᐅᔨᓴᕐᑕᐅᓗᓂ ᐃᓂᓚᒃᐸᓕᐊᓂᖓ ᓄᓇᖓᑕ ᖄᕐᐸᓯᐊᓂᑐᖅ ᐊᑖᓂ ᐅᔭᕋᒃᓯᐅᕕᕕᓂᐅᑉ. ᑭᖑᒥᒐᕐᓂᖅ 2011ᖑᑎᓗᒍ ᐅᐳᕐᓇᑐᐊᓗᓂ ᐊᓯᐳᕐᓂᑕᖃᓚᐅᖏᑐᖅ ᐊᕋᒍᔪᑦ ᓯᕗᓂᐊᓂᑦ. ᓯᕕᖓᓕᕆᓂᖓᓂ ᓴᕿᔮᕐᑎᓯᔪᖅ ᓄᓇᖑᐊᖅ ᐃᓚᒋᐊᕈᑦ 7ᒥᑐᖅ.

4.2. ᓯᒃᔭᕐᐸᓯᐊᑕ ᕿᖑᒥᒐᕐᑕᐅᓂᖓ

ᐊᕋᒍᑕᒫᑦ, ᕿᖑᒥᒐᖃᑕᕐᑐᒍᑦ ᐱᖓᓱᐃᓕᖃᖓᔪᓂ ᓯᒃᔭᕐᐸᓯᐊᓂ ᑕᐃᑯᓂ ᓯᕕᖓᓕᕐᑎᑕᐅᑲᓂᕐᓯᒪᒪᑕ ᖃᓄᐃᑐᓂᕕᓂᖓᓄ ᐅᑎᕐᑎᑕᐅᓇᓱᒃᑎᓗᒍ ᐊᕿᑕᐅᓂᑯ. ᕿᖑᒥᒐᕐᓗᑕ ᖃᐅᔨᓇᓱᖃᑕᕐᑐᒍᑦ ᑎᓱᓯᒪᒫᖓᑕ ᓯᒃᔭᕐᐸᓯᐊᓄ ᐊᕿᓱᓚᐅᓯᒪᔭᕗᑦ ᒪᓕᓄᑦ. ᕿᖑᒥᒐᕐᓗᑕ ᑕᑯᓴᐅᔪᓂ ᖃᐅᔨᓴᖃᑕᕐᑐᒍᑦ ᓯᔭᖓᓂ ᑕᑯᑯᓴᐅᔪᖃᒫᖓᑦ ᓯᒃᔭᕐᐸᓯᐊᓂ ᐊᓯᐳᕐᑕᐅᓂᑯᓂᑦ ᓯᑯᓄᑦ ᐊᒪᓗ ᒪᓕᖕᓄᑦ, ᑕᑯᓴᐅᔪᕐᒥ ᑎᓯᔪᖃᐸᓕᐊᖏᑐᖅ. ᑎᑎᕋᐅᔭᕐᓯᒪᔪᓂ ᕿᖑᒥᒐᕐᑕᐅᔪᓂ ᓯᒃᔭᕐᐊᓯᐊᓂ ᑕᕙᓂ ᐃᓚᐅᔪᕐᑕᓕ ᐃᓚᒋᐊᕈᑦ 7ᒥᑐᓂᒃ.

4.3. ᐊᕋᒍᑕᒫᑦ ᓄᓇᖓᑕ ᐊᕿᑕᐅᓯᒪᓂᖓᑕ ᖃᐅᔨᓴᕐᑕᐅᓂᖓ

ᓇᓗᓇᐃᓯᒪᓚᕆᑐᑯᓗᓗᑎᒃ ᐱᖕᒋᒪᑕ ᐃᒪᕐᒧᑦ ᐱᔪᓇᐅᑎᑎᓂ ᖃᓄᐃᑐᓂᖓᑕᓗᓃᑦ ᐅᑎᑎᑕᐅᓇᓱᓂᖓᑕ ᐸᕐᓇᒍᑎᒥ ᐊᖕᒋᑕᐅᓯᒪᔪᓂ ᖃᓄᐃᓕᐅᕆᐊᖃᒫᖓᑕ ᒪᓂᕋᖓ ᖃᐅᔨᓴᕐᑕᐅᓂᖓᓂ. ᐊᕋᒍ ᑕᒫᑦ, ᖃᐅᔨᓴᕐᑕᐅᑎᖃᑕᕐᑕᕗᑦ ᐃᒥᓂᕐᓱᕐᑐᕐᒧᑦ ᐅᔭᕋᓕᕆᐳᒪᕆᒧᑦ. 2011ᖑᑎᓗᒍ ᖃᐅᔨᓴᕐᑕᐅᓂᕆᔭᖓᑕ ᐅᓂᒃᑳᖓ ᐃᓚᐅᖃᑕᐅᔪᖅ ᑕᕙᓂ ᐃᓚᒋᐊᕈᑦ 8ᒥ. ᖃᐅᔨᓴᕐᑕᐅᓂᖓ ᐃᓗᓕᖃᓚᐅᒥᔪᖅ ᐊᕿᓱᕐᑕᐅᓯᒪᔪᑦ ᓴᓇᔭᐅᓯᒪᔪᓂ ᐅᕙᓗᓃᑦ ᐊᓯᐳᕆᐊᑕᐅᓂᑯᐃᑦ ᖃᓄᐃᑐᓂᖓᓄᑦ ᐅᑎᑎᑕᐅ)ᓱᒃᑎᓗᒍ ᐅᑯᓇᓂ ᐃᓗᐊᓂᑐᑦ:

- ᒋᐊᕈ ᑕᓯᖓ, ᑰᖓ ᐊᒪᓗ ᓯᒥᓕᐊᖑᓯᒪᔪᖅ
- ᓱᑲᑲᖓᔪᖅ ᑕᓯᕐᒥ ᖃᑎᒃᑐᓕᐊᖑᓯᒪᔪᖅ ᐊᕐᑯᑎᓕᐊᖑᓯᒪᔪᕐᒥᓗ
- ᓄᑖᖅ ᑐᐊᐸᒃᑕᕐᕕᐅᔫᑉ ᓄᓇᖓ
- ᓯᕕᖓᔪᓕᐊᖑᓯᒪᔪᖅ ᓄᓇᖓ
- ᐊᑐᕐᑕᐅᔪᖅ ᐊᒃᑕᕐᕕᒃ
- ᐊᐅᐸᕐᑐᖅ ᕿᒥᑯᓘᑉ ᓴᐅᔭᐅᓯᒪᓂᖓ
- ᐅᔭᖅᓯᐅᕐᕕᐅᓚᐅᑐᑦ ᐃᓯᕐᑕᕐᕕᖏᑦ
- ᓯᒃᔭᕐᐊᓯᐊ ᐃᓪᓗᖓᖓᓂᑐᖅ ᑐᓚᒃᑕᕐᕕᕕᓂᐅᑉ

ᐅᖃᐅᓯᕆᓯᒪᔭᖏᑦ ᒎᓪᑕ ᑲᑐᔪᖃᑎᒋᖏᑕ ᐅᓂᒃᑳᓕᐊᖏᑦ ᓇᐃᒃᓕᒋᐊᕐᓯᒪᔪᑦ:

ᓄᓇᖓ 1 – ᒋᐊᕈ ᑕᓯᖓ, ᑰᖓ ᓯᒥᓕᐊᕆᓯᒪᔪᕐᓗ

- “ᐅᐳᕐᓇᑐᐊᓗᖑᕆᑐᖅ ᐊᐅᓂᖓᓄᑦ ᐃᓂᓚᒃᓂᑯᑦ ᖄᖓ ᖃᑎᒃᓯᑎᑕᐅᓯᒪᔫᑉ ᓯᒥᓕᐊᖑᓯᒪᔫᑉ ᒪᓇᕋᑖᖅ ᒪᑐᔭᐅᓂᐊᓕᕐᑎᓗᒍ ᐊᕋᒍᑕᒫᑦ ᓄᓇᖓᑕ ᖃᐅᔨᓴᕐᑕᐅᓂᖓᓂ. ᓴᓂᕋᖕᒋᑕ ᓯᕕᖓᓕᕐᑎᓯᒪᔫᑉ ᓯᒥᐅᔫᑉ ᑕᑯᓴᐅᓂᖓ ᓄᖑᑕᐅᕙᓕᐊᓚᐅᖕᒋᑐᖅ ᐃᒪᕐᒧᑦ ᐅᕙᓗᓃᑦ ᐊᑕᕐᓇᖕᒋᑐᖅ ᔪᓚᐃ 2011ᒥ ᖃᐅᔨᓴᑕᐅᑎᓗᒍ."
- “ᐃᖑᔭᕆ ᑐᖓᕕᖓᓂᑐᖅ ᓯᕕᖓᓕᕐᑎᑕᐅᔫᑉ ᑕᑯᓴᐅᓂᖓ ᖃᓄᐃᖕᒋᑎᐊᕐᑐᖅ ᐊᒪᓗ ᐊᑐᑎᖃᓯᐊᕐᓗᓂ ᓴᐳᔪᓯᒪᔪᖅ ᓯᕕᖓᔪᓕᐊᕆᓯᒪᔪᕐᒥᑦ ᑲᖏᓲᔭᑰᑉ ᐃᒪᐅᓂᓘᑦ ᑎᓯᕙᓕᐊᖏᑐᖅ.”
- “ᑕᐃᒪᖓᓂ ᐃᒍᑎᕐᑕᐅᓕᓚᐅᒪᑕ, ᑐᐊᐸᖕᒥᒃ ᖃᑎᓯᕙᓕᐊᔪᖃᐃᓇᕐᑐᖅ ᐃᓪᓗᖓᖓᓂ ᖃᑎᒃᑐᓕᐊᓇᔭᐅᓯᒪᔪᕐᒥᒃ ᒪᓕᕐᒧᑦ ᓄᖃᑎᓯᔪᑎᐅᑉ ᓱᓪᓗᖓᓂ. ᖃᑎᓯᓯᒪᔪᖅ ᐅᕙᓗᓃᑦ ᑐᐊᐸᒃ ᒪᓕᒧᑦ ᓄᖃᑎᓯᔪᑎᑎᓕᐊᓇᓯᒪᔪᖅ ᐃᓪᓗᖓᖓᓂᑑᑉ ᑐᐊᐸᖓ ᐊᖕᒋᒃᓕᕙᓕᐊᔪᖅ (ᓲᕐᓗ ᑎᓯᕙᓕᐊᓂᖓ ᓯᓕᓯᕙᓕᐊᓗᓂᓗ) ᐊᑐᓂ ᐊᕋᒎᑕᒪᑦ ᑕᐃᒪᐃᓂᖓᓄᑦ ᑐᐊᐸᖓ ᐊᖕᒋᓕᕙᓕᐊᔪᖅ. ᐊᖕᒋᓕᕙᓕᐊᓂᖓ ᑕᐃᒪᐃᓇᓱᒋᔭᐅᔪᖅ ᓯᑯᒧᑦ ᐊᒪᓗ ᒪᓕᒧᑦ ᐃᑲᓂᖓᓂᑦ ᑯᐊᐸᖓ ᓄᒃᑎᕐᐸᓕᐊᔪᖅ ᖃᓂᒋᔮᓂᑦ ᓂᒋᕐᐸᓯᐊᓂᑦ ᒋᐊᕈ ᑕᓯᖓᑕ. ᑕᒪᓇ ᑕᐃᒪᐃᑑᔮᕐᑐᖅ ᐃᓄᒧᑦ ᑕᐃᒪᐃᑎᑕᐅᓇᓂ ᑕᐃᒪᐃᖃᑕᓂᑰᕐᑯᑐᖅ ᐅᕙᖅᓯᐅᕐᕕᒃ ᐱᒋᐊᕐᑕᐅᓚᐅᕐᑎᓇᒍ. ᑕᒪᓇ ᐊᑕᕐᓇᖕᒋᑐᑯᓗᓗᓂ ᑕᐃᒪᐃᖃᑕᕐᓂᖓ ᑕᐃᒪᐃᑎᓯᔫᔮᕐᑐᖅ ᐃᒪᖅ ᑎᓂᑉᐸᓗᓂᓗ ᐅᓕᑉᐸᓗᓂᓗ ᑐᐊᐸᒥ ᖃᑎᓯᒥᓯᒪᔪᕐᒥᑦ ᑕᓯᕐᒥᑦ ᑰᒧᑦ ᐃᒪᐅᓂᑯᑦ ᐊᐅᔭᐅᑎᓗᒍ. ᑭᓯᐊᓂᓕ, ᑐᐊᐸᒃ ᖃᑐᓕᐊᓇᓯᒪᔪᖅ ᐃᒪᕐᒥ ᓄᖃᖕᖑᕐᑎᓯᖃᑕᕐᒪᑦ ᐊᒪᓗ ᓱᓃᓯᒪᕐᑯᑐᖅ ᑕᓯᐅᑉ ᐃᒪᖓᑕ ᐃᒪᖃᓂᖓᓂᒃ (ᓇᓗᓇᐃᕐᑕᐅᔭᕆᐊᓕᒃ ᒎᓪᑕᑯᑦ ᕿᒥᕈᓚᐅᖕᒋᒪᑕ ᑕᓯᐅᑉ ᐃᒪᖃᓂᕆᔭᖓᑕ ᐊᖕᒋᓂᖓᓂᒃ ᓄᐊᑕᐅᑎᓗᒋᑦ ᖃᐅᔨᓴᕐᑕᐅᔪᑏᑦ ᐊᓯᖕᒋᓄᑦ ᑕᐃᒪᐃᓂᖓᓄᑦ ᑕᒪᓇ ᓇᓗᓇᐃᓯᔪᖅ ᑕᓯᐅᑉ ᐃᒪᖓᑕ ᐊᖕᒋᓂᖓ ᓱᓂᕐᓯᒪᖕᒋᑐᖅ ᑕᐃᒪᖓᓂᑦ 2008ᖑᓚᐅᓯᒪᖕᒪᑦ).

ᓄᓇᖓ 2 – ᓱᑲᑲᖓᔫᑉ ᑕᓯᖓᑕ ᖃᑎᒃᑐᓕᐊᕆᔭᐅᓯᖓᓂᖓ ᐊᖁᑎᓕᐊᖑᓯᒪᔪᕐᓗ

- “ᓱᑲᑲᖓᔫᑉ ᑕᓯᐅᑉ ᐅᐸᑕᐅᔭᓇᕈᑎᖓᑕ ᐊᖁᑖ ᓱᓕ ᖃᓄᐃᖏᑎᐊᕐᑐᖅ, ᐃᒥᓂ ᐊᕿᓱᕐᑐᕐᒥᒃ ᓴᐳᓗᑕᓕᐅᓗᓂ ᓴᕐᕙᐅᕙᓕᐊᖏᑐᖅ ᑰᒃᕕᐅᓂᖏᓂ. ᓯᕗᓂᐊᓂ ᐊᕿᓱᕐᑕᐅᓚᐅᑐᑦ ᓄᖑᐸᓕᐊᔪᑦ ᑎᓱᓗᑎᒃ ᐃᓗᕐᓴᓕᐊᖑᓯᒪᔪᑦ ᐅᔨᕆᔭᐅᓚᐅᑐᑦ ᐊᑕᕐᓇᖏᑐᕐᒥᑐᑦ ᔪᓚᐃ 2011ᖑᑎᓗᖑ ᖃᐅᔨᓴᕐᑕᐅᒪᑦ ᐊᒪᓗ ᑭᖑᓂᐊᒍᑦ ᑲᒪᒋᔭᐅᖏᑲᓗᐊᕈᓂ ᖃᓄᐃᖏᓗᓂ."
- “ᐱᔭᕐᓂᖓᑕ ᐃᓚᖓ ᖃᑎᒃᑐᓕᐊᕆᓯᒪᔪᑦ ᑐᐊᐸᓕᓲᕐᓯᒪᔪᑦ ᑕᐃᒪᐃᑐᔪᖅ ᐱᔪᑎᒋᓗᒍ ᓯᑯ ᐊᔭᒃᑕᐅᕙᓕᐊᖅᑕᕐᓂᖓᓄᑦ ᖃᑎᓯᓯᒪᔪᕐᒥ ᖃᐅᔨᓴᕐᑕᐅᑎᓗᒍ. ᑕᓯᐅᑉ ᐃᒪᖓ ᖃᑎᓯᓯᒪᔪᕐᐸᓯᒥ ᐅᔨᕆᔭᐅᓚᐅᑐᖅ ᓯᑯᖅᑲᖏᑐᖅ ᔪᓚᐃ 2011ᒥ ᖃᐅᔨᓴᕐᑕᐅᑎᓗᒍ.

ᓄᓇᖓ 3 – ᓄᑖᖅ ᑐᐊᐸᒃᑕᕕᓕᐊᕆᔭᐅᓯᒪᔪᖅ

- ᐱᕐᔪᐊᖑᖏᑐᕐᒥ ᐃᓄᒧᖏᑐᖅ ᑎᓲᕐᐸᓕᐊᔪᖅ ᐅᔨᕐᓇᓚᐅᑐᑦ ᓇᓗᓇᐃᑕᐅᓗᑎᒃᓗ ᑭᓯᐊᓂ ᐃᓱᒫᓗᓇᖏᑐᑦ. ᓴᓂᕐᓂ ᓯᕕᖓᔪᑦ ᑐᐊᐸᒃᑕᕐᕕᓕᐊᕆᓯᒪᔪᕐᒥ ᑲᔪᓯᔪᖅ ᐊᑕᕐᓇᑐᖓᖏᓗᑎᒃ. ᐃᓱᒫᓗᓇᕐᑐᕐᒥ ᓇᓗᓇᐃᑕᐅᔪᖅᑲᓚᐅᖏᑐᖅ.

ᓄᓇᖓ 4 – ᓯᕕᖓᓂᖓ ᓄᓇᐅᑉ

- “ᐅᔨᕐᓇᕐᑐᐊᓗᓂ ᑕᑯᓴᐅᔪᓂᒃ ᐊᓯᔨᕐᓂᑕᖅᑲᓚᐅᖏᑐᖅ ᐅᔭᖅᓯᐅᕐᕕᕕᓂᐅᑉ ᓯᕕᖓᓂᖓᓂ ᑕᑯᓴᐅᔪᓂ ᔪᓚᐃ 2011ᖑᑎᓗᒍ ᓄᓇᖓ ᖃᐅᔨᓴᕐᑕᐅᑎᓗᒍ ᐃᓱᒪᒋᓗᒍ ᓯᕗᓂᐊᓂ ᒪᑐᔭᐅᓚᐅᑎᓇᒍ ᖃᐅᔨᓴᕐᑕᐅᒪᑦ. ᐅᔨᕐᓇᕐᑐᕐᒥᒃ ᑕᑯᓴᐅᔪᓂ ᐱᑕᖅᑲᓚᐅᖏᑐᖅ ᓯᕕᖓᓂᖓᓂ ᔪᓚᐃ 2011ᒥ ᖃᐅᔨᓴᕐᑕᐅᑎᓗᒍ ᐊᑕᕐᓇᕈᑕᐅᔪᓇᕐᑐᓂᒃ ᐃᓄᓐᓄᑦ ᐅᕙᓗᓃᑦ ᐅᒪᔪᕐᓄᑦ.”
- “ᐊᕐᕋᒍ ᑕᒫᑦ ᖁᑎᓕᓇᓂᖓ ᕿᖑᒥᒐᕐᑕᐅᑎᓗᒍ ᓇᓗᓇᐃᓯᔪᖅ ᐅᔨᕐᓇᑐᒪᕆᒥᒃ ᐃᓂᓚᒃᑐᕐᓂᒃ ᐱᑕᖅᑲᓚᐅᖏᑐᖅ ᒪᑐᓂᐅᑉ ᓯᕗᓂᐊᓂ ᐅᐊᓯᔭᐅᖅᑕᕐᑎᓗᒍ (ᓲᕐᓗ, ᑕᐃᒪᖓᓂ 2005ᒥᓂᑦ)."

ᓄᓇᖓ 5 – ᐊᑐᕐᑕᐅᔪᖅ ᐊᒃᑕᕐᕕᒃ

- ᓄᓇᖓᑕ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᖓᑕ ᐅᓂᒃᑳᖓ ᐅᖃᓯᒪᔪᖅ "ᓇᓗᓇᐃᓯᒪᔪᕐᒥᒃ ᓯᕕᖓᓂᖓᑕ ᐊᑕᓇᓕᓂᖓᓂ ᐱᑕᖅᑲᖏᑐᖅ ᐅᕙᓗᓃᑦ ᓴᕿᔮᕐᑐᓂᒃ ᐊᒃᑐᕐᓗᑯᓂᒃ ᑕᑯᓴᐅᔪᕐᑕᖅᑲᓚᐅᖏᑐᖅ. ᓄᑎᒃᓯᒪᔪᕐᓂᒃ ᐅᕙᓗᓃᑦ ᐃᓗᑐᖅᒪᔪᓂᒃ ᐃᓂᓚᖕᓂᖓᓄᑦ ᐱᑕᖅᑲᓚᐅᖏᑐᖅ ᑕᑯᓴᐅᔪᓂ ᐊᒃᑕᕐᕕᐅᑉ ᓯᕕᖓᓂᖏᓂ." ᐃᓱᒫᓗᓇᕐᑐᓂᒃ ᓇᓗᓇᐃᑕᐅᔪᖅᑲᓚᐅᖏᑐᖅ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᕐᒥ.

ᓄᓇᖓ 6 – ᐊᐅᐸᕐᑐᑯᓗ ᕿᒥᒥ ᓴᐅᔭᐅᓯᒪᔪᑦ ᓄᓇᒧᑦ ᐅᓕᒃᑕᐅᓯᒪᓗᑎᒃ

- “ᓴᕿᑐᓂᒃ ᐊᒃᑕᕐᓗᑯᓂ ᐱᑕᖅᑲᖏᑐᖅ, ᓄᑎᒃᓯᒪᔪᓂᓗᓃᑦ ᐅᕙᓗᓃᑦ ᑲᑕᒃᓯᒪᔪᕐᓂᒃ ᐃᓂᓚᖕᓂᑯᓂᒃ ᑕᑯᓴᐅᔪᖅᑲᓚᐅᖏᑐᖅ ᐊᐅᐸᕐᑐᑯᓗ ᕿᒥᕐᒥ ᓴᐅᔭᐅᓯᒪᔪᓂ ᔪᓚᐃ 2011ᒥ ᖃᐅᔨᓴᕐᑕᐅᑎᓗᒍ." ᐅᓂᒃᑳᖅ ᐅᖃᓯᒪᒥᔪᖅ ᓴᐅᔭᐅᑎᓗᒍ 2010ᒥ ᐊᔨᒋᖏᑐᑦ ᐊᒃᑕᕐᓗᑯᐃ ᓄᐊᑕᐅᑎᓗᒋᑦ ᒪᑐᓂᐅᑉ ᓯᕗᓂᑎᐊᖓᓂ, ᐊᒪᓗ ᐅᓇᕐᓂᖓᑕ ᖃᐅᔨᓴᕈᑎᖏᑦ ᐊᕿᓱᕐᑕᐅᑎᓗᒋᑦ ᑏᒃᑯᑦ ᓴᕿᑎᓯᓚᐅᑐᑦ ᐊᐅᒪᓂᖓ ᓱᓕ ᐅᓕᖓᑕ ᐅᖓᑖᓂᖏᑐᖅ.

ᓄᓇᖓ 7 – ᐅᔭᖅᓯᐅᕐᕕᐅᑉ ᐃᓯᕐᑕᕐᕕᕕᓂᖏᑦ

- “ᑕᕐᒪᒥᓕᒫᖅ ᑎᓴᒪᐃᑦ ᐃᓯᕐᑕᕐᕕᕕᓂᖏᑦ ᑕᑯᔭᐅᒐᒥᒃ ᓱᓕ ᐱᐅᔪᐃᑦ ᖃᓄᐃᖏᑎᐊᕐᑐᑦ ᐊᒪᓗ ᐊᑕᕐᓇᑐᒥᓕᒪᖓᑕ ᓇᓗᓇᐃᑯᑕᖅᑲᖏᑐᑦ ᓄᖑᓕᓕᒪᖔᑕᓗᓃᑦ ᔪᓚᐃ 2011ᒥ ᖃᐅᔨᓴᕐᑕᐅᑎᓗᒍ”.
- “ᓯᕕᖓᓂᖓ ᓯᕗᓂᐊᓂ ᐃᓯᕐᑕᕐᕕᓗᐊᑕᐅᓚᐅᕐᑑᑉ ᓴᐳᓗᑕᓕᕐᑕᐅᑲᓂᓚᐅᑐᖅ ᓯᖓᕐᑕᐅᑎᐊᕐᓗᓂ 2009ᖑᑎᓗᒍ ᓯᕕᖓᓂᖓ ᐊᕿᓱᕐᑕᐅᑲᓂᕐᓗᓂ ᐱᐅᖏᓗᐊᕐᒪᑦ ᑕᔭᐅᓚᐅᑐᖅ ᖃᓄᐃᖏᑎᐊᕐᑐᖅ.”

ᓄᓇᖓ 8 – ᓯᒃᓴᕐᐸᓯᐊᑕ ᐃᒡᓗᖓᖓᓂᑐᖅ ᑐᓚᒃᑕᕐᕕᕕᓂᖅ

- “ᓯᕕᖓᓂᖏᑦ ᐃᒡᓗᖓᖓᓂᑐᑦ ᑐᓚᑕᕐᕕᕕᓂᐅ ᐊᑕᕐᓇᑐᒥᖏᑎᐊᕐᑐᑦ ᐅᔨᕆᔭᐅᓚᐅᑐᑦ. ᑕᑯᓴᐅᔪᕐᒥ ᒪᓕᓄᑦ ᓄᖑᑕᐅᕙᓕᐊᔪᕐᒥᒃ ᐱᑕᖅᑲᓚᐅᖏᑐᖅ, ᓯᐅᕿᔪᐃᓗᓃᑦ ᑎᓱᕙᓕᐊᖏᑐᑦ ᓯᒃᓴᕐᐸᓯᐊᓂ ᔪᓚᐃ 2011ᒥ ᖃᐅᔨᓴᕐᑕᐅᑎᓗᒍ. ᐃᒪᖓ ᐃᒡᓗᖓᖓᓂᑐᖅ ᓯᒃᓴᕐᐸᓯᐅᑉ ᓯᑯᖅᑲᖏᑎᐊᓚᐅᑐᖅ ᒪᓇᐅᔪᖅ ᐊᒪᓗ ᓯᕗᓂᐊᓂ ᓄᓇᖓ ᖃᐅᔨᓴᕐᑕᐅᓂᖃᑎᓗᒍ ᑕᒪᓇ ᓇᓗᓇᐃᓯᔪᖅ ᓯᐅᕿᔪᒥᒃ ᒪᕿᔪᖕᒥᓗᓃᑦ ᑕᕆᐅᒧᕐᑐᖃᐸᓕᐊᖏᑐᖅ ᐊᕿᓱᕐᑕᐅᓯᒪᔫᑉ ᓯᒃᓴᕐᐸᓯᐊᓂᑦ.”
- “ᐊᐅᒪᓂᖓᑕ ᐃᓂᓚᖕᓂᖓ ᐊᒪᓗ ᖃᓄᐃᓕᖓᓂᖓ ᑐᐊᐸᐅᔪᑦ ᑐᑭᓕᓈᑦ ᑕᐃᒪᐃᓕᑎᑕᐅᓯᒪᔪᑦ ᒪᓕᖕᒧᑦ ᐊᒪᓗ ᓯᑯᒧᑦ ᑕᑯᔭᐅᓚᐅᑐᑦ ᓯᒃᓴᕐᐸᓯᐊᓂ ᒪᑐᓂᒃᓴᐅᑉ ᓯᕗᓂᐊᓂ ᖃᐅᔨᓴᕐᑕᐅᓂᖃᑎᓗᒍ." "ᑭᓯᐊᓂᓕ ᐊᑕᖏᕐᓗᒍ ᓯᔭᓕᒫᖓ ᐊᑕᕐᓇᑐᒥᑐᔮᖏᑐᖅ ᐊᒪᓗ ᐱᓕᕆᐊᖑᑲᓂᕆᐊᖃᕐᑯᔮᖏᑐᖅ."

ᓈᒪᓗᓂ ᓄᓇᖓᑕ ᖃᐅᔨᓴᕐᑕᐅᓂᖓᑕ ᐅᓂᒃᑳᖓ ᐃᓚᐅᖅᑕᐅᔪᖅ ᑕᕙᓂ ᐃᓚᒋᐊᕈᑦ 8ᒥ.

4.4. ᒥᐊᕈ ᑕᓯᖓᑕ ᐃᒪᖓ ᖁᑎᓯᓯᒪᔪᕐ

ᐊᕋᒍ ᑕᒫᑦ ᕿᖑᒥᒐᕐᓂᑦ ᓯᕕᖓᓂᖓᓂᒃ ᒥᐊᕈ ᑕᓯᖓᑕ ᑲᔪᓯᑎᑕᐅᓚᐅᑐᖅ. ᐊᒐᓯ 2006ᖑᑎᓗᒍ, ᐊᖏᔪᑎᕈᓗᐃᑦ ᑐᐊᐸᐃᑦ ᓴᐳᓗᑕᓕᐊᕆᔭᐅᓚᐅᑐᑦ ᑕᒪᓇ ᐅᐳᕆᔭᐅᓚᐅᑐᖅ ᑰᖓᑕ ᖃᓂᖓᓂ ᒥᐊᕈ ᑕᓯᖓᓂ ᐱᔪᑎᒥᓗᒍ ᓯᑯᒧᑦ ᑕᐃᒪᐃᑎᑕᐅᔪᑦ. ᑕᐃᒪᐃᓂᖓᓄᑦ ᑕᓯᐅᑉ ᐃᒪᖓ ᖁᑎᓯᓯᒪᓚᐅᑐᖅ ᐊᑯᓂᖓᓂ 2005 ᐊᒪᓗ 2008. ᕿᖑᒥᒐᕐᓃᑦ ᓴᐳᓗᑕᖓᓂᒃ ᓴᕿᑎᓯᔪᕐ ᐅᔨᕐᓇᒪᕆᑐᕐᒥᒃ ᐊᓯᔨᕐᓂᕐᒥᒃ ᖃᓄᐃᓕᖓᓂᖓᑕ ᐊᕋᒍᒥᑦ ᐊᕋᒍᒧᑦ ᐱᔪᑎᒥᓗᒍ ᑲᔫᓇᕐᑐᕐᒥᒃ ᓯᑰᑉ ᓱᓃᓂᖓᓄᑦ (ᑕᑯᓗᒍ ᖁᑎᓕᕆᓂᖓᑕ ᑎᑎᕋᐅᔭᕐᓯᒪᓂᖓᓂᒃ ᐃᓚᒥᐊᕈᑦ 7ᒥ). ᐃᒪᖓ ᑕᓯᐅᑉ ᐊᖏᓕᕙᓕᕐᑐᒐᓗᐊᖅ 0.67 ᒦᑕᒥᒃ 2005ᒥᑦ 2008ᒧᑦ, ᒪᓇᐅᔪᖅ ᐊᓯᔨᕐᓯᒪᔪᓂᕐᑐᖅ ᕿᑎᖓᓂᑦ ᓄᖑᐊᓄᑦ ᔪᓚᐃᒥ ᑕᓯᐅᑉ ᐃᒪᖓ ᐊᓯᔨᕐᓂᖃᓚᐅᑐᖅ ᒥᑭᓂᕐᓴᕐᒥᒃ 0.1ᒦᑕᒥᒃ

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ᖃᐅᓴᕈᑎᕕᓃᑦ 2 - ᒥᐊᕈ ᑕᓯᖓᑕ ᓯᕕᖓᓂᖓ

ᐅᓪᓗᖓ	ᑕᓯᐅᑉ ᓯᕕᖓᓂᖓ (ᐅᒃᑰᑦ ᒦᑕᒧᑦ)	ᐅᖃᐅᓯᒃᓴᐃᑦ
27-ᔪᓂ-05	1005.30	
24-ᐊᒐᓯ-05	1005.26	ᑰᓗᐊᕈᓂᕐᑐᖅ ᓂᒃᓚᓱᓂᖓ ᐱᓪᓗᒍ
29-ᔪᓂ-06	1005.69	
09-ᔪᓚᐃ-06	1005.62	ᑰᒃᑐᖅ ᑐᐊᐸᑯᑦ ᓴᐳᓗᑕᓕᐊᖑᓯᒪᔪᑯᑦ
20-ᐊᒐᓯ-06	1005.50	ᓱᓕ ᑰᒃᑐᖅ ᑰᒃᑐᐊᓗᔪᓂᕐᓗᓂ
31-ᔪᓚᐃ-07	1005.60	ᑰᒃᑐᖅ ᑐᐊᐸᑯᑦ ᓴᐳᓗᑕᓕᐊᖑᓯᒪᔪᑯᑦ
19-ᔪᓚᐃ-08	1005.97	ᖃᖓᑕᕐᑎᑕᐅᓯᒪᔪᕐᒥᒃ ᐊᑐᕐᑐᒍᑦ ᑕᒪᖏᑎᐊᑐᒥ
29-ᐊᒐᓯ-08		ᖃᐅᔨᓴᕈᓇᖏᑕᕗᑦ ᒪᓪᓕᓗᐊᕐᒪᑦ
24-ᔪᓚᐃ-09	1006.09	ᖃᖓᑕᕐᑎᑕᐅᓯᒪᔪᕐᒥᒃ ᐊᑐᕐᑐᒍᑦ ᑕᒪᖏᑎᐊᑐᒥ
14-ᔪᓚᐃ-10	1006.04	ᖃᖓᑕᕐᑎᑕᐅᓯᒪᔪᕐᒥᒃ ᐊᑐᕐᑐᒍᑦ ᑕᒪᖏᑎᐊᑐᒥ
19-ᔪᓚᐃ-11	1006.10	ᖃᖓᑕᕐᑎᑕᐅᓯᒪᔪᕐᒥᒃ ᐊᑐᕐᑐᒍᑦ ᑕᒪᖏᑎᐊᑐᒥ

5. ᐊᓯᖏᑦ ᓄᓇᐃᑦ ᐅᐊᓯᔭᐅᓯᒪᔪᑦ

ᖃᑲᓂᐊᒍᑦ ᐅᐊᓯᓂᐅᑉ ᐃᒪᕐᓗᖃᒪᙱᑦ ᐅᔨᕐᓇᑐᓂᒃᓗ ᐊᑕᕐᓇᖏᑲᓗᐊᒪᙱᑦ ᒪᕈᓕᕿᒥ, ᐅᐊᓯᓂᖅ ᐊᓂᕆᐅᑉ ᓱᑲᓂᖓᓂᒃ ᕋᓴᓗᐸᐃᒥ, ᐅᐊᓯᓂᖅ ᐃᓗᐊᓂ ᐊᒃᑕᕐᓗᑯᐃᑦ ᐅᓇᓂᖓᓂᒃ, ᐊᒪᓗ ᐅᐊᓯᓂᖅ ᓴᕕᕋᔭᓴᕈᔪᐃᑦ ᓄᓇᖓᓂ ᒪᕋᕈᔪᓂᒪᙱᑕ ᓯᕐᓗᐊᖃᕕᕕᓂᕐᒥ ᓴᕕᕋᔭᒃᓴᖃᕕᕕᓂᕐᒥ ᖃᐅᔨᓴᕐᑕᐅᓚᐅᑐᑦ ᐱᖓᔪᖓᓂ ᑎᓴᒪᐃᓕᖃᖓᔪᑦ 2011ᒥ.

5.1. ᕋᓴᓗᐸᐃᒥ ᐊᓄᕆᒧᑦ ᖃᐅᔨᓴᕐᓂᖅ

ᐃᒪᐅᑉ ᐱᔪᓇᐅᑎᖓᓂ ᐊᒪᓗ ᖃᓄᐃᑐᓂᖓᓄᑦ ᐅᑎᑎᑕᐅᓇᓱᓂᖓᑕ ᐸᕐᓇᒍᑎᖓᓂ ᐱᔭᕆᐊᖃᑎᓯᔪᖅ ᓯᑯᖃᖏᑎᓗᒍ ᒥᐊᕈ ᑕᓯᖓᓂ ᐃᖃᓇᐃᔭᕐᑏᑦ ᒪᕈᓕᕿᒥᑐᓂᕋᖓᑕ, ᐊᓄᕆᐅᑉ ᓱᑲᓂᖓ ᐅᐊᓯᔭᐅᖁᓗᒍ ᕋᓴᓗᐸᐃᒥᑦ. ᓇᓗᓇᐃᓯᒪᑎᐊᕐᑐᑦ ᐊᓄᕆᐅᑉ ᓱᑲᓂᖓᑕ ᑎᑎᕋᓯᒪᔪᓂ ᐃᓚᒥᐊᕈᑦ 9ᒥᑐᑦ. ᓯᑎᐱᕆ 22ᒥ ᐊᒪᓗ 23ᒥ, ᕋᓴᓗᐸᐃᒥ, ᐊᓄᕆᐅᑉ ᓱᑲᓂᖓ ᐅᖓᑖᓂᓚᐅᑐᖅ 50 ᑭᓛᒥᑕ/ᐃᑲᕋ 34ᓄᑦ ᐃᑲᕋᓄᑦ ᑲᔫᓇᕐᓗᓂ (66 ᑭᓛᒥᑕ/ᐃᑲᕋᓗᐊᑕᐅᓚᐅᑐᖅ). ᒥᐊᕈ ᑕᓯᖓ ᐅᖓᓯᓂᖃᑐᖅ 80 ᑮᓪᓚᒥᑕᐅᑉ ᐅᖓᑖᓂ ᕋᓴᓗᐸᐃᒥᑦ ᓇᓗᓇᓚᑦᑐᖅ ᑕᐃᒪᐃᑐᓴᐃᓇᐅᓚᐅᒪᙱᑦ ᒥᐊᕈ ᑕᓯᖓᓂ.

ᑭᓯᐊᓂᓕ, ᒪᕈᓗᐊᑖᒃ ᐱᔪᑕᐅᔾᔮᒃ ᖃᓄᐃᒪᑦ ᑕᒪᓇ ᐃᓱᒫᓗᓇᖏᒪᙱᑦ:

- ᓯᓄᕗᓂᐊᓂ ᖃᓄᐃᑐᓂᖓᑕ ᐅᓂᒃᑳᖏᓂ (ᐃᓚᐅᓗᓂ ᐊᖏᕐᑕᐅᓯᒪᔪᑦ ᐃᒍᑎᕐᑕᐅᓂᖏᑦ ᐊᒪᓗ ᖃᓄᐃᑐᓂᖓᓄ ᐅᑎᑎᑕᐅᓇᓱᓂᖓᑕ ᐸᕐᓇᐅᑖ), ᐸᐅᓗ ᐃᐊᕆᒃᓴᓐ ᐃᒪᕐᓂᒃ ᐊᕙᑎᒥᒃᓗ ᖃᐅᔨᓴᕐᑎᒪᕆᑯᑦ ᐊᕙᑎᓕᕆᔩᑦ ᐅᖃᓯᒪᔪᑦ 49 ᑭᓛᒥᑕᒥᒃ/ᐃᑲᕋᒧᑦ ᐊᓄᕆᖓ ᐊᓄᕌᕐᑎᓗᒍ ᐅᓗᕐᒧᑦ ᐊᑕᐅᓯᕐᒧᑦ ᖄᕐᐸᓯᐊᓂᒃ ᐃᖑᓚᕐᔭᔪᓇᕐᑐᖅ 1ᒦᑕᒥᒃ ᑕᕆᐅᕈᔪᐊᓂᒃ ᖄᕐᐸᓯᐊᓂᑐᕐᒥᒃ ᐃᒪᕐᒥᒃ, 8.5ᒦᑕᒥᒃ ᐃᑎᓂᖃᓕᓗᒍ. ᐊᒪᓗ ᐅᓗᑲᓃᑦ 8ᖑᔪᑦ ᑕᐃᒪᓴᐃᓇᖅ ᐊᓄᕐᑎᒋᔭᕆᐊᖃᕋᔭᕐᑐᖅ ᐃᑎᓂᕐᑕᕐᓱᕐᑯᓗᒍ ᑕᒪᓇ ᐃᖑᓚᕐᓯᒪᓂᖓ ᑕᕆᐅᑉ 2ᒦᑕᖑᕐᓂᐊᕐᒪᑦ 10.5 ᒦᑕᒧᑦ ᑎᑭᓗᒍ. ᐅᖃᓚᐅᒥᔪᖅ ᐊᓄᕐᓂᖅᓴᐅᐸᒍᖅ ᑕᐃᒪᓴᐃᓇᖅ ᐃᖑᓚᓯᒐᔭᕐᑐᖅ ᕿᓚᒥᐅᑎᒥᓂᕐᓴᕐᒥ. ᐊᓄᕆᐅᑉ ᓱᑲᓂᖓ ᓯᑎᐱᕆᐅᑎᓗᒍ ᖁᑎᓂᕐᓴᐅᓚᐅᑐᖅ 49 ᑭᓛᒥᑕ/ᐃᑲᕋᒧᑦ ᑕᒪᓇ ᐊᑐᑕᐅᓚᐅᑐᖅ ᒥᓴᑕ ᐃᐊᕆᒃᓴᐅᑉ ᖃᐅᔨᓴᕈᑎᕆᓚᐅᑕᖓ, ᐅᖓᑖᓄᓚᐅᖏᑐᖅ ᐊᓄᕐᓂᖓ ᐅᓗᐃᑦ ᐊᑕᐅᓯᖅ ᓇᐸᕐᓗ, ᑕᒪᓇ ᐃᖑᓚᕐᔪᓇᓯᒐᔭᖏᑐᖅ ᖄᕐᐸᓯᐊᓂᒃ 10ᒦᑕᒧᑦ ᐃᑎᑎᒋᔪᕐᒧᑦ.

- ᖃᑉᐸᓯᒋᙱᑕᖓ ᑕᓯᐅᑉ ᐃᖑᓚᑦᑕᐅᒐᔭᑉᐸᑦ ᖃᑉᐸᓯᙵᓂᙶᑦᑐᑦᒥᒃ ᑕᓯᕐᒥ, ᑕᐃᒪ ᑕᒪᕐᒥᒃ ᖄᐸᓯᐊᓗ ᐊᑕᓂᑦᑐᑦᓗ ᐊᑎᒃᑐᕐᒥᑲᔭᕐᑐᖅ ᓴᕕᕋᔭᒃᓴᖃᓂᖕ, ᖃᓄᐃᑐᑐᐃᓇᖅ ᐃᒪᖅ ᑰᒃᑐᖅ ᑕᕐᓯᒥᑦ ᑰᖕᒧᑦ ᓱᓕ ᐅᖕᖓᑖᓄᕋᔭᙱᑦᑐᖅ ᐃᒪᐅ ᐱᔭᓇᐅᑎᑕ ᐱᔭᓇᕐᑎᑕᖕᖓᓂᑦ ᒪᓕᒋᐊᖃᑕᑎᓂᑦ.

5.2. ᐊᒃᑕᕐᕕᒥ ᐅᓇᓂᖓᑕ ᖃᐅᔨᓴᕐᑕᐅᓂᖓ

ᑎᓴᒪᐃᑦ ᐅᓇᕐᓂᕐᓯᐅᑏᑦ ᐊᕿᓱᕐᑕᐅᓚᐅᕐᑐᑦ ᑕᒪᐃᓄᑦ ᐊᐅᐸᕐᑐᖅ ᕿᒥᑯᓗᒥ ᓴᐅᔭᐅᓯᒪᔪᑦ ᐊᒃᑕᕐᓗᑯᓂ ᐊᒪᓗ ᐊᑐᕐᑕᐅᔪᖅ ᐊᒃᑕᕐᕕᒥ ᓴᐅᔭᐅᓯᒪᔪᓂ. ᐅᓇᕐᓂᕐᓯᐅᑦ ᐊᑐᓂ ᑕᒪᕐᒥᒃ ᐃᓕᓯᕕᐅᓯᒪᔪᑦ ᐅᓇᕐᓂᓯᐅᑎᓂᒃ ᐊᔾᔨᙱᑐᓂ ᐃᑎᓕᓈᒃᓂ ᐅᓕᖓᓂᓗ ᑕᒪᓂ ᑐᐊᐸᖕᒥ ᐊᒪᓗ ᐃᑎᓂᕐᓴᒥ ᐊᒃᑕᕐᕕᖅᕕᐅᔪᕐᒥ ᐅᐊᓯᔭᐅᕐᑯᓗᒍ ᐅᓇᕐᓂᖓᑕ ᖃᓄᐃᑐᓂᖓ. ᖃᐅᑕᒫᑦ ᐅᓇᕐᓂᕐᓯᐅᑏᑦ ᐅᓕᓯᒪᔪᕐᒥᑐᑦ ᐊᒪᓗ ᑕᒪᐃᓂ ᐃᔪᓂᙱᓂ ᓴᐅᔭᐅᓯᒪᔪᕐᓂ ᑎᑎᕋᑕᐅᕙᓕᐊᔪᑦ ᐃᒥᓂᒃ ᑎᑎᕋᐸᓕᐊᓗᑎᒃ ᑕᒪᐃᓂᓕᒫᖅ ᐅᓇᕐᓂᓯᐅᑎᖃᑐᓂ. ᑕᐃᒪ ᐊᐅᔭᑕᒫᑦ, ᑕᑯᐊ ᑎᑎᕋᓯᒪᔪᑦ ᑕᑯᓇᖓ ᑎᑎᕋᕆᑎᙱᓂᑦ ᓄᐊᑕᐅᖃᑕᕐᑐᑦ ᐊᑐᐃᓇᕈᑎᓯᓗᑎᒃ ᖃᐅᑕᒫᑦ ᐅᓇᕐᓂᖓᑕ ᑎᑎᕋᐸᓕᐊᓯᒪᔭᙱᓂᑦ ᑕᒪᐃᓂ ᐅᓇᓂᕐᓯᐅᑎᓂᑦ.

ᖄᕐᐸᓯᐊ ᑕᒪᕐᒥᒃ ᐊᒃᑕᕐᓗᑯᐃᑦ ᓴᐅᔭᐅᓯᒪᔪᑦ ᐃᔪᓂᖃᑐᑦ ᐅᓕᖕᒋᑦ 1.8 ᒦᑕᒥᒃ ᐊᒪᓗ ᐅᓇᕐᓂᓯᐅᑎᓂᒃ ᐃᓕᓯᕕᐅᓯᒪᓗᑎᒃ ᑕᑯᓴᐅᑎᓯᓗᑎᒃᓗ ᐊᐅᒪᓂᖓᓂᒃ (ᓲᕐᓗ ᓄᓇᖓ ᐊᐅᖃᑕᕐᑐᖅ ᐊᐅᔭᑕᒫᑦ) ᓴᓂᕐᓴᐅᔪᖅ ᐅᓕᓕᐊᕆᓯᒪᔪᕐᒥᑦ (ᐊᐅᒪᖃᑕᕐᓂᖓ ᐃᔪᓂᐹᖅ 1.5ᒦᑕ) ᑕᐃᒪᐃᓂᖓᓄᑦ ᑕᐃᑯᐊ ᐊᒃᑕᕐᓗᑯᐃᑦ ᓴᐅᔭᐅᓯᒪᔪᑦ ᕐᑯᐊᖑᖃᑕᕐᑐᑦ ᐊᕿᒍᓕᒫᖅ. ᑎᑎᕋᓯᒪᔪᑦ 5.2ᒥ ᑕᕙᓂᓗᐊᑕᖅ ᐅᓂᑲᓕᐊᖑᓯᒪᔪᕐᒥ 8ᖑᔪᓂᒃ ᑎᑎᕋᓯᒪᔪᕐᑯᑎᓕᒃ ᓇᓗᓇᐃᓯᒪᔪᓂᒃ ᓂᒃᓚᓱᖕᓂᖓᑕ ᐅᓇᕐᓂᖓᑕᓗᓃᑦ ᐊᓯᐆᕐᖃᑕᓂᖓᓂ ᐊᕿᒎᑉ ᐃᓗᐊᓂ.

5.3. ᓴᕕᕋᔭᒃᓴᖃᐅᑎᕕᓂᖅ ᓯᕐᓗᐊᕕᓂᐅᑉ ᐃᓂᕕᓂᖓᑕ ᓄᓇᖓᑕ ᓱᕈᓯᒪᓂᖓ

ᖃᓄᐃᑐᓂᕕᓂᖓᓄᑦ ᐅᑎᑎᑕᐅᓇᓱᓂᖓᓂ ᒪᕈᓕᕿᒥ, ᓴᕕᕋᔭᓴᕐᒧᑦ ᓱᕈᑕᐅᓯᒪᔪᑦ ᓄᓇᖓ ᐃᓗᐊᓂ ᑐᒥᖑᐊᑉ ᓴᕕᕋᔭᓴᖅᕕᐅᓚᐅᑑᑉ ᓯᕐᓗᐊᖑᓚᐅᕐᑑᑉ ᐃᒡᓗᖅᑯᑖᓂ ᐲᔭᕐᑕᐅᓚᐅᑐᖅ. ᑭᓯᐊᓂᓕ, ᖃᖓᑕ ᖄᐸᓕᓯᒪᑲᓂᕐᑑᑉ ᓴᕕᕋᔭᒃᓴᑕᖅᑲᕈᔪᒃᑑᑉ ᐳᔪᕈᔪᐊᓂᒃ ᐱᑕᓕᒃ ᐊᑖᓂ ᓱᕐᓯᒪᔫᑉ ᖃᐃᑐᕐᒥ ᐃᒡᓗᖃᕕᕕᓂᐅᑉ ᑐᒥᖑᐊᑉ ᐃᓚᖓᓂ. ᖃᓄᐃᑐᓂᖓᓄ ᐅᑎᑎᑕᐅᓇᓱᓂᖓ ᐱᔭᕆᑕᐅᓚᐅᑐᖅ ᐊᒪᓗ ᒥᑭᓕᓚᕐᒥᒃ 0.5 ᒦᑕᒥᒃ ᐃᔪᓂᓕᒧᑦ ᐅᓕᒃᑕᐅᓗᓂ ᑕᐃᑲᖓ ᑐᐊᐸᖓᓂᑦ ᐃᓕᓯᕕᐅᓚᐅᑐᖅ ᑕᐃᑯᖓ ᓱᕈᓯᒪᓂᕐᒧᑦ. ᐄᒃᑯᑦ ᐊᖏᓚᐅᑐᖅ ᖃᐅᔨᓴᕐᑕᐅᔪᑎᓴᕐᒥᒃ ᖄᐸᓯᐊᓂᑦ ᓴᕕ%ᕋᔭᒃᓴᕐᑕᖅᑲᒪᙱᑦ ᑕᐃᕙᓯᒪᙱᑦᑐᕐᒥᒃ ᐊᕿᒍ ᑕᒫᑦ ᖃᐅᔨᓴᕐᑕᐅᖅᑕᕐᒪᑦ ᖃᐅᔨᓴᕐᑕᐅᑎᓗᒍ ᓴᕿᑎᓇᓱᒃᓗᒍ ᓴᕕᕋᔭᒃᓴᖅᑲᓂᖓ ᓱᓕ ᐅᓕᒃᑕᐅᓯᒪᖓᒪᑦ ᖄᐸᓯᐊᓂᑐᕐᒧᑦ ᐅᓕᖓᓄᑦ ᑐᐊᐸᒃᒧᑦ ᓴᓗᒪᔪᕐᒧᑦ. ᖃᐅᔨᓴᕈᑏᑦ ᓴᕿᑎᓯᔪᑦ ᑕᒪᐃᒥᒃ ᐊᕿᓂᕐᓴᖅ ᓴᕕᕋᔭᒃᓴᖅ ᐊᒪᓗ ᑎᓯᓂᕐᓴᖅ ᓴᕕᕋᔭᓴᐃᑦ ᑐᓂ ᑑᖓᓂᑐᑦ ᐃᓱᓕᑕᕐᕕᖓᑕ ᐊᙱᑕᐅᓯᒪᔪᑦ ᓴᕕᕋᔭᒃᓴᐃᑦ ᒪᕈᓕᕿᒥ.

6. ᖃᓄᐃᑐᓂᕕᓂᐊᓄᑦ ᐅᑎᕐᑎᑕᐅᓂᖓᓄᑦ ᐱᓕᕆᐊᑦ

ᓴᓗᒪᕐᓴᐃᓂᖅ ᑲᔪᓯᓚᐅᙱᑐᖅ 2011ᖑᑎᓗᒍ. ᓯᑎᐱᕆ 1, 2011ᖑᑎᓗᒍ ᑕᐃᑯᐊ ᐊᒥᐊᑯᙱᑦ ᐊᙱᔪᑎᐅᓂᓴᐃᓗ ᒥᑭᓂᕐᓴᐃᓗ ᐱᕐᑯᒃᑎᑦ ᑕᐃᑲᖓ ᓅᑕᐅᓚᐅᑐᑦ ᒪᕈᓕᕿᒥᑦ ᐅᒥᐊᕐᔪᐊᑯᑦ ᐊᒪᓗ ᐊᐅᓚᐅᔭᐅᓗᑎᒃ ᖃᓗᓈᑦ ᓄᓇᖓᓄᑦ ᑲᓇᑕᒥ. ᓄᖑᐊᓂ ᐱᖓᔪᖓᑕ ᑎᓴᒪᐃᓕᖅᖓᔪᑦ, ᐄᒃᑯᑦ ᓇᒥᓂᕐᑯᑎᙱᓂᒃ ᐱᕐᑯᑎᓂᒃ ᐱᑕᖅᑲᕈᓂᓚᐅᑐᖅ ᒪᕈᓕᕿᒥ. ᐊᑕᐅᓯᑐᐊᖅ ᕿᔪᖕᒥᑦ ᓴᓇᒪᓇᖅ ᐃᒡᓗ ᓱᓕ ᑕᐃᑲᓂᑐᖅ ᖃᓂᕆᔭᓂᕐᒥᐅᑦ ᐃᓄᐃᑦ ᑲᓕᓂᐊᕐᒪᒍ ᐃᓄᐃᑦ ᓄᓇᕐᑯᑎᖓᓄᑕᐅᓛᕐᓗᓂ ᐅᑭᐅᑯᑦ.

7. ᓇᓚᐅᑖᕐᑕᐅᓯᒪᔪᑦ ᐊᒥᐊᑯᙱᑦ ᑭᓇᐅᔭᐃᑦ ᐅᖓᑖᓄᕈᑏᑦ

ᐃᓚᐅᔪᖅ ᐃᓚᒋᐊᕈᑦ 11ᒥ ᐱᖓᔪᕆᔭᖓᓂ ᑎᓴᒪᐃᓕᖅᖓᔪᑦ ᓄᑕᓕᕐᑕᐅᓯᒪᔪᖅ ᒪᕈᓕᕿᒥ ᐃᒍᑎᕐᑕᐅᓂᖓ, ᖃᓄᐃᑐᓂᖓᓄ ᐅᑎᑎᑕᐅᓂᖓ ᐊᒪᓗ ᐅᐊᓯᓂᖅ - ᖃᓯᓚᕆᓂᒃ ᑭᓇᐅᔭᕐᓂᒃ ᐊᑐᓚᐅᒪᙵᑕ ᑕᒪᑐᒧᖓ. ᑭᓇᐅᔭᐃᑦ ᐅᑐᕐᑕᐅᔪᑦ 2011ᒥ ᓄᖑᐊᓄᑦ ᐱᖓᔪᖓᓂ ᑎᓴᒪᐃᓕᖅᖓᔪᑦ ᓇᓚᐅᑕᕐᑕᐅᓯᒪᓚᐅᑐᖅ $474,500ᖑᓂᐊᕐᓱᕆᔭᐅᓗᓂ. ᐊᙱᔪᕐᒥ ᐱᒪᕆᒥᒃ ᑭᓇᐅᔭᕐᓂ ᐊᑐᓚᐅᙱᑐᑦ ᑎᓴᒪᖓᓂ ᑎᓴᒪᐃᓕᖅᖓᔪᓂ 2011ᖑᑎᓗᒍ ᐱᔪᑎᕆᓗᒍ ᑕᐃᑲᓂ ᐱᓕᕆᓂ ᐊᒪᓗ ᐅᐊᓯᓂᖅ ᑕᐃᒪᐃᑕᕆᐊᖅᑲᑎᓯᒪᑕ ᐃᒍᑎᕆᓂᒧᑦ ᖃᓄᐃᑐᓂᖓᓄᓗ ᐅᑎᑎᑕᐅᓇᓱᓂᒧᑦ ᐸᕐᓇᐅᑎᒃ ᐱᔭᕆᓯᒪᓕᓚᐅᒪᑦ.

ᑐᖓᕕᒋᓗᒍ ᐱᔭᕆᐊᖅᑲᓂᖓ ᒪᓇᐅᔪᖅ ᐃᒪᒧᑦ ᐱᔪᓇᐅᑎᒃ, (ᐃᓱᓕᓂᐊᑐᖅ ᑎᓯᐱᕆ 31, 2011ᒥ), ᑎᒃᑯᑦ ᐃᓱᒪᒧᑦ ᑕᒪᕿᒥᓕᒫᖅ ᐱᔭᕆᐊᖅᑕᙱᑦ ᒪᓕᓗᒋ ᐃᒪᒧᑦ ᐱᔪᓇᐅᑎᒃ ᑲᔪᓯᑎᑕᐅᓚᐅᑐᑦ. ᑎᒃᑯᑦ ᐃᓱᒪᔪᑦ ᑭᓇᐅᔭᕐᓂ ᐅᖓᑖᓄᕈᑎᓂᒃ ᐱᑕᖅᑲᙱᑐᖅ ᒪᕈᓕᕿ ᐱᓪᓗᒍ ᒪᓕᓗᒋᑦ ᒪᓕᑕᐅᔭᕆᐊᓖᑦ ᐃᒪᒧᑦ ᐱᔪᓇᐅᑎᒥᙱᑦᑐᓂᒃ.

ᑎᒃᑯᑦ ᐅᖃᐅᓯᖃᖃᑕᕐᓯᒪᔪᑦ ᑐᒃᓯᕋᐅᑎᒥᒃ ᑐᒃᓯᕋᑐᐃᓇᕆᐊᖃᓂᖏᓂᒃ ᐃᒪᒧᑦ ᐱᔪᓇᐅᑎᒃ ᐲᒥᒃ ᑕᐃᔭᐅᔪᖅ ᐊᑯᓂᐅᔪᖅ ᐅᐊᓯᔭᐅᖁᓗᒍ ᒪᕆᓕᕿᒥ ᐅᖓᑖᓄᓗᒍ ᓄᖑᐊ 2011. ᑕᒪᓇ ᓱᓕ ᐊᕿᑕᐅᑲᓂᓇᐊᓕᒃ. ᑏᒃᑯᑦ ᒪᓇᐅᒧᖅ ᑐᒃᓯᕋᑐᑦ ᐅᑎᕐᑎᑎᔪᒪᓗᑎᒃ ᐊᒥᐊᑯᖓᓂ 3,539,000ᒥᒃ ᓴᓗᒪᕐᓴᕐᑕᐅᓂᖓᑕ ᓴᓂᕙᕐᑕᐅᓯᒪᓂᖓᓂ ᒪᓕᓗᒍ ᖃᓄᐃᑐᓕᓂᖓ ᑕᑯᐊ ᐅᖃᒪᔭᐅᑎᐅᔪᑦ.

APPENDIX 2

2011 3rd Quarter

Garrow Lake Effluent Discharge Monitoring

As Reported by

Azimuth Consulting Group

POLARIS MINE – 2011 3rd QUARTER MMER REPORT

APPENDIX A

i. Table 1. Effluent Metals Concentrations and Loadings
ii. Table 2. Results of Rainbow Trout and *Daphnia magna* Acute Lethality Tests
iii. Table 3. Water Chemistry Results for Garrow Creek Final Discharge Point, Garrow Bay (Exposure Station) and the Reference Station in Garrow Bay, Little Cornwallis Island, Nunavut, 2011

APPENDIX B

iv. Results of Effluent Characterization, as per Paragraph 15(1)(a)

APPENDIX C

i. Sampling Chronology for 2011 Polaris Program

APPENDIX D

i. Information specified by Section 8.1 of Reference Method EPS 1/Rm/13: 96 hr acute rainbow trout test

APPENDIX E

i. Information specified by Section 8.1 of Reference Method EPS 1/Rm/14: 48 hr acute *Daphnia magna* test

APPENDIX F

i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPAW 95-EPA West Coast: 7-day Topsmelt Survival and Growth Tests.

APPENDIX G

i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPS 1/Rm/27-EC: 92 hr Echinoderm (sand dollar) Fertilization Test

APPENDIX H

i. Information specified in Schedule 5 of the MMER (June 2002) for Reference Method EPA/600/4-91-003, Method 1009.0: Algae (*Champia parvula*) 7-day Sublethal Growth Tests

APPENDIX I

i. July 2011 Toxicity Testing Laboratory Report (Acute and Sublethal Tests)

APPENDIX J

ii. September 2011 Toxicity Testing Laboratory Report (Acute and Sublethal Tests)

APPENDIX A

i. **Table 1. Effluent Metals Concentrations and Loadings**
ii. **Table 2. Results of Rainbow Trout and *Daphnia magna* Acute Lethality Tests**
iii. **Table 3. Water Chemistry Results for Garrow Creek Final Discharge Point, Garrow Bay (Exposure Station) and the Reference Station in Garrow Bay, Little Cornwallis Island, Nunavut, 2011**

2011 3rd QUARTER MMER REPORT

LOCATION - FINAL DISCHARGE POINT FROM GARROW LAKE (GARROW LAKE DAM SIPHONS)

Table 1a. CONCENTRATIONS OF EFFLUENT FOR MMER SCHEDULE 4 SAMPLED WEEKLY

Sample Taken During The Week of	Date Sample Taken	DELETERIOUS SUBSTANCE (mg/L)[1]										pH[1]	Collection Method
		Arsenic	Cadmium	Copper	Cyanide	Lead	Nickel	Mercury	Zinc	TSS	Radium 226[1]		
03-Jul-11	2-Jul-11	*0.0005*	0.00007	0.00010	*0.0005*	0.0003	0.0014	*0.00003*	0.011	*1.0*	*0.010*	7.81	Grab
10-Jul-11	12-Jul-11	*0.0005*	0.00014	0.00005	*0.0005*	0.0002	0.0002	*0.00003*	0.025	1.0	*0.010*	8.01	Grab
17-Jul-11	18-Jul-11	*0.0005*	0.00021	0.00006	*0.0005*	0.0002	0.0031	*0.00003*	0.057	1.0	*0.010*	7.73	Grab
24-Jul-11	23-Jul-11	*0.0005*	0.00032	*0.00005*	*0.0005*	0.0001	0.0045	*0.00003*	0.062	1.0	0.010	7.94	Grab
31-Jul-11	31-Jul-11	*0.0005*	-	-	*0.0005*	-	-	*0.00003*	-	*1.0*	*0.005*	7.90	Grab
06-Aug-11	no sample[1]	-	-	-	-	-	-	-	-	-	-	-	Grab
13-Aug-11	no sample[2]	-	-	-	-	-	-	-	-	-	-	-	Grab
20-Aug-11	16-Aug-11	*0.0005*	0.00027	*0.00005*	*0.0005*	0.0002	0.0055	*0.00003*	0.041	3.0	*0.010*	-	Grab
27-Aug-11	27-Aug-11	*0.0005*	0.00028	*0.00005*	*0.0005*	0.0002	0.0062	*0.00003*	0.041	1.0	*0.010*	8.06	Grab
03-Sep-11	2-Sep-11	*0.0005*	0.00030	0.00009	*0.0005*	0.0002	0.0061	*0.00003*	0.046	1.0	*0.010*	7.94	Grab
10-Sep-11	10-Sep-11	*0.0005*	0.00038	0.00008	*0.0005*	0.0003	0.0093	*0.00003*	0.051	1.0	*0.010*	7.94	Grab
17-Sep-11	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]	nd[4]

Note - Cells with a ' - ' designation indiate that no sample was collected

Note[1] - All concentrations are in mg/L except Radium 226 which is Bq/L and pH which is in pH units

Note [2] - it was not possible to get a trained technician to sample during the week of July 5, 2010, so a sample could not be collected.

Note [3] - poor weather conditions precluded flying to site on schedule and there was no aircraft available once the weather cleared during the week of July 19, 2010 and August 2, 2010, so no samples were collected.

Note [4] - "nd" refers to no effluent discharge to sample; creek had frozen

Concentrations in red italicized font are less than the detection limit shown.

Table 1b. MONTHLY MEAN CONCENTRATIONS OF EFFLUENT FOR MMER SCHEDULE 4

MONTH OF	MONTHLY MEAN CONCENTRATION[1] (mg/L) OF DELETERIOUS SUBSTANCE[2]									
	Arsenic	Cadmium	Copper	Cyanide	Lead	Nickel	Mercury	Zinc	TSS	Radium 226
July/11	0.0005	0.0002	0.0001	0.0005	0.0002	0.0023	0.00003	0.0388	1.0	0.0090
August/11	0.0005	0.0003	0.0001	0.0005	0.0002	0.0059	0.0000	0.0410	2.0	0.0050
September/11	0.0005	0.0003	0.0001	0.0005	0.0003	0.0077	0.0000	0.0485	1.0	0.0200

Note[1] - All concentrations are in mg/L except Radium 226 which is Bq/L

Note[2] - Monthly Mean Concentrations - the MEAN value of the concentrations measured in all water samples collected during each month when a deleterious substance is deposited. Note that the DL concentration is used to calcluate loadings when the parameter was <DL

Table 1c. MASS LOADING OF DELETERIOUS SUBSTANCE FOR EACH DAY SAMPLED

Sample Taken During The Week of	Date Sample Taken	DAILY MASS LOADING OF DELETERIOUS SUBSTANCE (kg/day)[1]										Average Daily Discharge (m^3/day)[4]
		Arsenic	Cadmium	Copper	Cyanide	Lead	Nickel	Mercury	Zinc	TSS	Radium 226[1]	
03-Jul-11	2-Jul-11	0.009	0.001	0.002	0.009	0.005	0.024	0.001	0.191	17.362	0.174	17,362
10-Jul-11	12-Jul-11	0.009	0.001	0.001	0.009	0.004	0.004	0.00055	0.459	18	0.184	18,371
17-Jul-11	18-Jul-11	0.008	0.003	0.001	0.008	0.003	0.051	0.000	0.946	16.589	0.166	16,589
24-Jul-11	23-Jul-11	0.009	0.006	0.001	0.009	0.002	0.080	0.001	1.099	17.723	0.177	17,723
31-Jul-11	31-Jul-11	0.009	-	-	0.009	-	-	0.001	-	18.857	0.094	18,857
06-Aug-11	no sample[1]	-	-	-	-	-	-	-	-	-	-	-
13-Aug-11	no sample[2]	-	-	-	-	-	-	-	-	-	-	-
20-Aug-11	16-Aug-11	0.009	0.005	0.001	0.009	0.003	0.095	0.001	0.708	51.840	0.173	17,280
27-Aug-11	26-Aug-11	0.008	0.005	0.001	0.008	0.003	0.102	0.000	0.672	16.394	0.164	16,394
03-Sep-11	2-Sep-11	0.007	0.004	0.001	0.007	0.003	0.087	0.000	0.656	14.269	0.143	14,269
10-Sep-11	10-Sep-11	0.006	0.005	0.001	0.006	0.004	0.118	0.000	0.647	12.694	0.127	12,694
	nd[4]											

Note[1] - Mass Loading is in kilograms per day of the deleterious substance deposited except Radium 226 which is in Bq per day. The [DL] was used to calcluate loadings where parameters were <DL.

Note [2] - No trained technician was available during the weeks of July 5 and 12, 2010, so a sample could not be collected.

Note [3] - "nd" refers to no effluent discharge to sample. Freeze-up of Garrow Creek occurred sometime during the first week of September 2010

Note [4] - Discharge could not be measured on 23 July because of a faulty meter; Discharge was estimated as the mean between the previous and later date

Table 1d. MASS LOADING PER CALENDAR MONTH FOR EACH DELETERIOUS SUBSTANCE

CALENDAR MONTH OF	MASS LOADING[1] FOR DELETERIOUS SUBSTANCE (kg/month)[2]										Average Weekly Discharge (m^3/week)	Total Monthly Discharge (m^3/month)[4]
	Arsenic	Copper		Cyanide	Lead	Nickel	Mercury	Zinc	TSS	Radium 226[2]		
July/11	0.28	0.09	0.04	0.28	0.11	1.23	0.02	20.88	551.19	4.93	124,463	551,637
August/11	0.26	0.14	0.03	0.26	0.10	3.05	0.02	21.40	1,057.63	5.22	117,859	521,947
September/11	0.10	0.07	0.02	0.10	0.05	1.54	0.01	9.78	202.22	2.02	94,371	202,223

Note[1] - Total Mass Loading for Calendar month calculated by multiplying the Average Daily Mass Loading for the Month x # days in the month

Note[2] - Mass loading units are in kg per month except Radium 226, which is in Bq per month

Note[3] - Average Weekly Discharge calculated by multiplying Average Daily Flow Rate x 7 days per week

Note[4] - Total Monthly discharge volume calculated by multiplying Average Daily Discharge for the month x days in month; Only 15 days used for September because of freeze-up

Table 2. 2011 3rd Quarter Polaris Mine results of acute toxicity testing.

Date Sample Collected	Effluent Acutely Lethal to Rainbow trout (YES or NO)	Effluent Acutely Lethal to *Daphnia magna* (YES or NO)
23-Jul-11	NO	NO
August samples exceeded holding by extended period - recollected in Sept	-	-
07-Sep-11	NO	NO

[1] Rainbow trout and *Daphnia* tests were initiated outside holding times due to shipping delays from the remote mine location.

Non-compliance Information

If effluent was non-compliant with the aurthorized limits set out in Schedule4, indicate the cause(s) of non-compliance and remedial measures planned or implemented. Also indicate remedial meaures planned or implemented in response to the failure of acute lethality tests.

There were no non-compliant concentrations, and no failed acute lethality toxicity tests during the 2011 3rd Quarter for Polaris Mine.

Table 3. Water Chemistry from Garrow Creek Final Discharge Point (Garrow Lake Former Dam / Syphons), Garrow Bay (Esposure Station), and Reference Station in Garrow Bay, Little Cornwallis Island, Nunavut, 2011

FDP Coordinates:
Northing: 75°22'32"
Easting: 96°48'37"

		Garrow Creek Former Dam/Syphons (Final Discharge Point)*									Garrow Bay - Exposure			Reference Area		
		Garrow Creek	Garrow Creek	Garrow Creek	Garrow Creek	Garrow Creek	Garrow Creek	Garrow Creek	Garrow Creek	Garrow Creek	Garrow Bay	Garrow Bay	Garrow Bay	Reference	Reference	Reference
		GC-070211	GC-071211	GC-071811	GC-July23	GC-July31^	GC-081611	GB-082711	GC-090211	GC-091012	GB-072311	GB-082711	GB-191011	GC-072311	GC-082711	GC-191011
Parameters	**Units**	**02-Jul-11**	**12-Jul-11**	**18-Jul-11**	**23-Jul-11**	**31-Jul-11**	**16-Aug-11**	**27-Aug-11**	**02-Sep-11**	**10-Sep-11**	**23-Jul-11**	**27-Aug-11**	**10-Sep-11**	**23-Jul-11**	**27-Aug-11**	**10-Sep-11**
Nitrite (N) [1]	mg/L	n/m	n/m	n/m	*<0.005*	*<0.005*	*<0.005*	*<0.005*	n/m	n/m	*<0.005*	*<0.005*	*<0.005*	*<0.005*	n/m	*<0.005*
Nitrate (N) [1]	mg/L	n/m	n/m	n/m	0.28	n/m	n/m	0.29	n/m	n/m	0.23	0.12	0.07	*<0.02*	*<0.02*	*<0.02*
Cyanide + Thiocyanate	mg/L	*<0.0005*	*<0.0005*	0.0001	0.0006	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	*<0.0005*	0.015	n/m	*<0.0005*
Total Hardness (CaCO3)	mg/L	365	n/m	n/m	n/m	n/m	1380	1530	n/m	n/m	n/m	2810	3430	n/m	5230	5220
Salinity	g/L	1.65	2.64	4.43	5.94	6.37	6.97	7.08	n/m	7.72	8.66	18.6	19.9	29	30.5	31.4
Alkalinity (Total as CaCO3)	mg/L	n/m	n/m	n/m	94	n/m	n/m	110	n/m	n/m	95	110	110	98	93	100
Alkalinity (PP as CaCO3)	mg/L	n/m	n/m	n/m	*<0.5*	n/m	n/m	*<0.5*	n/m	n/m	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Bicarbonate (HCO3)	mg/L	n/m	n/m	n/m	110	n/m	n/m	140	n/m	n/m	120	130	130	120	110	140
Carbonate (CO3)	mg/L	n/m	n/m	n/m	*<0.5*	n/m	n/m	*<0.5*	n/m	n/m	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Hydroxide (OH)	mg/L	n/m	n/m	n/m	*<0.5*	n/m	n/m	*<0.5*	n/m	n/m	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*
Ammonia (NH4)	mg/L	0.017	0.011	0.068	0.019	0.25	0.036	0.059	0.042	0.42	0.19	0.083	0.015	0.028	0.036	0.13
Nitrate plus Nitrite (N)	mg/L	n/m	n/m	n/m	0.28	n/m	n/m	0.29	n/m	n/m	0.28	0.12	0.12	*<0.02*	*<0.02*	*<0.02*
Conductivity	uS/cm	n/m	n/m	n/m	10400	n/m	n/m	12100	n/m	n/m	10400	29200	3400	44200	45800	47200
pH	pH Units	7.81	8.01	7.73	7.94	7.9	n/m	8.06	7.94	7.94	7.94	7.97	7.9	7.85	7.83	7.83
Total Suspended Solids [1]	mg/L	*<1*	1	1	1	*<1*	1	3	1	1	1	12	12	9	15	11
Total Calcium (Ca)	mg/L	36	52	92	106	n/m	140	147	129	129	130	214.0	245	373	350	344
Total Magnesium (Mg)	mg/L	66	105	177	238	n/m	251	299	270	270	299	554	263	1140	1060	1060
Total Aluminum (Al)	ug/L	n/m	n/m	n/m	*<10*	n/m	n/m	n/m	n/m	*<10*	*<10*	n/m	*<10*	*<10*	*<10*	*<10*
Total Arsenic (As)	ug/L	*<0.5*	*<0.5*	*<0.5*	*<0.5*	n/m	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	1.4	1.5	*<0.5*
Total Cadmium (Cd)	ug/L	0.07	0.14	0.21	0.32	n/m	0.27	0.28	0.3	0.38	0.29	0.24	0.21	*<0.05*	0.12	0.07
Total Copper (Cu)	ug/L	1	0.5	0.6	*<0.5*	n/m	*<0.5*	*<0.5*	0.9	0.8	1.8	0.8	0.8	*<0.5*	0.5	*<0.5*
Total Iron (Fe)	ug/L	n/m	n/m	n/m	11	n/m	n/m	n/m	n/m	18	102	n/m	18	3	n/m	7
Total Lead (Pb)	ug/L	0.3	0.2	0.2	0.1	n/m	0.2	0.2	0.2	0.3	0.4	0.20	0.3	0.1	0.1	0.1
Total Mercury (Hg)	ug/L	*<0.3*	*<0.3*	*<0.3*	*<0.3*	n/m	*<0.3*	*<0.3*	*<0.3*	*<0.3*	*<0.3*	*<0.3*	*<0.3*	*<0.3*	*<0.3*	*<0.3*
Total Nickel (Ni)	ug/L	1.4	*<0.2*	3.1	4.5	n/m	5.5	6.2	6.1	9.3	4.4	4.8	5.6	0.4	0.8	0.8
Total Molybdenum (Mo)	ug/L	n/m	n/m	n/m	2	n/m	n/m	n/m	n/m	n/m	9	n/m	n/m	9	n/m	n/m
Total Zinc (Zn)	ug/L	11	25	57	62	n/m	41	41	46	51	57	24	22	*<1*	1	1
Total Potassium (K)	mg/L	15	24	43	55	n/m	60	64	63	63	75	150	208	346	309	334
Total Sodium (Na)	mg/L	448	719	1250	1650	n/m	1730	2100	1820	1820	2330	4530	5390	9810	8860	8430
Total Sulphur (S)	mg/L	62	79	150	183	n/m	201	223	230	230	248	430	553	857	818	860

Note that TSS and nitrite/nitrate samples arrived at laboratory beyond the recommended holding time
Values shown in red italicized font are less than the detection limit reported.
[1] Parameters arrived at laboratory past holding time
^ Metals inadvertently not analysed for by lab on July 31
* Aircraft not availble to samplers on July 10 and August 13
n/m = not measured

APPENDIX B

Results of 2011 Effluent Characterization as per Paragraph 15(1)(a)

RESULTS OF 2011 EFFLUENT CHARACTERIZATION

AS PER PARAGRAPH 15(1)(a)

Nine (9) MMER effluent samples were collected during the 3rd Quarter of 2011 between July 2, 2011 and September 7, 2011. One sample, collected on August 6, was inadvertently analysed for conventional parameters only and not metals. Weekly sampling could not be conducted during the weeks of July 10 and August 13 because there was no aircraft available to fly from Resolute Bay to Little Cornwallis Island. Three of the nine effluent samples were also analyzed as "monthly/quarterly" samples. These were analyzed for a wider suite of elements, as per EEM guidance from Garrow Creek, as well as Garrow Bay and a nearby reference area. During the "monthly/quarterly" sampling events on July 31, and August 27 and September 7 water samples were also collected for toxicity testing. The August 27 samples were eventually discarded because delays in shipping from site resulted in great exceedences of holding times. Thus, the September 7 sample replaces the August 27 sample as the monthly sample. Monthly loadings of metals to Garrow Bay were calculated based on average weekly discharge volumes from Garrow Lake to Garrow Bay via discharge from Garrow Creek. Only one weekly discharge sample was not measured (July 23) because of a faulty meter.

Due to the remote, high Arctic location of the mine, travel into or out of Polaris can be hazardous due to weather conditions such as fog and snow. The mine ceased operations in 2002 with reclamation in 2004. The site has no staff, nor infrastucture. Sampling is typically conducted by a small, well trained crew that must fly into this remote site weather and aircraft availability permitting. During 2011, there was only one aircraft available for flying from Resolute Bay to the Polaris mine site, and it was often booked and used for other purposes, so flight rescheduling due to poor weather conditions was sometimes not possible, and re-scheduling was necessary. Despite the difficulties in acquiring an aircraft, relatively few weekly samples were missed in the open water period of 2011. The last sampling event was in on September 10, which is about one week longer than is typical. Given that freeze up was beginning to occur on this date, no further sampling was attempted after that date.

There was no effluent discharge from Garrow Lake during the first, second and fourth quarters of 2011. There were no exceedences of any Schedule 4 discharge limits during the third quarter of 2011.

Water samples for acute and sublethal toxicity testing were collected by pumping water from the collection point in Garrow Creek, about 25 m downstream of the historic dam location on Garrow Lake, directly into the laboratory supplied 20-L containers. A diaphragm pump and clean silicon tubing pump water from 10 cm below the water surface, taking care as to not disturb bottom sediment, to fill water for toxicity testing as well as routine chemistry.

Acute lethality toxicity samples (i.e., 96-hr rainbow trout and 48-hr *Daphnia magna*) were collected on July 31, 2011 and September 7, 2011. The September sample replaced the August sample because of the extended time between sample collection and receipt by the laboratory. Results of the acute toxicity tests revealed that there were no adverse effects observed in the two 96-hr rainbow trout toxicity tests. Similarly, there were no adverse effects observed in the 48-hr *Daphnia magna* toxicity tests collected in July, and September in the 100% effluent concentration (there were no effects in all lower concentrations). LC_{50} values were >100% effluent for both species in both testing events.

Of the three sublethal tests, sublethal effects were observed in the Echinoderm fertilization and *Champia* reproduction tests, but not the 7 day topsmelt growth and survival test. In the Echinoderm fertilization test, only the full strength effluent concentration produced a significantly lower fertilization ratio relative to the control group. The IC25 was 41% and the IC50 was >53%, lower than in 2010 (67% and >100%). For the *Champia* test,

there was 43% impairment to cystocarp production at the IC25 level. Survival and growth of topsmelt larvae was high and no different from the control, even at the highest concentration level tested (>74.7%).

Zinc is the primary contaminant of potential concern (COPC) identified in mine effluent. Concentrations of zinc during 2011 averaged 43 μg/L and ranged between 11 and 62 μg/L (**Appendix A, Table 3**). These values are well below the MMER effluent limit of 500 μg/L and similar to what has been measured in past year (e.g., 48 – 186 μg/L in 2003; 35 – 198 μg/L in 2004; 13 – 91 μg/L in 2005; 34 – 198 μg/L in 2006; and 17 – 52 μg/L in 2008; 15 – 87 μg/L in 2010). The 2011 values are less than what were observed in 2010 but well within the range of what has been observed historically. These data indicate that basic chemistry of the effluent has not changed much since tailings deposition ceased in 2002, 10 years earlier. The pattern of lower concentrations in spring due to dilution by snowmelt, with a gradual increase through the summer and fall as the influence of snowmelt diminishes was followed in 2011.

APPENDIX C

Polaris 2011 Sampling Event Chronology

Appendix C. Polaris 2011 - Sample Collection and Testing Chronology

Activities at the Polaris Mine site closed in 2002 with reclamation commencing in 2004. During that time, Teck completed the MMER and Environmental Effects Monitoring (EEM) program. Polaris has now achieved “closed mine status” and there are no further monitoring or reporting requirements for Environment Canada. However, monitoring and reporting requirements to meet the terms and conditions of the Water License issued by the Nunavut Water Board are similar to MMER requirements. Monitoring activities at the Polaris Mine in 2011 were conducted to support the Nunavut Water Board License. Collection of chemistry and toxicity samples from the mine site was conducted by small field crews who flew into site from Resolute Bay on a weekly basis, pending availabiliyt of aircraft. If due to mechanical difficulties or other commitments an aircraft was not available on a scheduled day, we re-scheduled for the next available opportunity; only two sampling weeks were missed during the course of the 2011 sampling, open water season.

Date	Event Type	Sampler(s)	Observations/Comments
late April, early June	Garrow Lake - Attempted	Curtis Kidd	Winter sampling of Garrow Lake under ice conditions was not conducted because of issues with shipping acids to the site. Bottles and acids were shipped out from the lab on April 14, 2011 and sampling was initially scheduled for late April 2011. However, shipping of preservatives from the lab was delayed in transit for several weeks because of an error by the courier. The acids arrived on May 20, 2011. Sampling Garrow Lake was re-attempted in early June 2011; however, the ice cover was not thick enough at that time to proceed. Details on the shipping issues are provided in a letter from Maxxam Analytics, dated September 2, 2011.
early July	-		Flow initiated in Garrow Creek
Sat. Jul-02-11	Weekly	Richard Chartrand/ Rick Gualton	Water chemistry sample collection from FDP (Garrow Creek). No exceedances of Schedule 4 limits. Discharged was measured using a flow meter
Fri. Jul-08-11	Scheduled Weekly	n/a	No plane available on July 8th/9th, a flight was rescheduled for July 12th.
Tue. Jul-12-11	Weekly	Richard Chartrand	Water chemistry sample collection from FDP (Garrow Creek). No exceedances of Schedule 4 limits. Discharge was measured using a flow meter
Mon. Jul-18-11	Weekly	Richard Chartrand/ Curtis Kidd	Water chemistry sample collection from FDP (Garrow Creek). No exceedances of Schedule 4 limits. Discharge was measured using a flow meter.
Sat. Jul-23-11	Monthly Acute Toxicity	Curtis Kidd	Water chemistry sample collection from FDP (Garrow Creek) (no exceedance of Schedule 4 limits), the exposure station (Garrow Bay) and the reference station (Garrow Bay). The flow meter malfuctioned and discharge was not measured Toxicity samples arrived at the Nautilus laboratory on Friday July 29, 2011. The samples were one day outside holding times for the acute tests (*Daphnia magna* and rainbow trout). The *Daphnia magna and rainbow trout* tests were both initiated on July 29, 2011 without incident. There was no toxicity in either test.
Sun. Jul-31-11	Weekly	Richard Chartrand	The flight to the mine site was postponed from Saturday to Sunday morning due to S&R requirement. Water chemistry sample collection from FDP (Garrow Creek). No exceedances of Schedule 4 limits. Discharge was measured using a flow meter
Sat. Aug-06-11	Scheduled Weekly	n/a	Sampling delayed until August 9, 2011 due to mechanical breakdown of one of the two planes servicing Resolute Bay. The breakdown created a backlog for Borek Air and water samples were given a lower priority.
Tue. Aug-09-11	Scheduled Weekly	n/a	Sampling on August 9 was missed due to lack of transportation. Borek Air was still down to one plane and water sampling was low on the priority list. By the time the plane was made available, the sampler was completing the August 16th sample.
Sat. Aug-13-11	Scheduled Weekly Scheduled Sublethal Toxicity (Champia only)	n/a	No sample due to lack of plane availability. One of the Borek Air twin otters was broken down and water sampling was given low priority. Sampling was delayed until Tuesday August 16, 2011.
Tue. Aug-16-11	Weekly Scheduled Sublethal Toxicity (Champia only)	Richard Chartrand	Water chemistry sample collection from FDP (Garrow Creek). No exceedances of Schedule 4 limits. Discharge was measured using a flow meter Champia was not collected due to concerns over flight schedules and missing holding times; rescheduled for Saturday August 20, 2011.
Sat. Aug-20-11	Scheduled Monthly/Quarterly Scheduled Acute Toxicity Scheduled Sublethal Toxicity (3 tests) Scheduled Garrow Lake	n/a	Sampling schedule was delayed because Borek Air did not have a plane available to go to site on the 20th. First Air Boeing 737 plane crash occurred in Resolute Bay on Saturday August 20, 2011. All sampling, including for Garrow Lake was delayed.
Fri. Aug-26-11	Monthly/Quarterly Scheduled Sublethal Toxicity (Champia only)	Richard Chartrand	Water chemistry sample collection from FDP (Garrow Creek) (no exceedance of Schedule 4 limits), the exposure station (Garrow Bay) and the reference station (Garrow Bay). Champia sample collected, however, shipment and delivery was unexpectedly slow (12 days, sample was not prioritized - expected delivery September 7, 2011). Aquatox laboratory has been instructed to hold sample until further notice, a new sample was collected on September 7, 2011 instead.
Fri. Sep-02-11	Garrow Lake	Curtis Kidd	Garrow Lake (from scheduled August trip) samples collected from multiple depths at South and Center locations (as well as bacteria, filters). Samples sent out of Resolute on Tuesday September 6, 2011.
Fri. Sep-02-11	Weekly Scheduled Acute Toxicity Scheduled Sublethal Toxicity (2 tests)	Curtis Kidd	Water chemistry sample collection from FDP (Garrow Creek). No exceedances of Schedule 4 limits. Discharge was measured using a flow meter. Decision made to re-collect toxicity samples on Wednesday September 7, 2011 and hope for a faster delivery to the laboratories
Wed. Sep-07-11	Monthly/Quarterly Acute Toxicity Sublethal Toxicity (3 tests)	Curtis Kidd	Water chemistry sample collection from FDP (Garrow Creek) (no exceedance of Schedule 4 limits), the exposure station (Garrow Bay) and the reference station (Garrow Bay). Discharge was measured using a flow meter. Acute and sublethal toxicity samples arrived at Nautilus laboratory on Sept 12, 5 days after collection and therefore just outside of holiding times for acute (5 d) and sublethal (3d). The rainbow trout test was initiated on Sept 13, the *Daphnia* test was initiated on Sept 14 without incident. The Topsmelt sublethal test was initiated on Sept 13 and the Echinoderm was initiated on Sept 14 witout incident. The *Champia* test was initiated on Sept 14. The Champia toxicity sample arrived at the Aquatox laboratory on September 14, 7 days after collection. Given the three day holding time, this test was initiated without incident 4 days beyond the holding time.
Thu. Sep-15-11	Freeze up	n/a	No further sampling was attempted because Garrow Creek was beginning to freeze on the September 7, 2011 sample event and the weather was turning cold and snowing.

[1]"Monthly/Quarterly" sample events include a larger suite of parameters than "Weekly" samples.

APPENDIX D

2011 96-h Acute Rainbow Trout Toxicity Test

Section 8.1.1 Effluent

i. Name & location of operation generating the effluent
   - Polaris Mine, Little Cornwallis Island, Nunavut
   - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.

ii. Date & time of sampling
   - Samples for monthly acute toxicity testing were collected

   Test 1: Saturday Jul 23, 2011 – 1030h
   Test 2: Wednesday Sept 7, 2011 – 1130h

iii. Type of sample
   - Final discharge point effluent water

iv. Brief description of sampling point
   - In Garrow Creek, 25m downstream of the discharge point from the former Garrow Lake dam

v. Sampling method
   - Samples were collected facing upstream
   - The water was collected between 5 and 10 cm below the surface to avoid and disturbance of the sediment.
   - A diaphragm pump and ultra-clean silicon tubing was used to pump water directly from Garrow Creek directly into the 20-L containers.
   - 2 x 20L sample bottles were filled

vi. Name of person submitting samples
   - Curtis Kidd (AECOM) Test 1, Test 2

vii. Labeling/coding of sample (Sample IDs)
   - Test 1 – GC-072311
   - Test 2 – GC-090711

viii. Date & time of sample receipt
   - Samples for sublethal toxicity testing were received:

     Test 1 – Friday Jul 29, 2011 – 1330h
     Test 2 – Monday Sept 12, 2011 – 1635h

ix. Temperature upon sample receipt at laboratory
   - Test 1: 8.6 °C
   - Test 2: 8.9 °C

Section 8.1.2 Test Facilities and Conditions

i. Test type & method
   - 96-hour Rainbow Trout LC_{50}

ii. Indications of deviations from requirements in Sections 2 to 7 of Method EPS 1/RM/13[1]
   - Test 1: No deviations from requirements
   - Test 2: Sample holding period of 5 days was exceeded as a result of time required to ship sample to lab

iii. Name and city of testing laboratory
- Nautilus Environmental, Burnaby, BC

iv. Source of test species
   - Miracle Springs, Mission, BC

v. Percent mortality of fish in stock tank(s)
   - Test 1: 0.7%
   - Test 2: 1.8%

vi. Species of test organism
   - Rainbow Trout (*Oncorhynchus mykiss*)

vii. Date and time for start of definitive test
   - Test 1: July 29, 2011 – 1515h
   - Test 2: September 13, 2011 – 1500h

viii. Person(s) performing the test and verifying the results
   - Test 1:Karen Lee, Josh Baker, Julianna Kalocai (QA/QC)
   - Test 2: Josh Baker, Andy Diewald, Julianna Kalocai (QA/QC

ix. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent
   - Test 1: pH – 7.9, T - 16.0 °C, DO – 9.5 mg/L, C – 10360 μS/cm
   - Test 2: pH – 7.9, T - 15.0 °C, DO – 9.9 mg/L, C – 13280 μS/cm

x. Confirmation that no adjustment of sample or solution pH occurred
   - Test 1: No pH adjustment
   - Test 2: No pH adjustment

xi. Indication of aeration of test solutions before introduction of fish
   - Test 1: 6.5 ± 1 mL/min/L for 30mins
   - Test 2: 6.5 ± 1 mL/min/L for 30mins

xii. Concentrations and volumes tested
   - Concentrations (% effluent volume / total volume) tested and total volumes used were:
   - Control (0%) – 16 L, 10 L
   - 6.25% - 16 L, 10 L
   - 12.5% - 16 L, 10 L
   - 25% - 16 L, 10 L
   - 50% - 16 L, 10 L
   - 100% - 16 L, 10 L

xiii. Measurements of dissolved oxygen, pH and temperature

Sample Collection Date	Test Concentration (% v/v)	Temperature (0hr) (°C)	Temperature (96hr) (°C)	Dissolved Oxygen (0hr) (mg/L)	Dissolved Oxygen (96hr) (mg/L)	pH (0hr) pH units	pH (96hr) pH units	Conductivity (0hr) uS/cm
Test 1	0 (Control)	14.5	14.5	9.6	9.5	7.3	6.9	29
19-July-11	6.25	14.5	14.5	9.6	9.5	7.6	6.9	727
	12.5	14.5	14.0	9.5	9.5	7.8	7.0	1501
	25	15.0	14.0	9.5	9.5	7.8	7.4	2690
	50	15.0	14.0	9.5	9.5	7.9	7.4	5360
	100	15.5	14.0	9.5	9.5	8.0	7.8	10550

Sample Collection Date	Test Concentration (% v/v)	Temperature (0hr) (°C)	Temperature (96hr) (°C)	Dissolved Oxygen (0hr) (mg/L)	Dissolved Oxygen (96hr) (mg/L)	pH (0hr) pH units	pH (96hr) pH units	Conductivity (0hr) uS/cm
Test 2	0 (Control)	14.0	14.5	9.9	9.8	7.1	6.9	32
13-Sep-11	6.25	14.0	14.5	10.0	9.9	7.5	7.1	607
	12.5	14.5	14.5	10.0	9.8	7.6	7.3	1770
	25	14.5	14.5	9.9	9.9	7.7	7.6	3520
	50	14.5	14.5	9.9	9.9	7.8	7.7	6890
	100	14.5	14.5	9.9	9.9	7.9	7.9	13420

xiv. Number of fish added to each test vessel
- Test 1: 10 fish/ 16L volume
- Test 2: 10 fish/10L volume

xv. Mean and range of fork length of control fish at end of test
- Test 1: 44 mm (42 – 47)
- Test 2: 37 mm (33 – 43)

xvi. Mean wet weight of individual control fish at end of the test
- Test 1: 0.76 g (0.61 – 1.02)
- Test 2: 0.46 g (0.37 – 0.73)

xvii. Estimated loading density of fish in test solutions
- Test 1: 0.48 g/L
- Test 2: 0.46 g/L

Section 8.1.3 Results

i. Number of mortalities of fish in each test solution

Test 1:
- Control (0%) - 0
- 6.25% - 0
- 12.5% - 0
- 25% - 0
- 50% - 0
- 100% - 0

Test 2:
- Control (0%) - 0
- 6.25% - 0
- 12.5% - 0
- 25% - 0
- 50% - 0
- 100% - 0

ii. Number of control fish showing atypical/stressed behaviour
- None in either test

iii. Mean mortality rate in solutions of effluent and control water

Test 1
- Control (0%) - 0%
- 6.25% - 0%
- 12.5% - 0%
- 25% - 0%
- 50% - 0%
- 100% - 0%

Test 2:
- Control (0%) - 0%
- 6.25% - 0%
- 12.5% - 0%
- 25% - 0%
- 50% - 0%
- 100% - 0%

iv. Estimate of 96-h LC50 in multi-concentration tests
   - Test 1: 96hr LC_{50} concentration > 100% effluent[2]
   - Test 2: 96hr LC_{50} concentration > 100% effluent
v. Most recent 96-h LC50 for reference toxicity test(s)
   - Reference toxicity tests for Toxicant: SDS
   - Test 1 (July 15 2011) 96-h LC_{50} = 3.5 mg/L $NaNO_2$, 95% CL = 1.7 – 4.9 mg/L
   - Test 2: (September 1, 2011) 96-h LC_{50} = 3.3 mg/L $NaNO_2$, 95% CL = 2.5 – 4.5 mg/L
vi. Reference toxicant warning limits (mean +/- 2SD range)
   - Reference toxicity tests for Toxicant: SDS
   - Test 1: 96-h LC_{50} = 6.0 (3.3 – 10.9) mg/L $NaNO_2$
   - Test 2: 96-h LC_{50} = 5.8 (3.0 – 11.3) mg/L $NaNO_2$

APPENDIX E

2011 48-h Acute *Daphnia magna* Toxicity Test

Section 8.1.1 Effluent

i. Name & location of operation generating the effluent
   - Polaris Mine, Little Cornwallis Island, Nunavut
   - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.

ii. Date & time of sampling
   - Samples for monthly acute toxicity testing were collected
   - Test 1: Saturday Jul 23, 2011 – 1030h
   - Test 2: Wednesday Sept 7, 2011 – 1130h

iii. Type of sample
   - Final discharge point effluent water

iv. Brief description of sampling point
   - In Garrow Creek, 20m downstream of the discharge point from the former Garrow Lake dam

v. Sampling method
   - Samples were collected facing upstream
   - The water was collected between 5 – 10 cm below the surface to avoid and disturbance of the sediment.
   - A diaphragm pump and ultra-clean silicon tubing was used to pump water directly from Garrow Creek directly into the 20-L containers.
   - 2 x 20L sample bottles were filled

vi. Name of person submitting samples
   - Curtis Kidd (AECOM) Test 1, Test 2

x. Labeling/coding of sample (Sample IDs)
   - Test 1 – GC-072311
   - Test 2 – GC-090711

xi. Date & time of sample receipt
   - Samples for sublethal toxicity testing were received:
     Test 1 – Friday Jul 29, 2011 – 1330h
     Test 2 – Monday Sept 12, 2011 – 1635h

xii. Temperature upon sample receipt at laboratory
   - Test 1: 8.6 °C
   - Test 2: 8.9 °C

Section 8.1.2 Test Facilities and Conditions

ii. Test type & method
   - 48-hour *Daphnia magna* LC_{50}

iii. Indications of deviations from requirements in Sections 2 to 7 of Method EPS 1/RM/13
   - Test 1 and Test 2: No deviations from requirements

iv. Name and city of testing laboratory
   - Nautilus Environmental, Burnaby, BC

v. Species of test organism
   - *Daphnia magna*

vi. Date and time for start of definitive test
   - Test 1: July 30, 2011 – 1230h
   - Test 2: September 14, 2011 – 1510h

vii. Person(s) performing the test and verifying the results
   - Test 1: Krysta Banack, Julianna Kalocai (QA/QC)
   - Test 2: Andy Diewald, Julianna Kalocai (QA/QC)

viii. pH, temperature, dissolved oxygen, and conductivity of unadjusted, undiluted effluent

- Test 1: pH – 7.9, T – 22.0 °C, DO – 8.7 mg/L, C – 10430 μmhos/cm
- Test 2: pH - 7.8, T – 19.5 °C, DO – 8.9 mg/L, C – 13330 μmhos/cm

ix. Confirmation that no adjustment of sample or solution pH occurred

- Test 1: No pH adjustment
- Test 2: No pH adjustment

x. Indication of any adjustment of hardness of effluent sample

- Test 1: No hardness adjustment (initial hardness = 550 mg/L)
- Test 2: No hardness adjustment (initial hardness = 1150 mg/L)

xi. Indication of any aeration of sample

- Test 1: None
- Test 2: None

xii. Concentrations and volumes tested

- Concentrations (% effluent volume / total volume) tested and total volumes used for Test 1 and Test 2 were:
- Control (0%) - 200 mL
- 6.25% - 200 mL
- 12.5% - 200 mL
- 25% - 200 mL
- 50% - 200 mL
- 100% - 200 mL

xiii. Measurements of dissolved oxygen, pH and temperature

Sample Collection Date	Test Concentration (% v/v)	Temperature (0hr) (°C)	Temperture (48 hr) (°C)	Dissolved Oxygen (0hr) (mg/L)	Dissolved Oxygen (48hr) (mg/L)	pH (0hr) pH units	pH (48hr) pH units	Conductivity (0hr) umhos/cm	Hardness (0hr) (mg/L)
Test 1	0 (Control)	21.5	21.5	8.6	7.8	8.2	8.0	345	100
30-Jul 11	6.25	21.5	21.0	8.6	8.5	8.1	8.1	1137	
	12.5	21.5	21.0	8.6	8.8	8.1	8.1	1802	
	25	22.0	21.0	8.7	8.8	8.0	8.1	3160	
	50	22.0	21.0	8.7	8.7	8.0	8.1	5670	
	100	22.0	21.0	8.7	8.8	7.9	8.0	10430	550
Test 2	0 (Control)	19.5	20.0	9.0	8.8	8.0	8.0	343	100
14-Sep-11	6.25	19.5	20.0	9.0	8.9	8.1	8.1	3430	
	12.5	19.5	20.0	9.0	8.9	8.1	8.1	3640	
	25	19.5	20.0	9.0	9.0	8.2	8.0	4410	
	50	19.5	20.0	9.0	9.0	8.2	8.0	6340	
	100	19.5	20.0	8.9	9.0	8.2	8.0	13330	1150

xiv. Estimates of time to first brood, average number of neonates per brood, and percent mortality during the seven-day period prior to the test

- Test 1: 9 days to brood, 21 neonates/brood, 0% mortality in 7d prior to test
- Test 2: 9 days to brood, 39 neonates/brood, 0% mortality in 7d prior to test

xv. Number of neonates per test vessel and milliliters of solution per daphnid

- Methods for all tests and dilution series were the same:
- 10 neonates per vessel
- 200 mL of solution per vessel
- 20 mL of solution per daphnid

Section 8.1.3 Results

i. Number of dead and/or immobile daphnids in each test solution including controls
  - Results were the same for Test 1 and Test 2, except where noted
  - Control (0%) - 0 dead / immobile
  - 6.25% - 0 dead / immobile
  - 12.5% - 0 dead / immobile
  - 25% - 0 dead / immobile
  - 50% - 0 dead / immobile
  - 100% - 0 dead / immobile

ii. For single-concentration test the number of daphnids dead in each of three replicate effluent solutions and in each of three replicate control solutions at end of test. Also report the mean value.
  - Single concentration test was not conducted, dilution series tests were conducted

iii. Estimate of 48-h LC50 and 95% confidence limits in multi-concentration tests, 48-h EC50 for immobilization and 95% confidence limits, indication of statistical method on which results are based.
  - Test 1: 48-h LC_{50} = > 100% effluent; EC50 >100% (only reported if observed); statistical method not applicable due to lack of toxicity
  - Test 2: 48-h LC_{50} = > 100% effluent EC50 >100% (only reported if observed); statistical method not applicable due to lack of toxicity

iv. Most recent 48-h LC50 for reference toxicant test(s), reference chemical(s), date test initiated, historic geometric mean LC50 and warning limits.
  - Reference toxicity tests for Toxicant: NaCl
  - Test 1: (Aug-11-11) 48-h LC_{50} = 3.7 g/L NaCl, 95% CL = 3.2 – 4.2 g/L
  - Test 2: (Sep-14-11) 48-h LC_{50} = 4.2 g/L NaCl, 95% CL = 3.7 – 4.8 g/L

v. Reference toxicant warning limits (mean +/- 2 SD)
  - Reference toxicity tests for Toxicant: NaCl
  - Test 1: 48-h LC_{50} = 4.0 (3.6 – 4.4) g/L NaCl
  - Test 2: 48-h LC_{50} = 4.0 (3.6 – 4.4) g/L NaCl

APPENDIX F

2011 7-d Topsmelt Growth and Survival Toxicity Test

Reporting Requirements for Reference Method EPAW 95-EPA West Coast (Topsmelt)

Effluent Sample

i. Name & location of operation generating the effluent
   - Polaris Mine, Little Cornwallis Island, Nunavut
   - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.

ii. Date & time of sampling
   - Samples for sublethal toxicity testing were collected:

   Wednesday September 7, 2011 – 1130h

iii. Type of sample
   - Final effluent water from final discharge point

iv. Brief description of sampling point
   - 20m downstream of the siphon discharge point at Garrow Lake dam

v. Sampling method
   - Water was collected from at least 10cm below the surface using a water pump with silicon tubing
   - Water was collected from the upstream direction
   - The pump was flushed with site water for at least one minute prior to sample collection
   - 3 x 20L sample bottles were filled

vi. Name of person submitting samples
   - Curtis Kidd (Teck)

vii. **Labeling/coding of sample (Sample IDs)
   - GC-070911

viii. **Date & time of sample receipt

   Monday September 12, 2011 – 1635h

ix. **Temperature upon sample receipt at laboratory
   - 8.9 °C

Test Organisms Imported from External Supplier

i. Species of test organism
   - Topsmelt (*Atherinops affinis*)

ii. Name and city of testing laboratory
   - Nautilus Environmental, Burnaby, BC

iii. Source of test species
   - Aquatic Bio Systems (ABS), Fort Collins, Colorado

iv. Date test species acquired on
   - September 13, 2011

v. Indications of deviations from EC guidance on the importation of test organisms
   - No deviations from EC requirements

vi. Percent mortality of fish in 24-hour period preceding the test
   - <10% mortality

vii. Age at start of test
   - 11 days post-hatch

viii. Unusual appearance, behaviour, or treatment of larvae before their use in the test
   - None noted.

ix. Confirmation that larvae are actively feeding and swimbladders are not inflated
   - Larvae actively feeding and swimbladders not inflated

Reporting Requirements for Reference Method EPAW 95-EPA West Coast (Topsmelt)

x. Confirmation that temperature change was <3°C and dissolved oxygen was maintained at >6mg/L during transport
   - Temperature change was <2°C and dissolved oxygen supersaturated mg/L during transport

xi. Test organism acclimation rate at the testing laboratory
   - Holding water conditions upon arrival were DO=11.3, pH = 7.0, T = 22°C
   - Organisms were acclimated slowly after arrival
   - Addition of control seawater at intervals of 30 – 60min to reach acceptable conditions
   - Organisms were acclimated to DO = 8.0 mg/L, salinity = 29 ppt, T=20°C

Test Facilities and Conditions

i. Test type & method
   - 7-day Topsmelt (*Atherinops affinis*) Survival and Growth Toxicity Test
   - Static renewal
   - Sample water was renewed daily
   - Reference Method - EPA/600/R-95/136 (EPAW 95-EPA West Coast)

ii. **Dates or test days during test when subsamples or multiple samples were renewed
   - Samples were renewed daily (Test Day 1,2,3,4,5,6)
   - Test was conducted using a single sample for the duration of the test

iii. Indications of deviations from requirements in Sections 11 of Method EPA/600/R-95/136 (EPAW 95-EPA West Coast)
   - No deviations from requirements
   - Brine controls were run

iv. Date and time for start of definitive test
   - Tuesday September 13, 2011 – 1300h (3 day holding time was exceeded)

v. **Date for test completion
   - September 20, 2011

vi. Test vessel description
   - 350mL glass jar

vii. Person(s) performing the test and verifying the results
   - Testing by Karen Lee and Andy Diewald; Statistics by Karen Lee; QA/QC by Julianna Kalocai

viii. pH, temperature, dissolved oxygen, and salinity of unadjusted, undiluted effluent
   - pH 7.8, T 20.0 °C, DO 9.3 mg/L, 7.7 ppt

ix. Confirmation that no adjustment of sample or solution pH occurred
   - No pH adjustment

x. Indication of aeration of test solutions before introduction of fish
   - No pre-aeration noted

xi. **Indication that EC guidance document for salinity adjustment was followed
   - No deviations from EC guidance document for salinity adjustment of sample
   - Hypersaline brine was added to sample to salinity adjust to 30 ppt

xii. Type and source of control/dilution water
   - Control/dilution water was natural seawater from the Pacific Environmental Science Centre

xiii. Concentrations and volumes tested:

   - Concentrations (% effluent volume / total volume) tested and total volumes used were:
     - Control (0%) - 200 mL
     - Brine Control (0%) - 200mL

- 4.7% - 200mL
- 9.3% - 200mL
- 18.7% - 200mL
- 37.4% - 200mL
- 74.7% - 200mL

xiv. Number of replicated per concentration
- 5 replicates per concentration

xv. Number of organisms added to each test vessel
- 5 fish per vessel

xvi. Manner and rate of exchange of test solutions
- Daily renewal

xvii. **Measurements of dissolved oxygen, pH and temperature, and salinity for each 24 hr period
- See attached photocopied pages 3.1 and 3.2 of original laboratory report

Results

i. **Number and % of mortalities of fish in each test solution. Note that this data is presented in units of number of SURVIVORS and % MORTLITY. (Data is entered from original handwritten tables in lab reports)
- Totals from all 5 replicates are presented (see attached pages 1.3-1.4 for original lab data):

Concentration		Number of Survivors - Day of Test							% Mortality on the Day of Test						
(% effluent v/v)	Replicate	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control	A	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	B	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	C	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	D	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	E	5	5	5	5	5	5	5	0	0	0	0	0	0	0
Brine Control	A	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	B	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	C	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	D	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	E	5	5	5	5	5	5	5	0	0	0	0	0	0	0
4.7%	A	5	5	5	5	5	5	4	0	0	0	0	0	0	20
	B	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	C	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	D	5	5	5	4	4	4	4	0	0	0	20	0	0	0
	E	5	5	5	5	5	5	5	0	0	0	0	0	0	0
9.3%	A	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	B	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	C	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	D	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	E	5	5	5	5	5	5	5	0	0	0	0	0	0	0
18.7%	A	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	B	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	C	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	D	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	E	5	5	5	5	5	5	5	0	0	0	0	0	0	0

Reporting Requirements for Reference Method EPAW 95-EPA West Coast (Topsmelt)

Concentration (% effluent v/v)	Replicate	Number of Survivors - Day of Test 1	2	3	4	5	6	7	% Mortality on the Day of Test 1	2	3	4	5	6	7
37.4%	A	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	B	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	C	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	D	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	E	5	5	5	5	5	5	5	0	0	0	0	0	0	0
74.7%	A	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	B	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	C	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	D	5	5	5	5	5	5	5	0	0	0	0	0	0	0
	E	5	5	5	5	5	5	5	0	0	0	0	0	0	0

ii. **Average dry weight (mg) per original fish in test vessel. No preservation of fish was used. Fish were dried and then weighed.

- Mean dry weight (mg) of each replicate and overall means are presented:

Concentration (% effluent v/v)	Replicate 1	2	3	4	5	Overall Mean	Standard Deviation
Neg Control (0%)	1.01	1.332	0.86	0.8	1.386	1.078	0.269
Brine Control	1.01	1.012	1.274	1.066	1.104	1.093	0.108
4.7%	0.99	1.06	1.158	0.83	1.206	1.049	0.148
9.3%	1.066	1.184	1.234	1.25	1.1	1.167	0.081
18.7%	1.198	0.948	1.286	1.008	1.134	1.115	0.138
37.4%	0.96	1.128	1.158	1.386	1.216	1.17	0.154
74.7%	1.098	1.144	1.306	1.09	1.09	1.146	0.092

iii. Estimate of 7-d LC_{50} (95% CL)

- 7-d LC_{50} concentration > 74.7% effluent
- Quantal statistic methods not required

iv. Estimate of 7-d IC_{25} (95% CL) for growth

- 7-d IC_{25} concentration > 74.7%

v. Current reference toxicity tests (95% CL) for 7-d LC_{50} for survival and 7-d IC_{50} for growth

- Reference toxicity tests for Toxicant: Copper
  - Test conducted on September 13, 2011, same day as effluent test
  - Reference toxicant test was conducted on the same batch of externally supplied topsmelt used in the effluent test and under the same experimental conditions as the effluent test
  - 7-d LC_{50} survival = 112 mg/L Cu, 95% CL = 99 - 127 mg/L
  - 7-d IC_{50} growth = 109 mg/L Cu, 95% CL = 101 – 116 mg/L

vi. Reference toxicity warning limits (+/- SD) for 7-d LC_{50} for survival and 7-d IC_{50} for growth

- Reference toxicity tests for Toxicant: Copper
  - 7-d LC_{50} survival = 74 (45 - 122) mg/L Cu,
  - 7-d IC_{50} growth = 70 (43 - 114) mg/L Cu

APPENDIX G

2011 Echinoderm Fertilization Test

<u>Reporting Requirements for Reference Method EPS1/RM/27-EC 92 (Sperm Cell)</u>

Effluent Sample

i. Name & location of operation generating the effluent
   - Polaris Mine, Little Cornwallis Island, Nunavut
   - Final Discharge Point for Garrow Lake is geo referenced as 75° 22' 32" N, 97° 48' 37" W.

ii. Date & time of sampling
   - Samples for sublethal toxicity testing were collected:

   Wednesday September 7, 2011 – 1130h

iii. Type of sample
   - Final effluent water

iv. Brief description of sampling point
   - 20m downstream of the siphon discharge point at Garrow Lake dam

v. Sampling method
   - Water was collected from at least 15cm below the surface using a water pump with silicon tubing
   - Water was collected from the upstream direction
   - The pump was flushed with site water for at least one minute prior to sample collection
   - 4 x 20L sample bottles were filled

vi. Name of person submitting samples
   - Curtis Kidd (Teck)

x. **Labeling/coding of sample (Sample IDs)
   - GC-070911

xi. **Date & time of sample receipt
   - Samples for sublethal toxicity testing were collected:

   Monday September 12, 2011 – 1635h

xii. **Temperature upon sample receipt at laboratory
   - 8.9 °C

Test Organisms

i. Species of test organism
   - Sandollar Echinoid (*Dendraster excentricus*)

ii. Name and city of testing laboratory
   - Nautilus Environmental, Burnaby, BC

iii. Source of test species
   - M-REP, Escondido, California
   - All adults providing gametes are from the same population and source
   - Gametes are spawned in-house at Nautilus Environmental

iv. Date test species acquired on
   - September 14, 2011

v. Holding time and conditions for adults
   - Adults received at the testing laboratory were used the same day.

vi. Indications of deviations from EC guidance on the importation of test organisms
   - No deviations from EC requirements

vii. Weekly percent mortality of adults being held over 7d preceding test
   - <2% per day over the 7 days preceding the test

viii. Age of test organisms
   - < 4 hours after spawning

ix. **Unusual appearance, behaviour, or treatment of adults or gametes before test start, or anything unusual about the test
    - Organisms appear healthy, in good condition, nothing unusual about test organisms or test

Test Facilities and Conditions

i. Test type & method
    - Echinoderm (*Dendraster excentricus*) Fertilization Toxicity Test
    - Static
    - Reference Method – EPS/1/RM/27 (2011)

ii. Test duration
    - 10:10 min (10min sperm + 10min sperm & egg)

iii. Date and time for start of definitive test
    - Wednesday September 14, 2011 – 1745h

iv. Test vessel description
    - 40mL glass vials

v. Person(s) performing the test and verifying the results
    - Testing by Josh Baker. Statistical analyses by Josh Baker. QA/QC reviewed by Julianna Kalocai.

vi. Indication of rate and duration of pre-aeration of test solutions before initiation of test
    - No pre-aeration noted.

vii. Confirmation that no adjustment of sample or solution pH occurred
    - No pH adjustment

viii. Procedure for sample filtration
    - No sample filtration

ix. **Procedure for preparation of hypersaline brine (HSB) as per EC guidance document on salinity adjustment – July 1997
    - Hypersaline brine was added to sample to salinity adjust to 30 ppt.

x. Procedure for salinity adjustment as per EC guidance document on salinity adjustment – July 1997
    - No deviations from EC guidance for salinity adjustment
    - salinity adjusted from 8 to 29 ppt

xi. Type and source of control/dilution water
    - Natural seawater from the Pacific Environmental Science Centre

xii. Concentrations and volumes tested
    - Concentrations (% effluent volume / total volume) tested and total volumes used were:
        - Control (0%) - 10mL
        - Brine Control (0%) - 10mL
        - 1.2% - 10mL
        - 2.4% - 10mL
        - 4.7% - 10mL
        - 9.4% - 10mL
        - 18.8% - 10mL
        - 37.5% - 10mL
        - 75% - 10mL

xiii. Number of replicates per concentration
    - 4 replicates per treatment concentration

xiv. **Number of organisms per container
    - 2000 eggs per vessel (100 counted)

xv. Measurements of pH and dissolved oxygen in sample water before use
- pH 8.4, DO 8.5

xvi. Measurements of pH, temperature, dissolved oxygen, and salinity during test
- pH – 7.7-8.0, T – 14.5-15.0°C, DO - 8.4mg/L, salinity – 29ppt

Results

i. Number and % of fertilized eggs in each test concentration
- (Number is equal to percent since totals were 100)
    - Control (0%): #F = 72, 60, 68, 73 #UF = 28, 40, 32, 27
    - Brine Control: #F = 62, 61, 60, 68 #UF = 38, 39, 40, 32
    - 1.2% #F = 62, 59, 57, 60 #UF = 38, 41, 43, 40
    - 2.4%: #F = 63, 66, 68, 73 #UF = 37, 34, 32, 27
    - 4.7%: #F = 66, 63, 69, 70 #UF = 34, 37, 31, 30
    - 9.3%: #F = 57, 56, 70, 63 #UF = 43, 44, 30, 37
    - 18.7%: #F = 60, 64, 54, 61 #UF = 40, 36, 46, 39
    - 37.5%: #F = 55, 57, 51, 58 #UF = 45, 43, 49, 42
    - 75%: #F = 27, 24, 21, 17 #UF = 73, 76, 79, 83

ii. **Estimate of IC_{25} (95% CL) for fertilization success
- IC_{25} concentration = 40.8 (32.8 – 45.9)% v/v effluent
- Quantitative statistic used to generate IC_{25} values was log-linear interpolation (200 resamples) calculated using CETIS version 1.8.0.11

iii. Current reference toxicity tests (95% CL) for IC_{50} for fertilization
- Reference toxicity tests for Toxicant: Copper
    - Test conducted on September 14, 2011, same day as effluent test
    - Reference test conducted under same conditions as test
    - IC_{50} for fertilization = 23.7 µg/L Cu, 95% CL = (20.2 – 26.2) µg/L

iv. Reference toxicant warning limits (+/- 2SD range) for IC_{50} for fertilization
- 4.8 – 63.4 µg/L Cu

APPENDIX H

2011 7-d Sublethal *Champia* (Algae) Toxicity Test

Reporting Requirements for Reference Method EPA/600/4-91-003, Method 1009.0 (*Champia*)

Effluent Sample

i. Name & location of operation generating the effluent
  - Polaris Mine, Little Cornwallis Island, Nunavut
  - Final Discharge Point for Garrow Lake is geo referenced as 75° 22’ 32” N, 97° 48’ 37” W.

ii. Date & time of sampling
  - The sample for sublethal toxicity testing using *Champia* was collected:
    Wednesday September 7, 2011 – 1130h

iii. Type of sample
  - Final effluent water

iv. Brief description of sampling point
  - 25m downstream of the siphon discharge point at Garrow Lake dam

v. Sampling method
  - Water was collected from at least 10 cm below the surface using a water pump with silicon tubing
  - Water was collected from the upstream direction
  - The pump was flushed with site water for at least one minute prior to sample collection
  - 1 x 4L sample bottles were filled

vi. Name of person submitting samples
  - Curtis Kidd (Teck)

vii. Temperature of water upon receipt at lab
  - 8.0°C

xiii. **Labeling/coding of sample (Sample IDs)
  - GC-070911

xiv. Date & time of sample receipt
  September 13, 2011 – 1430h

Test Organisms

i. Species of test organism
  - Algae (*Champia parvula*)

ii. Name and city of testing laboratory
  - Aquatox Testing and Consulting Inc, Guelph, ON

iii. Source of test species and health of organisms
  - Sexually mature male and female branches
  - Obtained from in house cultures
  - Appear in good health, with normal coloration and no signs of stress
  - Females have trichogynes, males have sori with spermatia

iv. **Any unusual appearance, behaviour, or treatment of test organisms, before their use in test
  - Nothing unusual about the tests

Test Facilities and Conditions

i. Test type & method
  - *Champia parvula* sexual reproduction test
  - Static, non-renewal
  - 2-day exposure, followed by 5-7 day recovery period for cystocarp development
  - Reference Method – EPA-821-R-02-014, Method 1009.0 with Canadian adaptations (Environment Canada 1998, 1999)

ii. Date and time for start of definitive test

- September 14, 2011 10:30 h

xviii. **Date for test completion

- September 16, 2011

iii. Test vessel description

- 240mL polystyrene cups

iv. Person(s) performing the test and verifying the results

- Emilia Jonczyk, Martina Rendas

v. Indication of pre-aeration of test solutions

- No aeration indicated.

vi. Confirmation that no pH adjustment of sample or solution occurred

- No pH adjustment

vii. **Indication that EC guidance document for salinity adjustment was followed

- HSB prepared by addition of Instant Ocean
- No deviations from EC guidance document for salinity adjustment of sample
- Salinity of samples adjusted from 8ppt to 30ppt

viii. Type and source of control/dilution water

- Natural seawater collected from Shediac Bay, NB
- Filtered and autoclaved prior to use
- Salinity adjusted as per EC guidance document to 30ppt with Instant Ocean

ix. **Type and quantity of any chemicals added to the control dilution water

- Test nutrients as described in Test Method EPA-821-R-02-014, Method 1009.0 were added at concentration of 10mL/L, analytical grade, 10mL added

x. Concentrations and volumes of test solutions

- Concentrations (% effluent volume / total volume) tested and total volumes used were:
  - Control (Natural Seawater) (0%) - 100mL, 5cm depth
  - Salinity Control (0%) - 100mL, 5cm depth
  - 0.81% - 100mL, 5cm depth
  - 2.7% - 100mL, 5cm depth
  - 8.9% - 100mL, 5cm depth
  - 29.7% - 100mL, 5cm depth
  - 99.0% - 100mL, 5cm depth

xi. Number of replicated per concentration

- 3 replicates per concentration

xii. Number of organisms per test chamber

- 5 female branches + 2 male branches per chamber

xiii. Measurements of pH, temperature, dissolved oxygen, and salinity of sample before use

- pH – 7.9, T – 23.0 °C, DO – 7.1mg/L, salinity - 30ppt

xiv. **Measurements of pH, temperature, dissolved oxygen, and salinity of test solution and controls at 0hr, 48hr, and the beginning and end of recovery period

xv.

Concentration (% v/v)	Temperature (°C)				Dissolved Oxygen (mg/L)				pH (pH units)				Salinity (ppt)			
	Exposure		Recovery		Exposure		Recovery		Exposure		Recovery		Exposure		Recovery	
	0	48	0	End	0	48	0	end	0	48	0	end	0	48	0	end
Control-NSW[1]	23	24	23	24	7.0	7.3	6.9	6.6	7.5	9.0	7.8	8.5	30	30	30	30
Control-salt	23	24	23	24	6.9	7.3	6.9	7.1	7.7	9.0	7.8	8.6	30	30	30	30
0.81	23	24	23	24	6.9	7.3	6.9	6.9	7.5	9.0	7.8	8.5	30	30	30	30
2.7	23	24	23	24	7.0	7.2	6.9	7.2	7.5	8.9	7.8	8.7	30	30	30	30
8.9	23	24	23	24	7.0	7.3	6.9	6.9	7.6	8.8	7.8	8.5	30	30	30	30
29.7	23	24	23	24	7.0	7.3	6.9	7.4	7.7	9.0	7.8	8.8	30	30	30	30
99	23	24	23	24	7.0	7.3	6.9	7.1	7.9	9.1	7.8	8.7	30	30	30	30

[1]NSW = natural seawater

Reporting Requirements for Reference Method EPA/600/4-91-003, Method 1009.0 (*Champia*)

Results

i. Number and % mortality of female plants after recovery in each test solution

- Totals from all 3 replicates are presented:
    - Control (0%): 0 (0%) mortality
    - Salinity Control (0%): 0 (0%) mortality
    - 0.81%: 0 (0%) mortality
    - 2.7%: 0 (0%) mortality
    - 8.9%: 0 (0%) mortality
    - 29.7%: 0 (0%) mortality
    - 99.0%: 0 (0%) mortality

ii. **Mean number of cystocarps per plant in each replicate of each test concentration

- Test 3: (Replicates are A, B, and C)
    - Control (0%): A) 45.0, B) 38.0, C) 47.8
    - Salinity Control (0%): A) 48.2, B) 45.6, C) 54.2
    - 0.81% A) 47.2, B) 47.4, C) 44.6
    - 2.7%: A) 55.0, B) 43.0, C) 44.0
    - 8.9%: A) 42.0, B) 46.2, C) 46.6
    - 29.7%: A) 46.6, B) 44.6, C) 43.8
    - 99.0%: A) 11.6, B) 13.4, C) 11.8

iii. **Estimate of IC_{25} (95% CL) for cystocarp development

- IC_{25} concentration = 42.9 (33.6 – 45.8)% effluent v/v
    - Quantal statistic method was linear interpolation determined using CETIS

iv. Current reference toxicity tests (95% CL) for IC_{50} for cystocarp development

- Test conducted on September 14, 2011, within 30 days of effluent test
    - Reference toxicant test was conducted under the same experimental conditions as the effluent test
    - IC_{50} cystocarp development = 0.097mg/L SDS, 95% CL = (0.077 – 0.106) mg/L

v. Reference toxicant warning limits (+/- 2SD) for IC_{50} for cystocarp development

- Reference toxicity tests for Toxicant: Sodium Dodecyl Sulfate 0.100 (0.072 – 0.138) mg/L SDS

APPENDIX I

July 2011 Toxicity Testing Laboratory Report (Acute and Sublethal Tests)

Nautilus Environmental
8664 Commerce Court, Burnaby, BC V5A 4N7

WO#: 11345-346

Ms. Cheryl Mackintosh
Azimuth Consulting Group Inc.
218-2902 W. Broadway
Vancouver, BC
V6K 2G8

August 22, 2011

Dear Ms. Mackintosh:

Re: Toxicity testing on the sample identified as GC-072311 (Collected on July 23, 2011)

Nautilus Environmental is pleased to provide you the results of the 96-h rainbow trout LC50 and 48-h LC50 *Daphnia magna* toxicity tests on the above sample, received on July 29, 2011. Testing was conducted according to Environment Canada 1/RM/13, (Second Edition, 2000, with May 2007 amendments) and 1/RM/14, (Second Edition, 2000) protocols. The sample was received outside of 5 days from the sampling date, therefore exceeding the handling and storage period. The test was initiated upon request of the client. The results of these tests are provided in the tables below and are based on the appended data. All other acceptability criteria outlined in the Environment Canada protocols were met.

Table A. Results for the 96-h rainbow trout tests.

Sample ID	Collection Date and Time	96-h LC50 (% v/v) [1]
GC-072311	July 23, 2011 @ 1030h	>100

[1] Results relate only to the sample tested.

Table B. Results for the 48-h *D. magna* tests.

Sample ID	Collection Date and Time	48-h LC50 (% v/v) [1]
GC-072311	July 23, 2011@ 1030h	>100

[1] Results relate only to the sample tested.

Please feel free to contact the undersigned at 604-420-8773 should you have any questions or require any additional information.

Yours truly,

Nautilus Environmental

Josh Baker

Josh Baker, M.Sc.
Environmental Scientist

Rainbow Trout Summary Sheet

Client: Azimuth

Start Date/Time: Jul 29/11 @ 1515h

Work Order No.: 11345

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: GC-072311
Sample Date: Jul 23/11
Date Received: Jul 29/11
Sample Volume: ~~2×20L~~ JAB 1×20L + 3L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L $CaCO_3$): JAB ~~10~~ 11
Alkalinity (mg/L $CaCO_3$): 8

Test Organism Information:

Batch No.: 063011
Source: Miracle Springs
No. Fish/Volume (L): 10/16L
Loading Density: 0.48
Mean Length ± SD (mm): 44 ± 2 Range: 42-47
Mean Weight ± SD (g): 0.76 ± 0.12 Range: 0.61-1.02

SDS Reference Toxicant Results:

Reference Toxicant ID: RTNt8
Stock Solution ID: 11Nt01
Date Initiated: July 15, 2011
96-h LC50 (95% CL): 3.5 (1.7 - 4.9) mg/L $NaNO_2$

Reference Toxicant Mean (2SD Range): 6.0, 3.3 - 10.9 mg/L $NaNO_2$
Reference Toxicant CV (%): 35

Test Results: The 96-h LC50 is >100% (v/v).

Reviewed by: JGL

Date reviewed: Aug. 18/11

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Azimuth Consulting Group
Sample I.D. GC-072311
W.O. # 11345
RBT Batch #: 063011
Date Collected/Time: Jul 23/11 @ 1030h
Date Setup/Time: Jul 29/11 @ 1515h
Sample Setup By: KJL

Number Fish/Volume: 10/~~18~~ 16 L KJL
7-d % Mortality: 1.8%
Total Pre-aeration Time (mins): 30
Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: DO-1
pH meter: pH-1
Cond. Meter: C-1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	16.0	/	15.5
pH	7.9	/	8.0
D.O. (mg/L)	9.5	/	9.5
Cond. (µS/cm)	10360	/	10550

Concentration	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
Control				10	10	10	10	14.5	14.5	14.5	14.0	14.5	9.6	9.6	9.6	9.9	9.5	7.3	6.9	6.9	7.0	6.9	29	36
6.25				10	10	10	10	14.5	14.5	14.0	14.0	14.5	9.6	9.6	9.8	9.5	9.5	7.6	6.8	6.8	7.0	6.9	727	729
12.5				10	10	10	10	14.5	14.5	14.0	14.0	14.0	9.5	9.6	9.7	9.7	9.5	7.8	~~6.9~~ 7.0 KJL	7.0	7.2	7.0	1501	1509
25				10	10	10	10	15.0	14.5	14.0	14.0	14.0	9.5	9.6	9.7	9.7	9.5	7.8	7.3	7.3	7.4	7.4	2690	2720
50				10	10	10	10	15.0	14.5	14.0	14.0	14.0	9.5	9.7	9.6	9.8	9.5	7.9	7.2	7.2	7.5	7.4	5360	5390
100				10	10	10	10	15.5	14.5	14.0	14.0	14.0	9.5	9.7	9.1	9.5	9.5	8.0	7.6	7.5	7.7	7.8	10550	~~11270~~ KJL 10640
Initials				KCB	KCB	JAB	KJL	KJL	KCB	KCB	JAB	KJL	KJL	KCB	KCB	JAB	KJL	KJL	KCB	KCB	JAB	KJL	KJL	KJL

Sample Description/Comments: clear, colorless

Fish Description at 96? all fish look ok

Other Observations:

Reviewed by: JGh

Date Reviewed: Aug 18/11

Daphnia magna Summary Sheet

Client: Azimuth
Work Order No.: 11346

Start Date/Time: July30/11 @1230h
Test Species: D.magna
Set up by: KLB

Sample Information:

Sample ID: GC-072311
Sample Date: July23/11
Date Received: July29/11
Sample Volume: 2x1L

Test Organism Information:

Broodstock No.: 071311A
Age of young (Day 0): < 24 hours
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: Dm73
Stock Solution ID: 11NaO1
Date Initiated: August11/11
48-h LC50 (95% CL): 3.7(3.2-4.2) g/LNaCL

Reference Toxicant Mean (2SD Range): 4.0(3.6-4.4) g/L NaCL
Reference Toxicant CV (%): 5

Test Results: The 48-h LC50 is 7 100% (v/v)

Reviewed by: JGh

Date reviewed: Aug. 18/11

Freshwater Acute
48 Hour Toxicity Test Data Sheet

Client:	Azimuth	Start Date/Time:	July 30/11 @ 1230h
Sample ID:	GC-072311	No. Organisms/volume:	10/200mL
Work Order No.:	11346	Test Organism:	*D.magna*
		Set up by:	KLB

DO meter: DO-1 pH meter: pH-1 Conductivity meter: C-1

Concentration % (v/v)	Rep	Number of Live Organisms 24	Number of Live Organisms 48	No. Immobilized 48	Temperature (°C) 0	Temperature (°C) 24	Temperature (°C) 48	Dissolved oxygen (mg/L) 0	Dissolved oxygen (mg/L) 24	Dissolved oxygen (mg/L) 48	pH 0	pH 24	pH 48	Conductivity (µS/cm) 0	Conductivity (µS/cm) 48
Control	A	10	10	0	21.5	22.0	21.5	8.6		7.8	8.2		8.0	345	413
	B														
	C														
	D														
6.25	A	10	10	0	21.5	22.0	21.0	8.6		8.5	8.1		8.1	1137	~~2080~~ KLB 1338
	B														
	C														
	D														
12.5	A	10	10	0	21.5	22.0	21.0	8.6		8.8	8.1		8.1	1802	2080
	B														
	C														
	D														
25	A	10	10	0	22.0	22.0	21.0	8.7		8.8	8.0		8.1	3160	3620
	B														
	C														
	D														
50	A	10	10	0	22.0	22.0	21.0	8.7		8.7	8.0		8.1	5670	6520
	B														
	C														
	D														
100	A	10	10	0	22.0	22.0	21.0	8.7		8.8	7.9		8.0	10430	11850
	B														
	C														
	D														
Technician Initials		KLB	KLB	KLB	KLB	KLB	KLB	KLB		KLB	KLB		KLB	KLB	KLB

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCo3)	
Control (MHW)	100	70
Highest conc.	550	80

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	22.0		
DO (mg/L)	8.7		
pH	7.9		
Cond (µS/cm)	10430		

Sample Description: Clear

Comments: Batch#: 071311A 7-d previous # young/brood: 21 Day of 1st Brood: 9 Previous 7-d % Mortality: 0

Reviewed by: JGL Date reviewed: Aug 18/11

Client: Azimuth

W.O.#: 11346

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity (mg/L$CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L $CaCO_3$)	Technician
GC-072311	Jul30/11	100 (1)	0.9	1.0	80		100 (1)	~~5.2~~ 5.5 KLB	~~520~~ 550 KLB	KLB
MHW	Jul30/11	50	3.6	3.7	70		50	5.0	100	KLB

Notes: (1) Diluted to 100mL w/ DI water

Reviewed by: JGh

Date Reviewed: Aug. 18/11

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody

0500

Date July 23 Page 1 of 1

Sample Collection by: Curtis Kidd

Report to:
Company Azimuth Consulting Group
Address 218-2902 West Broadway
City Vancouver Prov. BC PC V6K 2G8
Contact Randy Baker / Cheryl Mackintosh
Phone No. 604 730 1220

Invoice to: Same as Report
Company
Address
City Prov. PC
Contact ① Ryan
Phone No.

ANALYSIS REQUIRED

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	RBT LC50 Acute toxicity	Daphnia LC50									RECEIPT TEMPERATURE (°C)
6C-072311 ①	July 23	10:30 am	Seawater	20L	1		X	X									
6C-072311	"	"	"	2L	1		X										
6C-072311	"	"	"	1L	2		X										
							WO#11345	WO#11346									

PROJECT INFORMATION
CLIENT Teck (Polaris)
P.O. NO.
SHIPPED VIA:

SAMPLE RECEIPT
TOTAL NO. OF CONTAINERS
REC'D GOOD CONDITION

RELINQUISHED BY (CLIENT) Curtis Kidd
(Signature) [signature] 4pm (Time)
(Printed Name) July 23/11 (Date)
(Company)

RELINQUISHED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
(Signature) [signature] 1330 (Time)
(Printed Name) John T Jul 29/11 (Date)

SPECIAL INSTRUCTIONS/COMMENTS:
① CLIENT ADVISES PROCEED WITH TEST EVEN THOUGH HOLDING TIME EXPIRED

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

APPENDIX J

September 2011 Toxicity Testing Laboratory Report (Acute and Sublethal Tests)

Nautilus Environmental

Toxicity Testing for Sample GC-070911, collected September 7th, 2011

Final Report

Report date:
November 17, 2011

Submitted to:

Azimuth Consulting Group
Vancouver, BC

Burnaby Laboratory
8664 Commerce Court
Burnaby, BC
V5A 4N7

Nautilus Environmental

WO#: 11399-402

Mr. Randy Baker
Azimuth Consulting Group
218-2902 West Broadway
Vancouver, BC
V6K 2G8

November 17, 2011

Mr. Baker:

Re: Water sample for toxicity testing (Sample Collected September 7, 2011)

Nautilus Environmental is pleased to provide you with the results of the toxicity tests conducted on water samples received on September 12, 2011. Testing of the water sample was conducted using acute and sublethal tests. Toxicity tests followed Environment Canada protocol and US EPA methods. A summary of the test methods and results are provided in the following report.

Please feel free to contact the undersigned at 604-420-8773 should you have any questions or require any additional information.

Nautilus Environmental

for

Josh Baker, M.Sc.
Environmental Scientist

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1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests on a sample identified as GC-070911 collected on September 7th, 2011 and delivered to the Nautilus Environmental Laboratory in Burnaby, BC on September 12th, 2011. The sample was transported in two 20-L and four 1-L plastic containers inside coolers. The following toxicity tests were conducted on the sample:

- 96 hr acute toxicity test using rainbow trout (*Oncorhynchus mykiss*)
- 48 hr acute toxicity test using *Daphnia magna*
- 10 minute echinoderm (*Dendraster excentricus*) fertilization test
- 7-d topsmelt (*Atherinops affinis*) survival and growth toxicity test

In addition, a subsample of this sample was sent from the site to AquaTox Testing and Consulting, Guelph, ON, where it arrived on September 13th, 2011. A reproduction test using C. *parvula* was conducted on this subsample.

The rainbow trout and topsmelt tests were initiated on September 13, while *Daphnia magna*, echinoderm and C. *parvula* tests were initiated on September 14. This report summarizes the results of the toxicity tests; copies of raw laboratory data sheets and statistical analysis for the tests are provided in Appendices A through D. The test report for the C. test is provided in Appendix E and the chain of custody form is provided in Appendix F. The results presented herein relate only to the sample tested.

2.0 METHODS

2.1 Toxicity Tests

Methods for the toxicity tests are summarized in Tables 1 through 4 and are briefly described in Sections 2.1.1 to 2.1.4. Statistical analyses were performed using CETIS (Tidepool Scientific Software).

2.1.1 Acute toxicity tests using rainbow trout and *Daphnia magna*

Acute toxicity tests using rainbow trout and *D. magna* were conducted following Environment Canada (2000a and b) procedures, as summarized in Table 1. These tests involve a 96- and 48-hr exposure period, respectively, in which the organisms are exposed to the sample under static conditions using a single replicate of ten organisms for each test concentration. Water quality

parameters (dissolved oxygen, pH, and temperature) were measured at 24 hr intervals throughout the tests. The endpoint from this test was mortality and, in the case of *Daphnia*, immobility at the end of the exposure. The test acceptance criterion for control performance was ≥90% survival for both test species and no signs of stress were exhibited.

Table 1. Summary of test conditions: acute tests using rainbow trout and *Daphnia magna*.

Test species	Rainbow trout	*Daphnia magna*
Test type	96 hr static	48 hr static
Endpoints	Survival	Survival
Organism source	Miracle Springs Hatchery	In-house culture
Organism age	Fry - 0.3 - 0.8 g	< 24 hr old
Feeding	None	None
Test chamber	15-L glass aquaria	300 mL glass
Test volume	10 L	200 mL
Test temperature	15 ± 1°C	20 ± 2°C
Control water	Dechlorinated municipal tapwater	Moderately hard synthetic water
Organisms/replicate	10	10
Number of replicates	1	1
Photoperiod	16 hours light/8 hours dark	16 hours light/8 hours dark
Aeration	Continuous	None
Reference toxicant	Nitrite	NaCl
Acceptability criterion for controls	≥90% survival	≥90% survival

Reference toxicant tests were conducted with rainbow trout and *Daphnia* using sodium nitrite and NaCl as the toxicant, respectively. The results were compared to historical data to assess the health and sensitivity of the organisms.

2.1.2 7-d topsmelt survival and growth test

The topsmelt (*A. affinis*) survival and growth test was conducted according to US EPA (1995); these methods are summarized in Table 2. The endpoints were survival and growth (dry weight) at the end of the 7-d exposure period. The salinity of the sample was adjusted to 30 ppt using hypersaline brine and 74.7 % (v/v) sample was used as the highest test concentration. The remaining concentrations were prepared following a 0.5 X dilution factor. A dilution water (natural seawater) control was also tested concurrently with the samples. Testing was conducted in 200 mL volumes in 375 mL glass jars using five replicates per concentration.

Five 11-day old larvae were exposed in each replicate. The test was conducted at 20 ± 1°C under a 16:8 h light:dark photoperiod. Temperature, DO, and salinity were recorded daily throughout exposure. At the end of the 7-d exposure period, survival was scored and surviving larvae were dried in an oven overnight, prior to measuring dry weight. The LC50 for survival, IC50 and IC25 values (with 95% confidence limits) were calculated for the dry weight endpoint.

For a valid test, the negative control survival must be ≥80%. A reference toxicant test using copper was conducted concurrently and compared to historical data to assess the health and sensitivity of the organisms.

Table 2. Summary of conditions for the 7-d topsmelt survival and growth test.

Test organism	*Atherinops affinis*
Test organism source	Aquatic Biosystems, Fort Collins CO
Test organism age	11 days old
Test type	Static renewal with daily renewal
Test duration	7 days
Test chamber	375-mL glass jars
Test solution volume	200 mL
Test concentrations (% sample)	74.7, 37.4, 18.7, 9.3, 4.7%, plus seawater and brine control
Number of replicates	5
Dilution water	Natural clean seawater
Test temperature	20 ± 1°C
Salinity	30 ± 2 ppt
Salinity adjustment	None
Number of organisms/chamber	5
Feeding	*Artemia* nauplii daily
Aeration	None
Test protocol	USEPA (1995), EPA/600/R-95-136
Test endpoint	Survival and growth
Test acceptability criterion for controls	80% survival
Reference toxicant	Copper

2.1.3 10 min echinoderm fertilization test

Echinoderm fertilization tests were conducted using the sand dollar, *D. excentricus*, obtained from M-REP (Carlsbad, CA). Tests were performed according to procedures described in Environment Canada (February 2011) and summarized in Table 3.

Four replicates were evaluated for each test concentration, each containing 10 mL of sample. The laboratory control consisted of clean seawater. The salinity of the sample was adjusted using hypersaline brine (90 ± 1 ppt, prepared from natural seawater) and 74.7 % (v/v) was used as the highest concentration with a 0.5X dilution factor to prepare the remaining concentrations. Water quality parameters (dissolved oxygen, pH, salinity and temperature) were measured prior to initiating the tests. Gametes were obtained by injection of gravid adult sand dollars with 0.5 M potassium chloride. The quality of gametes was evaluated under a microscope prior to use. High quality eggs were pooled and adjusted to achieve a density of 2000 eggs per mL. Sperm was collected from male sand dollars and stored chilled until ready for use. Prior to initiating the test, a pre-trial test was conducted to determine the optimal sperm-to-egg ratio to use in the definitive test. The optimal sperm-to-egg ratio was determined as the concentration of sperm required to achieve between 70 and 90% fertilization.

To initiate the test, 0.1 mL of the appropriate sperm concentration was added to the test vials. After a 10 min exposure period, 1 mL of the 2000 eggs/mL stock was added to the vials containing sperm and left to fertilize for 10 min. After 10 min, the sperm/eggs solutions were preserved in 10% buffered formalin and were subsequently evaluated under a microscope to determine the percentage of fertilized eggs. The endpoint indicating fertilization success was formation of a fertilization membrane around the eggs. The test acceptance criterion was ≥50 and <100% fertilization in the control seawater.

A reference toxicant test was conducted in conjunction with the fertilization test using copper. The results of this test were compared with historical data to determine whether the organisms used in the toxicity test were within the range of acceptable quality and sensitivity.

Table 3. Summary of conditions for the 10-min echinoderm fertilization test.

Test organism	*Dendraster excentricus*
Test organism source	M-REP, Carlsbad, CA
Test organism age	< 3 hours post gamete collection
Test type	Static
Test duration	10 min sperm exposure; 10 min egg fertilization
Test chamber	30-mL glass vials
Test solution volume	10 mL
Test concentrations (% sample)	74.5, 37.4, 18.7, 9.3, 4.7, 2.4 and 1.2%, plus seawater control and brine control
Number of replicates	4
Dilution water	Natural clean seawater
Test solution renewal	None
Test temperature	15 ± 1°C
Salinity	30 ± 2 ppt
Salinity adjustment	Hypersaline brine (90 ± 1 ppt)
Number of organisms/chamber	2000 eggs
Feeding	None
Light intensity	100 to 500 lux
Aeration	None
Test protocol	Environment Canada (February 2011), EPS 1/RM/27
Test endpoint	Fertilization
Test acceptability criterion for controls	≥ 50% and < 100% fertilization
Reference toxicant	Copper

2.1.4 48-hr sexual reproduction test using *Champia parvula*

A toxicity test was conducted by AquaTox Testing and Consulting (Guelph, ON) using the red alga, *Champia parvula*. This test involves a 48 hr exposure of male and female plants. The number of cystocarps produced on the female plants is scored after a 7-day recovery period. Procedures used in this test are summarized in Table 4, and additional details on the test procedures are provided in the report provided by Aquatox provided in Appendix E.

A reference toxicant test was conducted in conjunction with the reproduction test using SDS. The results of this test were compared with historical data to determine whether the organisms used in the toxicity test were within the range of acceptable quality and sensitivity.

Table 4. Summary of conditions for the 48-hr *Champia parvula* reproduction test.

Test organism	*Champia parvula*
Test organism source	In-house culture
Test organism age	Male and female branches
Test type	Static
Test duration	48 hr exposure, followed by 7 day recovery period
Test chamber	240-mL polystyrene cup
Test solution volume	100 mL
Test concentrations (% sample)	99, 29.7, 8.9, 2.7 and 0.81%, plus seawater and salt control
Number of replicates	3
Dilution water	Natural clean seawater
Test solution renewal	Renewed with control water following 48 hr exposure
Test temperature	23 ± 1°C
Salinity	30 ± 2 ppt
Salinity adjustment	Hypersaline brine prepared with Instant Oceans salt
Number of organisms/chamber	2 male and 5 female plants
Light intensity	1024 to 1247 lux
Aeration	None during exposure; aeration provided during recovery
Test protocol	EPA-821-R-02-014
Test endpoint	Cystocarp production
Reference toxicant	SDS

2.2 Quality Assurance/Quality Control (QA/QC)

Nautilus follows a comprehensive QA/QC program to ensure that the data generated are of high quality and scientifically defensible. To meet these objectives, Nautilus has implemented a number of quality control procedures that include the following:

- Negative controls to ensure that appropriate testing performance criteria are met;
- Positive controls to assess the health and sensitivity of the test organisms;
- Use of appropriate species and life stage to meet the study objectives;
- Appropriate number of replicates to allow for proper statistical analyses;
- Calibration and proper maintenance of instruments to ensure accurate measurements;
- Proper documentation and record-keeping to allow traceability of performance;
- Adequate supervision and training of staff to ensure that methods are followed;
- Proper handling and storage of samples to ensure their integrity;
- Procedures in place to address issues that may arise during testing and ensure the implementation of appropriate corrective actions; and
- Review of data by a Registered Professional Biologist to ensure they are of acceptable quality and are scientifically defensible prior to releasing to the client.

3.0 RESULTS AND DISCUSSION

The results of acute toxicity tests using rainbow trout and *Daphnia magna* are shown in Table 5. The LC50 estimates were of >100% in both tests. No adverse effects to topsmelt survival or growth were observed; therefore the LC50, IC25 and IC50 were all >74.7%. Results of the 7-da topsmelt test are summarized in Table 6.

Fertilization was reduced in the echinoderm test resulting in IC25 and IC50 values of 40.8 and 58.3%, respectively. These results are provided in Table 7. Results of the cystocarp production test using *C. parvula* are detailed in the report provided in Appendix E, and are summarized in Table 8. Adverse effects to *C. parvula* were observed in the sample. The IC25 for cystocarp production was 42.9%.

Table 5. Results of acute toxicity tests, presented as percent survival.

Percent sample	Rainbow trout	*Daphnia magna*
Control	100	100
6.25	100	100
12.5	100	100
25	100	100
50	100	100
100	100	1000
LC50	>100%	>100%

LC = Lethal Concentration.

Table 6. Toxicity test results for the 7-d topsmelt survival and growth test.

Concentration (% v/v)	Survival (%) (Mean ± SD)	Growth (mg) (Mean ± SD)
Negative Control	100.0 ± 0.0	1.08 ± 0.27
Brine Control	100.0 ± 0.0	1.09 ± 0.11
4.7	92.0 ± 11.0	1.05 ± 0.15
9.3	100.0 ± 0.0	1.17 ± 0.08
18.7	100.0 ± 0.0	1.12 ± 0.14
37.4	100.0 ± 0.0	1.17 ± 0.15
74.7	100.0 ± 0.0	1.15 ± 0.09
Test endpoint	(% v/v)	(% v/v)
LC25 (survival); IC25 (growth)	>74.7	>74.7
LC50 (survival); IC50 (growth)	>74.7	>74.7

LC = Lethal Concentration.
IC = Inhibition Concentration
SD = Standard Deviation.

Table 7. Toxicity test results for the 10-min echinoderm fertilization test.

Concentration (% v/v)	Fertilized eggs (%) (Mean ± SD)
Negative Control	68.2 ± 5.9
Brine Control	62.8 ± 3.6
1.2	59.5 ± 2.1
2.4	67.5 ± 4.2
4.7	67.0 ± 3.2
9.3	61.5 ± 6.5
18.7	59.8 ± 4.2
37.4	55.2 ± 3.1
74.7	22.2 ± 4.3
Test endpoint	**(% v/v)**
IC25 (95% confidence limits)	40.8 (32.8 - 45.9)
IC50 (95% confidence limits)	58.3 (52.5 - 64.4)

IC = Inhibition Concentration.
SD = Standard Deviation.

Table 8. Toxicity test results for the *Champia parvula* cystocarp production test.

Concentration (% v/v)	Cystocarps (Mean ± SD)
Negative Control	43.6 ± 5.0
Salt Control	49.3 ± 4.4
0.81	46.4 ± 1.6
2.7	47.3 ± 6.7
8.9	44.9 ± 2.5
29.7	45.0 ± 1.4
99	12.3 ± 1.0
Test endpoint	**(% v/v)**
IC25 (95% confidence limits)	42.9 (33.6- 45.8)

IC = Inhibition Concentration.
SD = Standard Deviation.

3.1 Quality Assurance/Quality Control

Sample holding time was exceeded for all of the tests as a result of extended shipping time required to get the sample from the site to the laboratory. The tests were conducted, regardless, according to instruction provided by the client. The toxicity tests conducted using rainbow trout and *Daphnia magna* were initiated six and seven days after sampling, which exceeded the five-day holding time specified for these tests. The *Champia parvula* and echinoderm were initiated seven days after sampling, which exceeded the three-day holding period for this test. The topsmelt test was initiated six days after sampling, which exceeded the three-day holding period for this test.

The tests met all control acceptability criteria and water quality parameters remained within acceptable ranges throughout the test, with the exception of the *C. parvula* test. Temperature exceeded the range of 23 ± 1°C on one day due to equipment malfunction. However, this temperature deviation did not affect the test results as test validity criteria were met. Uncertainty associated with this test is best described by the confidence intervals around the point estimates.

The brine control (prepared using hypersaline brine) used in the echinoderm and topsmelt tests resulted in similar fertilization rate and survival/growth to the regular control, respectively. The salt control (Instant Ocean salt added into deionized water) used in the *Champia* test resulted in similar cyctocarp production to the regular control. Thus, brine and salt addition did not contribute to any adverse effect observed with this species.

Results of reference toxicant tests conducted using rainbow trout, *D. magna,* topsmelt, echinoderm and *C. parvula* are summarized in Table 9. The results of these tests all fell within the acceptable range of historical test results.

Table 9. Reference toxicant test results.

Species	Endpoint	Result	Historical range	CV(%)	Initiation Date
Rainbow trout	Survival (LC50)	3.3 mg/L $NaNO_2$	3.0 - 11.3	39	13/9/11
Daphnia magna	Survival (LC50)	4.2 mg/L NaCl	3.6 - 4.4	6	14/9/11
A. affinis	Biomass (IC50)	109 µg/L Cu	43.0 - 114.2	28	13/9/11
D.excentricus	Fertilization (IC50)	23.7 µg/L Cu	4.8 - 63.4	91	14/9/11
C.parvula	Reproduction (IC25)	0.097 mg/L SDS	0.072 - 0.138	38	14/9/11

4.0 REFERENCES

Environment Canada. 2011. Biological test method: Fertilization assay using echinoids (sea urchins and sand dollar). Environmental Protection Series EPS 1/RM/27. February 2011. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 110 pp.

Environment Canada. 2000a. Biological test method: reference method for determining acute lethality of effluents to rainbow trout. Report EPS 1/RM/13, Second Edition. Environment Canada, Science and Technology Branch, Ottawa, ON.

Environment Canada. 2000b. Biological test method: reference method for determining acute lethality of effluents to *Daphnia magna*. Report EPS 1/RM/14, Second Edition. Environment Canada, Science and Technology Branch, Ottawa, ON.

Tidepool Scientific Software. 2007. CETIS comprehensive environmental toxicity information system, version 1.5.0D. Tidepool Scientific Software, McKinleyville, CA. 222 pp.

USEPA (US Environmental Protection Agency). 1995. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to west coast marine and estuarine organisms. EPA/600/R-95/136.

APPENDIX A – Rainbow trout toxicity test data

Rainbow Trout Summary Sheet

Client: Azimuth

Start Date/Time: Sept 13/11 @ 1500h

Work Order No.: 11399

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID:	GC-070911
Sample Date:	Sept 7/11
Date Received:	Sept 12/11
Sample Volume:	2x20L, 4x1L
Other:	—

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type:	Dechlorinated Municipal Tap Water
Hardness (mg/L $CaCO_3$):	9
Alkalinity (mg/L $CaCO_3$):	8

Test Organism Information:

Batch No.:	080411		
Source:	Miracle Springs		
No. Fish/Volume (L):	10/10L		
Loading Density:	0.46		
Mean Length ± SD (mm):	37±3	Range:	33-43
Mean Weight ± SD (g):	0.46±0.14	Range:	0.32-0.73

Nitrate Reference Toxicant Results:

Reference Toxicant ID:	RTNt10
Stock Solution ID:	11Nt01
Date Initiated:	Sept 1, 2011
96-h LC50 (95% CL):	3.3 (2.5 - 4.5) mg/L $NaNO_2$

Reference Toxicant Mean (2SD Range):	5.8, 3.0 - 11.3 mg/L $NaNO_2$
Reference Toxicant CV (%):	39

Test Results: The 96-hr LC50 > 100 % v/v

Reviewed by: JOU

Date reviewed: Oct. 20/11

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#:	Azimuth	**Number Fish/Volume:**	**10/10L**
Sample I.D.	GC-070911	**7-d % Mortality:**	0.7%
W.O. #	11399	**Total Pre-aeration Time (mins):**	30 mins
RBT Batch #:	080411	**Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N):**	Y
Date Collected/Time:	Sept 7/11 @ 1130h		
Date Setup/Time:	Sept 13/11 @ 1500h		
Sample Setup By:	JAB		

D.O. meter:	**DO-1**
pH meter:	**pH-1**
Cond. Meter:	**C-1**

Undiluted Sample WQ

Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0		14.5
pH	7.9		7.9
D.O. (mg/L)	9.9		9.9
Cond. (µS/cm)	13280		13420

Concentration	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
Control				10	10	10	10	14.0	15.0	15.0	14.5	14.5	9.9	10.0	9.9	10.1	9.8	7.1	7.1	7.0	7.1	6.9	32	36
6.25				10	10	10	10	14.0	15.0	15.0	14.5	14.5	10.0	9.8	9.9	9.9	9.9	7.5	7.5	7.3	7.3	7.1	947	1007
12.5				10	10	10	10	14.5	15.0	15.0	14.5	14.5	10.0	9.8	9.9	9.9	9.8	7.6	7.6	7.5	7.5	7.3	1770	1787
25				10	10	10	10	14.5	15.0	15.0	14.5	14.5	9.9	9.9	9.9	9.9	9.9	7.7	7.6	7.7	7.5	7.6	3520	3680
50				10	10	10	10	14.5	15.0	15.0	14.5	14.5	9.9	9.9	9.8	9.9	9.9	7.8	7.7	7.8	7.7	7.7	6890	6890
100				10	10	10	10	14.5	15.0	15.0	14.5	14.5	9.9	9.8	9.8	9.8	9.9	7.9	7.8	7.9	7.8	7.9	13420	13400
Initials				JAB	JAB	JAB	~	JAB	JAB	JAB	JAB	~	JAB	JAB	JAB	JAB	~	JAB	JAB	JAB	JAB	~	JAB	~

Sample Description/Comments: Clear, colorless (slight yellow tint), salinity = 8 ppt

Fish Description at 96? all fish appear ok

Other Observations:

Reviewed by: JGh

Date Reviewed: Oct-20/11

APPENDIX B - *Daphnia magna* toxicity test data

Daphnia magna Summary Sheet

Client: Azimuth
Work Order No.: 11400

Start Date/Time: Sept 14/11 @1510h
Test Species: *Daphnia magna*
Set up by: AWO

Sample Information:

Sample ID: GC-070911
Sample Date: Sept 7/11
Date Received: Sept 12/11
Sample Volume: 2x20L, 2x1L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 082411A
Age of young (Day 0): < 24 hours
Avg No. young per brood in previous 7 d: 39
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: Dm74
Stock Solution ID: 11NaO1
Date Initiated: Sept 14/11
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/LNaCL

Reference Toxicant Mean and Historical Range: 4.0 (3.6-4.4) g/L NaCL
Reference Toxicant CV (%): 6

Test Results: The 48-h LC50 is >100% (v/v)

Reviewed by: JGh

Date reviewed: Oct-20/11

Freshwater Acute
48 Hour Toxicity Test Data Sheet

Client: Arnold

Sample ID: GL-070911

Work Order No.: 11400

Start Date/Time: Sept 14/11 @ 1510h

No. Organisms/volume: 10/200mL

Test Organism: *D.magna*

Set up by: [illegible]

DO meter: DO-1

pH meter: pH-1

Conductivity meter: C-1

Concentration % (v/v)	Rep	Number of Live Organisms 24	Number of Live Organisms 48	No. Immobilized 48	Temperature (°C) 0	Temperature (°C) 24	Temperature (°C) 48	Dissolved oxygen (mg/L) 0	Dissolved oxygen (mg/L) 24	Dissolved oxygen (mg/L) 48	pH 0	pH 24	pH 48	Conductivity (µS/cm) 0	Conductivity (µS/cm) 48
Control	A	10	10	0	19.5	19.5	20.0	9.0		8.8	8.0		8.0	343	362
	B														
	C														
	D														
6.25	A	10	10	0	19.6	19.5	20.0	9.0		8.9	8.0		8.1	3470	3450
	B														
	C														
	D														
12.5	A	10	10	0	19.5	19.6	20.0	9.0		8.9	8.0		8.1	3640	3680
	B														
	C														
	D														
25	A	10	10	0	19.6	19.5	20.0	9.0		9.0	7.9		8.2	4410	4480
	B														
	C														
	D														
50	A	10	10	0	19.5	19.6	20.0	9.0		9.0	7.9		8.2	6340	6320
	B														
	C														
	D														
100	A	10	10	0	19.5	19.6	20.0	8.9		9.0	7.8		8.2	13330	13360
	B														
	C														
	D														
Technician Initials		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

WQ Ranges: T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCo3)	
Control (MHW)	100	64
Highest conc.	~~6~~ 1150	120

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.6		
DO (mg/L)	8.9		
pH	7.8		
Cond (µS/cm)	13330		

Sample Description: light yellow - slightly opaque

Comments: Batch#: 052411A 7-d previous # young/brood: 39 Day of 1st Brood: 9 Previous 7-d % Mortality: 0

Reviewed by: JGh Date reviewed: Oct-20/11

Client: Azimuth

W.O.#: 11400

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity (mg/L$CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L $CaCO_3$)	Technician
GC-072911	Sept14/11	50	6.1	6.2	120		10①	11.5	1150	KCB
MHW	Sept14/11	50	3.3	3.4	64		50	5.0	100	KCB

Notes: ① Diluted to 100mL with DI water

Reviewed by: JGh

Date Reviewed: Oct. 20/11

APPENDIX C – Topsmelt toxicity test data

Topsmelt Test Summary Sheet

Client: Azimuth

Start Date: Sept 13, 2011

Work Order No.: 11402

Test Species: Atherinops affinis

Sample Information:

Sample ID: GC-070911
Sample Date: Sept 7/11
Date Received: Sept 12/11
Sample Volume: 2x20L, 4x1L

Dilution Water:

Type: Natural Seawater
Source: Pacific Environmental Science Centre (PESC)

Test Organism Information:

Batch No.: 091311
Source: ABS Aquatic Bio-Systems
Age: ~~10-day~~ 11-day

Copper Reference Toxicant Results:

Reference Toxicant ID: AAC6
Stock Solution ID: 11Cu01
Date Initiated: Sept 13, 2011
7-d EC50 (95% CL): ~~74.3 (45.1-122.3) ug/L Cu~~ 112.1 (98.7-127.4) ug/L Cu
7-d IC50 (95% CL): ~~7~~ 109.0 (101.2-116.3) ug/L Cu

EC50 Reference Toxicant Mean (Acceptable Range): 74.3 (45.1-122.3) ug/L Cu CV (%): 28
IC50 Reference Toxicant Mean (Acceptable Range): 70.1 (43.0-114.2) ug/L Cu CV (%): 28

Test Results:

	Survival	Dry Weight
EC25 % (v/v) (95% CL)	>74.7	
EC50 % (v/v) (95% CL)	>74.7	
IC25 % (v/v) (95% CL)		>74.7
IC50 % (v/v) (95% CL)		>74.7

Reviewed by: ____________ Date reviewed: ____________

Chronic Marine Toxicity Test
Initial and Final Water Quality Measurements

Client:	Azimuth	**Start Date & Time:**	Sept. 13, 2011 @ 1300h
Sample ID:	GC-070911	**Stop Date:**	Sept. 20, 2011
Work Order #:	11402	**Test Species:**	*Atherinops affinis*

%(v/v) Concentration Control	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.5	20.0	20.0	20.0	20.0	20.0	20.0
DO (mg/L)	7.4	6.9	7.3	6.9	7.1	7.0	7.1	6.8	7.5	6.3	~~8.7~~ 7.4	6.4	7.4	6.5
pH	7.7	~~8.1~~ 7.8	7.8	7.7	7.7	7.7	7.8	7.8	7.9	7.9	8.0	7.8	8.0	7.8
Salinity (ppt)	29	29		29		29		29		29		29		29
Initials	ARG	KJL	ARG	ARG	ARG	ARG	ARG	[illegible]	[illegible]	[illegible]	[illegible]	ARG	ARG	ARG

Concentration 4.7	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.5	20.0	20.0	20.0	20.0	20.0	20.0
DO (mg/L)	7.4	7.1	7.1	7.0	7.0	7.0	7.1	6.6	7.5	6.3	7.4	6.3	7.4	6.6
pH	7.8	7.8	7.8	7.7	7.7	7.7	7.8	7.8	7.8	7.9	8.0	7.8	8.0	7.9
Salinity (ppt)	29	29		29		29		29		29		29		29
Initials	ARG	KJL	ARG	ARG	ARG	ARG	ARG	[illegible]	[illegible]	[illegible]	[illegible]	ARG	ARG	ARG

Concentration 18.7	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.5	20.0	20.0	20.0	20.0	20.0	20.0
DO (mg/L)	7.5	7.1	7.1	7.0	7.0	7.0	7.1	6.9	7.5	6.4	7.4	6.3	7.4	6.4
pH	7.9	7.8	7.8	7.7	7.7	7.7	7.8	7.8	7.8	7.9	8.0	7.8	8.0	7.9
Salinity (ppt)	29	29		29		29		29		29		29		29
Initials	ARG	KJL	ARG	ARG	ARG	ARG	ARG	[illegible]	[illegible]	[illegible]	[illegible]	ARG	ARG	ARG

74.7 Concentration	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	21.0	20.0	20.0	20.0	20.0	20.0	20.0	20.5	20.0	20.0	20.0	20.0	20.0	20.0
DO (mg/L)	7.5	7.1	7.1	7.0	7.1	7.0	7.1	6.6	7.4	6.4	7.5	6.2	7.4	6.4
pH	7.9	8.0	7.8	7.8	7.8	7.7	7.7	7.7	7.9	7.8	8.1	7.8	8.1	7.9
Salinity (ppt)	29	29		29		29		29		29		29		29
Initials	ARG	KJL	ARG	ARG	ARG	ARG	ARG	[illegible]	[illegible]	[illegible]	[illegible]	ARG	ARG	ARG

Analysts: KJL, AMT, ARG

Reviewed by: JGL
Date reviewed: Oct. 20/11

Sample Description: Clear, colorless (slight yellow tint)

Comments:

7-d Topsmelt Toxicity Test
Daily Survival

Client: Azimuth
Sample ID: GC 070911 (Polaris)
Work Order #: 11402

Start Date & Time: Sept. 13, 2011 1200h
Stop Date: Sept. 20, 2011
Test Species: *Atherinops affinis*

Concentration %(v/v)	Rep	Day of Test - No. of Survivors 1	2	3	4	5	6	7	Comments
	A	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	
Control	C	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	
	A	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	
Brine Control	C	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	
	A	5	5	5	5	5	5	4	
	B	5	5	5	5	5	5	5	
4.7	C	5	5	5	5	5	5	5	
	D	5	5	5	4	4	4	4	
	E	5	5	5	5	5	5	5	
	A	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	
9.3	C	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	
	A	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	
18.7	C	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	
	A	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	
37.4	C	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	
	A	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	
74.7	C	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	
	A								
	B								
	C								
	D								
	E								
Tech Initials		KJL	KJL	KJL	m	m	KJL	GHP	

Comments:

Reviewed by: JGL

Date reviewed: Oct 20/11

CETIS Analytical Report

Report Date: 20 Oct-11 11:58 (p 1 of 2)
Test Code: 11402 | 00-5782-8219

Larval Fish 7-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	20-9749-1316	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	22 Sep-11 16:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	03-3119-8055	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	13 Sep-11 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	20 Sep-11 11:00	**Species:**	Atherinops affinis	**Brine:**	Frozen Seawater
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	04-0306-4023	**Code:**	11402	**Client:**	Azimuth
Sample Date:	21 Sep-11 16:18	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	21 Sep-11 16:18	**Source:**	Azimuth		
Sample Age:	N/A	**Station:**	GC 070911 Polaris		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	366852637	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>74.7	N/A	N/A	<1.339	N/A	N/A
EC10	>74.7	N/A	N/A	<1.339	N/A	N/A
EC15	>74.7	N/A	N/A	<1.339	N/A	N/A
EC20	>74.7	N/A	N/A	<1.339	N/A	N/A
EC25	>74.7	N/A	N/A	<1.339	N/A	N/A
EC40	>74.7	N/A	N/A	<1.339	N/A	N/A
EC50	>74.7	N/A	N/A	<1.339	N/A	N/A

7d Survival Rate Summary — **Calculated Variate(A/B)**

Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	1	1	1	0	0	0.0%	0.0%	25	25
4.7		5	0.92	0.8	1	0.04899	0.1095	11.91%	8.0%	23	25
9.3		5	1	1	1	0	0	0.0%	0.0%	25	25
18.7		5	1	1	1	0	0	0.0%	0.0%	25	25
37.4		5	1	1	1	0	0	0.0%	0.0%	25	25
74.7		5	1	1	1	0	0	0.0%	0.0%	25	25

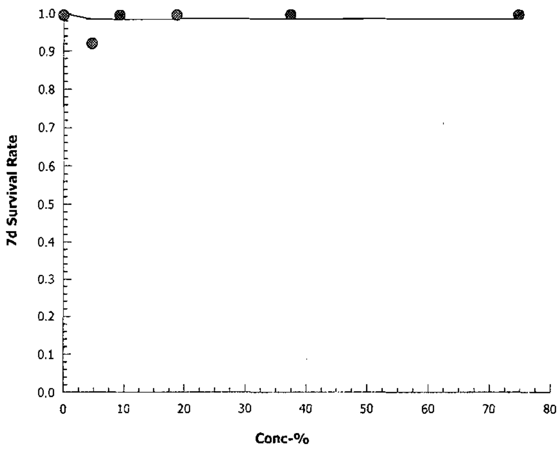
7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
4.7		0.8	1	1	0.8	1
9.3		1	1	1	1	1
18.7		1	1	1	1	1
37.4		1	1	1	1	1
74.7		1	1	1	1	1

Larval Fish 7-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 20-9749-1316		**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed: 22 Sep-11 16:54		**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



7-d Topsmelt Toxicity Test Data Sheet
Dry Weight Data

Client: **Azimuth** Start Date: 13-Sep-11

Sample ID: **GC 070911 (Polaris)** Termination Date: 20-Sep-11

Work Order No.: **11402** Test Species: *Atherinops affinis*

%(v/v)

Sample ID	Rep	Pan No. orange	No. alive	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	A	1	5	GHP	1314.25	1319.30	5	ARG
	B	2	5	GHP	1312.52	1319.18	5	ARG
	C	3	5	GHP	1321.49	1325.79	5	ARG
	D	4	5	GHP	1320.34	1324.34	5	ARG
	E	5	5	GHP	1323.35	1330.28	5	ARG
Brine Control	A	6	5	GHP	1305.62	1310.67	5	ARG
	B	7	5	GHP	1325.02	1330.08	5	ARG
	C	8	5	GHP	1316.58	1322.95	5	ARG
	D	9	5	GHP	1317.19	1322.52	5	ARG
	E	10	5	GHP	1311.43	1316.95	5	ARG
4.7	A	11	4	GHP	1335.37	1340.32	4	ARG
	B	12	5	GHP	1304.00	1309.30	5	ARG
	C	13	5	GHP	1317.10	1322.89	5	ARG
	D	14	4	GHP	1311.76	1315.91	4	ARG
	E	15	5	GHP	1305.18	1311.21	5	ARG
9.3	A	16	5	GHP	1318.18	1323.51	5	ARG
	B	17	5	GHP	1321.54	1327.46	5	ARG
	C	18	5	GHP	1323.24	1329.41	5	ARG
	D	19	5	GHP	1321.74	1327.99	5	ARG
	E	20	5	GHP	1320.88	1326.38	5	ARG
18.7	A	21	5	GHP	1318.19	1324.18	5	ARG
	B	22	5	GHP	1321.73	1326.47	5	ARG
	C	23	5	GHP	1309.06	1315.49	5	ARG
	D	24	5	GHP	1321.83	1326.87	5	ARG
	E	25	5	GHP	1313.01	1318.68	5	ARG
37.4	A	26	5	GHP	1320.83	1325.63	5	ARG
	B	27	5	GHP	1315.71	1321.35	5	ARG
	C	28	5	GHP	1321.26	1327.05	5	ARG
	D	29	5	GHP	1327.25	1334.18	5	ARG
	E	30	5	GHP	1321.97	1328.05	5	ARG

Comments: Re-weigh: 6- 1310.71 14- 1316.03 27- 1321.37

Generated: March 17, 2009

Reviewed by: JCK Date Reviewed: Oct. 20/11

7-d Topsmelt Toxicity Test Data Sheet
Dry Weight Data

Client: Azimuth | Start Date: 13-Sep-11
Sample ID: GC 070911 (Polaris) | Termination Date: 20-Sep-11
Work Order No.: 11402 | Test Species: *Atherinops affinis*

%(v/v)

Sample ID	Rep	Pan No.	No. alive	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
74.7	A	31	5	GHP	1307.29	1312.78	5	ARG
	B	32	5	GHP	1312.99	1318.71	5	ARG
	C	33	5	GHP	1306.43	1312.96	5	ARG
	D	34	5	GHP	1311.56	1317.01	5	ARG
	E	35	5	GHP	1323.48	1328.93	5	ARG

Comments: 35-1329.11

Generated: March 17, 2009
Reviewed by: JOh
Date Reviewed: Oct-20/11

CETIS Analytical Report

Larval Fish 7-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	18-6547-5944	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.0
Analyzed:	18 Oct-11 10:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	03-3119-8055	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	13 Sep-11 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	20 Sep-11 11:00	**Species:**	Atherinops affinis	**Brine:**	Frozen Seawater
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	04-0306-4023	**Code:**	11402	**Client:**	Azimuth
Sample Date:	21 Sep-11 16:18	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	21 Sep-11 16:18	**Source:**	Azimuth		
Sample Age:	N/A	**Station:**	GC 070911 Polaris		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	14614252	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1.078	0.85 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>74.7	N/A	N/A	<1.339	N/A	N/A
IC10	>74.7	N/A	N/A	<1.339	N/A	N/A
IC15	>74.7	N/A	N/A	<1.339	N/A	N/A
IC20	>74.7	N/A	N/A	<1.339	N/A	N/A
IC25	>74.7	N/A	N/A	<1.339	N/A	N/A
IC40	>74.7	N/A	N/A	<1.339	N/A	N/A
IC50	>74.7	N/A	N/A	<1.339	N/A	N/A

Mean Dry Biomass-mg Summary — **Calculated Variate**

Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	1.078	0.8	1.386	0.1202	0.2687	24.94%	0.0%
4.7		5	1.049	0.83	1.206	0.06637	0.1484	14.15%	2.67%
9.3		5	1.167	1.066	1.25	0.0363	0.08118	6.96%	-8.28%
18.7		5	1.115	0.948	1.286	0.06157	0.1377	12.35%	-3.45%
37.4		5	1.17	0.96	1.386	0.06884	0.1539	13.16%	-8.54%
74.7		5	1.146	1.09	1.306	0.04134	0.09243	8.07%	-6.31%

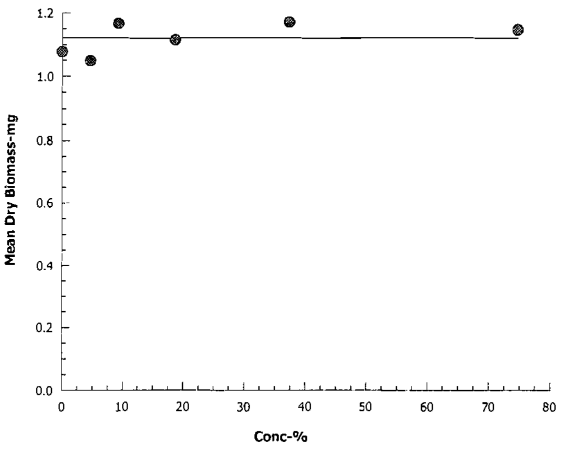
Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.01	1.332	0.86	0.8	1.386
4.7		0.99	1.06	1.158	0.83	1.206
9.3		1.066	1.184	1.234	1.25	1.1
18.7		1.198	0.948	1.286	1.008	1.134
37.4		0.96	1.128	1.158	1.386	1.216
74.7		1.098	1.144	1.306	1.09	1.09

Larval Fish 7-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	18-6547-5944	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.0
Analyzed:	18 Oct-11 10:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Report Date:	26 Oct-11 12:39 (p 1 of 1)		
Test Code:	11402 | 00-5782-8219		

Larval Fish 7-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-3876-5112	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	26 Oct-11 12:37	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes

Batch ID:	03-3119-8055	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	13 Sep-11 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	20 Sep-11 11:00	**Species:**	Atherinops affinis	**Brine:**	Frozen Seawater
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	04-0306-4023	**Code:**	11402	**Client:**	Azimuth
Sample Date:	21 Sep-11 16:18	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	21 Sep-11 16:18	**Source:**	Azimuth		
Sample Age:	N/A	**Station:**	GC 070911 Polaris		

Data Transform	Zeta	Alt Hyp	MC Trials	Test Result
Untransformed		C > T	Not Run	Sample passes 7d survival rate endpoint

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	Decision(0.05)
Negative Control		Brine Reagent	1	1.0000	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

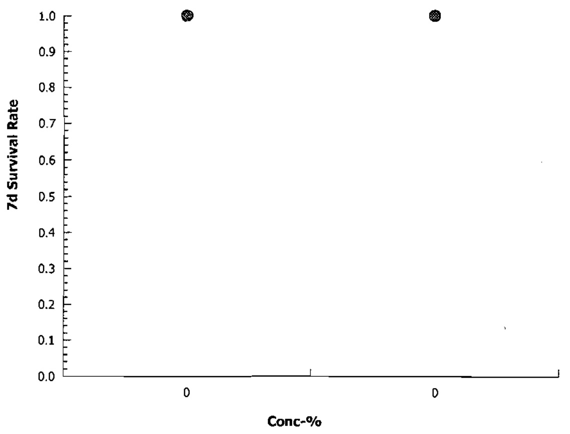
Data Summary

Conc-%	Control Type	No-Resp	Resp	Total
0	Brine Reagent	25	0	25
0	Negative Contr	25	0	25

7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Reagent	1	1	1	1	1
0	Negative Control	1	1	1	1	1

Graphics



Larval Fish 7-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	13-8676-2207	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.0
Analyzed:	26 Oct-11 12:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	03-3119-8055	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	13 Sep-11 13:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	20 Sep-11 11:00	**Species:**	Atherinops affinis	**Brine:**	Frozen Seawater
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	04-0306-4023	**Code:**	11402	**Client:**	Azimuth
Sample Date:	21 Sep-11 16:18	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	21 Sep-11 16:18	**Source:**	Azimuth		
Sample Age:	N/A	**Station:**	GC 070911 Polaris		

Data Transform	Zeta	Alt Hyp	MC Trials	Test Result	PMSD
Untransformed	0	C > T	Not Run	Sample passes mean dry biomass-mg endpoint	22.4%

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
Negative Control		Brine Reagent	-0.1203	1.86	8	0.241	0.5464	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1.078	0.85 - NL	Yes	Passes Acceptability Criteria
Control Resp	1.093	0.85 - NL	Yes	Passes Acceptability Criteria
PMSD	0.2236	NL - 0.5	No	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006076825	0.0006076825	1	0.01447	0.9072	Non-Significant Effect
Error	0.3358753	0.04198441	8			
Total	0.336483	0.0425921	9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	6.137	23.15	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9369	0.7411	0.5195	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	1.078	0.9754	1.18	0.8	1.386	0.1202	0.2687	24.94%	0.0%
0	Brine Reagent	5	1.093	1.052	1.134	1.01	1.274	0.04851	0.1085	9.92%	-1.45%

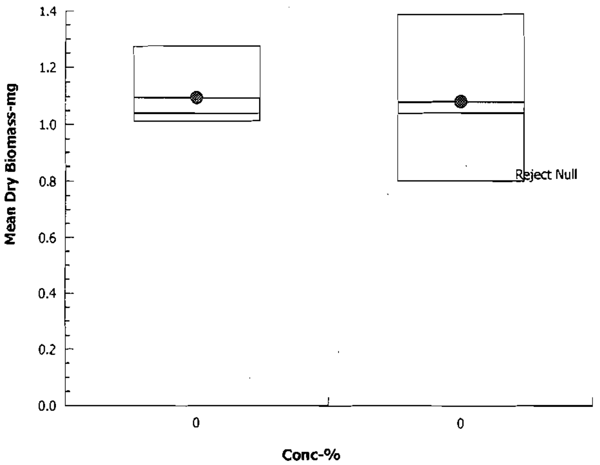
Larval Fish 7-d Survival and Growth Test — **Nautilus Environmental**

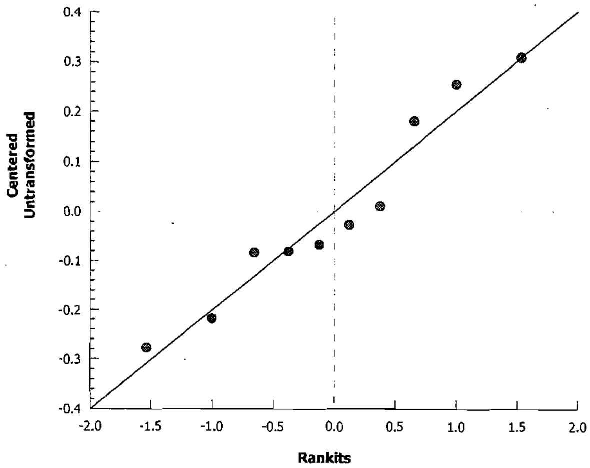
Analysis ID:	13-8676-2207	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.0
Analyzed:	26 Oct-11 12:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Brine Reagent	1.01	1.012	1.274	1.066	1.104
0	Negative Control	1.01	1.332	0.86	0.8	1.386

Graphics





APPENDIX D - Echinoderm toxicity test data

Echinoderm Fertilization Test Summary Sheet

Client: Azimuth

Start Date/Time: Sept 14/11 @ 1745h

Work Order No.: 11401

Test Species: D. excentricus

Sample Information:

Sample ID: GC-070911
Sample Date: Sept 7/11
Date Received: Sept 12/11
Sample Volume: 4 x 1L, 2 x 20L
Other: —

Dilution Water:

Type: Natural Seawater
Source: PESC
Other: —

Test Organism Information:

Batch No.: 091411
Source: MREP
Sperm:Egg Ratio: 32 000 : 1
Exposure Period: 10 mins : 10 mins

~~SDS~~ Cu Reference Toxicant Results:

Reference Toxicant ID: DE13
Stock Solution ID: 11Cu01
Date Initiated: Sept 14/11
IC50 (95% CL): 23.7 (20.2-26.2) ug/L Cu

Reference Toxicant Mean ± 2 SD: 17.4 (4.8-63.4) ug/L Cu
Reference Toxicant CV (%): 91

Test Results: The fertilization rate IC50 is estimated at ~~58.2~~ 58.3 % (v/v) with 95 % confidence limits at ~~55.5 %~~ 52.5 % and ~~61.1 % (v/v)~~ 64.4 % (v/v)

Reviewed by: JAB

Date reviewed: Nov - 8/11

Echinoderm Fertilization WQ Data Sheet

Client : Azimuth
Analysts: JAB
Sample ID: GC-070911
Test Date: 14-Sep-11
WO No: 11401
Test Species: *D. excentricus/S. purpuratus*

Brine Adjustment (sample and brine control):

Sample 200 mL of sample with 68 mL of brine (91 ppt)
Brine Ctrl 100 mL of DI with ~~40~~ 43 mL of brine. JAB

Initial Water Quality

	100% sample
Temp (°C)	15.0
DO (mg/L)	9.4
pH	7.7
Salinity	7.7

Brine/Salt Adjusted Water Quality

	75 % sample
Temp (°C)	15.0
DO (mg/L)	8.4
pH	8.0
Salinity	29

	Water Quality			
Concentration % (v/v)	Temp. (°C)	DO (mg/L)	pH	Salinity (ppt)
Control	14.5	8.4	7.7	29
1.2	14.5	8.4	7.7	29
2.4	14.5	8.4	7.7	29
4.7	14.5	8.4	7.7	29
9.4	14.5	8.4	7.8	29
18.8	14.5	8.4	7.8	29
37.5	15.0	8.4	7.9	29
75	15.0	8.4	8.0	29
Brine Control	15.5	8.0	8.4	29
Analyst Initials	JAB	JAB	JAB	JAB

Sample Description: Clear, slight yellow

Echinoderm Source: MREP
Date Received: Sept 14/11

Seawater Source: PESC
Date Collected: Sept 8/11

Comments:

Reviewed: JGL
Date Reviewed: Nov-8/11

Echinoderm Fertilization Toxicity Test Data Sheet
Fertilized Egg Counts

Client: Azimuth
Work Order #: 11401
Sample ID: GC-070911

Start Date/Time: Sept 14/11 @1745h
Test species: D.excentricus
Test set up by: JAB
Test duration: 10:10

Concentration % (v/v)	Rep	No. Fertilized Eggs	No. Unfertilized Eggs	Comments	Initials
Control	A	72	28		JAB
	B	60	40		
	C	68	32		
	D	73	27		
1.2	A	62	38		
	B	59	41		
	C	57	43		
	D	60	40		
2.4	A	63	37		
	B	66	34		
	C	68	32		
	D	73	27		
4.7	A	66	34		
	B	63	37		
	C	69	31		
	D	70	30		
9.3	A	57	43		
	B	56	44		
	C	70	30		
	D	63	37		
18.7	A	60	40		
	B	64	36		
	C	54	46		
	D	61	39		
37.4	A	55	45		
	B	57	43		
	C	51	49		
	D	58	42		
74.7	A	27	73		
	B	24	76		
	C	21	79		
	D	17	83		↓

Comments: Brine Control: A-62/38 B-61/39 C-60/40 D-68/32 JAB

Reviewed by: JGh Date Reviewed: Oct. 20/11

CETIS Analytical Report

Echinoid Sperm Cell Fertilization Test — **Nautilus Environmental**

Analysis ID:	12-3356-1180	**Endpoint:**	Fertilization Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	19 Oct-11 14:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	19-8043-5122	**Test Type:**	Fertilization	**Analyst:**	
Start Date:	14 Sep-11 17:45	**Protocol:**	EC/EPS 1/RM/27	**Diluent:**	Natural seawater
Ending Date:	14 Sep-11 18:05	**Species:**	Dendraster excentricus	**Brine:**	
Duration:	20m	**Source:**	MREP	**Age:**	

Sample ID:	17-7735-6802	**Code:**	11401	**Client:**	Azimuth
Sample Date:	07 Sep-11	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	12 Sep-11	**Source:**	Azimuth		
Sample Age:	7d 18h	**Station:**			

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	746455546	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.119	N/A	22.15	89.38	4.514	N/A
IC10	9.59	N/A	37.08	10.43	2.697	N/A
IC15	24.49	N/A	47.44	4.083	2.108	N/A
IC20	37.92	3.49	43.23	2.637	2.313	28.65
IC25	40.75	32.79	45.86	2.454	2.18	3.05
IC40	50.53	45.5	56.19	1.979	1.78	2.198
IC50	58.3	52.49	64.35	1.715	1.554	1.905

Fertilization Rate Summary — **Calculated Variate(A/B)**

Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.6825	0.6	0.73	0.02955	0.05909	8.66%	0.0%	273	400
1.2		4	0.595	0.57	0.62	0.01041	0.02082	3.5%	12.82%	238	400
2.4		4	0.675	0.63	0.73	0.02102	0.04203	6.23%	1.1%	270	400
4.7		4	0.67	0.63	0.7	0.01581	0.03162	4.72%	1.83%	268	400
9.3		4	0.615	0.56	0.7	0.03227	0.06455	10.5%	9.89%	246	400
18.7		4	0.5975	0.54	0.64	0.02097	0.04193	7.02%	12.45%	239	400
37.4		4	0.5525	0.51	0.58	0.01548	0.03096	5.6%	19.05%	221	400
74.7		4	0.2225	0.17	0.27	0.02136	0.04272	19.2%	67.4%	89	400

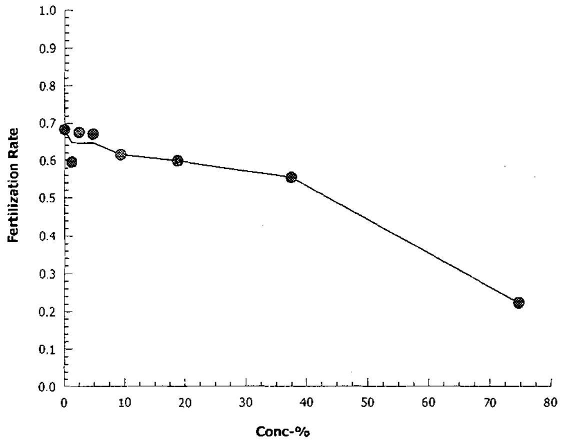
Fertilization Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.72	0.6	0.68	0.73
1.2		0.62	0.59	0.57	0.6
2.4		0.63	0.66	0.68	0.73
4.7		0.66	0.63	0.69	0.7
9.3		0.57	0.56	0.7	0.63
18.7		0.6	0.64	0.54	0.61
37.4		0.55	0.57	0.51	0.58
74.7		0.27	0.24	0.21	0.17

Echinoid Sperm Cell Fertilization Test — **Nautilus Environmental**

Analysis ID: 12-3356-1180	**Endpoint:**	Fertilization Rate	**CETIS Version:**	CETISv1.8.0
Analyzed: 19 Oct-11 14:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Echinoid Sperm Cell Fertilization Test — **Nautilus Environmental**

Analysis ID:	06-4242-7677	**Endpoint:**	Fertilization Rate	**CETIS Version:**	CETISv1.8.0
Analyzed:	26 Oct-11 12:30	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes

Batch ID:	19-8043-5122	**Test Type:**	Fertilization	**Analyst:**	
Start Date:	14 Sep-11 17:45	**Protocol:**	EC/EPS 1/RM/27	**Diluent:**	Natural seawater
Ending Date:	14 Sep-11 18:05	**Species:**	Dendraster excentricus	**Brine:**	
Duration:	20m	**Source:**	MREP	**Age:**	

Sample ID:	17-7735-6802	**Code:**	11401	**Client:**	Azimuth
Sample Date:	07 Sep-11	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	12 Sep-11	**Source:**	Azimuth		
Sample Age:	7d 18h	**Station:**			

Data Transform	Zeta	Alt Hyp	MC Trials	Test Result
Untransformed		C > T	Not Run	Sample passes fertilization rate endpoint

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	Decision(0.05)
Negative Control		Brine Reagent	0.05912	0.0591	Non-Significant Effect

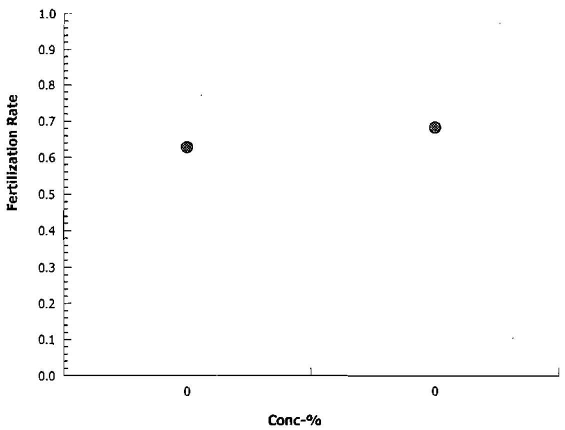
Data Summary

Conc-%	Control Type	No-Resp	Resp	Total
0	Brine Reagent	251	149	400
0	Negative Contr	273	127	400

Fertilization Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Brine Reagent	0.62	0.61	0.6	0.68
0	Negative Control	0.72	0.6	0.68	0.73

Graphics



APPENDIX E - *Champia parvula* **toxicty test data**

AquaTox Testing & Consulting Inc.
11B Nicholas Beaver Rd.
RR 3
Guelph ON N1H 6H9
Tel: (519) 763-4412 Fax: (519) 763-4419

Work Order : 219871
Sample Number : 31804

SAMPLE IDENTIFICATION

Company :	Nautilus Environmental		
Location :	Victoria BC	Date Collected :	2011-09-07
Substance :	Polaris Champia Sample	Time Collected :	11:30
Sampling Method :	Grab	Date Received :	2011-09-13
Sampled By :	C. Kidd	Time Received :	14:30
Temp. on arrival :	8.0°C	Date Tested :	2011-09-14
Sample Description :	Clear, colourless, odourless.		

Test Method : Test of Sexual Reproduction using the Red Macroalga *Champia parvula*. EPA-821-R-02-014, October 2002, Method 1009.0, with Canadian adaptations (Environment Canada 1998, 1999), with deviation(s) as noted below.

TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	42.9%	33.6-45.8	Linear Interpolation (CETIS) a

The results reported relate only to the sample tested.

SODIUM DODECYL SULPHATE (SDS) REFERENCE TOXICANT DATA

Date Tested :	2011-09-14	Statistical Method :	Linear Interpolation (CETIS)[a]
Organism Batch :	Cp11-09	Historical Mean IC25 :	0.100 mg/L
Test Duration :	48 hrs exposure, 7 days recovery	Warning Limits (± 2SD) :	0.072 - 0.138 mg/L
IC25 (Reproduction) :	0.097 mg/L	Analyst(s) :	VC/EJ
95% Confidence Limits :	0.077 - 0.106 mg/L		

The reference toxicity test was performed under the same experimental conditions as those used with the test sample

TEST CONDITIONS

Test Organism :	*Champia parvula*	Test Type :	Static
Organism Batch :	Cp11-09	Sample Filtration :	None
Test Organism Source :	In-house culture	Control/Dilution Water :	Natural seawater (no chemicals added)
Life Stage :	Sexually mature	Control/Dilution Water Source :	Pointe-du-Chene, Shediac Bay NB
Mean Culture Mortality :	0 % (previous 7 days)	Concentrations Tested :	5 (minimum), Control and Salt Control
Males per Test Chamber :	2 (having sori with spermatia)	Replicates per Concentration :	3
Females per Test Chamber :	5 (having trichogynes)	Volume per Replicate :	100 mL
pH Adjustment :	None	Test Chamber :	240 mL polystyrene cup
Exposure Duration :	48 hours	Depth of Test Solution :	5.0 cm
Aeration during Exposure :	None	Photoperiod (h) :	16 light / 8 dark
Recovery Duration :	7 days	Light Intensity :	907 - 1128 lux
Aeration during Recovery :	Yes; ≤ 100 bubbles/min	Test Method Deviation(s) :	See 'Comments'

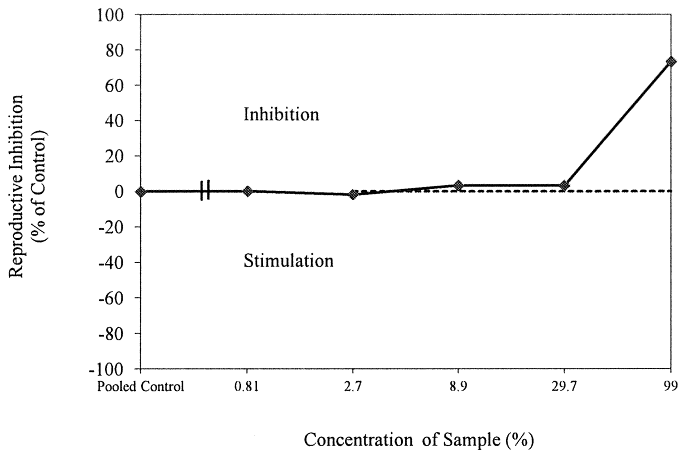
COMMENTS

Noted Deviation(s): Due to a system malfunction on 2011-09-22, the test temperature exceeded the acceptable range of 23± 1 °C as required by the test method. There were no additional deviations from the test method. Since all test validity criteria were satisfied, this deviation is not considered to have had a significant impact on the test outcome, and the test is considered to be valid. The maximum holding time of 3 days was exceeded. The sample was not received at the laboratory within the 3-day holding time, test was initiated as per clients request.

- No organisms appearing unhealthy, discoloured, or otherwise stressed, or undergoing unusual treatment, were used in the test
- All test validity criteria as specified in the test method cited above were satisfied
- No significant difference (α=0.05) between controls was detected by Equal Variance t Two Sample Test (CETIS)[a]. Therefore, controls were pooled prior to statistical analysis of the test endpoint(s).
- Maximum effluent concentration tested was 99% due to the addition of nutrient stocks to the 100% effluent
- This report is based on the Environment Canada Guidance Document: Report Assessment Checklist for the Pulp and Paper and Metal Mining EEM Programs, April 2005.

Work Order : 219871
Sample Number : 31804

Champia parvula Reproductive Inhibition



SALINITY ADJUSTMENT

Method : Direct Salt Addition
Salt Added : Instant Ocean™
Aging Conditions : 4±2°C, sealed in complete darkness, with minimal air space
Reference : Salinity Adjustment Guidance Document. Environment Canada, revised December 2001.

Date	Initial Salinity (‰)	Initial pH	Volume Adjusted (L)	Amount of Salt Added (g)	Salinity After Adjustment (‰)	pH After Salinity Adjustment	Analyst(s)	Aging Time (h)
2011-09-13	10	7.9	1.0	22	30	7.9	VC	17.2

REFERENCES

[a] CETIS, © 2001-2007. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, McKinleyville, Calif. 95519 [Program on disk and printed User's Guide].

Date: 2011-10-07
yyyy-mm-dd

Approved By : [signature]
Project Manager

Work Order : 219871
Sample Number : 31804

Cystocarp Counts at Test Termination

Initiated By : EJ
Initiation Date : 2011-09-14
Terminated By : EJ
Termination Date : 2011-09-23

Concentration (%)	Replicate	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Replicate Mean	Treatment Mean	Standard Deviation	CV (%)
Control	A	41	55	56	41	32	45.0			
	B	36	43	48	23	40	38.0[1]	43.6	5.0	11.6
	C	51	23	53	63	49	47.8			
Salt Control*	A	43	50	38	54	56	48.2			
	B	44	41	49	35	59	45.6	49.3	4.4	8.9
	C	65	46	56	59	45	54.2			
0.81	A	62	47	33	29	65	47.2			
	B	39	41	55	58	44	47.4	46.4	1.6	8.9
	C	32	50	47	38	56	44.6			
2.7	A	70	59	55	40	51	55.0			
	B	37	44	32	35	67	43.0	47.3	6.7	3.4
	C	52	26	45	38	59	44.0			
8.9	A	36	27	43	49	55	42.0			
	B	62	39	48	51	31	46.2	44.9	2.5	14.1
	C	37	64	39	46	47	46.6			
29.7	A	53	39	33	45	63	46.6			
	B	43	51	35	48	46	44.6	45.0	1.4	5.7
	C	38	45	46	51	39	43.8			
99	A	9	11	10	13	15	11.6			
	B	12	16	13	12	14	13.4	12.3	1.0	3.2
	C	8	8	15	15	13	11.8			

"–" = not counted/not required

*'Salt Control' is a control prepared by Direct Salt Addition with Instant Ocean™ according to: Salinity Adjustment Guidance Document (2001). Environment Canada, revised December 2001.

[1] Outlier according to Grubbs Test (CETIS)[a]. Test data were analyzed with outlier(s) both included and excluded. The outlier(s) was included in calculation of the final result since exclusion had little effect on the final test outcome.

Cumulative Plant Mortality

Observation Period

Concentration (%)	♂ 0 Hours Number Dead	♂ 0 Hours Mortality (%)	♀ 0 Hours Number Dead	♀ 0 Hours Mortality (%)	♂ 48 Hours Number Dead	♂ 48 Hours Mortality (%)	♀ 48 Hours Number Dead	♀ 48 Hours Mortality (%)	♀ Test Completion Number Dead	♀ Test Completion Mortality (%)
Control	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Salt Control*	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
0.81	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
8.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
29.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
99	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Test Data Reviewed By: SM

Date: 2011-09-27

Work Order : 219871
Sample Number: 31804

WATER CHEMISTRY DATA

Initial Water Chemistry (100% Sample)

	Temperature (°C)	pH	Dissolved O_2 (mg/L)	O_2 Saturation (%)*	Salinity (‰)	Pre-aeration Time (h)[2]
Initial Chemistry :	23.0	8.0	9.7	121	10	–
Chemistry after Salinity Adjustment[1]:	22.0	7.8	8.5	121	30	–
Chemistry after Pre-Aeration[2]:	23.0	7.9	7.1	100	30	1:00

Exposure Period Water Chemistry

0 hours

Date & Time : 2011-09-14 10:30
Analyst(s) : VC

Conc.(%)	pH	D.O. (mg/L)	O_2 Sat. (%)*	Salinity (‰)	Temp. (°C)
99	7.9	7.0	100	30	23.0
29.7	7.7	7.0	100	30	23.0
8.9	7.6	7.0	100	30	23.0
2.7	7.5	7.0	100	30	23.0
0.81	7.5	6.9	99	30	23.0
Salt Control	7.7	6.9	99	30	23.0
Control	7.5	7.0	100	30	23.0

48 hours

Date & Time : 2011-09-16 10:30
Analyst(s) : EJ

Conc.(%)	pH	D.O. (mg/L)	O_2 Sat. (%)*	Salinity (‰)	Temp. (°C)
99	9.1	7.2	105	30	24.0
29.7	9.0	7.3	106	30	24.0
8.9	8.8	7.3	106	30	24.0
2.7	8.9	7.2	105	30	24.0
0.81	9.0	7.3	107	30	24.0
Salt Control	9.0	7.3	105	30	24.0
Control	9.0	7.3	106	30	24.0

Recovery Period Water Chemistry

0 hours

Date & Time : 2011-09-16 10:30
Analyst(s) : EJ

Conc.(%)	pH	D.O. (mg/L)	O_2 Sat. (%)*	Salinity (‰)	Temp. (°C)
99	7.8	6.9	100	30	23.0
29.7	7.8	6.9	100	30	23.0
8.9	7.8	6.9	100	30	23.0
2.7	7.8	6.9	100	30	23.0
0.81	7.8	6.9	100	30	23.0
Salt Control	7.8	6.9	100	30	23.0
Control	7.8	6.9	100	30	23.0

Test Completion

Date & Time : 2011-09-23 14:00
Analyst(s) : EJ

Conc.(%)	pH	D.O. (mg/L)	O_2 Sat. (%)*	Salinity (‰)	Temp. (°C)
99	8.7	7.1	102	30	24.0
29.7	8.8	7.4	107	30	24.0
8.9	8.5	6.9	101	30	24.0
2.7	8.7	7.2	103	30	24.0
0.81	8.5	6.9	100	30	24.0
Salt Control	8.6	7.1	102	30	24.0
Control	8.5	6.6	94	30	24.0

Daily Temperature Monitoring

Date	Temp. (°C)	Analyst(s)
2011-09-14	23.0	VC
2011-09-15	24.0	EJ
2011-09-16	24.0	EJ
2011-09-17	24.0	RD
2011-09-18	24.0	RD
2011-09-19	22.0	VC
2011-09-20	23.0	EJ
2011-09-21	23.0	EJ
2011-09-22	23.0	VC
2011-09-23	24.0	EJ

[1] if applicable

[2] @ <100 bubbles/min

* adjusted for barometric pressure

APPENDIX F - Chain of Custody Form

Nautilus Environmental

TESTING LOCATION

Chain of Custody

British Columbia
8664 Commerce Court
Burnaby, British Columbia, Canada V5A 4N3
Phone 604.420.8773
Fax 604.357.1361

Date 07/09/11 Page 1 of 1

Sample Collection By:

Report to:

Company	Azimuth Consulting Group, Inc.
Address	218-2902 West Broadway
City/State/Zip	Vancouver, BC, V6K 2G8
Contact	Cheryl Mackintosh/ Randy Baker
Phone	604-730-1220
Email	cmackintosh@azimuthgroup.ca

Invoice To:

Company	same as report
Address	
City/State/Zip	
Contact	
Phone	
Email	

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	96hr rainbow trout LC50	48hr Daphnia magna LC50	Echino Fert	7-d Topsmelt							Receipt Temperature (°C)
1	GC-070911	~~2010-~~ 07/09/11	11:30am	Seawater	20 L carboy	2		X	X	X	X							8.9
2					~~2 L plastic~~	~~2~~	(extra water - same sample as above)											
3					1L plastic	2	"	WO # 11399	WO # 11400	WO # 11401	WO # 11402							
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:	Teck (Polaris)	Total No. of Containers	
PO No.:	TC-10-01	Received Good Condition?	
Shipped Via:	First Air/Air Canada	Matches Test Schedule?	

RELINQUISHED BY (CLIENT)

(Signature) Curtis Kidd (Time) 3:00pm
(Printed Name) CURTIS KIDD (Date) Sept. 7/11
(Company) TECK

RELINQUISHED BY (COURIER)

(Signature) (Time)
(Printed Name) (Date)
(Company)

SPECIAL INSTRUCTIONS/COMMENTS:

RECEIVED BY (COURIER)

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)

(Signature) [signature] (Time) 1135
(Printed Name) John T. (Date) Sept 12/11
(Company) Nautilus Env.

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

APPENDIX 3

Garrow Lake Water Column

Minimum Ice Conditions

Hydrolab Data

(September 2nd 2011)

TABLE 1

2011 HYDROLAB RESULTS - GARROW LAKE - SEPTEMBER 2nd

STATION 262-3 (Centre Station)

Depth	Centre Station - Temp (^{0}C)	DO (mg/L)	Centre Station - Cond (mS/cm)	pH	Redox (mV)	Comments
0	4.88	12.07	13.63	9.01	312	
1	4.88	12.01	13.65	9.02	311	
2	4.86	11.95	13.65	9.02	311	
3	4.86	11.92	13.65	9.02	311	
4	4.86	11.89	13.65	9.03	309	
5	4.86	11.75	13.65	9.06	305	
6	4.86	11.72	13.65	9.07	303	
7	4.86	11.69	13.65	9.08	302	
8	4.88	11.71	13.66	9.08	301	
9	5.57	12.15	17.2	8.91	304	
9.5	5.92	5.99	29.4	8.28	311	
10	6.68	2.69	62.5	8.15	312	
10.5	7.25	1.46	78.5	8.21	304	
11	7.77	2.06	86.9	8.24	297	
12	8.04	2.2	88.4	8.24	292	
13	8.23	0.4	89.3	8.2	285	
14	7.87	0.22	90	8.25	188	
15	7.20	0.19	90.4	8.28	158	
16	6.82	0.14	90.3	8.3	136	
17	6.58	0.13	90.6	8.31	129	
18	6.48	0.12	90.5	8.32	124	
19	6.45	0.12	90.5	8.32	80	
20	6.43	0.11	90.5	8.32	0	
22	6.41	0.11	90.5	8.33	-20	
30	6.63	0.09	90.6	8.27	-115	
38	7.32	0.09	91.9	8.09	-152	

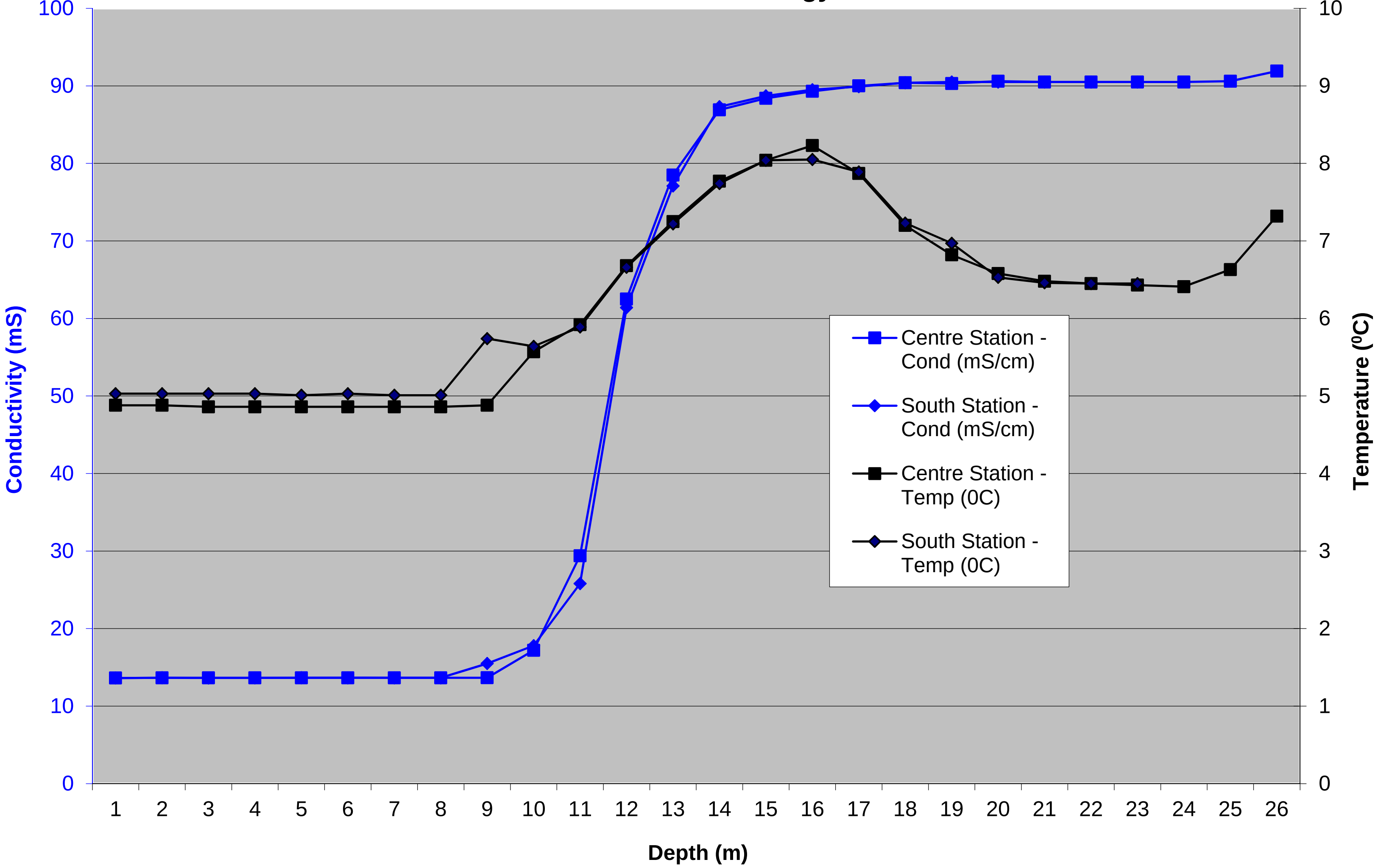
TABLE 2

2011 HYDROLAB RESULTS - GARROW LAKE - SEPTEMBER 2nd

STATION 262-3A (South Station)

Depth	South Station - Temp (^{0}C)	DO (mg/L)	South Station - Cond (mS/cm)	pH	Redox (mV)	Comments
0	5.03	11.92	13.63	9.15	203	
1	5.03	11.89	13.66	9.16	201	
2	5.03	11.79	13.63	9.16	199	
3	5.03	11.75	13.65	9.16	198	
4	5.01	11.68	13.66	9.17	196	
5	5.03	11.61	13.65	9.17	195	
6	5.01	11.57	13.65	9.17	194	
7	5.01	11.56	13.65	9.18	194	
8	5.74	13.35	15.5	9.09	196	
9	5.64	13	17.8	8.99	199	
9.5	5.89	7.8	25.8	8.53	208	
10	6.66	2.5	61.4	8.22	211	
10.5	7.22	1.97	77.1	8.27	207	
11	7.74	2.44	87.3	8.3	202	
12	8.04	2.44	88.7	8.3	197	
13	8.05	0.94	89.5	8.27	191	
14	7.89	0.45	89.9	8.27	189	
15	7.23	0.27	90.4	8.29	165	
16	6.97	0.2	90.5	8.31	137	
17	6.53	0.18	90.5	8.32	127	
18	6.46	0.17	90.5	8.32	69	
19	6.45	0.16	90.5	8.32	20	
20	6.45	0.15	90.5	8.32	-18	

Figure 1
Garrow Lake - September 2nd 2011
Centre Station (262-3) and South Station (262-3A) Stations
Minimum Ice Thickness Limnology



APPENDIX 4

Garrow Lake Water Column

Minimum Ice Conditions

Water Quality Data

(September 2nd 2011)

Success Through Science®

Your Project #: POLARIS MINE, GARROW LK
Your C.O.C. #: 08337517, 08337513

Attention: Randy Baker
AZIMUTH CONSULTING GROUP
218 - 2902 WEST BROADWAY
VANCOUVER, BC
CANADA V6K 2G8

Report Date: 2011/12/08
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B184425
Received: 2011/09/08, 11:00

Sample Matrix: Sea Water
Samples Received: 24

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	24	2011/09/10	2011/09/10	BBY6SOP-00026, BBY0SOP-00002	SM2320B
Chlorophyll A (water)(sin)	6	2011/09/22	2011/09/22	BBY6SOP-00002	SM-10200 H
Cyanide (Total)	4	N/A	2011/09/21	BBY6SOP-00004	SM4500-CN N
Conductance - water	24	N/A	2011/09/10	BBY6SOP-00026	SM-2510B
Hardness (calculated as CaCO3)	6	N/A	2011/09/23	BBY7SOP-00002	Calc
Heterotropic Plate Count (MF) in Water	6	N/A	2011/09/08	BBY4SOP-00003	Based on APHA 9215
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	6	N/A	2011/09/23	BBY7SOP-00002	EPA 200.8
Elements by ICPMS (dissolved) - Seawater	6	N/A	2011/09/23	BBY7SOP-00002	EPA 200.8
Na, K, Ca, Mg, S by CRC ICPMS (total)	24	N/A	2011/09/15	BBY7SOP-00002	EPA 200.8
Metals by Chelation CRC ICPMS (tot)	24	N/A	2011/09/22	BBY7SOP-00002	EPA 200.8
Elements by CRC ICPMS (total) - Seawater	24	N/A	2011/09/15	BBY7SOP-00002	EPA 200.8
Filter and HNO3 Preserve for Metals	6	N/A	2011/09/09	BBY6WI-00001	EPA 200.2
pH Water	24	N/A	2011/09/10	BBY6SOP-00026	SM-4500H+B
Salinity by Conductivity Method	24	2011/09/10	2011/09/10	BBY6SOP-00026	SMAA 2520B
Sulphide	6	N/A	2011/09/12	BBY6SOP-00006	SM-4500 S2D
Total Suspended Solids-LowLevel	24	N/A	2011/09/10	BBY6SOP-00034	SM-2540 D

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

TABITHA RUDKIN, Project Manager
Email: TRudkin@maxxam.ca
Phone# (604) 638-2639

==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B184425
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: POLARIS MINE, GARROW LK

RESULTS OF CHEMICAL ANALYSES OF SEA WATER

Maxxam ID		BL9561	BL9562	BL9563		BL9564	BL9565	BL9566		BL9567		
Sampling Date		2011/09/02	2011/09/02	2011/09/02		2011/09/02	2011/09/02	2011/09/02		2011/09/02		
	Units	**GLC 0M**	**GLC 1M**	**GLC 2M**	**QC Batch**	**GLC 3M**	**GLC 4M**	**GLC 5M**	**QC Batch**	**GLC 6M**	**RDL**	**QC Batch**
Parameter												
Chlorophyll a	ug/L					0.70			5200723		0.50	
Calculated Parameters												
Filter and HNO3 Preservation	N/A					LAB			5162291		N/A	
Misc. Inorganics												
Cyanide + Thiocyanate	mg/L			0.00107	5200502	<0.00050		<0.00050	5196432		0.00050	
Dissolved Hardness (CaCO3)	mg/L					1530			5156208		0.5	
Salinity	g/L	7.85	7.84	7.90	5164670	7.84	7.91	7.91	5164670	7.74	0.010	5164711
Alkalinity (Total as CaCO3)	mg/L	113	112	114	5164660	112	113	113	5164660	111	0.50	5164699
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	5164660	<0.50	<0.50	<0.50	5164660	<0.50	0.50	5164699
Bicarbonate (HCO3)	mg/L	138	136	139	5164660	136	138	138	5164660	135	0.50	5164699
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	5164660	<0.50	<0.50	<0.50	5164660	<0.50	0.50	5164699
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	5164660	<0.50	<0.50	<0.50	5164660	<0.50	0.50	5164699
MISCELLANEOUS												
Sulphide	mg/L									<0.0050(1)	0.0050	5166528
Physical Properties												
Conductivity	uS/cm	13400	13400	13500	5164668	13400	13500	13500	5164668	13100	1.0	5164709
pH	pH Units	8.09	8.03	8.14	5164669	8.03	8.12	8.12	5164669	8.12		5164710
Physical Properties												
Total Suspended Solids	mg/L	1.2(2)	2.2(2)	2.6(2)	5162924	1.8(2)	2.2(2)	2.1(2)	5162924	3.0(2)	1.0	5162924

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time
(2) - Sample was analyzed after hold time expired

Success Through Science®

Maxxam Job #: B184425
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: POLARIS MINE, GARROW LK

RESULTS OF CHEMICAL ANALYSES OF SEA WATER

Maxxam ID		BL9568	BL9569	BL9570	BL9570	BL9571	BL9572	BL9605	BL9606	BL9607		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 7M**	**GLC 8M**	**GLC 9M**	**GLC 9M Lab-Dup**	**GLC 10M**	**GLC 11M**	**GLC 12M**	**GLC 13M**	**GLC 14M**	**RDL**	**QC Batch**
Parameter												
Chlorophyll a	ug/L	0.66		<0.50		<0.50	<0.50				0.50	5200723
Calculated Parameters												
Filter and HNO3 Preservation	N/A	LAB		LAB		LAB	LAB				N/A	5162291
Misc. Inorganics												
Cyanide + Thiocyanate	mg/L					0.00177					0.00050	5196432
Dissolved Hardness (CaCO3)	mg/L	1580		1810		3050	11300				0.5	5156208
Salinity	g/L	7.86	7.84	9.19		16.2	60.1(1)	64.0(1)	64.7(1)	64.7(1)	0.010	5164670
Alkalinity (Total as CaCO3)	mg/L	111	112	127	127	147	383	404	403	411	0.50	5164660
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Bicarbonate (HCO3)	mg/L	136	137	155	155	179	467	493	492	501	0.50	5164660
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
MISCELLANEOUS												
Sulphide	mg/L									0.0086(2)	0.0050	5166528
Physical Properties												
Conductivity	uS/cm	13400	13400	15500	15500	26100	83600	88200	89000	89000	1.0	5164668
pH	pH Units	8.07	8.08	7.99	8.07	7.96	7.92	7.90	7.85	7.84		5164669
Physical Properties												
Total Suspended Solids	mg/L	1.3(3)	1.5(3)	1.5(3)		8.0(3)	12.9(3)	13.5(3)	15.0(3)	12.3(3)	1.0	5162924

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample salinity value outside salinity calibration range of 0.01 to 35 grams per liter.
(2) - Sample received at less than recommended preservation pH 9.
Sample analysed past recommended hold time
(3) - Sample was analyzed after hold time expired

Maxxam

Success Through Science®

AZIMUTH CONSULTING GROUP
Client Project #: POLARIS MINE, GARROW LK

Maxxam Job #: B184425
Report Date: 2011/12/08

RESULTS OF CHEMICAL ANALYSES OF SEA WATER

Maxxam ID		BL9608		BL9609	BL9609	BL9610	BL9611	BL9612	BL9613		
Sampling Date		2011/09/02		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 15M**	**QC Batch**	**GLC 16M**	**GLC 16M Lab-Dup**	**GLC 17M**	**GLC 18M**	**GLC 19M**	**GLC 20M**	**RDL**	**QC Batch**
Parameter											
Chlorophyll a	ug/L	5.72	5200723							0.50	
Calculated Parameters											
Filter and HNO3 Preservation	N/A	LAB	5162291							N/A	
Misc. Inorganics											
Dissolved Hardness (CaCO3)	mg/L	11600	5156208							0.5	
Salinity	g/L	64.9 (1)	5164670	64.8	64.9	65.1	64.5	64.8 (2)	64.8	0.010	5164711
Alkalinity (Total as CaCO3)	mg/L	416	5164660	412	415	409	406	412	404	0.50	5164699
Alkalinity (PP as CaCO3)	mg/L	<0.50	5164660	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164699
Bicarbonate (HCO3)	mg/L	507	5164660	503	506	499	495	503	493	0.50	5164699
Carbonate (CO3)	mg/L	<0.50	5164660	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164699
Hydroxide (OH)	mg/L	<0.50	5164660	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164699
MISCELLANEOUS											
Sulphide	mg/L		5166528						0.107 (3)	0.0050	5166528
Physical Properties											
Conductivity	uS/cm	89200	5164668	89800	89900	90100	87900	89800	88500	1.0	5164709
pH	pH Units	7.88	5164669	7.84	7.83	7.80	7.85	7.85	7.79		5164710
Physical Properties											
Total Suspended Solids	mg/L	21.2 (4)	5162924	13.6 (4)		10.7 (4)	18.7 (4)	16.9 (4)	15.0 (4)	1.0	5162924

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) - Sample salinity value outside salinity calibration range of 0.01 to 35 grams per liter.
(2) - Result exceeds 35g/L salinity.
(3) - Sample received at less than recommended preservation pH 9.
Sample analysed past recommended hold time
(4) - Sample was analyzed after hold time expired

RESULTS OF CHEMICAL ANALYSES OF SEA WATER

Maxxam ID		BL9614			BL9615	BL9616	BL9616		
Sampling Date		2011/09/02			2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 22M**	**RDL**	**QC Batch**	**GLC 30M**	**GLC 38M**	**GLC 38M Lab-Dup**	**RDL**	**QC Batch**
Misc. Inorganics									
Salinity	g/L	63.7 (1)	0.010	5164670	64.8	66.2	66.2	0.010	5164711
Alkalinity (Total as CaCO3)	mg/L	410	0.50	5164660	406	394	397	0.50	5164699
Alkalinity (PP as CaCO3)	mg/L	<0.50	0.50	5164660	<0.50	<0.50	<0.50	0.50	5164699
Bicarbonate (HCO3)	mg/L	501	0.50	5164660	496	481	485	0.50	5164699
Carbonate (CO3)	mg/L	<0.50	0.50	5164660	<0.50	<0.50	<0.50	0.50	5164699
Hydroxide (OH)	mg/L	<0.50	0.50	5164660	<0.50	<0.50	<0.50	0.50	5164699
MISCELLANEOUS									
Sulphide	mg/L	0.150 (2)	0.0050	5166528	1.70 (2)	1.24 (2)		0.050	5166528
Physical Properties									
Conductivity	uS/cm	87900	1.0	5164668	88400	89800	90000	1.0	5164709
pH	pH Units	7.76		5164669	7.83	7.78	7.79		5164710
Physical Properties									
Total Suspended Solids	mg/L	13.4 (3)	1.0	5162924	16.5 (3)	2480 (3)		1.0	5162924

RDL = Reportable Detection Limit
(1) - Sample salinity value outside salinity calibration range of 0.01 to 35 grams per liter.
(2) - Sample received at less than recommended preservation pH 9.
Sample analysed past recommended hold time
(3) - Sample was analyzed after hold time expired

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9561	BL9561	BL9562	BL9563	BL9564	BL9564	BL9565	BL9566	BL9567	BL9568		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 0M**	**GLC 0M Lab-Dup**	**GLC 1M**	**GLC 2M**	**GLC 3M**	**GLC 3M Lab-Dup**	**GLC 4M**	**GLC 5M**	**GLC 6M**	**GLC 7M**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS													
Dissolved Aluminum (Al)	ug/L					<10	<10				<10	10	5197086
Dissolved Antimony (Sb)	ug/L					<0.5	<0.5				<0.5	0.5	5197086
Dissolved Arsenic (As)	ug/L					<0.5	<0.5				<0.5	0.5	5197086
Dissolved Barium (Ba)	ug/L					71	72				71	1	5197086
Dissolved Beryllium (Be)	ug/L					<1	<1				<1	1	5197086
Dissolved Bismuth (Bi)	ug/L					<1	<1				<1	1	5197086
Dissolved Boron (B)	ug/L					775	775				788	50	5197086
Dissolved Cadmium (Cd)	ug/L					0.32	0.26				0.29	0.05	5197086
Dissolved Chromium (Cr)	ug/L					<0.5	<0.5				<0.5	0.5	5197086
Dissolved Cobalt (Co)	ug/L					<0.1	<0.1				<0.1	0.1	5197086
Dissolved Copper (Cu)	ug/L					0.7	0.7				0.6	0.5	5197086
Dissolved Iron (Fe)	ug/L					<2	<2				<2	2	5197086
Dissolved Lead (Pb)	ug/L					<0.1	<0.1				<0.1	0.1	5197086
Dissolved Lithium (Li)	ug/L					65	67				67	20	5197086
Dissolved Manganese (Mn)	ug/L					4.3	4.3				4.5	0.5	5197086
Dissolved Molybdenum (Mo)	ug/L					2	2				2	1	5197086
Dissolved Nickel (Ni)	ug/L					4.0	4.0				3.7	0.2	5197086
Dissolved Phosphorus (P)	ug/L					<50	<50				<50	50	5197086
Dissolved Selenium (Se)	ug/L					<0.5	<0.5				<0.5	0.5	5197086
Dissolved Silicon (Si)	ug/L					524	532				551	100	5197086
Dissolved Silver (Ag)	ug/L					<0.05	<0.05				<0.05	0.05	5197086
Dissolved Strontium (Sr)	ug/L					2530	2530				2550	10	5197086
Dissolved Thallium (Tl)	ug/L					<0.1	<0.1				<0.1	0.1	5197086
Dissolved Tin (Sn)	ug/L					<1	<1				<1	1	5197086
Dissolved Titanium (Ti)	ug/L					<10	<10				<10	10	5197086
Dissolved Uranium (U)	ug/L					0.13	0.13				0.09	0.05	5197086
Dissolved Vanadium (V)	ug/L					<10	<10				<10	10	5197086
Dissolved Zinc (Zn)	ug/L					102	101				107	1	5197086
Dissolved Calcium (Ca)	mg/L					134					138	1	5159450
Dissolved Magnesium (Mg)	mg/L					290					299	1	5159450
Dissolved Potassium (K)	mg/L					67					68	1	5159450
Dissolved Sodium (Na)	mg/L					2100					2150	1	5159450
Dissolved Sulphur (S)	mg/L					224					224	20	5159450

RDL = Reportable Detection Limit

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9561	BL9561	BL9562	BL9563	BL9564	BL9564	BL9565	BL9566	BL9567	BL9568		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 0M**	**GLC 0M Lab-Dup**	**GLC 1M**	**GLC 2M**	**GLC 3M**	**GLC 3M Lab-Dup**	**GLC 4M**	**GLC 5M**	**GLC 6M**	**GLC 7M**	**RDL**	**QC Batch**
Total Metals by ICPMS													
Total Aluminum (Al)	ug/L	10		<10	<10	<10		<10	<10	<10	<10	10	5171027
Total Antimony (Sb)	ug/L	<0.5		<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	0.5	5171027
Total Arsenic (As)	ug/L	<0.5		<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	0.5	5171027
Total Barium (Ba)	ug/L	68		71	69	69		70	70	68	70	1	5171027
Total Beryllium (Be)	ug/L	<1		<1	<1	<1		<1	<1	<1	<1	1	5171027
Total Bismuth (Bi)	ug/L	<1		<1	<1	<1		<1	<1	<1	<1	1	5171027
Total Boron (B)	ug/L	886		871	855	858		844	857	833	826	50	5171027
Total Cadmium (Cd)	ug/L	0.45	0.47	0.46	0.47	0.46		0.47	0.46	0.48	0.47	0.01	5195712
Total Chromium (Cr)	ug/L	<0.5		0.5	0.7	<0.5		<0.5	<0.5	<0.5	<0.5	0.5	5171027
Total Cobalt (Co)	ug/L	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	0.05	5195712
Total Copper (Cu)	ug/L	1.18	1.18	0.85	0.85	0.93		0.83	0.89	0.90	0.85	0.05	5195712
Total Iron (Fe)	ug/L	11	12	11	13	11		12	11	11	11	1	5195712
Total Lead (Pb)	ug/L	0.33	0.33	0.43	0.22	0.27		0.17	0.18	0.18	0.23	0.05	5195712
Total Lithium (Li)	ug/L	71		73	72	72		73	74	72	72	20	5171027
Total Manganese (Mn)	ug/L	4.7	4.6	4.6	4.7	4.9		4.8	4.6	4.7	4.6	0.2	5195712
Total Mercury (Hg)	ug/L	<0.3		<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	0.3	5171027
Total Nickel (Ni)	ug/L	4.10	4.10	4.04	4.06	4.12		4.07	4.09	4.30	4.03	0.05	5195712
Total Molybdenum (Mo)	ug/L	2		2	2	2		2	2	2	2	1	5171027
Total Phosphorus (P)	ug/L	<50		<50	<50	<50		<50	<50	<50	<50	50	5171027
Total Selenium (Se)	ug/L	<0.5		<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	0.5	5171027
Total Silicon (Si)	ug/L	501		560	543	543		509	508	512	497	100	5171027
Total Silver (Ag)	ug/L	<0.05		<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	0.05	5171027
Total Strontium (Sr)	ug/L	2400		2430	2410	2420		2430	2430	2450	2440	10	5171027
Total Thallium (Tl)	ug/L	<0.1		<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	0.1	5171027
Total Tin (Sn)	ug/L	<1		<1	<1	<1		<1	<1	<1	<1	1	5171027
Total Titanium (Ti)	ug/L	<10		<10	<10	<10		<10	<10	<10	<10	10	5171027
Total Zinc (Zn)	ug/L	185	185	178	187	186		187	181	192	180	0.5	5195712
Total Uranium (U)	ug/L	0.81		0.80	0.79	0.80		0.81	0.81	0.81	0.78	0.05	5171027
Total Vanadium (V)	ug/L	<10		<10	<10	<10		<10	<10	<10	<10	10	5171027
Total Calcium (Ca)	mg/L	129		132	137	136		128	127	130	128	1	5158247
Total Magnesium (Mg)	mg/L	268		271	272	270		273	270	274	273	1	5158247
Total Potassium (K)	mg/L	65		66	66	65		66	64	65	65	1	5158247
Total Sodium (Na)	mg/L	1800		1820	1820	1810		1840	1830	1870	1870	1	5158247
Total Sulphur (S)	mg/L	224		226	222	220		221	215	220	221	20	5158247

RDL = Reportable Detection Limit

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9569	BL9570	BL9571		BL9572	BL9605	BL9606	BL9607		
Sampling Date		2011/09/02	2011/09/02	2011/09/02		2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 8M**	**GLC 9M**	**GLC 10M**	**RDL**	**GLC 11M**	**GLC 12M**	**GLC 13M**	**GLC 14M**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS											
Dissolved Aluminum (Al)	ug/L		<10	<10	10	<20				20	5197086
Dissolved Antimony (Sb)	ug/L		<0.5	<0.5	0.5	<1				1	5197086
Dissolved Arsenic (As)	ug/L		<0.5	<0.5	0.5	<1				1	5197086
Dissolved Barium (Ba)	ug/L		81	81	1	48				2	5197086
Dissolved Beryllium (Be)	ug/L		<1	<1	1	<2				2	5197086
Dissolved Bismuth (Bi)	ug/L		<1	<1	1	<2				2	5197086
Dissolved Boron (B)	ug/L		909	1700	50	6230				100	5197086
Dissolved Cadmium (Cd)	ug/L		0.38	0.64	0.05	0.2				0.1	5197086
Dissolved Chromium (Cr)	ug/L		<0.5	<0.5	0.5	<1				1	5197086
Dissolved Cobalt (Co)	ug/L		<0.1	<0.1	0.1	2.0				0.2	5197086
Dissolved Copper (Cu)	ug/L		0.8	1.2	0.5	<1				1	5197086
Dissolved Iron (Fe)	ug/L		<2	<2	2	<4				4	5197086
Dissolved Lead (Pb)	ug/L		<0.1	<0.1	0.1	<0.2				0.2	5197086
Dissolved Lithium (Li)	ug/L		78	127	20	418				40	5197086
Dissolved Manganese (Mn)	ug/L		4.3	18.6	0.5	167				1	5197086
Dissolved Molybdenum (Mo)	ug/L		3	3	1	5				2	5197086
Dissolved Nickel (Ni)	ug/L		4.6	5.3	0.2	7.7				0.4	5197086
Dissolved Phosphorus (P)	ug/L		<50	<50	50	<100				100	5197086
Dissolved Selenium (Se)	ug/L		<0.5	<0.5	0.5	2				1	5197086
Dissolved Silicon (Si)	ug/L		653	1630	100	11200				200	5197086
Dissolved Silver (Ag)	ug/L		<0.05	<0.05	0.05	<0.1				0.1	5197086
Dissolved Strontium (Sr)	ug/L		2960	5050	10	17700				20	5197086
Dissolved Thallium (Tl)	ug/L		<0.1	<0.1	0.1	<0.2				0.2	5197086
Dissolved Tin (Sn)	ug/L		<1	<1	1	<2				2	5197086
Dissolved Titanium (Ti)	ug/L		<10	<10	10	<20				20	5197086
Dissolved Uranium (U)	ug/L		0.14	0.20	0.05	1.8				0.1	5197086
Dissolved Vanadium (V)	ug/L		<10	<10	10	<20				20	5197086
Dissolved Zinc (Zn)	ug/L		114	221	1	43				2	5197086
Dissolved Calcium (Ca)	mg/L		153	233	1	778				2	5159450
Dissolved Magnesium (Mg)	mg/L		348	599	1	2280				2	5159450
Dissolved Potassium (K)	mg/L		80	140	1	499				2	5159450
Dissolved Sodium (Na)	mg/L		2510	4450	1	16500				2	5159450
Dissolved Sulphur (S)	mg/L		268	441	20	1760				40	5159450

RDL = Reportable Detection Limit

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9569	BL9570	BL9571		BL9572	BL9605	BL9606	BL9607		
Sampling Date		2011/09/02	2011/09/02	2011/09/02		2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 8M**	**GLC 9M**	**GLC 10M**	**RDL**	**GLC 11M**	**GLC 12M**	**GLC 13M**	**GLC 14M**	**RDL**	**QC Batch**
Total Metals by ICPMS											
Total Aluminum (Al)	ug/L	<10	<10	<10	10	<10	<10	<10	<10	10	5171027
Total Antimony (Sb)	ug/L	<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	<0.5	0.5	5171027
Total Arsenic (As)	ug/L	<0.5	<0.5	0.5	0.5	0.9	0.9	0.9	0.6	0.5	5171027
Total Barium (Ba)	ug/L	71	78	77	1	50	51	53	54	1	5171027
Total Beryllium (Be)	ug/L	<1	<1	<1	1	<1	<1	<1	<1	1	5171027
Total Bismuth (Bi)	ug/L	<1	<1	<1	1	<1	<1	<1	<1	1	5171027
Total Boron (B)	ug/L	828	938	1610	50	5770	6110	6180	6150	50	5171027
Total Cadmium (Cd)	ug/L	0.46	0.54	0.85	0.01	0.20	0.04	0.02	0.02	0.01	5195712
Total Chromium (Cr)	ug/L	0.5	<0.5	0.8	0.5	<0.5	0.5	0.9	1.3	0.5	5171027
Total Cobalt (Co)	ug/L	<0.05	<0.05	0.06	0.05	1.46	1.50	1.22	0.98	0.05	5195712
Total Copper (Cu)	ug/L	0.86	1.01	1.33	0.05	0.93	0.65	0.33	0.30	0.05	5195712
Total Iron (Fe)	ug/L	12	11	12	1	32	44	90	217	1	5195712
Total Lead (Pb)	ug/L	0.14	0.16	0.25	0.05	0.84	0.77	0.58	0.58	0.05	5195712
Total Lithium (Li)	ug/L	72	84	139	20	468	484	493	496	20	5171027
Total Manganese (Mn)	ug/L	4.8	4.9	20.3	0.2	153	142	127	121	0.2	5195712
Total Mercury (Hg)	ug/L	<0.3	<0.3	<0.3	0.3	<0.3	<0.3	<0.3	<0.3	0.3	5171027
Total Nickel (Ni)	ug/L	4.12	4.67	5.89	0.05	8.07	7.49	5.34	4.91	0.05	5195712
Total Molybdenum (Mo)	ug/L	2	2	3	1	5	5	5	4	1	5171027
Total Phosphorus (P)	ug/L	<50	<50	<50	50	<50	<50	<50	<50	50	5171027
Total Selenium (Se)	ug/L	<0.5	<0.5	<0.5	0.5	1.4	1.4	1.9	1.9	0.5	5171027
Total Silicon (Si)	ug/L	625	577	1430	100	8140	9000	9430	9250	100	5171027
Total Silver (Ag)	ug/L	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.05	5171027
Total Strontium (Sr)	ug/L	2460	2890	4960	10	18600	19300	19500	19200	10	5171027
Total Thallium (Tl)	ug/L	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	5171027
Total Tin (Sn)	ug/L	<1	<1	<1	1	<1	<1	<1	<1	1	5171027
Total Titanium (Ti)	ug/L	<10	<10	<10	10	<10	<10	<10	<10	10	5171027
Total Zinc (Zn)	ug/L	187	221	376	0.5	153	25.5	15.7	16.0	0.5	5195712
Total Uranium (U)	ug/L	0.83	0.94	1.26	0.05	5.00	5.60	5.71	5.90	0.05	5171027
Total Vanadium (V)	ug/L	<10	<10	<10	10	<10	<10	<10	<10	10	5171027
Total Calcium (Ca)	mg/L	124	143	224	1	704	751	751	733	1	5158247
Total Magnesium (Mg)	mg/L	278	333	573	1	2160	2270	2270	2270	1	5158247
Total Potassium (K)	mg/L	65	79	141	1	511	571	576	579	1	5158247
Total Sodium (Na)	mg/L	1900	2260	4030	1	13900	15000	15100	15100	1	5158247
Total Sulphur (S)	mg/L	221	270	442	20	1770	1790	1790	1760	20	5158247

RDL = Reportable Detection Limit

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9608	BL9608	BL9609	BL9610	BL9611	BL9612		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 15M**	**GLC 15M Lab-Dup**	**GLC 16M**	**GLC 17M**	**GLC 18M**	**GLC 19M**	**RDL**	**QC Batch**
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	ug/L	<20						20	5197086
Dissolved Antimony (Sb)	ug/L	<1						1	5197086
Dissolved Arsenic (As)	ug/L	<1						1	5197086
Dissolved Barium (Ba)	ug/L	53						2	5197086
Dissolved Beryllium (Be)	ug/L	<2						2	5197086
Dissolved Bismuth (Bi)	ug/L	<2						2	5197086
Dissolved Boron (B)	ug/L	6840						100	5197086
Dissolved Cadmium (Cd)	ug/L	<0.1						0.1	5197086
Dissolved Chromium (Cr)	ug/L	<1						1	5197086
Dissolved Cobalt (Co)	ug/L	1.1						0.2	5197086
Dissolved Copper (Cu)	ug/L	<1						1	5197086
Dissolved Iron (Fe)	ug/L	35						4	5197086
Dissolved Lead (Pb)	ug/L	<0.2						0.2	5197086
Dissolved Lithium (Li)	ug/L	444						40	5197086
Dissolved Manganese (Mn)	ug/L	123						1	5197086
Dissolved Molybdenum (Mo)	ug/L	4						2	5197086
Dissolved Nickel (Ni)	ug/L	3.2						0.4	5197086
Dissolved Phosphorus (P)	ug/L	<100						100	5197086
Dissolved Selenium (Se)	ug/L	2						1	5197086
Dissolved Silicon (Si)	ug/L	10800						200	5197086
Dissolved Silver (Ag)	ug/L	<0.1						0.1	5197086
Dissolved Strontium (Sr)	ug/L	18400						20	5197086
Dissolved Thallium (Tl)	ug/L	<0.2						0.2	5197086
Dissolved Tin (Sn)	ug/L	<2						2	5197086
Dissolved Titanium (Ti)	ug/L	<20						20	5197086
Dissolved Uranium (U)	ug/L	1.7						0.1	5197086
Dissolved Vanadium (V)	ug/L	<20						20	5197086
Dissolved Zinc (Zn)	ug/L	<2						2	5197086
Dissolved Calcium (Ca)	mg/L	741						2	5159450
Dissolved Magnesium (Mg)	mg/L	2380						2	5159450
Dissolved Potassium (K)	mg/L	568						2	5159450
Dissolved Sodium (Na)	mg/L	17800						2	5159450
Dissolved Sulphur (S)	mg/L	1750						40	5159450

RDL = Reportable Detection Limit

Maxxam Job #: B184425
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: POLARIS MINE, GARROW LK

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9608	BL9608	BL9609	BL9610	BL9611	BL9612		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 15M**	**GLC 15M Lab-Dup**	**GLC 16M**	**GLC 17M**	**GLC 18M**	**GLC 19M**	**RDL**	**QC Batch**
Total Metals by ICPMS									
Total Aluminum (Al)	ug/L	<10		<10	<10	<10	<10	10	5171027
Total Antimony (Sb)	ug/L	<0.5		<0.5	<0.5	<0.5	<0.5	0.5	5171027
Total Arsenic (As)	ug/L	0.6		0.7	0.7	0.6	0.6	0.5	5171027
Total Barium (Ba)	ug/L	54		56	54	54	54	1	5171027
Total Beryllium (Be)	ug/L	<1		<1	<1	<1	<1	1	5171027
Total Bismuth (Bi)	ug/L	<1		<1	<1	<1	<1	1	5171027
Total Boron (B)	ug/L	6160		6280	6220	6200	5980	50	5171027
Total Cadmium (Cd)	ug/L	0.02	0.01	<0.01	<0.01	<0.01	<0.01	0.01	5195727
Total Chromium (Cr)	ug/L	1.6		1.1	0.9	0.9	1.0	0.5	5171027
Total Cobalt (Co)	ug/L	0.81	0.81	0.77	0.70	0.71	0.73	0.05	5195727
Total Copper (Cu)	ug/L	0.29	0.36	0.24	0.27	0.25	0.26	0.05	5195727
Total Iron (Fe)	ug/L	555	539	418	408	399	390	1	5195727
Total Lead (Pb)	ug/L	0.55	0.55	0.42	0.45	0.43	0.33	0.05	5195727
Total Lithium (Li)	ug/L	490		502	498	494	475	20	5171027
Total Manganese (Mn)	ug/L	119	118	116	114	113	111	0.2	5195727
Total Mercury (Hg)	ug/L	<0.3		<0.3	<0.3	<0.3	<0.3	0.3	5171027
Total Nickel (Ni)	ug/L	4.17	4.24	4.10	3.91	3.79	3.83	0.05	5195727
Total Molybdenum (Mo)	ug/L	4		4	4	4	4	1	5171027
Total Phosphorus (P)	ug/L	<50		<50	<50	<50	<50	50	5171027
Total Selenium (Se)	ug/L	2.0		2.2	2.1	2.6	2.1	0.5	5171027
Total Silicon (Si)	ug/L	9920		9550	9690	9220	9700	100	5171027
Total Silver (Ag)	ug/L	<0.05		<0.05	0.05	<0.05	<0.05	0.05	5171027
Total Strontium (Sr)	ug/L	19500		19700	19400	19400	19300	10	5171027
Total Thallium (Tl)	ug/L	<0.1		<0.1	<0.1	<0.1	<0.1	0.1	5171027
Total Tin (Sn)	ug/L	<1		<1	<1	<1	<1	1	5171027
Total Titanium (Ti)	ug/L	<10		<10	<10	<10	<10	10	5171027
Total Zinc (Zn)	ug/L	9.0	8.8	4.5	4.6	3.8	3.9	0.5	5195727
Total Uranium (U)	ug/L	6.08		5.81	5.82	5.86	5.87	0.05	5171027
Total Vanadium (V)	ug/L	<10		<10	<10	<10	<10	10	5171027
Total Calcium (Ca)	mg/L	746		740	753	725	751	1	5158247
Total Magnesium (Mg)	mg/L	2250		2250	2260	2270	2260	1	5158247
Total Potassium (K)	mg/L	574		571	574	575	582	1	5158247
Total Sodium (Na)	mg/L	15000		15000	15200	15200	15000	1	5158247
Total Sulphur (S)	mg/L	1750		1730	1750	1760	1800	20	5158247

RDL = Reportable Detection Limit

AZIMUTH CONSULTING GROUP
Client Project #: POLARIS MINE, GARROW LK

Maxxam Job #: B184425
Report Date: 2011/12/08

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9612		BL9613	BL9614	BL9615	BL9616		
Sampling Date		2011/09/02		2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 19M Lab-Dup**	**QC Batch**	**GLC 20M**	**GLC 22M**	**GLC 30M**	**GLC 38M**	**RDL**	**QC Batch**
Total Metals by ICPMS									
Total Aluminum (Al)	ug/L		5171027	<10	<10	<10	215	10	5171062
Total Antimony (Sb)	ug/L		5171027	<0.5	<0.5	<0.5	<0.5	0.5	5171062
Total Arsenic (As)	ug/L	0.7	5171027	0.7	0.7	0.7	0.8	0.5	5171062
Total Barium (Ba)	ug/L		5171027	55	55	50	40	1	5171062
Total Beryllium (Be)	ug/L		5171027	<1	<1	<1	<1	1	5171062
Total Bismuth (Bi)	ug/L		5171027	<1	<1	<1	<1	1	5171062
Total Boron (B)	ug/L		5171027	6160	6160	6220	6380	50	5171062
Total Cadmium (Cd)	ug/L		5195727	<0.01	0.02	<0.01	4.30	0.01	5195727
Total Chromium (Cr)	ug/L		5171027	<0.5	0.8	0.6	4.4	0.5	5171062
Total Cobalt (Co)	ug/L		5195727	0.78	0.80	0.33	0.18	0.05	5195727
Total Copper (Cu)	ug/L		5195727	0.16	0.44	0.13	42.9	0.05	5195727
Total Iron (Fe)	ug/L		5195727	435	422	268	1420	1	5195727
Total Lead (Pb)	ug/L		5195727	0.40	2.00	0.45	1390	0.05	5195727
Total Lithium (Li)	ug/L		5171027	481	485	486	505	20	5171062
Total Manganese (Mn)	ug/L		5195727	116	121	94.6	357	0.2	5195727
Total Mercury (Hg)	ug/L	<0.3	5171027	<0.3	<0.3	<0.3	<0.3	0.3	5171062
Total Nickel (Ni)	ug/L		5195727	3.96	4.42	1.70	1.84	0.05	5195727
Total Molybdenum (Mo)	ug/L		5171027	4	4	1	<1	1	5171062
Total Phosphorus (P)	ug/L		5171027	<50	<50	<50	170	50	5171062
Total Selenium (Se)	ug/L		5171027	2.0	1.7	1.3	<0.5	0.5	5171062
Total Silicon (Si)	ug/L		5171027	9740	9280	9610	10000	100	5171062
Total Silver (Ag)	ug/L		5171027	<0.05	<0.05	<0.05	0.06	0.05	5171062
Total Strontium (Sr)	ug/L		5171027	19900	20000	20400	20600	10	5171062
Total Thallium (Tl)	ug/L		5171027	<0.1	<0.1	<0.1	0.1	0.1	5171062
Total Tin (Sn)	ug/L		5171027	<1	<1	<1	<1	1	5171062
Total Titanium (Ti)	ug/L		5171027	<10	<10	<10	<10	10	5171062
Total Zinc (Zn)	ug/L		5195727	5.0	9.6	3.6	941	0.5	5195727
Total Uranium (U)	ug/L		5171027	5.59	5.57	4.75	2.79	0.05	5171062
Total Vanadium (V)	ug/L		5171027	<10	<10	<10	<10	10	5171062
Total Calcium (Ca)	mg/L		5158247	758	730	746	901	1	5158247
Total Magnesium (Mg)	mg/L		5158247	2330	2350	2310	2470	1	5158247
Total Potassium (K)	mg/L		5158247	570	576	569	592	1	5158247
Total Sodium (Na)	mg/L		5158247	15700	15800	15500	16100	1	5158247
Total Sulphur (S)	mg/L		5158247	1740	1750	1690	1740	20	5158247

RDL = Reportable Detection Limit

Maxxam Job #: B184425
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: POLARIS MINE, GARROW LK

MICROBIOLOGY (SEA WATER)

Maxxam ID		BL9564	BL9568	BL9570	BL9571	BL9572	BL9608		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 3M**	**GLC 7M**	**GLC 9M**	**GLC 10M**	**GLC 11M**	**GLC 15M**	**RDL**	**QC Batch**
Microbiological Param.									
Heterotrophic Plate Count	CFU/mL	3	2	1	<1	<1	<1	1	5160002

RDL = Reportable Detection Limit

General Comments

Sample BL9609-01: Result exceeds 35g/L salinity.

Sample BL9610-01: Result exceeds 35g/L salinity.

Sample BL9611-01: Result exceeds 35g/L salinity.

Sample BL9613-01: Result exceeds 35g/L salinity.

Sample BL9615-01: Result exceeds 35g/L salinity.

Sample BL9616-01: Result exceeds 35g/L salinity.

RESULTS OF CHEMICAL ANALYSES OF SEA WATER Comments

Sample BL9561-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9562-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9563-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9564-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9565-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9566-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9567-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9568-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9569-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9570-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9571-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9572-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9605-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9606-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9607-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9608-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9609-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9610-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9611-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9612-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9613-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9614-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9615-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9616-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER) Comments

Sample BL9572-05 Elements by ICPMS (dissolved) - Seawater: Detection limits raised due to matrix interference

Sample BL9608-05 Elements by ICPMS (dissolved) - Seawater: Detection limits raised due to matrix interference

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
5162924	Total Suspended Solids	2011/09/10			104	80 - 120	<1.0	mg/L		
5164660	Alkalinity (Total as CaCO3)	2011/09/10	NC	80 - 120	93	80 - 120	<0.50	mg/L	0.3	20
5164660	Alkalinity (PP as CaCO3)	2011/09/10					<0.50	mg/L	NC	20
5164660	Bicarbonate (HCO3)	2011/09/10					<0.50	mg/L	0.3	20
5164660	Carbonate (CO3)	2011/09/10					<0.50	mg/L	NC	20
5164660	Hydroxide (OH)	2011/09/10					<0.50	mg/L	NC	20
5164668	Conductivity	2011/09/10			98	80 - 120	<1.0	uS/cm	0.2	20
5164670	Salinity	2011/09/10					<0.010	g/L	0.4	25
5164699	Alkalinity (Total as CaCO3)	2011/09/10	NC	80 - 120	93	80 - 120	<0.50	mg/L	0.7	20
5164699	Alkalinity (PP as CaCO3)	2011/09/10					<0.50	mg/L	NC	20
5164699	Bicarbonate (HCO3)	2011/09/10					<0.50	mg/L	0.7	20
5164699	Carbonate (CO3)	2011/09/10					<0.50	mg/L	NC	20
5164699	Hydroxide (OH)	2011/09/10					<0.50	mg/L	NC	20
5164709	Conductivity	2011/09/10			100	80 - 120	<1.0	uS/cm	0.2	20
5164711	Salinity	2011/09/10					<0.010	g/L	0.1	25
5166528	Sulphide	2011/09/12	52 (1)	80 - 120	98	80 - 120	<0.0050	mg/L	8.6	20
5171027	Total Arsenic (As)	2011/09/15	108	75 - 125	100	75 - 125	<0.5	ug/L	NC	25
5171027	Total Barium (Ba)	2011/09/15	NC	75 - 125	99	75 - 125	<1	ug/L		
5171027	Total Beryllium (Be)	2011/09/15	96	75 - 125	100	75 - 125	<1	ug/L		
5171027	Total Chromium (Cr)	2011/09/15	89	75 - 125	100	75 - 125	<0.5	ug/L		
5171027	Total Lithium (Li)	2011/09/15	NC	75 - 125	103	75 - 125	<20	ug/L		
5171027	Total Selenium (Se)	2011/09/15	98	75 - 125	107	75 - 125	<0.5	ug/L		
5171027	Total Strontium (Sr)	2011/09/15	NC	75 - 125	98	75 - 125	<10	ug/L		
5171027	Total Titanium (Ti)	2011/09/15	102	75 - 125	99	75 - 125	<10	ug/L		
5171027	Total Uranium (U)	2011/09/15	98	75 - 125	98	75 - 125	<0.05	ug/L		
5171027	Total Vanadium (V)	2011/09/15	97	75 - 125	98	75 - 125	<10	ug/L		
5171027	Total Aluminum (Al)	2011/09/15					<10	ug/L		
5171027	Total Antimony (Sb)	2011/09/15					<0.5	ug/L		
5171027	Total Bismuth (Bi)	2011/09/15					<1	ug/L		
5171027	Total Boron (B)	2011/09/15					<50	ug/L		
5171027	Total Mercury (Hg)	2011/09/15					<0.3	ug/L	NC	25
5171027	Total Molybdenum (Mo)	2011/09/15					<1	ug/L		
5171027	Total Phosphorus (P)	2011/09/15					<50	ug/L		
5171027	Total Silicon (Si)	2011/09/15					<100	ug/L		
5171027	Total Silver (Ag)	2011/09/15					<0.05	ug/L		
5171027	Total Thallium (Tl)	2011/09/15					<0.1	ug/L		
5171027	Total Tin (Sn)	2011/09/15					<1	ug/L		
5171062	Total Arsenic (As)	2011/09/15	103	75 - 125	102	75 - 125	<0.5	ug/L	2.6	25
5171062	Total Barium (Ba)	2011/09/15	99	75 - 125	99	75 - 125	<1	ug/L	0.5	25
5171062	Total Beryllium (Be)	2011/09/15	108	75 - 125	103	75 - 125	<1	ug/L	NC	25

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
5171062	Total Chromium (Cr)	2011/09/15	100	75 - 125	99	75 - 125	<0.5	ug/L	NC	25
5171062	Total Lithium (Li)	2011/09/15	106	75 - 125	107	75 - 125	<20	ug/L	NC	25
5171062	Total Selenium (Se)	2011/09/15	109	75 - 125	104	75 - 125	<0.5	ug/L	NC	25
5171062	Total Strontium (Sr)	2011/09/15	NC	75 - 125	99	75 - 125	<10	ug/L	0.7	25
5171062	Total Titanium (Ti)	2011/09/15	98	75 - 125	103	75 - 125	<10	ug/L	NC	25
5171062	Total Uranium (U)	2011/09/15	98	75 - 125	96	75 - 125	<0.05	ug/L	NC	25
5171062	Total Vanadium (V)	2011/09/15	98	75 - 125	98	75 - 125	<10	ug/L	NC	25
5171062	Total Aluminum (Al)	2011/09/15					<10	ug/L	NC	25
5171062	Total Antimony (Sb)	2011/09/15					<0.5	ug/L	NC	25
5171062	Total Bismuth (Bi)	2011/09/15					<1	ug/L	NC	25
5171062	Total Boron (B)	2011/09/15					<50	ug/L	NC	25
5171062	Total Mercury (Hg)	2011/09/15					<0.3	ug/L		
5171062	Total Molybdenum (Mo)	2011/09/15					<1	ug/L	NC	25
5171062	Total Phosphorus (P)	2011/09/15					<50	ug/L	NC	25
5171062	Total Silicon (Si)	2011/09/15					<100	ug/L	0.3	25
5171062	Total Silver (Ag)	2011/09/15					<0.05	ug/L	NC	25
5171062	Total Thallium (Tl)	2011/09/15					<0.1	ug/L	NC	25
5171062	Total Tin (Sn)	2011/09/15					<1	ug/L	NC	25
5195712	Total Cadmium (Cd)	2011/09/22	94	80 - 120	97	80 - 120	<0.01	ug/L	5.0	25
5195712	Total Cobalt (Co)	2011/09/22	103	80 - 120	94	80 - 120	<0.05	ug/L	NC	25
5195712	Total Copper (Cu)	2011/09/22	96	80 - 120	93	80 - 120	<0.05	ug/L	0.3	25
5195712	Total Lead (Pb)	2011/09/22	93	80 - 120	92	80 - 120	<0.05	ug/L	1	25
5195712	Total Manganese (Mn)	2011/09/22	96	80 - 120	97	80 - 120	<0.2	ug/L	1.9	25
5195712	Total Nickel (Ni)	2011/09/22	99	80 - 120	89	80 - 120	<0.05	ug/L	0.1	25
5195712	Total Zinc (Zn)	2011/09/22	NC	80 - 120	99	80 - 120	<0.5	ug/L	0.2	25
5195712	Total Iron (Fe)	2011/09/22					<1	ug/L	2.1	25
5195727	Total Cadmium (Cd)	2011/09/22	87	80 - 120	98	80 - 120	<0.01	ug/L	NC	25
5195727	Total Cobalt (Co)	2011/09/22	99	80 - 120	96	80 - 120	<0.05	ug/L	1.1	25
5195727	Total Copper (Cu)	2011/09/22	88	80 - 120	96	80 - 120	<0.05	ug/L	23.2	25
5195727	Total Lead (Pb)	2011/09/22	91	80 - 120	94	80 - 120	<0.05	ug/L	0.3	25
5195727	Total Manganese (Mn)	2011/09/22	NC	80 - 120	97	80 - 120	<0.2	ug/L	0.8	25
5195727	Total Nickel (Ni)	2011/09/22	95	80 - 120	94	80 - 120	<0.05	ug/L	1.6	25
5195727	Total Zinc (Zn)	2011/09/22	NC	80 - 120	100	80 - 120	<0.5	ug/L	2.5	25
5195727	Total Iron (Fe)	2011/09/22					<1	ug/L	3.0	25
5196432	Cyanide + Thiocyanate	2011/09/21	98	N/A	98	N/A	<0.00050	mg/L	NC	20
5197086	Dissolved Arsenic (As)	2011/09/23	110	75 - 125	103	75 - 125	<0.5	ug/L	NC	25
5197086	Dissolved Barium (Ba)	2011/09/23	NC	75 - 125	102	75 - 125	<1	ug/L	1.8	25
5197086	Dissolved Beryllium (Be)	2011/09/23	102	75 - 125	101	75 - 125	<1	ug/L	NC	25
5197086	Dissolved Cadmium (Cd)	2011/09/23	99	75 - 125	104	75 - 125	<0.05	ug/L	20.9	25
5197086	Dissolved Chromium (Cr)	2011/09/23	102	75 - 125	108	75 - 125	<0.5	ug/L	NC	25

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
5197086	Dissolved Cobalt (Co)	2011/09/23	100	75 - 125	106	75 - 125	<0.1	ug/L	NC	25
5197086	Dissolved Copper (Cu)	2011/09/23	97	75 - 125	106	75 - 125	<0.5	ug/L	NC	25
5197086	Dissolved Lead (Pb)	2011/09/23	96	75 - 125	101	75 - 125	<0.1	ug/L	NC	25
5197086	Dissolved Lithium (Li)	2011/09/23	NC	75 - 125	94	75 - 125	<20	ug/L	NC	25
5197086	Dissolved Manganese (Mn)	2011/09/23	99	75 - 125	106	75 - 125	<0.5	ug/L	0.4	25
5197086	Dissolved Nickel (Ni)	2011/09/23	98	75 - 125	109	75 - 125	0.2, RDL=0.2	ug/L	1.1	25
5197086	Dissolved Selenium (Se)	2011/09/23	109	75 - 125	105	75 - 125	<0.5	ug/L	NC	25
5197086	Dissolved Strontium (Sr)	2011/09/23	NC	75 - 125	102	75 - 125	<10	ug/L	0.1	25
5197086	Dissolved Titanium (Ti)	2011/09/23	114	75 - 125	108	75 - 125	<10	ug/L	NC	25
5197086	Dissolved Uranium (U)	2011/09/23	104	75 - 125	100	75 - 125	<0.05	ug/L	NC	25
5197086	Dissolved Vanadium (V)	2011/09/23	108	75 - 125	104	75 - 125	<10	ug/L	NC	25
5197086	Dissolved Zinc (Zn)	2011/09/23	NC	75 - 125	109	75 - 125	<1	ug/L	1.3	25
5197086	Dissolved Aluminum (Al)	2011/09/23					<10	ug/L	NC	25
5197086	Dissolved Antimony (Sb)	2011/09/23					<0.5	ug/L	NC	25
5197086	Dissolved Bismuth (Bi)	2011/09/23					<1	ug/L	NC	25
5197086	Dissolved Boron (B)	2011/09/23					<50	ug/L	0.01	25
5197086	Dissolved Iron (Fe)	2011/09/23					4, RDL=2	ug/L	NC	25
5197086	Dissolved Molybdenum (Mo)	2011/09/23					<1	ug/L	NC	25
5197086	Dissolved Phosphorus (P)	2011/09/23					<50	ug/L	NC	25
5197086	Dissolved Silicon (Si)	2011/09/23					<100	ug/L	1.4	25
5197086	Dissolved Silver (Ag)	2011/09/23					<0.05	ug/L	NC	25
5197086	Dissolved Thallium (Tl)	2011/09/23					<0.1	ug/L	NC	25
5197086	Dissolved Tin (Sn)	2011/09/23					<1	ug/L	NC	25
5200502	Cyanide + Thiocyanate	2011/09/22	102	N/A	105	N/A	<0.00050	mg/L	NC	20
5200723	Chlorophyll a	2011/09/22					<0.50	ug/L		

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Analytics Inc

Sample delivery to: 4606 Canada Way, Burnaby, BC, V5G 1K5, Tel: (604) 734-7276
Contact: Tabitha Rudkin Tel: (604) 638 2639, Fax: (604) 630 0110, COC#
www.maxxamanalytics.com

08337517

ANALYTICAL REQUEST FO

Page 1 of

B184425

Invoice To: Require Report? Yes [x] No [ ]

Company Name:	Azimuth Consulting Group
Contact Name:	Randy Baker or Cheryl Mackintosh
Address:	218-2902 West Broadway
	Vancouver, BC PC: V6K 2G8
Phone / Fax#:	Ph: 604-730-1220 Fax: 604-739-8511

Report To: same as invoice

PC:

Ph: Fax:

PO# / AFE#:	
Quotation #:	B11-065-DL
Project # :	TC-11-03 Polaris
Proj. Name:	Polaris Mine, Garrow Lake
Location:	Little Cornwallis Isl, NU
Sampler's Initials:	CK

REGULATORY REQUIREMENTS:

- [ ] CSR
- [ ] CCME
- [ ] CCME FWAL
- [x] MMER
- [ ] PST
- [ ] CDWQG
- [ ] G50

REPORT DISTRIBUTION:

- [ ] Mail
- [ ] Fax
- [x] PDF
- [x] Excel
- [ ] Other:
- [x] Email: rbaker@azimuthgroup.ca, cmackintosh@azimuthgroup.ca, bruce.donald@teck.com

SERVICE REQUESTED:

- [ ] RUSH (Please ensure you contact the lab) Date Required:
- [x] REGULAR Turnaround

METALS: (WATERS)

- [x] Total
- [ ] Extractable
- [ ] Dissolved

ANALYSIS REQUESTED (Lab use only)

	Sample Identification		Matrix	Date/Time Sampled	Sample Type Grab/Comp	Hold > 60 Days	Sample Container #	total suspended solids	conductivity, pH, salinity, alkalinity	hardness	total metals in seawater by chelation	total metals in seawater by dilution	sulphide	cyanide	dissolved metals	heterotrophic bacteria	chlorophyll
1	GLC 0m	BL9561	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
2	GLC 1M	BL9562	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
3	GLC 2M	BL9563	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X		X			
4	GLC 3M	BL9564	seawater	Sept. 2, 2011	Grab		8	X	X	X	X	X		X	X	X	X
5	GLC 4M	BL9565	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
6	GLC 5M	BL9566	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X		X			
7	GLC 6M	BL9567	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
8	GLC 7M	BL9568	seawater	Sept. 2, 2011	Grab		7	X	X	X	X	X			X	X	X
9	GLC 8M	BL9569	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
10	GLC 9M	BL9570	seawater	Sept. 2, 2011	Grab		7	X	X	X	X	X			X	X	X
11	GLC 10M	BL9571	seawater	Sept. 2, 2011	Grab		8	X	X	X	X	X		X	X	X	X
12	GLC 11M	BL9572	seawater	Sept. 2, 2011	Grab		7	X	X	X	X	X			X	X	X
** For water samples, please indicate if sample container has been preserved (P) and/or filtered (F).										P	P	P	P				

Relinquished By:	Curtis Kidd	Date/Time:	05-Sep-11
Signature:	Curtis Kidd		

Received: Nahed Amer, Sept 8, 2011, Time 11:00, CS : N/A

Temperature: 10,10,11; 8,8,9; 9,9,10; 8,9,10 — 9,10,11; 10,10,11; 8,8,9

Login check

COMMENTS/SPECIAL INSTRUCTIONS: *Water is hypersaline, for TSS measurement run 1-2L distilled water through filters!!!; Note 2 methods of analysis are requested for total metals; Total metals have been preserved with HNO3; Sulfide has been preserved with NaOH and zinc acetate; Cyanide has been preserved with NaOH. dissolved metals, chlorophyll and bacteria to be preserved by maxxam*

B184425

Maxxam Analytics Inc

Sample delivery to: 4606 Canada Way, Burnaby, BC, V5G 1K5, Tel: (604) 734-7276
Contact: Tabitha Rudkin Tel: (604) 638 2639, Fax: (604) 630 0110,
www.maxxamanalytics.com

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08337513

lab)

ANALYTICAL REQUEST FORM

Invoice To: Require Report? Yes [x] No [ ]

Company Name:	Azimuth Consulting Group
Contact Name:	Randy Baker or Cheryl Mackintosh
Address:	218-2902 West Broadway
	Vancouver, BC PC: V6K 2G8
Phone / Fax#:	Ph: 604-730-1220 Fax: 604-739-8511

Report To: B184425

same as invoice

PC:

Ph: Fax:

PO# / AFE#:	
Quotation #:	B11-065-DL
Project # :	TC-11-03
Proj. Name:	Polaris Mine, Final Discharge Point
Location:	Little Cornwallis Isl, NU
Sampler's Initials:	CK

REGULATORY REQUIREMENTS:

- [ ] CSR
- [ ] CCME
- [ ] CCME FWAL
- [x] MMER
- [ ] PST
- [ ] CDWQG
- [ ] G50

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- [ ] Fax
- [x] PDF
- [x] Excel
- [ ] Other:
- [x] Email: rbaker@azimuthgroup.ca, cmackintosh@azimuthgroup.ca, bruce.donald@teck.com

SERVICE REQUESTED:

- [ ] RUSH (Please ensure you contact the lab)
  Date Required:
- [x] REGULAR Turnaround

METALS: (WATERS)

- [x] Total
- [ ] Extractable
- [ ] Dissolved

ANALYSIS REQUESTED (Lab use only)

#	Sample Identification	Matrix	Date/Time Sampled	Sample Type Grab/Comp	Hold > 60 Days	Sample Container #	total suspended solids	conductivity, pH, salinity, alkalinity	hardness	total metals in seawater by chelation	total metals in seawater by dilution	sulphide	cyanide	dissolved metals	heterotrophic bacteria	chlorophyll
1	GLC 12M BL9605	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
2	GLC 13M BL9606	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
3	GLC 14M BL9607	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
4	GLC 15M BL9608	seawater	Sept. 2, 2011	Grab		7	X	X	X	X	X			X	X	X
5	GLC 16M BL9609	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
6	GLC 17M BL9610	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
7	GLC 18M BL9611	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
8	GLC 19M BL9612	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
9	GLC 20M BL9613	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
10	GLC 22M BL9614	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
11	GLC 30M BL9615	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
12	GLC 38M BL9616	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
	** For water samples, please indicate if sample container has been preserved (P) and/or filtered (F).						/	/		P	P	P	P	P	F	/

B184425

Relinquished By: Curtis Kidd

Date/Time: 05-Sep-11

Signature: Curtis Kidd

COMMENTS/SPECIAL INSTRUCTIONS: *Water is hypersaline, for TSS measurement run 1-2L distilled water through filters!!!; Note 2 methods of analysis are requested for total metals; Total metals have been preserved with HNO_3; Sulfide has been preserved with NaOH and zinc acetate; Cyanide has been preserved with NaOH. dissolved metals, chlorophyll and bacteria to be preserved by maxxam*

Received
Nahed Amer
Sept 8, 2011
Time 11:00
CS: NA

Temperature
10, 10, 11
8, 8, 9
9, 9, 10
8, 9, 10

9, 10, 11
10, 10, 11
8, 8, 9

Login check

Your Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Your C.O.C. #: 08337460, 08337461

Attention: Randy Baker
AZIMUTH CONSULTING GROUP
218 - 2902 WEST BROADWAY
VANCOUVER, BC
CANADA V6K 2G8

Report Date: 2011/12/08
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B184469
Received: 2011/09/08, 11:00

Sample Matrix: Sea Water
Samples Received: 21

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	21	2011/09/10	2011/09/10	BBY6SOP-00026, BBY0SOP-00002	SM2320B
Cyanide (Total)	4	N/A	2011/09/14	BBY6SOP-00004	SM4500-CN N
Conductance - water	21	N/A	2011/09/10	BBY6SOP-00026	SM-2510B
Na, K, Ca, Mg, S by CRC ICPMS (total)	21	N/A	2011/09/15	BBY7SOP-00002	EPA 200.8
Metals by Chelation CRC ICPMS (tot)	1	N/A	2011/09/22	BBY7SOP-00002	EPA 200.8
Metals by Chelation CRC ICPMS (tot)	20	N/A	2011/10/02	BBY7SOP-00002	EPA 200.8
Elements by CRC ICPMS (total) - Seawater	21	N/A	2011/09/15	BBY7SOP-00002	EPA 200.8
pH Water	21	N/A	2011/09/10	BBY6SOP-00026	SM-4500H+B
Salinity by Conductivity Method	21	2011/09/10	2011/09/10	BBY6SOP-00026	SMAA 2520B
Sulphide	4	N/A	2011/09/12	BBY6SOP-00006	SM-4500 S2D
Total Suspended Solids-LowLevel	21	N/A	2011/09/10	BBY6SOP-00034	SM-2540 D

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

TABITHA RUDKIN, Project Manager
Email: TRudkin@maxxam.ca
Phone# (604) 638-2639

==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B184469
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Sampler Initials: CK

RESULTS OF CHEMICAL ANALYSES OF SEA WATER

Maxxam ID		BL9836	BL9837	BL9838	BL9839	BL9840	BL9841	BL9842	BL9842	BL9843		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLS 0M**	**GLS 1M**	**GLS 2M**	**GLS 3M**	**GLS 4M**	**GLS 5M**	**GLS 6M**	**GLS 6M Lab-Dup**	**GLS 7M**	**RDL**	**QC Batch**
Misc. Inorganics												
Cyanide + Thiocyanate	mg/L			<0.00050	0.00061		0.00053				0.00050	5173436
Salinity	g/L	7.82	7.84	7.80	7.83	7.91	7.82	7.82		7.82	0.010	5164670
Alkalinity (Total as CaCO3)	mg/L	111	113	113	109	114	111	111	113	112	0.50	5164660
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Bicarbonate (HCO3)	mg/L	136	138	138	134	139	136	135	138	136	0.50	5164660
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
MISCELLANEOUS												
Sulphide	mg/L							<0.0050(1)			0.0050	5166528
Physical Properties												
Conductivity	uS/cm	13300	13400	13300	13300	13500	13300	13300	13300	13300	1.0	5164668
pH	pH Units	7.96	8.09	8.03	7.84	8.13	7.99	7.97	8.02	8.03		5164669
Physical Properties												
Total Suspended Solids	mg/L	1.6(2)	1.6(2)	2.1(2)	1.8(2)	3.7(2)	1.8(2)	1.8(2)		4.8(2)	1.0	5162924

RDL = Reportable Detection Limit
(1) - Sample analysed past recommended hold time
(2) - Sample was analyzed after hold time expired

Maxxam Job #: B184469
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Sampler Initials: CK

RESULTS OF CHEMICAL ANALYSES OF SEA WATER

Maxxam ID		BL9844	BL9844	BL9845	BL9846	BL9847	BL9849	BL9850	BL9851		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLS 8M**	**GLS 8M Lab-Dup**	**GLS 9M**	**GLS 10M**	**GLS 11M**	**GLS 12M**	**GLS 13M**	**GLS 14M**	**RDL**	**QC Batch**
Misc. Inorganics											
Cyanide + Thiocyanate	mg/L				0.00106					0.00050	5173436
Salinity	g/L	7.93	7.90	9.46	17.8	58.5(1)	63.9(1)	64.3(1)	65.1(1)	0.010	5164670
Alkalinity (Total as CaCO3)	mg/L	113	112	132	153	375	407	403	412	0.50	5164660
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Bicarbonate (HCO3)	mg/L	138	136	161	187	458	496	491	503	0.50	5164660
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
MISCELLANEOUS											
Sulphide	mg/L								0.0076(2)	0.0050	5166528
Physical Properties											
Conductivity	uS/cm	13500	13500	15900	28400	81700	88100	88600	89500	1.0	5164668
pH	pH Units	8.15	8.08	8.02	7.94	7.91	7.90	7.84	7.92		5164669
Physical Properties											
Total Suspended Solids	mg/L	1.6(3)		5.1(3)	4.5(3)	16.1(3)	20.2(3)	17.0(3)	17.3(3)	1.0	5162924

RDL = Reportable Detection Limit
(1) - Sample salinity value outside salinity calibration range of 0.01 to 35 grams per liter.
(2) - Sample received at less than recommended preservation pH 9.
Sample analysed past recommended hold time
(3) - Sample was analyzed after hold time expired

Success Through Science®

Maxxam Job #: B184469
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Sampler Initials: CK

RESULTS OF CHEMICAL ANALYSES OF SEA WATER

Maxxam ID		BL9852	BL9853	BL9854	BL9855	BL9856	BL9857		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLS 15M**	**GLS 16M**	**GLS 17M**	**GLS 18M**	**GLS 19M**	**GLS 20M**	**RDL**	**QC Batch**
Misc. Inorganics									
Salinity	g/L	64.9(1)	65.0(1)	64.6(1)	64.5(1)	64.5(1)	64.9(1)	0.010	5164670
Alkalinity (Total as CaCO3)	mg/L	412	416	413	415	415	408	0.50	5164660
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Bicarbonate (HCO3)	mg/L	503	507	505	507	506	498	0.50	5164660
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	5164660
MISCELLANEOUS									
Sulphide	mg/L					0.0372(2)	0.0778(2)	0.0050	5166528
Physical Properties									
Conductivity	uS/cm	89300	89400	88900	88800	88800	89300	1.0	5164668
pH	pH Units	7.89	7.91	7.84	7.86	7.85	7.85		5164669
Physical Properties									
Total Suspended Solids	mg/L	41.7(3)	18.3(3)	14.1(3)	13.8(3)	12.6(3)	12.7(3)	1.0	5162924

RDL = Reportable Detection Limit
(1) - Sample salinity value outside salinity calibration range of 0.01 to 35 grams per liter.
(2) - Sample received at less than recommended preservation pH 9.
Sample analysed past recommended hold time
(3) - Sample was analyzed after hold time expired

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Maxxam Job #: B184469
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Sampler Initials: CK

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9836		BL9837	BL9837	BL9838	BL9839	BL9840	BL9841	BL9842	BL9843		
Sampling Date		2011/09/02		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLS 0M**	**QC Batch**	**GLS 1M**	**GLS 1M Lab-Dup**	**GLS 2M**	**GLS 3M**	**GLS 4M**	**GLS 5M**	**GLS 6M**	**GLS 7M**	**RDL**	**QC Batch**
Total Metals by ICPMS													
Total Aluminum (Al)	ug/L	<10	5171061	<10		<10	<10	<10	<10	<10	<10	10	5171061
Total Antimony (Sb)	ug/L	<0.5	5171061	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	5171061
Total Arsenic (As)	ug/L	<0.5	5171061	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	5171061
Total Barium (Ba)	ug/L	69	5171061	68		70	69	69	67	70	68	1	5171061
Total Beryllium (Be)	ug/L	<1	5171061	<1		<1	<1	<1	<1	<1	<1	1	5171061
Total Bismuth (Bi)	ug/L	<1	5171061	<1		<1	<1	<1	<1	<1	<1	1	5171061
Total Boron (B)	ug/L	864	5171061	868		834	833	823	824	828	812	50	5171061
Total Cadmium (Cd)	ug/L	0.46	5195727	0.51	0.50	0.47	0.46	0.48	0.48	0.46	0.49	0.01	5212674
Total Chromium (Cr)	ug/L	<0.5	5171061	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	5171061
Total Cobalt (Co)	ug/L	<0.05	5195727	<0.05	0.05	<0.05	0.05	0.05	<0.05	<0.05	<0.05	0.05	5212674
Total Copper (Cu)	ug/L	1.39	5195727	0.87	0.81	0.86	0.84	0.90	1.60	0.94	0.91	0.05	5212674
Total Iron (Fe)	ug/L	16	5195727	16	16	16	15	16	17	12	18	1	5212674
Total Lead (Pb)	ug/L	0.24	5195727	0.13	0.13	0.13	0.12	0.16	0.15	0.15	0.12	0.05	5212674
Total Lithium (Li)	ug/L	72	5171061	71		70	71	71	70	72	70	20	5171061
Total Manganese (Mn)	ug/L	4.6	5195727	4.8	4.7	4.8	4.5	4.9	4.9	4.7	4.9	0.2	5212674
Total Mercury (Hg)	ug/L	<0.3	5171061	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.3	5171061
Total Nickel (Ni)	ug/L	4.41	5195727	4.30	4.12	4.18	4.05	4.24	4.28	4.25	4.26	0.05	5212674
Total Molybdenum (Mo)	ug/L	2	5171061	2		2	2	2	2	2	2	1	5171061
Total Phosphorus (P)	ug/L	<50	5171061	<50		<50	<50	<50	<50	<50	<50	50	5171061
Total Selenium (Se)	ug/L	<0.5	5171061	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	5171061
Total Silicon (Si)	ug/L	517	5171061	540		520	512	537	500	536	489	100	5171061
Total Silver (Ag)	ug/L	<0.05	5171061	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	5171061
Total Strontium (Sr)	ug/L	2380	5171061	2380		2400	2400	2400	2380	2470	2370	10	5171061
Total Thallium (Tl)	ug/L	<0.1	5171061	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	5171061
Total Tin (Sn)	ug/L	<1	5171061	<1		<1	<1	<1	<1	<1	<1	1	5171061
Total Titanium (Ti)	ug/L	<10	5171061	<10		<10	<10	<10	<10	<10	<10	10	5171061
Total Zinc (Zn)	ug/L	179	5195727	186	183	180	177	185	188	181	189	0.5	5212674
Total Uranium (U)	ug/L	0.90	5171061	0.91		0.93	0.91	0.96	0.89	0.81	0.92	0.05	5171061
Total Vanadium (V)	ug/L	<10	5171061	<10		<10	<10	<10	<10	<10	<10	10	5171061
Total Calcium (Ca)	mg/L	128	5158247	131		131	129	132	125	137	123	1	5158247
Total Magnesium (Mg)	mg/L	269	5158247	261		273	271	273	270	283	270	1	5158247
Total Potassium (K)	mg/L	65	5158247	62		65	64	65	63	67	63	1	5158247
Total Sodium (Na)	mg/L	1820	5158247	1760		1860	1830	1870	1850	1930	1850	1	5158247
Total Sulphur (S)	mg/L	239	5158247	221		231	217	223	227	226	218	20	5158247

RDL = Reportable Detection Limit

Maxxam

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Maxxam Job #: B184469
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Sampler Initials: CK

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9844	BL9845	BL9846	BL9847	BL9849	BL9850	BL9851	BL9852	BL9853		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLS 8M**	**GLS 9M**	**GLS 10M**	**GLS 11M**	**GLS 12M**	**GLS 13M**	**GLS 14M**	**GLS 15M**	**GLS 16M**	**RDL**	**QC Batch**
Total Metals by ICPMS												
Total Aluminum (Al)	ug/L	<10	<10	40	<10	<10	<10	<10	<10	<10	10	5171061
Total Antimony (Sb)	ug/L	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	5171061
Total Arsenic (As)	ug/L	<0.5	<0.5	<0.5	0.9	0.9	0.9	0.7	0.7	0.6	0.5	5171061
Total Barium (Ba)	ug/L	69	82	78	50	52	52	53	56	55	1	5171061
Total Beryllium (Be)	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	5171061
Total Bismuth (Bi)	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	5171061
Total Boron (B)	ug/L	812	960	1800	5610	6200	6090	5980	6180	6140	50	5171061
Total Cadmium (Cd)	ug/L	0.50	0.59	0.92	0.26	0.04	0.03	0.03	0.03	0.02	0.01	5212674
Total Chromium (Cr)	ug/L	<0.5	<0.5	<0.5	<0.5	0.9	1.2	1.3	1.3	1.5	0.5	5171061
Total Cobalt (Co)	ug/L	0.05	<0.05	0.07	1.58	1.45	1.33	1.09	0.88	0.82	0.05	5212674
Total Copper (Cu)	ug/L	0.86	1.02	1.44	0.87	0.72	0.50	0.52	0.20	0.34	0.05	5212674
Total Iron (Fe)	ug/L	16	13	16	32	43	75	207	306	513	1	5212674
Total Lead (Pb)	ug/L	0.14	0.14	0.21	0.66	0.50	0.55	0.50	0.50	0.40	0.05	5212674
Total Lithium (Li)	ug/L	70	86	155	456	500	494	480	493	491	20	5171061
Total Manganese (Mn)	ug/L	4.9	4.6	26.4	164	148	138	126	124	120	0.2	5212674
Total Mercury (Hg)	ug/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.3	5171061
Total Nickel (Ni)	ug/L	4.53	5.18	6.14	8.97	7.96	6.78	5.15	4.58	4.39	0.05	5212674
Total Molybdenum (Mo)	ug/L	2	2	3	5	5	5	4	4	4	1	5171061
Total Phosphorus (P)	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	50	5171061
Total Selenium (Se)	ug/L	<0.5	<0.5	<0.5	1.4	1.7	1.8	1.9	1.7	2.1	0.5	5171061
Total Silicon (Si)	ug/L	493	643	1680	8040	9110	8680	9450	9640	9290	100	5171061
Total Silver (Ag)	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.05	5171061
Total Strontium (Sr)	ug/L	2390	2940	5540	18100	19500	19200	19100	19500	19500	10	5171061
Total Thallium (Tl)	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	5171061
Total Tin (Sn)	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	5171061
Total Titanium (Ti)	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	10	5171061
Total Zinc (Zn)	ug/L	191	233	401	209	21.2	20.6	15.9	10.4	5.4	0.5	5212674
Total Uranium (U)	ug/L	0.93	1.14	1.52	5.45	5.58	5.70	6.00	6.09	6.20	0.05	5171061
Total Vanadium (V)	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	10	5171061
Total Calcium (Ca)	mg/L	126	162	246	710	759	721	761	761	732	1	5158247
Total Magnesium (Mg)	mg/L	279	332	631	2120	2270	2230	2230	2250	2220	1	5158247
Total Potassium (K)	mg/L	65	78	152	497	572	567	572	577	572	1	5158247
Total Sodium (Na)	mg/L	1920	2290	4420	13600	15000	14800	14900	15000	14800	1	5158247
Total Sulphur (S)	mg/L	231	274	483	1740	1810	1770	1760	1770	1740	20	5158247

RDL = Reportable Detection Limit

Maxxam Job #: B184469
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Sampler Initials: CK

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BL9854	BL9855	BL9856	BL9856		BL9857		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02		2011/09/02		
	Units	**GLS 17M**	**GLS 18M**	**GLS 19M**	**GLS 19M Lab-Dup**	**QC Batch**	**GLS 20M**	**RDL**	**QC Batch**
Total Metals by ICPMS									
Total Aluminum (Al)	ug/L	<10	<10	<10	<10	5171061	<10	10	5171062
Total Antimony (Sb)	ug/L	<0.5	<0.5	<0.5		5171061	<0.5	0.5	5171062
Total Arsenic (As)	ug/L	0.7	0.8	0.7	0.7	5171061	0.6	0.5	5171062
Total Barium (Ba)	ug/L	57	55	55		5171061	55	1	5171062
Total Beryllium (Be)	ug/L	<1	<1	<1		5171061	<1	1	5171062
Total Bismuth (Bi)	ug/L	<1	<1	<1		5171061	<1	1	5171062
Total Boron (B)	ug/L	6290	6110	6080		5171061	6240	50	5171062
Total Cadmium (Cd)	ug/L	0.01	0.01	0.01		5212674	0.02	0.01	5212674
Total Chromium (Cr)	ug/L	1.5	1.2	1.5		5171061	0.8	0.5	5171062
Total Cobalt (Co)	ug/L	0.76	0.80	0.75		5212674	0.78	0.05	5212674
Total Copper (Cu)	ug/L	0.14	0.14	0.13		5212674	0.11	0.05	5212674
Total Iron (Fe)	ug/L	418	454	426		5212674	434	1	5212674
Total Lead (Pb)	ug/L	0.36	0.33	0.31		5212674	0.30	0.05	5212674
Total Lithium (Li)	ug/L	508	493	489		5171061	496	20	5171062
Total Manganese (Mn)	ug/L	116	119	119		5212674	117	0.2	5212674
Total Mercury (Hg)	ug/L	<0.3	<0.3	<0.3	<0.3	5171061	<0.3	0.3	5171062
Total Nickel (Ni)	ug/L	4.01	4.11	4.18		5212674	4.27	0.05	5212674
Total Molybdenum (Mo)	ug/L	4	4	4	4	5171061	4	1	5171062
Total Phosphorus (P)	ug/L	<50	<50	<50		5171061	<50	50	5171062
Total Selenium (Se)	ug/L	1.9	1.9	1.9		5171061	1.8	0.5	5171062
Total Silicon (Si)	ug/L	9500	9560	9710		5171061	9270	100	5171062
Total Silver (Ag)	ug/L	<0.05	<0.05	0.05		5171061	<0.05	0.05	5171062
Total Strontium (Sr)	ug/L	20000	19500	19500		5171061	20200	10	5171062
Total Thallium (Tl)	ug/L	<0.1	<0.1	<0.1		5171061	<0.1	0.1	5171062
Total Tin (Sn)	ug/L	<1	<1	<1		5171061	<1	1	5171062
Total Titanium (Ti)	ug/L	<10	<10	<10		5171061	<10	10	5171062
Total Zinc (Zn)	ug/L	4.2	4.6	4.8		5212674	4.2	0.5	5212674
Total Uranium (U)	ug/L	6.18	6.03	6.04		5171061	5.97	0.05	5171062
Total Vanadium (V)	ug/L	<10	<10	<10		5171061	<10	10	5171062
Total Calcium (Ca)	mg/L	748	751	761		5158247	731	1	5158247
Total Magnesium (Mg)	mg/L	2250	2210	2270		5158247	2320	1	5158247
Total Potassium (K)	mg/L	579	570	586		5158247	563	1	5158247
Total Sodium (Na)	mg/L	15000	14800	15100		5158247	15500	1	5158247
Total Sulphur (S)	mg/L	1750	1750	1780		5158247	1730	20	5158247

RDL = Reportable Detection Limit

RESULTS OF CHEMICAL ANALYSES OF SEA WATER Comments

Sample BL9836-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9837-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9838-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9839-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9840-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9841-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9842-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9843-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9844-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9845-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9846-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9847-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9849-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9850-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9851-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9852-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9853-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9854-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9855-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9856-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BL9857-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Maxxam Job #: B184469
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Sampler Initials: CK

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
5162924	Total Suspended Solids	2011/09/10			104	80 - 120	<1.0	mg/L		
5164660	Alkalinity (Total as CaCO3)	2011/09/10	NC	80 - 120	93	80 - 120	<0.50	mg/L	1.4	20
5164660	Alkalinity (PP as CaCO3)	2011/09/10					<0.50	mg/L	NC	20
5164660	Bicarbonate (HCO3)	2011/09/10					<0.50	mg/L	1.5	20
5164660	Carbonate (CO3)	2011/09/10					<0.50	mg/L	NC	20
5164660	Hydroxide (OH)	2011/09/10					<0.50	mg/L	NC	20
5164668	Conductivity	2011/09/10			98	80 - 120	<1.0	uS/cm	0.3	20
5164670	Salinity	2011/09/10					<0.010	g/L	0.4	25
5166528	Sulphide	2011/09/12	52 (1)	80 - 120	98	80 - 120	<0.0050	mg/L	8.6	20
5171061	Total Arsenic (As)	2011/09/15	105	75 - 125	100	75 - 125	<0.5	ug/L	NC	25
5171061	Total Barium (Ba)	2011/09/15	NC	75 - 125	97	75 - 125	<1	ug/L		
5171061	Total Beryllium (Be)	2011/09/15	99	75 - 125	102	75 - 125	<1	ug/L		
5171061	Total Chromium (Cr)	2011/09/15	89	75 - 125	95	75 - 125	<0.5	ug/L		
5171061	Total Lithium (Li)	2011/09/15	NC	75 - 125	106	75 - 125	<20	ug/L		
5171061	Total Selenium (Se)	2011/09/15	98	75 - 125	100	75 - 125	<0.5	ug/L		
5171061	Total Strontium (Sr)	2011/09/15	NC	75 - 125	96	75 - 125	<10	ug/L		
5171061	Total Titanium (Ti)	2011/09/15	104	75 - 125	102	75 - 125	<10	ug/L		
5171061	Total Uranium (U)	2011/09/15	100	75 - 125	95	75 - 125	<0.05	ug/L		
5171061	Total Vanadium (V)	2011/09/15	97	75 - 125	95	75 - 125	<10	ug/L		
5171061	Total Aluminum (Al)	2011/09/15					<10	ug/L	NC	25
5171061	Total Antimony (Sb)	2011/09/15					<0.5	ug/L		
5171061	Total Bismuth (Bi)	2011/09/15					<1	ug/L		
5171061	Total Boron (B)	2011/09/15					<50	ug/L		
5171061	Total Mercury (Hg)	2011/09/15					<0.3	ug/L	NC	25
5171061	Total Molybdenum (Mo)	2011/09/15					<1	ug/L	NC	25
5171061	Total Phosphorus (P)	2011/09/15					<50	ug/L		
5171061	Total Silicon (Si)	2011/09/15					<100	ug/L		
5171061	Total Silver (Ag)	2011/09/15					<0.05	ug/L		
5171061	Total Thallium (Tl)	2011/09/15					<0.1	ug/L		
5171061	Total Tin (Sn)	2011/09/15					<1	ug/L		
5171062	Total Arsenic (As)	2011/09/15	103	75 - 125	102	75 - 125	<0.5	ug/L	2.6	25
5171062	Total Barium (Ba)	2011/09/15	99	75 - 125	99	75 - 125	<1	ug/L	0.5	25
5171062	Total Beryllium (Be)	2011/09/15	108	75 - 125	103	75 - 125	<1	ug/L	NC	25
5171062	Total Chromium (Cr)	2011/09/15	100	75 - 125	99	75 - 125	<0.5	ug/L	NC	25
5171062	Total Lithium (Li)	2011/09/15	106	75 - 125	107	75 - 125	<20	ug/L	NC	25
5171062	Total Selenium (Se)	2011/09/15	109	75 - 125	104	75 - 125	<0.5	ug/L	NC	25
5171062	Total Strontium (Sr)	2011/09/15	NC	75 - 125	99	75 - 125	<10	ug/L	0.7	25
5171062	Total Titanium (Ti)	2011/09/15	98	75 - 125	103	75 - 125	<10	ug/L	NC	25
5171062	Total Uranium (U)	2011/09/15	98	75 - 125	96	75 - 125	<0.05	ug/L	NC	25
5171062	Total Vanadium (V)	2011/09/15	98	75 - 125	98	75 - 125	<10	ug/L	NC	25

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Maxxam Job #: B184469
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AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Sampler Initials: CK

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**% Recovery**	**QC Limits**	**Value**	**Units**	**Value (%)**	**QC Limits**
5171062	Total Aluminum (Al)	2011/09/15					<10	ug/L	NC	25
5171062	Total Antimony (Sb)	2011/09/15					<0.5	ug/L	NC	25
5171062	Total Bismuth (Bi)	2011/09/15					<1	ug/L	NC	25
5171062	Total Boron (B)	2011/09/15					<50	ug/L	NC	25
5171062	Total Mercury (Hg)	2011/09/15					<0.3	ug/L		
5171062	Total Molybdenum (Mo)	2011/09/15					<1	ug/L	NC	25
5171062	Total Phosphorus (P)	2011/09/15					<50	ug/L	NC	25
5171062	Total Silicon (Si)	2011/09/15					<100	ug/L	0.3	25
5171062	Total Silver (Ag)	2011/09/15					<0.05	ug/L	NC	25
5171062	Total Thallium (Tl)	2011/09/15					<0.1	ug/L	NC	25
5171062	Total Tin (Sn)	2011/09/15					<1	ug/L	NC	25
5173436	Cyanide + Thiocyanate	2011/09/14	89	N/A	98	N/A	<0.00050	mg/L	NC	20
5195727	Total Cadmium (Cd)	2011/09/22	87	80 - 120	98	80 - 120	<0.01	ug/L	NC	25
5195727	Total Cobalt (Co)	2011/09/22	99	80 - 120	96	80 - 120	<0.05	ug/L	1.1	25
5195727	Total Copper (Cu)	2011/09/22	88	80 - 120	96	80 - 120	<0.05	ug/L	23.2	25
5195727	Total Lead (Pb)	2011/09/22	91	80 - 120	94	80 - 120	<0.05	ug/L	0.3	25
5195727	Total Manganese (Mn)	2011/09/22	NC	80 - 120	97	80 - 120	<0.2	ug/L	0.8	25
5195727	Total Nickel (Ni)	2011/09/22	95	80 - 120	94	80 - 120	<0.05	ug/L	1.6	25
5195727	Total Zinc (Zn)	2011/09/22	NC	80 - 120	100	80 - 120	<0.5	ug/L	2.5	25
5195727	Total Iron (Fe)	2011/09/22					<1	ug/L	3.0	25
5212674	Total Cadmium (Cd)	2011/10/02	94	80 - 120	100	80 - 120	<0.01	ug/L	2.2	25
5212674	Total Cobalt (Co)	2011/10/02	99	80 - 120	98	80 - 120	<0.05	ug/L	NC	25
5212674	Total Copper (Cu)	2011/10/02	94	80 - 120	97	80 - 120	0.10, RDL=0.05	ug/L	6.7	25
5212674	Total Lead (Pb)	2011/10/02	95	80 - 120	99	80 - 120	<0.05	ug/L	NC	25
5212674	Total Manganese (Mn)	2011/10/02	95	80 - 120	97	80 - 120	<0.2	ug/L	1.9	25
5212674	Total Nickel (Ni)	2011/10/02	92	80 - 120	96	80 - 120	<0.05	ug/L	4.1	25
5212674	Total Zinc (Zn)	2011/10/02	NC	80 - 120	100	80 - 120	<0.5	ug/L	2.1	25
5212674	Total Iron (Fe)	2011/10/02					<1	ug/L	1.9	25

N/A = Not Applicable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Analytics Inc

Sample delivery to: 4606 Canada Way, Burnaby, BC, V5G 1K5, Tel: (604) 734-7276
Contact: Tabitha Rudkin Tel: (604) 638 2639, Fax: (604) 630 0110,
www.maxxamanalytics.com

COC# 08337460

ANALYTICAL REQUEST FORM

Page 1 of 1

Invoice To: Require Report? Yes [x] No [ ]

Company Name:	Azimuth Consulting Group
Contact Name:	Randy Baker or Cheryl Mackintosh
Address:	218-2902 West Broadway
	Vancouver, BC PC: V6K 2G8
Phone / Fax#:	Ph: 604-730-1220 Fax: 604-739-8511

Report To: B184469

same as invoice

PC:

Ph: Fax:

PO# / AFE#:	
Quotation #:	B11-065-DL
Project # :	TC-11-03
Proj. Name:	Polaris Mine, Final Discharge Point
Location:	Little Cornwallis Isl, NU
Sampler's Initials:	CK

REGULATORY REQUIREMENTS:

- [ ] CSR
- [ ] CCME
- [ ] CCME FWAL
- [x] MMER
- [ ] PST
- [ ] CDWQG
- [ ] G50

REPORT DISTRIBUTION:

- [ ] Mail
- [ ] Fax
- [x] PDF
- [x] Excel
- [ ] Other:
- [x] Email: rbaker@azimuthgroup.ca, cmackintosh@azimuthgroup.ca, bruce.donald@teck.com

SERVICE REQUESTED:

- [ ] RUSH (Please ensure you contact the lab)
  Date Required:
- [x] REGULAR Turnaround

METALS: (WATERS)

- [x] Total
- [ ] Extractable
- [ ] Dissolved

ANALYSIS REQUESTED (lab use only)

#	Sample Identification		Matrix	Date/Time Sampled	Sample Type Grab/Comp	Hold > 60 Days	Sample Container #	total suspended solids	conductivity, pH, salinity, alkalinity	hardness	total metals in seawater by chelation	total metals in seawater by dilution	sulphide	cyanide	dissolved metals	heterotrophic bacteria	chlorophyll
1	GLS 0M	BL9836	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x					
2	GLS 1M	BL9837	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x					
3	GLS 2M	BL9838	seawater	Sept. 2, 2011	Grab		5	x	x	x	x	x		x			
4	GLS 3M	BL9839	seawater	Sept. 2, 2011	Grab		5	x	x	x	x	x		x			
5	GLS 4M	BL9840	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x					
6	GLS 5M	BL9841	seawater	Sept. 2, 2011	Grab		5	x	x	x	x	x		x			
7	GLS 6M	BL9842	seawater	Sept. 2, 2011	Grab		5	x	x	x	x	x	x				
8	GLS 7M	BL9843	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x					
9	GLS 8M	BL9844	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x					
10	GLS 9M	BL9845	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x					
11	GLS10M	BL9846	seawater	Sept. 2, 2011	Grab		5	x	x	x	x	x		x			
12	GLS 11M	BL9847	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x					
**	For water samples, please indicate if sample container has been preserved (P) and/or filtered (F).										P	P	P	P			

B184469

Relinquished By: Curtis Kidd **Date/Time:** 05-Sep-11

Signature: Curtis Kidd

COMMENTS/SPECIAL INSTRUCTIONS: *Water is hypersaline, for TSS measurement run 1-2L distilled water through filters!!!; Note 2 methods of analysis are requested for total metals; Total metals have been preserved with HNO3; Sulfide has been preserved with NaOH and zinc acetate; Cyanide has been preserved with NaOH*

Received: Nahed Amer, Sept 8, 2011, Time: 11:00, CS: N/A

Temperature: 10, 10, 11 / 8, 8, 9 / 9, 9, 10 / 8, 9, 10 / 9, 10, 11 / 10, 10, 11 / 8, 8, 9

Login check

Maxxam Analytics Inc

Sample delivery to: 4606 Canada Way, Burnaby, BC, V5G 1K5, Tel: (604) 734-7276
Contact: Tabitha Rudkin Tel: (604) 638 2639, Fax: (604) 630 0110,
www.maxxamanalytics.com

COC# 08337461

ANALYTICAL REQUEST FORM

Page 1 of 1

B184469

Invoice To: Require Report? Yes [x] No [ ]		**Report To:**		
Company Name:	Azimuth Consulting Group	same as invoice	PO# / AFE#:	
Contact Name:	Randy Baker or Cheryl Mackintosh		Quotation #:	B11-065-DL
Address:	218-2902 West Broadway		Project #:	TC-11-03
	Vancouver, BC PC: V6K 2G8	PC:	Proj. Name:	Polaris Mine, Final Discharge Point
Phone / Fax#:	Ph: 604-730-1220 Fax: 604-739-8511	Ph: Fax:	Location:	Little Cornwallis Isl, NU
			Sampler's Initials:	CK

REGULATORY REQUIREMENTS:

- [ ] CSR
- [ ] CCME
- [ ] CCME FWAL
- [x] MMER
- [ ] PST
- [ ] CDWQG
- [ ] G50

REPORT DISTRIBUTION:

- [ ] Mail
- [ ] Fax
- [x] PDF
- [x] Excel
- [ ] Other:
- [x] Email: rbaker@azimuthgroup.ca, cmackintosh@azimuthgroup.ca, bruce.donald@teck.com

SERVICE REQUESTED:

- [ ] RUSH (Please ensure you contact the lab) Date Required:
- [x] REGULAR Turnaround

METALS: (WATERS)

- [x] Total
- [ ] Extractable
- [ ] Dissolved

ANALYSIS REQUESTED (Lab use only)

#	Sample Identification		Matrix	Date/Time Sampled	Sample Type Grab/Comp	Hold > 60 Days	Sample Container #	total suspended solids	conductivity, pH, salinity, alkalinity	hardness	total metals in seawater by chelation	total metals in seawater by dilution	sulphide	cyanide	dissolved metals	heterotrophic bacteria	chlorophyll
1	GLS 12M	BL9849	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
2	GLS 13M	BL9850	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
3	GLS 14M	BL9851	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
4	GLS 15M	BL9852	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
5	GLS 16M	BL9853	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
6	GLS 17M	BL9854	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
7	GLS 18M	BL9855	seawater	Sept. 2, 2011	Grab		4	X	X	X	X	X					
8	GLS 19M	BL9856	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
9	GLS 20M	BL9857	seawater	Sept. 2, 2011	Grab		5	X	X	X	X	X	X				
10																	
11																	
12																	
** For water samples, please indicate if sample container has been preserved (P) and/or filtered (F).											P	P	P				

B184469

Relinquished By: Curtis Kidd **Date/Time:** 05-Sep-11

Signature: Curtis Kidd

COMMENTS/SPECIAL INSTRUCTIONS: *Water is hypersaline, for TSS measurement run 1-2L distilled water through filters!!!; Note 2 methods of analysis are requested for total metals; Total metals have been preserved with HNO3; Sulfide has been preserved with NaOH and zinc acetate; Cyanide has been preserved with NaOH*

Received: Nahed Amer Sept 8, 2011 Time: 11:00 CS: N/A

Temperature: 10, 10, 11; 8, 8, 9; 9, 9, 10; 8, 9, 10 — 9, 10, 11; 10, 10, 11; 8, 8, 9

Login check

Your Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU
Your C.O.C. #: 08337509

Attention: Randy Baker
AZIMUTH CONSULTING GROUP
218 - 2902 WEST BROADWAY
VANCOUVER, BC
CANADA V6K 2G8

Report Date: 2011/12/08
This report supersedes all previous reports with the same Maxxam job number

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B184494
Received: 2011/09/08, 11:00

Sample Matrix: Sea Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	4	2011/09/10	2011/09/10	BBY6SOP-00026, BBY0SOP-00002	SM2320B
Cyanide (Total)	2	N/A	2011/09/15	BBY6SOP-00004	SM4500-CN N
Conductance - water	4	N/A	2011/09/10	BBY6SOP-00026	SM-2510B
Hardness Total (calculated as CaCO3)	4	N/A	2011/09/15		
Na, K, Ca, Mg, S by CRC ICPMS (total)	4	N/A	2011/09/15	BBY7SOP-00002	EPA 200.8
Metals by Chelation CRC ICPMS (tot)	4	N/A	2011/09/22	BBY7SOP-00002	EPA 200.8
Elements by CRC ICPMS (total) - Seawater	4	N/A	2011/09/15	BBY7SOP-00002	EPA 200.8
pH Water	4	N/A	2011/09/10	BBY6SOP-00026	SM-4500H+B
Salinity by Conductivity Method	4	2011/09/10	2011/09/10	BBY6SOP-00026	SMAA 2520B
Sulphide	3	N/A	2011/09/12	BBY6SOP-00006	SM-4500 S2D
Total Suspended Solids-LowLevel	4	N/A	2011/09/10	BBY6SOP-00034	SM-2540 D

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

TABITHA RUDKIN, Project Manager
Email: TRudkin@maxxam.ca
Phone# (604) 638-2639

==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B184494
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU

RESULTS OF CHEMICAL ANALYSES OF SEA WATER

Maxxam ID		BM0041	BM0042	BM0043	BM0044		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 9AM**	**GLC 20AM**	**GLS 6AM**	**GLS 20AM**	**RDL**	**QC Batch**
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	1670	11500	1430	11500	0.50	5158846
Misc. Inorganics							
Cyanide + Thiocyanate	mg/L		2.89		3.08	0.050	5177193
Salinity	g/L	9.15	63.9 (1)	7.79	64.0 (1)	0.010	5164670
Alkalinity (Total as CaCO3)	mg/L	128	407	111	410	0.50	5164660
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Bicarbonate (HCO3)	mg/L	156	496	135	500	0.50	5164660
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	5164660
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50	5164660
MISCELLANEOUS							
Sulphide	mg/L	<0.0050 (2)	0.123 (2)		0.0848 (2)	0.0050	5166528
Physical Properties							
Conductivity	uS/cm	15400	88100	13300	88200	1.0	5164668
pH	pH Units	8.03	7.74	8.01	7.76		5164669
Physical Properties							
Total Suspended Solids	mg/L	1.9 (3)	12.9 (3)	2.0 (3)	20.0 (3)	1.0	5162924

RDL = Reportable Detection Limit
(1) - Sample salinity value outside salinity calibration range of 0.01 to 35 grams per liter.
(2) - Sample received at less than recommended preservation pH 9.
Sample analysed past recommended hold time
(3) - Sample was analyzed after hold time expired

Maxxam Job #: B184494
Report Date: 2011/12/08

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU

ELEMENTS BY ATOMIC SPECTROSCOPY (SEA WATER)

Maxxam ID		BM0041	BM0042	BM0043	BM0044		
Sampling Date		2011/09/02	2011/09/02	2011/09/02	2011/09/02		
	Units	**GLC 9AM**	**GLC 20AM**	**GLS 6AM**	**GLS 20AM**	**RDL**	**QC Batch**
Total Metals by ICPMS							
Total Aluminum (Al)	ug/L	<10	<10	21	<10	10	5171062
Total Antimony (Sb)	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	5171062
Total Arsenic (As)	ug/L	<0.5	0.5	<0.5	0.7	0.5	5171062
Total Barium (Ba)	ug/L	75	55	70	55	1	5171062
Total Beryllium (Be)	ug/L	<1	<1	<1	<1	1	5171062
Total Bismuth (Bi)	ug/L	<1	<1	<1	<1	1	5171062
Total Boron (B)	ug/L	1070	6160	912	6020	50	5171062
Total Cadmium (Cd)	ug/L	0.55	<0.01	0.48	0.01	0.01	5195727
Total Chromium (Cr)	ug/L	<0.5	0.9	0.7	0.9	0.5	5171062
Total Cobalt (Co)	ug/L	<0.05	0.71	<0.05	0.74	0.05	5195727
Total Copper (Cu)	ug/L	1.25	0.15	0.95	0.25	0.05	5195727
Total Iron (Fe)	ug/L	16	414	16	424	1	5195727
Total Lead (Pb)	ug/L	0.34	0.45	0.14	0.33	0.05	5195727
Total Lithium (Li)	ug/L	82	487	70	481	20	5171062
Total Manganese (Mn)	ug/L	4.9	112	4.8	115	0.2	5195727
Total Mercury (Hg)	ug/L	<0.3	<0.3	<0.3	<0.3	0.3	5171062
Total Nickel (Ni)	ug/L	5.07	3.98	4.23	4.05	0.05	5195727
Total Molybdenum (Mo)	ug/L	3	4	2	4	1	5171062
Total Phosphorus (P)	ug/L	<50	<50	<50	<50	50	5171062
Total Selenium (Se)	ug/L	<0.5	2.1	<0.5	2.1	0.5	5171062
Total Silicon (Si)	ug/L	636	9210	503	9380	100	5171062
Total Silver (Ag)	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	5171062
Total Strontium (Sr)	ug/L	2810	20000	2450	19800	10	5171062
Total Thallium (Tl)	ug/L	<0.1	<0.1	<0.1	<0.1	0.1	5171062
Total Tin (Sn)	ug/L	<1	<1	<1	<1	1	5171062
Total Titanium (Ti)	ug/L	<10	<10	<10	<10	10	5171062
Total Zinc (Zn)	ug/L	222	4.3	187	4.2	0.5	5195727
Total Uranium (U)	ug/L	1.00	6.07	0.93	5.96	0.05	5171062
Total Vanadium (V)	ug/L	<10	<10	<10	<10	10	5171062
Total Calcium (Ca)	mg/L	151	724	125	735	1	5158247
Total Magnesium (Mg)	mg/L	315	2360	271	2350	1	5158247
Total Potassium (K)	mg/L	73	578	62	578	1	5158247
Total Sodium (Na)	mg/L	2130	15700	1830	15800	1	5158247
Total Sulphur (S)	mg/L	269	1770	223	1760	20	5158247

RDL = Reportable Detection Limit

RESULTS OF CHEMICAL ANALYSES OF SEA WATER Comments

Sample BM0041-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BM0042-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BM0043-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Sample BM0044-01 Total Suspended Solids-LowLevel: Sample was analyzed after holding time expired.

Maxxam Job #: B184494
Report Date: 2011/12/08

Success Through Science®

AZIMUTH CONSULTING GROUP
Client Project #: TC-11-03 POLARIS MINE, FINAL D
Site Location: LITTLE CORNWALLIS ISL, NU

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
5162924	Total Suspended Solids	2011/09/10			104	80 - 120	<1.0	mg/L		
5164660	Alkalinity (Total as CaCO3)	2011/09/10	NC	80 - 120	93	80 - 120	<0.50	mg/L	0.3	20
5164660	Alkalinity (PP as CaCO3)	2011/09/10					<0.50	mg/L	NC	20
5164660	Bicarbonate (HCO3)	2011/09/10					<0.50	mg/L	0.3	20
5164660	Carbonate (CO3)	2011/09/10					<0.50	mg/L	NC	20
5164660	Hydroxide (OH)	2011/09/10					<0.50	mg/L	NC	20
5164668	Conductivity	2011/09/10			98	80 - 120	<1.0	uS/cm	0.2	20
5164670	Salinity	2011/09/10					<0.010	g/L	0.4	25
5166528	Sulphide	2011/09/12	52 (1)	80 - 120	98	80 - 120	<0.0050	mg/L	8.6	20
5171062	Total Arsenic (As)	2011/09/15	103	75 - 125	102	75 - 125	<0.5	ug/L	2.6	25
5171062	Total Barium (Ba)	2011/09/15	99	75 - 125	99	75 - 125	<1	ug/L	0.5	25
5171062	Total Beryllium (Be)	2011/09/15	108	75 - 125	103	75 - 125	<1	ug/L	NC	25
5171062	Total Chromium (Cr)	2011/09/15	100	75 - 125	99	75 - 125	<0.5	ug/L	NC	25
5171062	Total Lithium (Li)	2011/09/15	106	75 - 125	107	75 - 125	<20	ug/L	NC	25
5171062	Total Selenium (Se)	2011/09/15	109	75 - 125	104	75 - 125	<0.5	ug/L	NC	25
5171062	Total Strontium (Sr)	2011/09/15	NC	75 - 125	99	75 - 125	<10	ug/L	0.7	25
5171062	Total Titanium (Ti)	2011/09/15	98	75 - 125	103	75 - 125	<10	ug/L	NC	25
5171062	Total Uranium (U)	2011/09/15	98	75 - 125	96	75 - 125	<0.05	ug/L	NC	25
5171062	Total Vanadium (V)	2011/09/15	98	75 - 125	98	75 - 125	<10	ug/L	NC	25
5171062	Total Aluminum (Al)	2011/09/15					<10	ug/L	NC	25
5171062	Total Antimony (Sb)	2011/09/15					<0.5	ug/L	NC	25
5171062	Total Bismuth (Bi)	2011/09/15					<1	ug/L	NC	25
5171062	Total Boron (B)	2011/09/15					<50	ug/L	NC	25
5171062	Total Mercury (Hg)	2011/09/15					<0.3	ug/L		
5171062	Total Molybdenum (Mo)	2011/09/15					<1	ug/L	NC	25
5171062	Total Phosphorus (P)	2011/09/15					<50	ug/L	NC	25
5171062	Total Silicon (Si)	2011/09/15					<100	ug/L	0.3	25
5171062	Total Silver (Ag)	2011/09/15					<0.05	ug/L	NC	25
5171062	Total Thallium (Tl)	2011/09/15					<0.1	ug/L	NC	25
5171062	Total Tin (Sn)	2011/09/15					<1	ug/L	NC	25
5177193	Cyanide + Thiocyanate	2011/09/15	91	N/A	102	N/A	<0.00050	mg/L	NC	20
5195727	Total Cadmium (Cd)	2011/09/22	87	80 - 120	98	80 - 120	<0.01	ug/L	NC	25
5195727	Total Cobalt (Co)	2011/09/22	99	80 - 120	96	80 - 120	<0.05	ug/L	1.1	25
5195727	Total Copper (Cu)	2011/09/22	88	80 - 120	96	80 - 120	<0.05	ug/L	23.2	25
5195727	Total Lead (Pb)	2011/09/22	91	80 - 120	94	80 - 120	<0.05	ug/L	0.3	25
5195727	Total Manganese (Mn)	2011/09/22	NC	80 - 120	97	80 - 120	<0.2	ug/L	0.8	25
5195727	Total Nickel (Ni)	2011/09/22	95	80 - 120	94	80 - 120	<0.05	ug/L	1.6	25

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
5195727	Total Zinc (Zn)	2011/09/22	NC	80 - 120	100	80 - 120	<0.5	ug/L	2.5	25
5195727	Total Iron (Fe)	2011/09/22					<1	ug/L	3.0	25

N/A = Not Applicable
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Analytics Inc

Sample delivery to: 4606 Canada Way, Burnaby, BC, V5G 1K5, Tel: (604) 734-7276
Contact: Tabitha Rudkin Tel: (604) 638 2639, Fax: (604) 630 0110,
www.maxxamanalytics.com

COC# 08337509

ANALYTICAL REQUEST FORM

B184494

Invoice To: Require Report? Yes [x] No [ ]

Company Name:	Azimuth Consulting Group
Contact Name:	Randy Baker or Cheryl Mackintosh
Address:	218-2902 West Broadway
	Vancouver, BC PC: V6K 2G8
Phone / Fax#:	Ph: 604-730-1220 Fax: 604-739-8511

Report To: same as invoice

PC:

Ph: Fax:

PO# / AFE#:	
Quotation #:	B11-065-DL
Project # :	TC-11-03
Proj. Name:	Polaris Mine, Final Discharge Point
Location:	Little Cornwallis Isl, NU
Sampler's Initials:	

REGULATORY REQUIREMENTS:

- [ ] CSR
- [ ] CCME
- [ ] CCME FWAL
- [x] MMER
- [ ] PST
- [ ] CDWQG
- [ ] G50

REPORT DISTRIBUTION:

- [ ] Mail
- [ ] Fax
- [x] PDF
- [x] Excel
- [ ] Other:
- [x] Email: rbaker@azimuthgroup.ca, cmackintosh@azimuthgroup.ca, bruce.donald@teck.com

SERVICE REQUESTED:

- [ ] RUSH (Please ensure you contact the lab)
  Date Required:
- [x] REGULAR Turnaround

METALS: (WATERS)

- [x] Total
- [ ] Extractable
- [ ] Dissolved

ANALYSIS REQUESTED (Lab use only)

	Sample Identification	Matrix	Date/Time Sampled	Sample Type Grab/Comp	Hold > 60 Days	Sample Container #	total suspended solids	conductivity, pH, salinity, alkalinity	hardness	total metals in seawater by chelation	total metals in seawater by dilution	sulphide	cyanide	dissolved metals	heterotrophic bacteria	chlorophyll
1	GLC 9Am BM0041	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x	x				
2	GLC 20Am BM0042	seawater	Sept. 2, 2011	Grab		6	x	x	x	x	x	x	x			
3	GLS 6Am BM0043	seawater	Sept. 2, 2011	Grab		4	x	x	x	x	x					
4	GLS 20Am BM0044	seawater	Sept. 2, 2011	Grab		6	x	x	x	x	x	x	x			
5																
6																
7																
8																
9																
10																
11																
12																
** For water samples, please indicate if sample container has been preserved (P) and/or filtered (F).										P	P	P	P			

B184494

Relinquished By:	Curtis Kidd	Date/Time:	05/09/2011
Signature:	Curtis Kidd		

COMMENTS/SPECIAL INSTRUCTIONS: *Water is hypersaline, for TSS measurement run 1-2L distilled water through filters!!!; Note 2 methods of analysis are requested for total metals; Total metals have been preserved with HNO3; Sulfide has been preserved with NaOH and zinc acetate; Cyanide has been preserved with NaOH*

Received: Nahed Amer, Sept 3, 2011, Time 11:00, CS: NA

Temperature: 10, 10, 11 / 8, 8, 9 / 9, 9, 10 / 8, 9, 10

9, 10, 11 / 10, 10, 11 / 8, 8, 9

Login check

APPENDIX 5

Garrow Lake Water Column

Minimum Ice Conditions

Total Zinc Concentration Trends in the Water Column

(September 2nd 2011)

FIGURE 1

GARROW LAKE - SUMMER SAMPLIING EVENTS
Station 262-3 (Lake Centre)
Trends In Zinc Concentrations In The Water Column 2005 to 2011

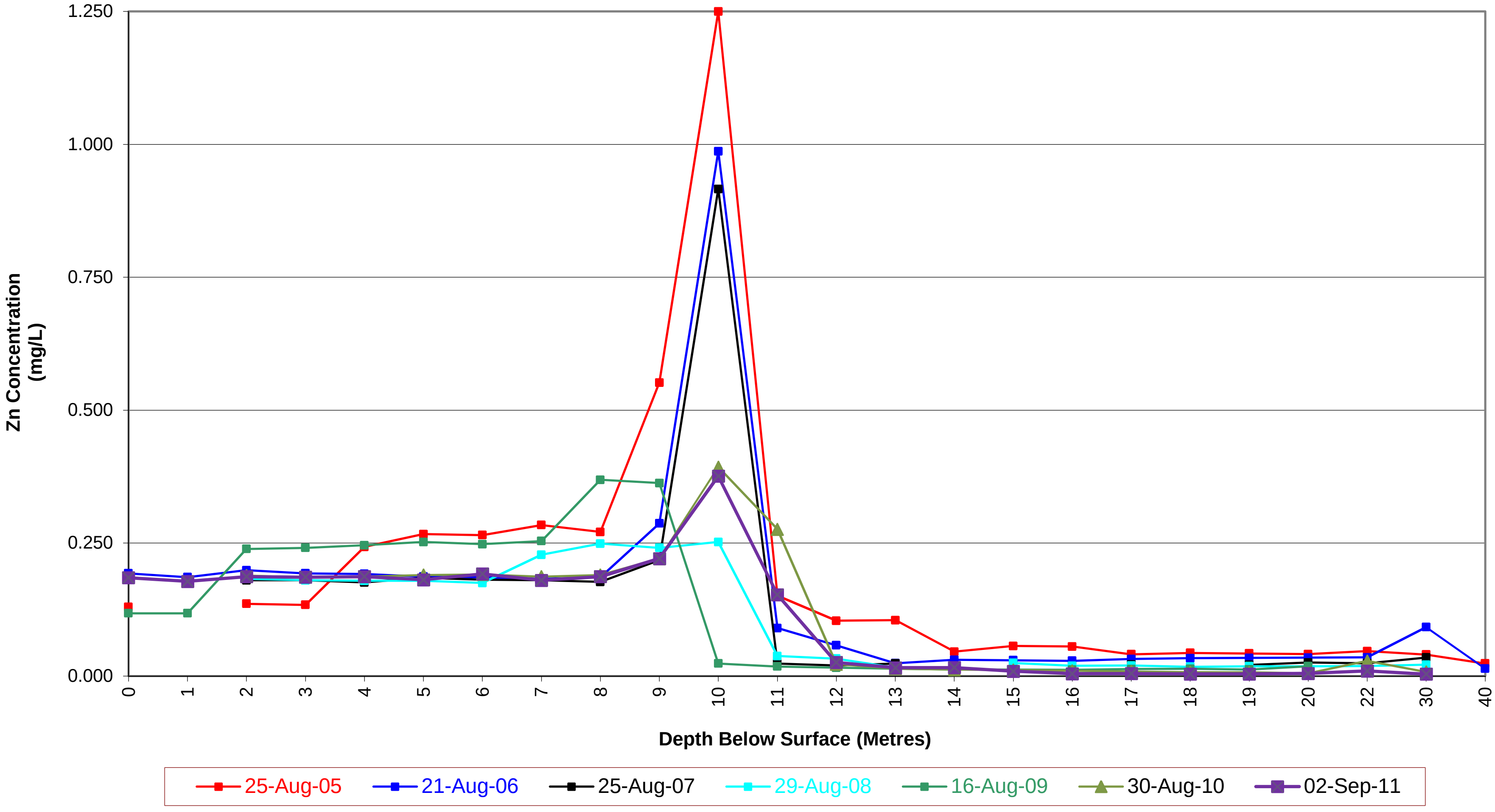


FIGURE 2

GARROW LAKE - SUMMER SAMPLING EVENTS
Station 262-3A (South)
Trends in Zinc Concentrations In The Water Column 2005 to 2011

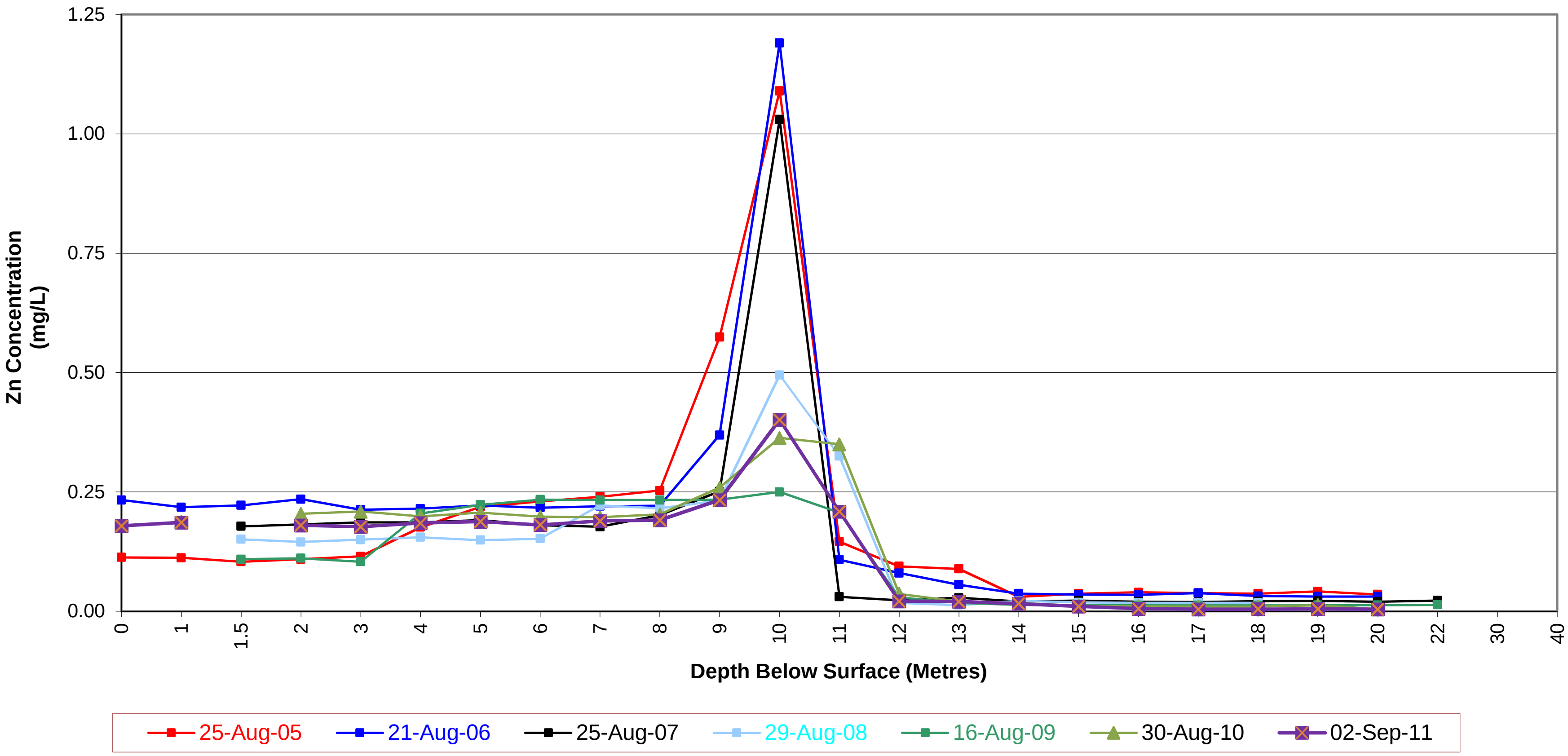


TABLE 1

GARROW LAKE WATER COLUMN MONITORING

STATION 262-3: Garrow Lake at Centre

Depth	Zinc Concentrations (mg/L)																		
	18-Jan-02	13-Mar-02	4-Feb-03	29-Mar-03	1-Jan-04	3-May-04	13-May-05	25-Aug-05	22-May-06	21-Aug-06	3-Jun-07	25-Aug-07	27-May-08	29-Aug-08	12-Jun-09	16-Aug-09	28-May-10	30-Aug-10	2-Sep-11
0								0.130	0.227	0.193									0.185
1									0.246	0.186									0.178
2							0.244	0.136	0.235	0.199	0.23	0.180		0.183	0.266	0.1180	0.261	0.189	0.187
3	0.26	0.30	0.25	0.28	0.236	0.234	0.247	0.134	0.241	0.193	0.244	0.180	0.257	0.180	0.264	0.1180	0.246	0.186	0.186
4				0.28	0.197	0.227	0.244	0.243	0.237	0.192	0.241	0.176	0.250	0.179	0.272	0.2390	0.251	0.187	0.187
5		0.32		0.29	0.209	0.247	0.228	0.267	0.25	0.187	0.234	0.185	0.251	0.179	0.260	0.2410	0.256	0.190	0.181
6				0.29	0.207	0.229	0.239	0.265	0.211	0.186	0.228	0.181	0.270	0.175	0.254	0.2460	0.253	0.191	0.192
7		0.32		0.29	0.197	0.227	0.241	0.284	0.218	0.183	0.245	0.180	0.246	0.228	0.257	0.2520	0.246	0.187	0.18
8				0.29	0.189	0.231	0.248	0.271	0.233	0.186	0.231	0.177	0.250	0.249	0.261	0.2480	0.254	0.190	0.187
9				0.30	0.702	0.816	1.120	0.552	0.359	0.287	0.246	0.218	0.249	0.241	0.255	0.2540	0.272	0.221	0.221
10	0.34	0.37	0.60	0.87	0.932	0.764	0.535	1.250	0.491	0.987	0.917	0.916	0.792	0.252	0.452	0.3690	0.359	0.393	0.376
11	1.40	1.6	1.40	0.96	0.279	0.315	0.134	0.151	0.0721	0.0903	0.0319	0.024	0.046	0.038	0.381	0.3630	0.345	0.276	0.153
12	0.68	0.60	0.585	0.52	0.27	0.262	0.120	0.104	0.0383	0.0578	0.0288	0.020	0.024	0.033	0.0201	0.0236	0.0349	0.022	0.0255
13	0.46	0.48	0.70	0.44	0.251	0.234	0.0812	0.105	0.0226	0.0241	0.0279	0.024	0.019	0.016	0.0146	0.0180	0.0115	0.014	0.0157
14	0.45	0.460	0.52	0.41	0.229	0.211	0.0482	0.0457	0.024	0.0304	0.0204		0.020		0.0153	0.0156	0.0094	0.012	0.016
15	0.42	0.47	0.44	0.52	0.256	0.211	0.0378	0.0565	0.021	0.0297	0.0208	0.022	0.020	0.025	0.0153	0.0139	0.0091	0.011	0.009
16	0.44	0.48	0.44	0.42	0.265	0.201	0.0429	0.0556	0.03	0.0287	0.0589		0.021	0.019	0.0149	0.0124	0.0093	0.010	0.0045
17	0.44	0.48	0.44	0.42	0.267	0.193	0.0435	0.0409	0.0294	0.032	0.0252	0.022	0.020	0.020	0.0152	0.0122	0.0114	0.009	0.0046
18	0.44	0.48	0.44	0.41	0.275	0.204	0.0440	0.0435	0.0314	0.0336	0.0238		0.020	0.017	0.0151	0.0117	0.0075	0.007	0.0038
19	0.44	0.48	0.45	0.42	0.266	0.202	0.0448	0.0425	0.0351	0.034	0.0208	0.021	0.021	0.018	0.0153	0.0130	0.0118	0.007	0.0039
20	0.43	0.50	0.46	0.40	0.260	0.197	0.0425	0.0413	0.0293	0.0346	0.0228	0.025	0.021	0.018	0.0154	0.0137	0.0063	0.005	0.005
22	0.43	0.49	0.46	0.42	0.260	0.199	0.0407	0.0468	0.0301	0.0351	0.0218	0.024	0.052	0.019	0.0154	0.0124	0.0056	0.029	0.0096
30	0.43	0.50		0.38	0.0514	0.117	0.0310	0.0404		0.092	0.0453	0.035	0.020	0.021	0.0261	0.0184	0.0614	0.008	0.0036
40	0.44	0.53	0.07	0.06		0.0301	0.0214	0.0235	0.0558	0.0139					0.0119				

Notes: For 1-Jan-2004 at 40m depth the zinc concentration was reported to be 0.234 mg/L. The sample must have been miss labled as salinity was recorded as 7.3 compared to samples just above it with salinity approximately 62 mg/L (i.e. less dense water above it which can not be correct).

For 22-May-2006, did not graph the data from 30m depth as there is must be a data error. The Zn = 0.561 and the TSS was 111 mg/L. The sampler must have been contaminated

For 03-Jun-2007, did not show the 35m depth as the sampler must have disturbed the bottom. The zinc concentrations wer 0.529 mg/L and TSS was 1020 mg/L.

For 27-May-08 did not show the 36m depth sample as zinc was 2.01 mg/L and TSS was 138 mg/L. Believe that the sample was contaminated by hitting the lake bottom and creating turbidity

For 16-Aug-09 data for 39m depth was discarded due to the sample being contaminated. Zinc was 17.6 mg/L and TSS = 698 mg/L indicating the bottom sediments were disturbed.

For both the May and August 2010 sampling events, the samples were analyzed by Maxxam Analytics where as previous data was analyzed by ALS Laboratories.
For 2-Sep-11 data for 38m depth was discarded due to the sample being contaminated. Assume the sampler disturbed the bottom of the lake. TSS was 2,500 mg/L. Total Zinc was 0.941 mg/L

TABLE 2
GARROW LAKE WATER COLUMN MONONITORING
STATION 262-3A: Garrow Lake Near Discharge

Zinc Concentrations mg/L

Depth	27-Jan-04	3-May-04	13-May-05	25-Aug-05	22-May-06	21-Aug-06	3-Jun-07	25-Aug-07	27-May-08	29-Aug-08	12-Jun-09	16-Aug-09	28-May-10	30-Aug-10	2-Sep-11
0				0.113	0.246	0.233								0.179	0.179
1				0.112	0.244	0.218								0.187	0.186
1.5				0.104	0.255	0.222	0.212	0.178		0.151		0.1090			
2			0.224	0.109	0.235	0.235	0.207	0.182		0.145	0.2820	0.1110	0.2610	0.204	0.180
3	0.223	0.232	0.221	0.115	0.267	0.213	0.210	0.186	0.257	0.150	0.271	0.104	0.263	0.209	0.177
4	0.211	0.230	0.231	0.176	0.205	0.215	0.207	0.186	0.250	0.155	0.272	0.205	0.261	0.199	0.185
5	0.223	0.250	0.206	0.219	0.216	0.222	0.212	0.191	0.251	0.149	0.275	0.223	0.258	0.207	0.188
6	0.202	0.240	0.219	0.230	0.243	0.217	0.191	0.180	0.270	0.152	0.276	0.234	0.249	0.198	0.181
7	0.208	0.252	0.228	0.240	0.246	0.220	0.186	0.177	0.246	0.222	0.281	0.233	0.251	0.197	0.189
8	0.223	0.228	0.264	0.253	0.237	0.221	0.167	0.201	0.250	0.216	0.253	0.233	0.261	0.203	0.191
9	1.000	0.916	0.854	0.574	0.374	0.369	0.196	0.251	0.249	0.232	0.256	0.234	0.277	0.259	0.233
10	0.423	0.496	0.501	1.090	0.983	1.190	0.720	1.030	0.792	0.495	0.704	0.250	0.685	0.363	0.401
11	0.308	0.300	0.136	0.146	0.098	0.108	0.038	0.030	0.046	0.325	0.038	0.207	0.207	0.350	0.209
12	0.297	0.283	0.106	0.094	0.059	0.080	0.025	0.023	0.024	0.018	0.020	0.029	0.022	0.037	0.021
13	0.238	0.250	0.042	0.089	0.032	0.056	0.023	0.028	0.019	0.013	0.015	0.018	0.016	0.020	0.021
14	0.241	0.203	0.041	0.030	0.031	0.037	0.017	0.021	0.020	0.022	0.015	0.014	0.009	0.018	0.016
15	0.261	0.211	0.045	0.037	0.030	0.035	0.018	0.023	0.020	0.019	0.014	0.013	0.008	0.012	0.010
16	0.270	0.193	0.041	0.040	0.032	0.034	0.018	0.020	0.021	0.018	0.014	0.013	0.008	0.011	0.005
17	0.272	0.198	0.046	0.038	0.030	0.038	0.018	0.019	0.021	0.018	0.015	0.012	0.008	0.010	0.004
18	0.265	0.198	0.039	0.037	0.026	0.032	0.019	0.021	0.021	0.018	0.014	0.013	0.007	0.010	0.005
19	0.263	0.201	0.047	0.042	0.032	0.031	0.018	0.022	0.019		0.014	0.013	0.005	0.0129	0.0048
20	0.266	0.206	0.042	0.035	0.029	0.031	0.021	0.020	0.021		0.014	0.013	0.005	0.0045	0.0042
22	0.267				0.029			0.023				0.0135			
30	0.076														
40	0.075														

Note - The Water Licence did not require sampling of this station prior to 2004

APPENDIX 6

Monitoring of Other Site Surface Waters

(LRD Quarry and Frustration Lake)

And

Soil Samples from the Former Concentrate Storage Shed

July 19th, 2011

Success Through Science®

Your Project #: POLARIS MINE
Site Location: LITTLE CORNWALLIS ISLAND
Your C.O.C. #: 08335665

Attention: Bruce Donald
TECK RESOURCES LTD.
BAG 2000
601 Knighton Rd.
KIMBERLEY, BC
Canada V1A 3E1

Report Date: 2011/08/15

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B172156
Received: 2011/08/08, 15:00

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by ICPMS (total)	3	2011/08/10	2011/08/10	BBY7SOP-00001	EPA 200.8
pH (2:1 DI Water Extract)	3	2011/08/11	2011/08/11	BBY6SOP-00028	Carter, SSMA 16.2

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Hardness Total (calculated as CaCO3)	1	N/A	2011/08/13		
Mercury (Total) by CVAF	1	2011/08/12	2011/08/13	65-A-002-10	EPA 1631B
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	2011/08/08	2011/08/13	BBY7SOP-00002	EPA 200.8
Elements by CRC ICPMS (total)	1	2011/08/11	2011/08/13	BBY7SOP-00002	EPA 200.8
Total Suspended Solids	1	N/A	2011/08/12	BBY6SOP-00034	SM - 2540 D

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

VJ OCO, Burnaby Customer Service
Email: VOco@maxxam.ca
Phone# (604) 639-8422

==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B172156
Report Date: 2011/08/15

TECK RESOURCES LTD.
Client Project #: POLARIS MINE
Site Location: LITTLE CORNWALLIS ISLAND

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		BE8780		
Sampling Date		2011/07/19		
	Units	**FRUSTRATION LAKE**	**RDL**	**QC Batch**
Physical Properties				
Total Suspended Solids	mg/L	<4	4	5083057

RDL = Reportable Detection Limit

Maxxam Job #: B172156
Report Date: 2011/08/15

TECK RESOURCES LTD.
Client Project #: POLARIS MINE
Site Location: LITTLE CORNWALLIS ISLAND

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		BE8781		
Sampling Date		2011/07/19		
	Units	**LRD**	**RDL**	**QC Batch**
Calculated Parameters				
Total Hardness (CaCO3)	mg/L	155	0.5	5070500
Elements				
Total Mercury (Hg)	ug/L	<0.02	0.02	5085753

RDL = Reportable Detection Limit

Maxxam

Success Through Science®

Maxxam Job #: B172156
Report Date: 2011/08/15

TECK RESOURCES LTD.
Client Project #: POLARIS MINE
Site Location: LITTLE CORNWALLIS ISLAND

CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		BE8781		
Sampling Date		2011/07/19		
	Units	**LRD**	**RDL**	**QC Batch**
Total Metals by ICPMS				
Total Aluminum (Al)	ug/L	21	3	5083797
Total Antimony (Sb)	ug/L	<0.5	0.5	5083797
Total Arsenic (As)	ug/L	0.2	0.1	5083797
Total Barium (Ba)	ug/L	34	1	5083797
Total Beryllium (Be)	ug/L	<0.1	0.1	5083797
Total Bismuth (Bi)	ug/L	<1	1	5083797
Total Boron (B)	ug/L	261	50	5083797
Total Cadmium (Cd)	ug/L	0.03	0.01	5083797
Total Chromium (Cr)	ug/L	<1	1	5083797
Total Cobalt (Co)	ug/L	<0.5	0.5	5083797
Total Copper (Cu)	ug/L	1.0	0.2	5083797
Total Iron (Fe)	ug/L	25	5	5083797
Total Lead (Pb)	ug/L	0.6	0.2	5083797
Total Lithium (Li)	ug/L	<5	5	5083797
Total Manganese (Mn)	ug/L	<1	1	5083797
Total Molybdenum (Mo)	ug/L	6	1	5083797
Total Nickel (Ni)	ug/L	3	1	5083797
Total Selenium (Se)	ug/L	3.8	0.1	5083797
Total Silicon (Si)	ug/L	472	100	5083797
Total Silver (Ag)	ug/L	<0.02	0.02	5083797
Total Strontium (Sr)	ug/L	200	1	5083797
Total Thallium (Tl)	ug/L	0.15	0.05	5083797
Total Tin (Sn)	ug/L	<5	5	5083797
Total Titanium (Ti)	ug/L	<5	5	5083797
Total Uranium (U)	ug/L	2.6	0.1	5083797
Total Vanadium (V)	ug/L	<5	5	5083797
Total Zinc (Zn)	ug/L	12	5	5083797
Total Zirconium (Zr)	ug/L	<0.5	0.5	5083797
Total Calcium (Ca)	mg/L	38.3	0.05	5071667
Total Magnesium (Mg)	mg/L	14.5	0.05	5071667
Total Potassium (K)	mg/L	7.11	0.05	5071667
Total Sodium (Na)	mg/L	44.6	0.05	5071667
Total Sulphur (S)	mg/L	39	3	5071667

RDL = Reportable Detection Limit

Maxxam Job #: B172156
Report Date: 2011/08/15

TECK RESOURCES LTD.
Client Project #: POLARIS MINE
Site Location: LITTLE CORNWALLIS ISLAND

CSR/CCME METALS IN SOIL (SOIL)

Maxxam ID		BE8777	BE8778	BE8779		
Sampling Date		2011/07/19	2011/07/19	2011/07/19		
	Units	**CON SHED NORTH**	**CON SHED CENTRAL**	**CON SHED SOUTH**	**RDL**	**QC Batch**
Physical Properties						
Soluble (2:1) pH	pH Units	8.80	8.67	8.72	0.01	5077704
Total Metals by ICPMS						
Total Lead (Pb)	mg/kg	186	108	87.8	0.1	5077651
Total Zinc (Zn)	mg/kg	403	362	763	1	5077651

RDL = Reportable Detection Limit

Maxxam Job #: B172156
Report Date: 2011/08/15

TECK RESOURCES LTD.
Client Project #: POLARIS MINE
Site Location: LITTLE CORNWALLIS ISLAND

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5077651	Total Lead (Pb)	2011/08/10	93	75 - 125	96	75 - 125	<0.1	mg/kg	7.0	35	105	70 - 130
5077651	Total Zinc (Zn)	2011/08/10	NC	75 - 125	98	75 - 125	<1	mg/kg	7.3	30	116	70 - 130
5077704	Soluble (2:1) pH	2011/08/11			102	96 - 104			0	20		
5083057	Total Suspended Solids	2011/08/12	100	80 - 120	107	80 - 120	<4	mg/L	NC	20		
5083797	Total Antimony (Sb)	2011/08/13	103	80 - 120	104	80 - 120	<0.5	ug/L	NC	20		
5083797	Total Arsenic (As)	2011/08/13	97	80 - 120	95	80 - 120	<0.1	ug/L	0.5	20		
5083797	Total Barium (Ba)	2011/08/13	97	80 - 120	101	80 - 120	<1	ug/L	NC	20		
5083797	Total Beryllium (Be)	2011/08/13	98	80 - 120	97	80 - 120	<0.1	ug/L	NC	20		
5083797	Total Bismuth (Bi)	2011/08/13	92	80 - 120	89	80 - 120	<1	ug/L	NC	20		
5083797	Total Cadmium (Cd)	2011/08/13	98	80 - 120	101	80 - 120	<0.01	ug/L	NC	20		
5083797	Total Chromium (Cr)	2011/08/13	101	80 - 120	96	80 - 120	<1	ug/L	NC	20		
5083797	Total Cobalt (Co)	2011/08/13	98	80 - 120	95	80 - 120	<0.5	ug/L	NC	20		
5083797	Total Copper (Cu)	2011/08/13	NC	80 - 120	98	80 - 120	<0.2	ug/L	13.2	20		
5083797	Total Iron (Fe)	2011/08/13	98	80 - 120	93	80 - 120	<5	ug/L	NC	20		
5083797	Total Lead (Pb)	2011/08/13	92	80 - 120	100	80 - 120	<0.2	ug/L	13.8	20		
5083797	Total Lithium (Li)	2011/08/13	94	80 - 120	97	80 - 120	<5	ug/L	NC	20		
5083797	Total Manganese (Mn)	2011/08/13	100	80 - 120	94	80 - 120	<1	ug/L	NC	20		
5083797	Total Molybdenum (Mo)	2011/08/13	100	80 - 120	105	80 - 120	<1	ug/L	NC	20		
5083797	Total Nickel (Ni)	2011/08/13	97	80 - 120	98	80 - 120	<1	ug/L	NC	20		
5083797	Total Selenium (Se)	2011/08/13	95	80 - 120	92	80 - 120	<0.1	ug/L	NC	20		
5083797	Total Silver (Ag)	2011/08/13	105	80 - 120	109	80 - 120	<0.02	ug/L	NC	20		
5083797	Total Strontium (Sr)	2011/08/13	NC	80 - 120	101	80 - 120	<1	ug/L	9.4	20		
5083797	Total Thallium (Tl)	2011/08/13	90	80 - 120	91	80 - 120	<0.05	ug/L	NC	20		
5083797	Total Tin (Sn)	2011/08/13	98	80 - 120	102	80 - 120	<5	ug/L	NC	20		
5083797	Total Titanium (Ti)	2011/08/13	105	80 - 120	111	80 - 120	<5	ug/L	NC	20		
5083797	Total Uranium (U)	2011/08/13	101	80 - 120	101	80 - 120	<0.1	ug/L	NC	20		
5083797	Total Vanadium (V)	2011/08/13	103	80 - 120	97	80 - 120	<5	ug/L	NC	20		
5083797	Total Zinc (Zn)	2011/08/13	NC	80 - 120	96	80 - 120	<5	ug/L	NC	20		
5083797	Total Aluminum (Al)	2011/08/13					<3	ug/L	NC	20		
5083797	Total Boron (B)	2011/08/13					<50	ug/L	NC	20		
5083797	Total Silicon (Si)	2011/08/13					<100	ug/L	6.5	20		

Maxxam Job #: B172156
Report Date: 2011/08/15

TECK RESOURCES LTD.
Client Project #: POLARIS MINE
Site Location: LITTLE CORNWALLIS ISLAND

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
5083797	Total Zirconium (Zr)	2011/08/13					<0.5	ug/L	NC	20		
5085753	Total Mercury (Hg)	2011/08/13	104	80 - 120	99	80 - 120	<0.02	ug/L	NC	20		

N/A = Not Applicable
RPD = Relative Percent Difference
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Maxxam Analytics Inc

Sample delivery to: 4606 Canada Way, Burnaby, BC, V5G 1K5, Tel: (604) 734-7276
www.maxxamanalytics.com

COC: 08335665

B172156

ANALYTICAL REQUEST FORM

Page: 1 of 1

Invoice To: Require Report? Yes ✓ No ☐

Company Name: Teck Resources
Contact Name: Bruce Donald
Address: Bag 2000
Kimberley, BC PC: V1A 3E1
Phone / Fax#: Ph: 250 427 8405 Fax: 250 427 8451

Report To: Same as Invoice
PC:
Ph: Fax:

PO# / AFE#:
Quotation #:
Project #:
Proj. Name: Polaris Mine
Location: Little Cornwallis Island
Sampler's Initials: CK

REGULATORY REQUIREMENTS:
- ☑ CSR
- ☐ CCME
- ☐ CCME FWAL
- ☐ MMER
- ☐ PST
- ☐ CDWQG
- ☐ G50

REPORT DISTRIBUTION:
- ☐ Mail
- ☐ Fax
- ☑ PDF
- ☑ Excel
- ☐ Other:
- ☑ Email: Bruce.Donald@teck.com

SERVICE REQUESTED:
- ☐ RUSH (Please ensure you contact the lab)
- Date Required:
- ☑ REGULAR Turnaround

METALS: (WATERS)
- ☑ Total
- ☐ Extractable
- ☐ Dissolved

ANALYSIS REQUESTED (Lab use only)

Lab ID	#	Sample Identification	Matrix	Date/Time Sampled	Sample Type Grab/Comp	Hold > 60 Days	Sample Container #	TSS	Total Metals	Lead	Zinc
BE8777	1	Con Shed North	Soil	July 19	Grab		Jar			X	X
BE8778	2	Con shed Central	Soil	"	"		Jar			X	X
BE8779	3	Con Shed South	Soil	"	"		Jar			X	X
BE8780	4	Frustration Lake	Water	"	"		Bottle	X			
BE8781	5	LRD	Water	"	"		Bottle		X		
	6										
	7										
	8										
	9										
	10										
	11										
	12										
		** For water samples, please indicate if sample container has been preserved (P) and/or filtered (F).							P		

B172156

Relinquished By: Curtis Kidd
Signature: Curtis Kidd
Date/Time: July 21, 4pm

Received: Nicole Lockyer Aug. 08, 2011 15:00

Temperature: 23, 23, 23

Login check

COMMENTS/SPECIAL INSTRUCTIONS:

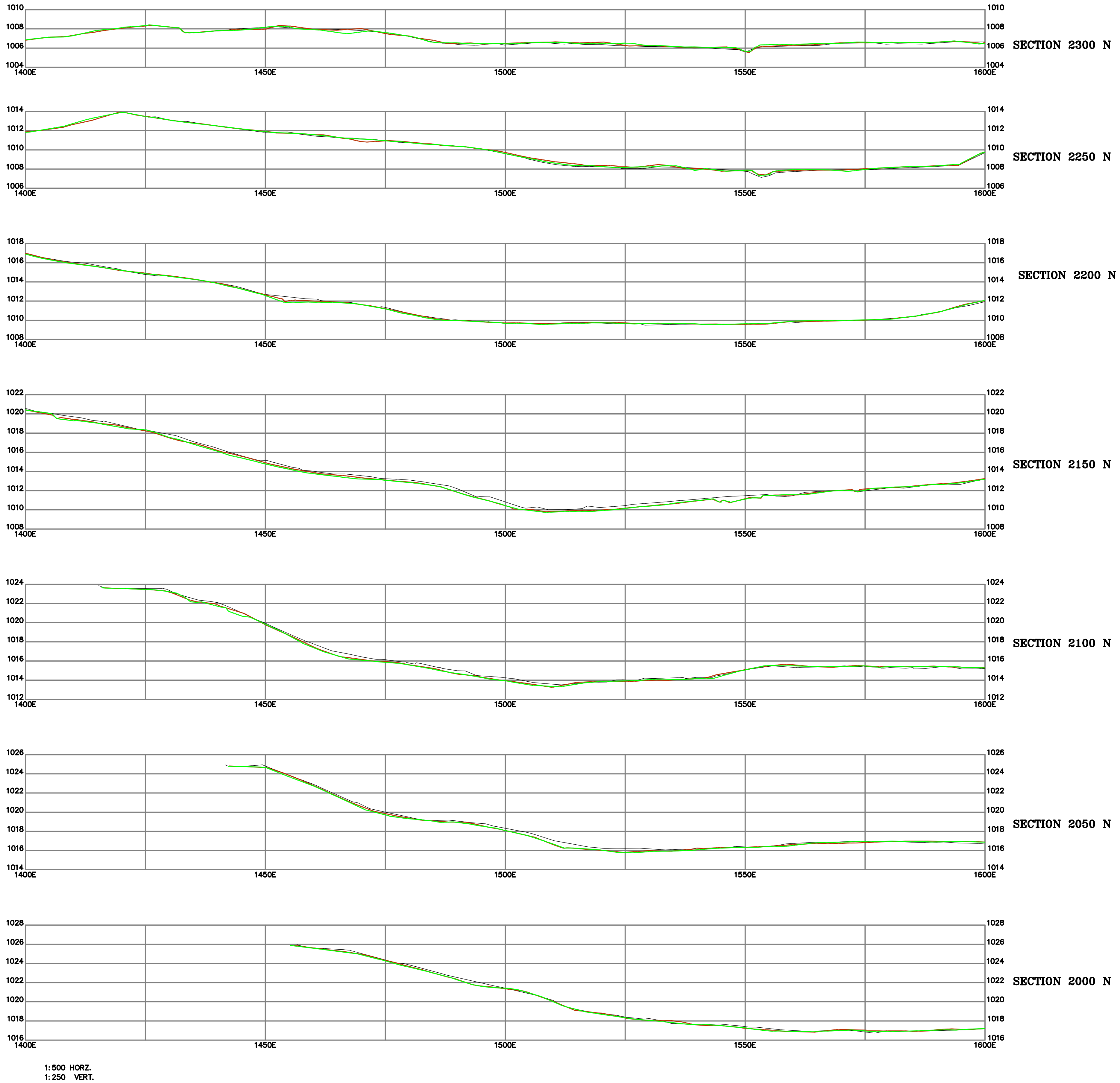
APPENDIX 7

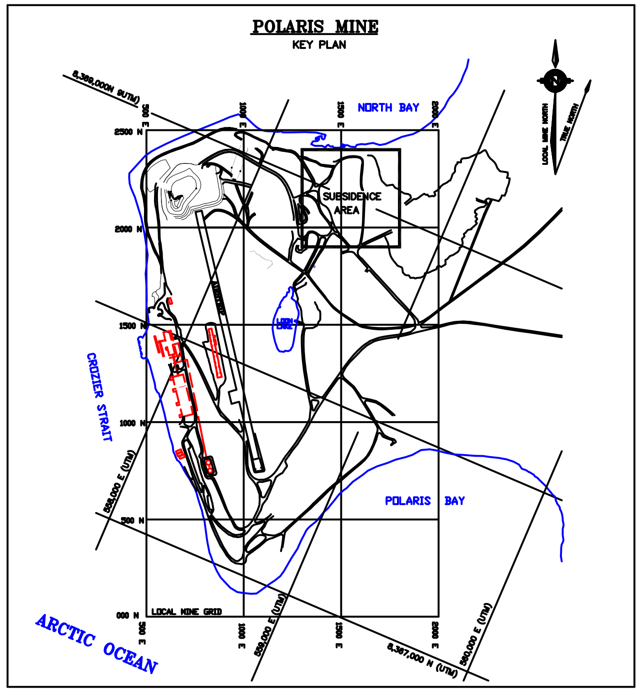
2011 Site Surveys Of

Subsidence Area, Marine Foreshore

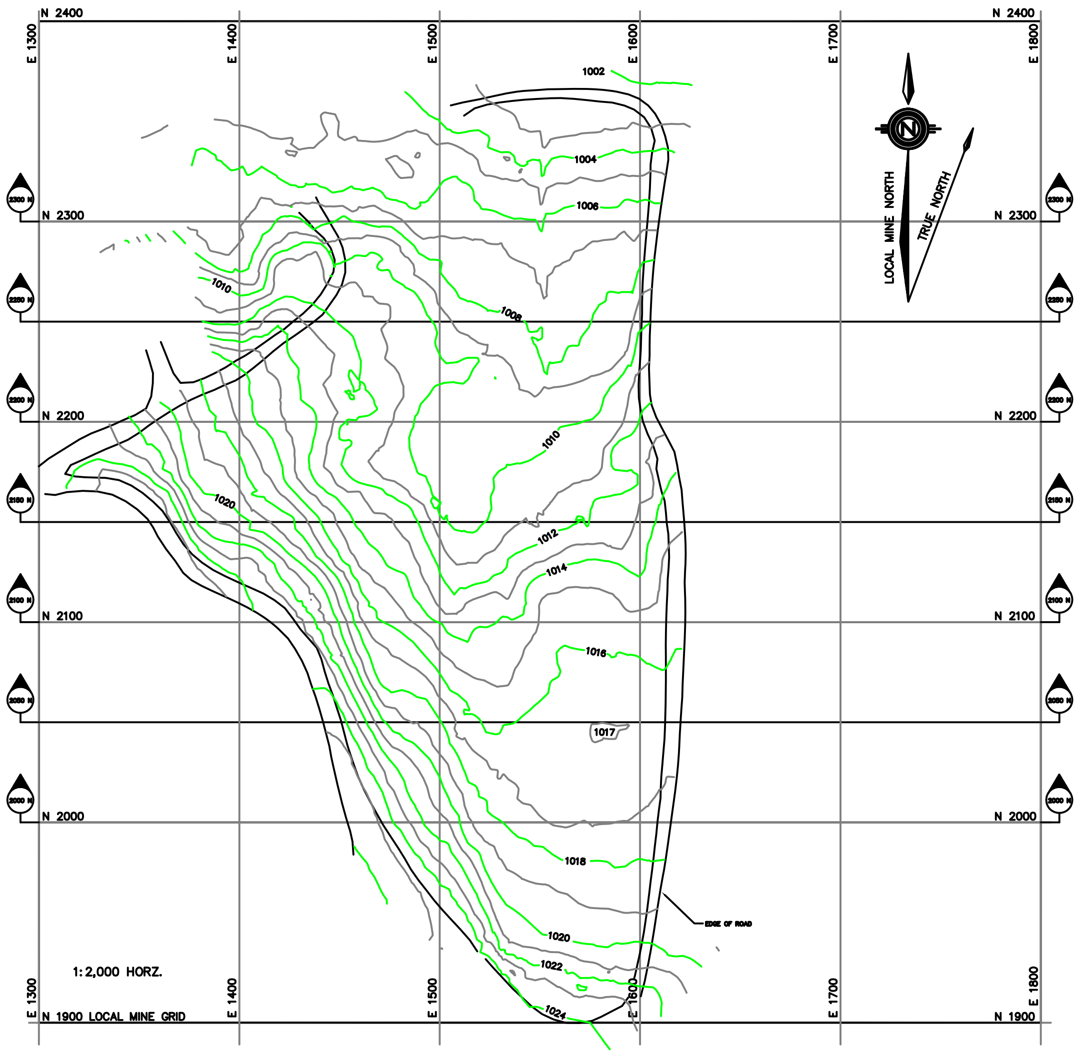
And

Garrow Lake Wave-Break Structure





POLARIS MINE
AREA 8



NOTES:

1. DATA COLLECTED JULY, 2011 BY FOCUS ENGINEERING.
2. SECTION CO-ORDINATES AND ELEVATIONS REFER TO LOCAL MINE DATUM.
3. CONTOUR INTERVALS = 1meter
4. SECTIONS HAVE A 2:1 VERTICAL EXAGGERATION.

LEGEND:

- DENOTES 2011 SURFACE.
- DENOTES 2010 SURFACE.
- DENOTES 2005 SURFACE.

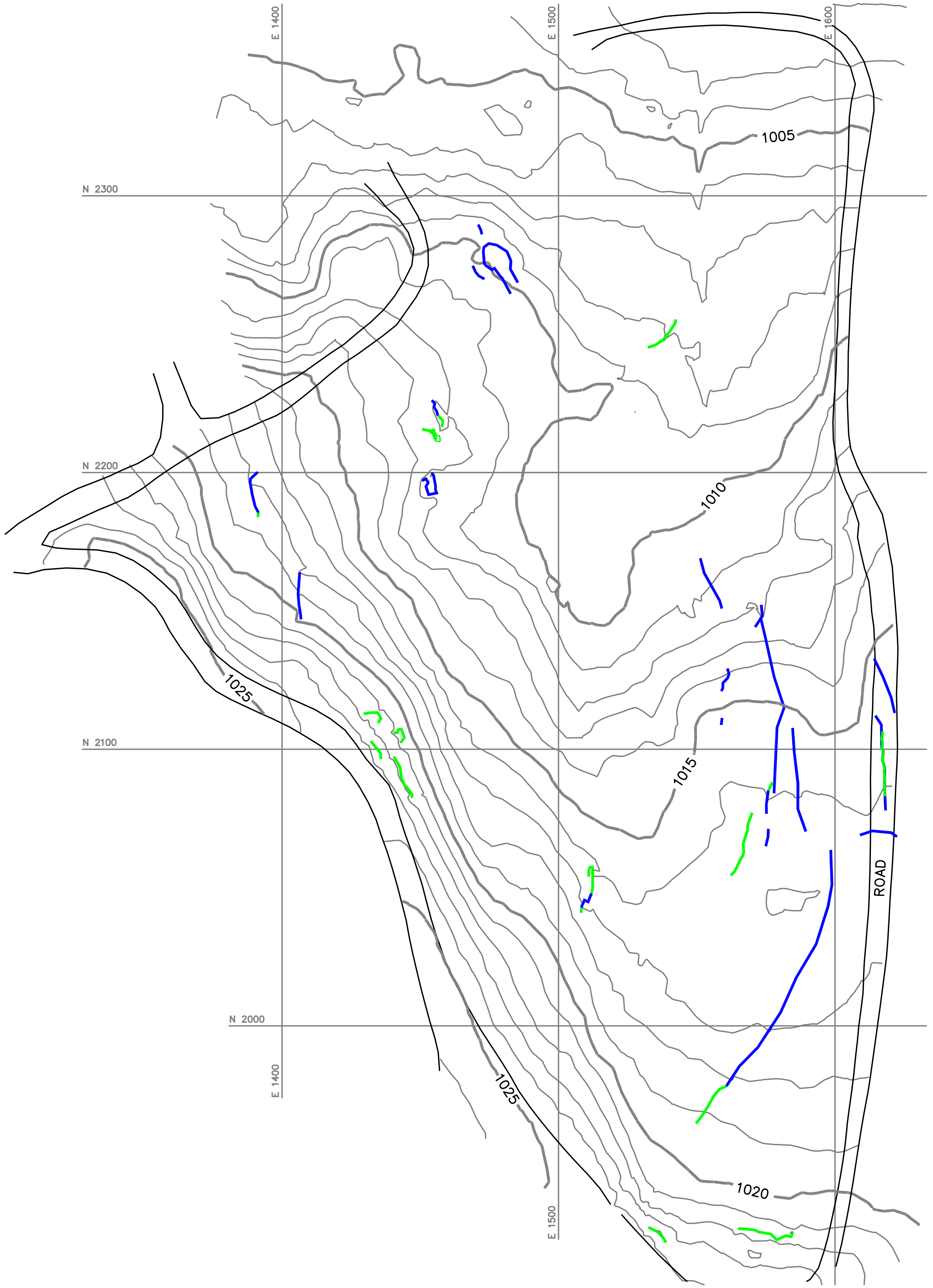
PROJECT:

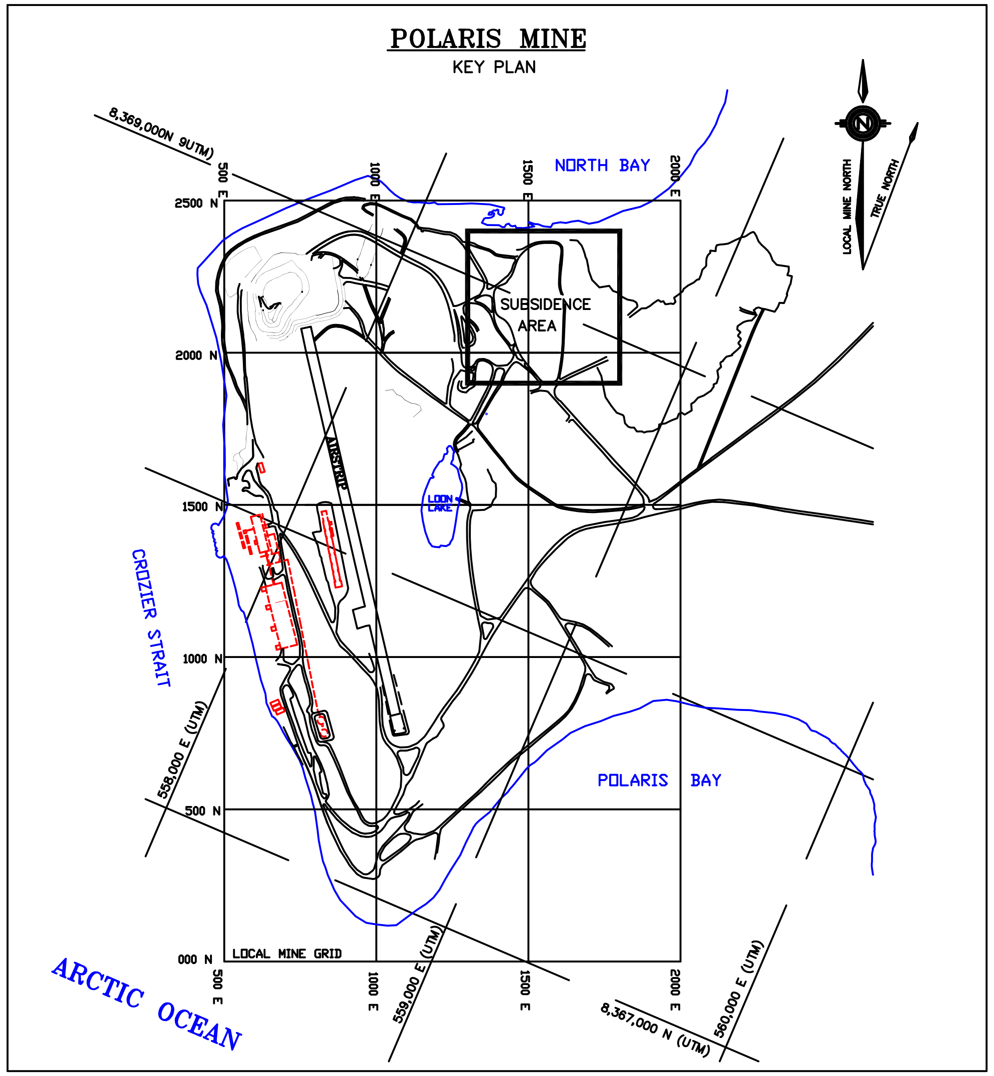
POLARIS MINE POST CLOSURE
2011 ANNUAL SITE INSPECTION

DRAWING:

PLAN & SECTION VIEWS
SUBSIDENCE – AREA 8

DRAWN BY: T. M. TECH SERVICES 10-542	CLIENT: Teck
DATE: AUGUST 3, 2011	SCALE: 1:500 HORZ. 1:250 VERT.
FIGURE No.: PM 2011 AREA 8	SHEET: 1 OF 2





POLARIS MINE
AREA 8

NOTES:

1. DATA COLLECTED JULY, 2011 BY FOCUS ENGINEERING.
2. ELEVATIONS REFER TO LOCAL MINE DATUM.
3. CONTOUR INTERVAL 1 meter.

LEGEND:

- (green line) DENOTES CRACKS LOCATED IN 2011 NOT PREVIOUSLY IDENTIFIED
- (blue line) DENOTES CRACKS IDENTIFIED IN PREVIOUS YEARS

CONTOURS FROM JULY 2011 SURVEY

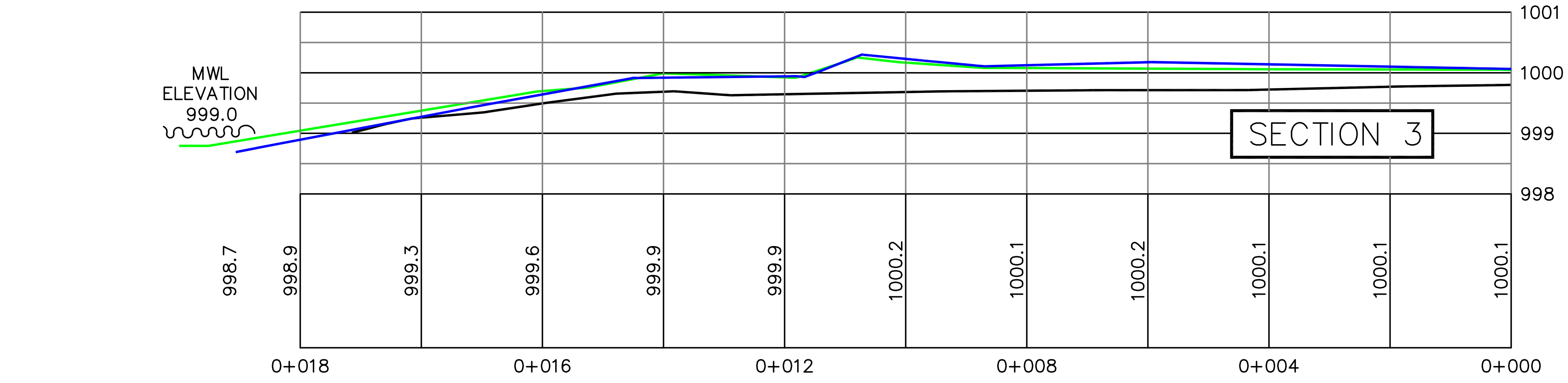
PROJECT:

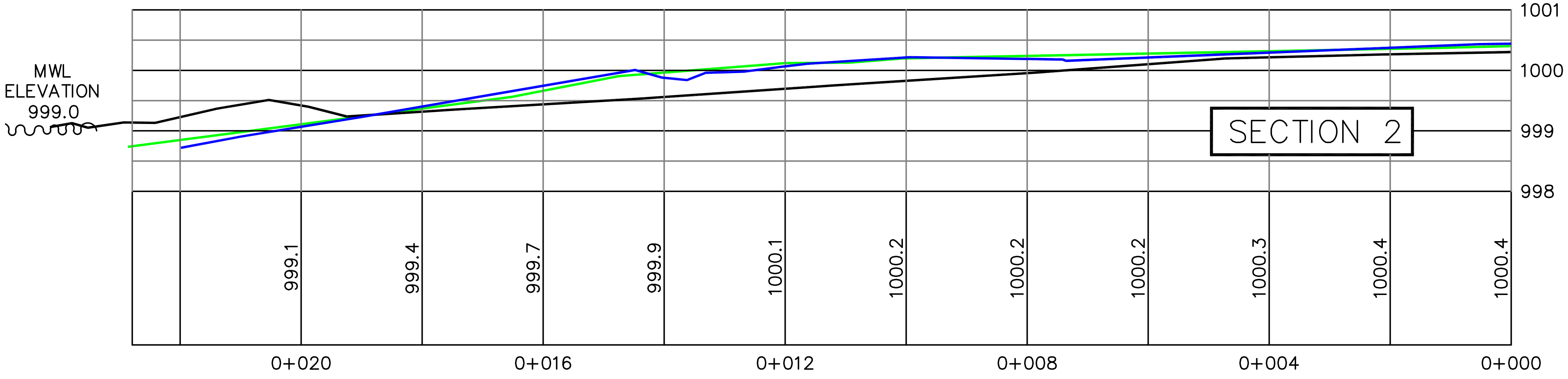
POLARIS MINE POST CLOSURE
2011 ANNUAL SITE INSPECTION

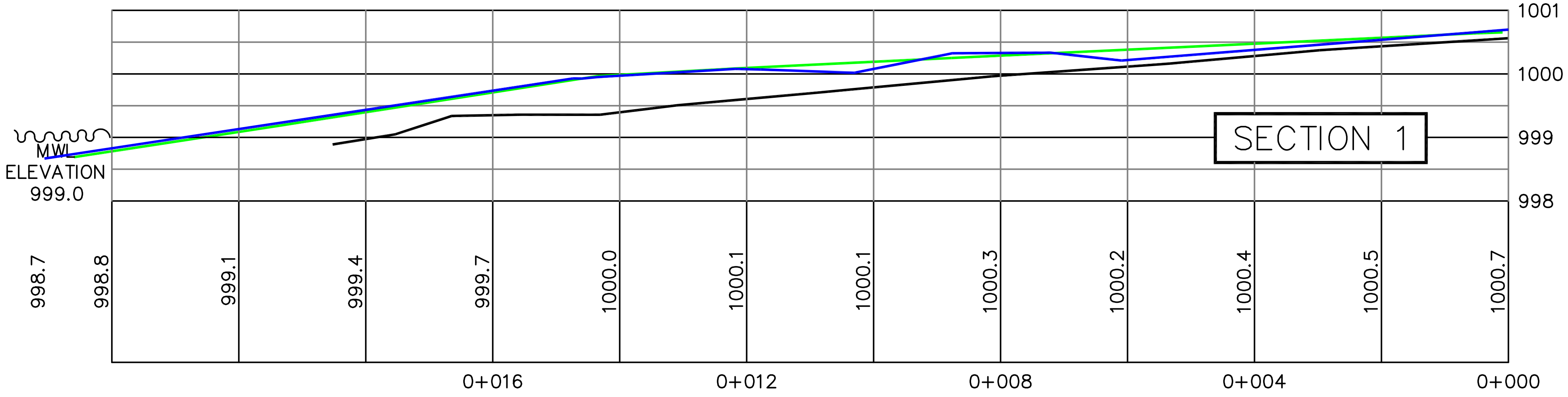
DRAWING:

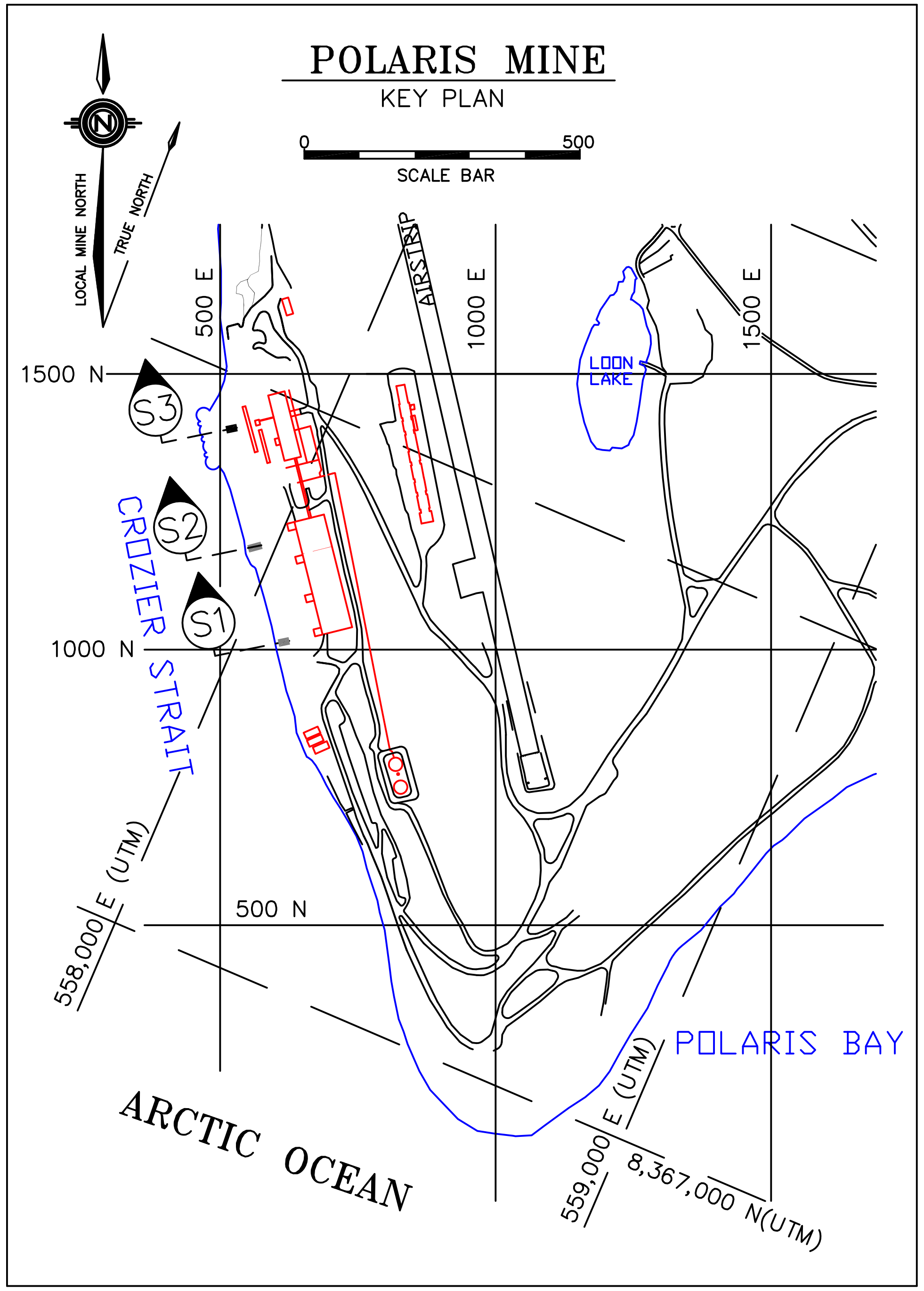
ANNUAL SURVEY REVIEW
SUBSIDENCE CRACKS – AREA 8

DRAWN BY: T. M. TECH SERVICES	CLIENT: Teck
11–578	
DATE: AUGUST 4, 2011	SCALE: 1:1000 (Metric)
FIGURE No.: PM 2011 AREA 8	SHEET: 2 of 2









No.	REVISION	DATE	BY
5			
4			
3			
2			
1			

NOTE:
1. DATA COLLECTED BY FOCUS ENGINEERING.
2. SECTION CO-ORDINATES AND ELEVATIONS REFER TO LOCAL MINE DATUM.
3. SECTION ELEVATIONS REFER TO 2010 SURVEY.

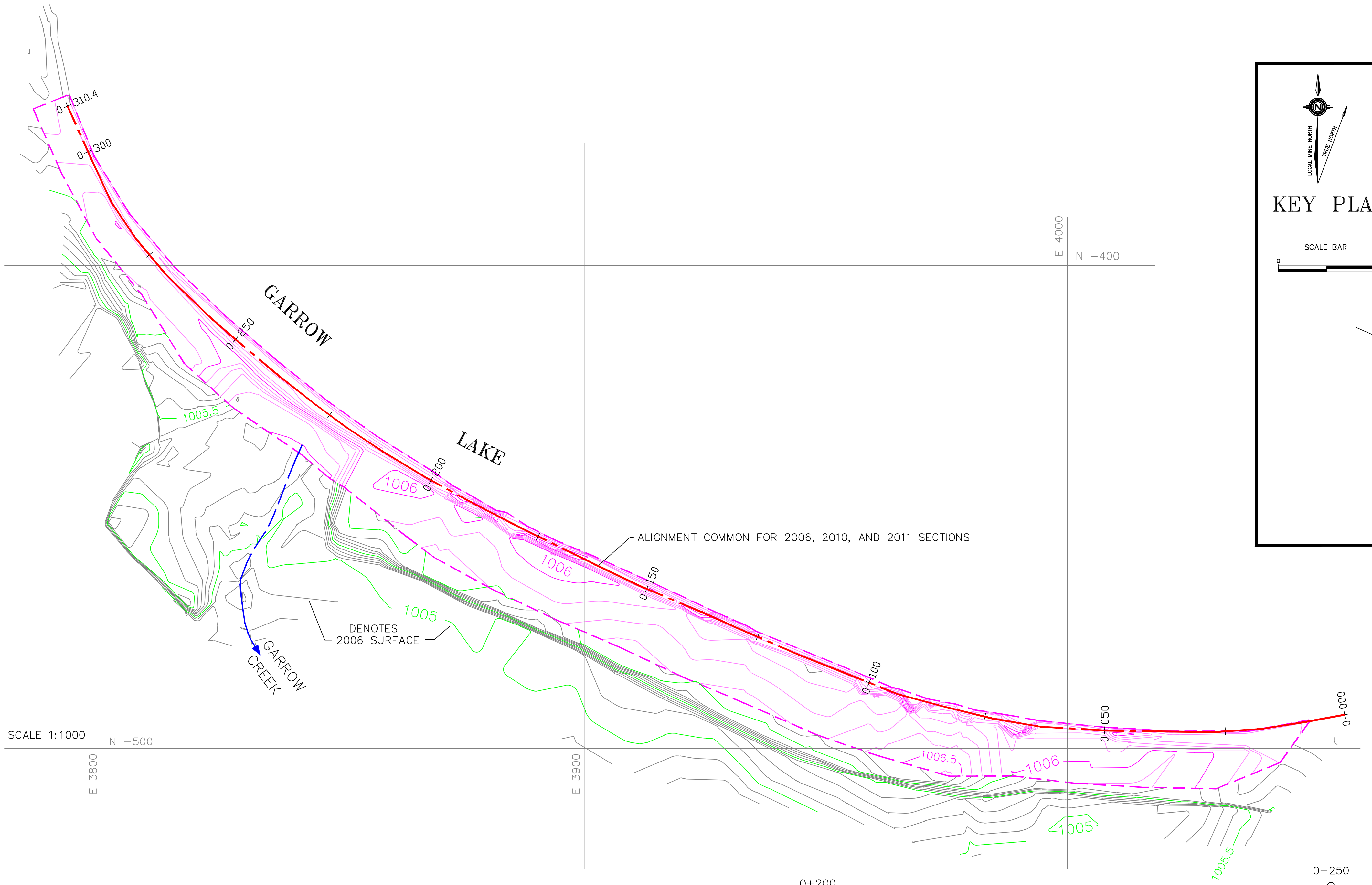
DENOTES 2011 SURFACE
DENOTES 2010 SURFACE
DENOTES 2005 SURFACE

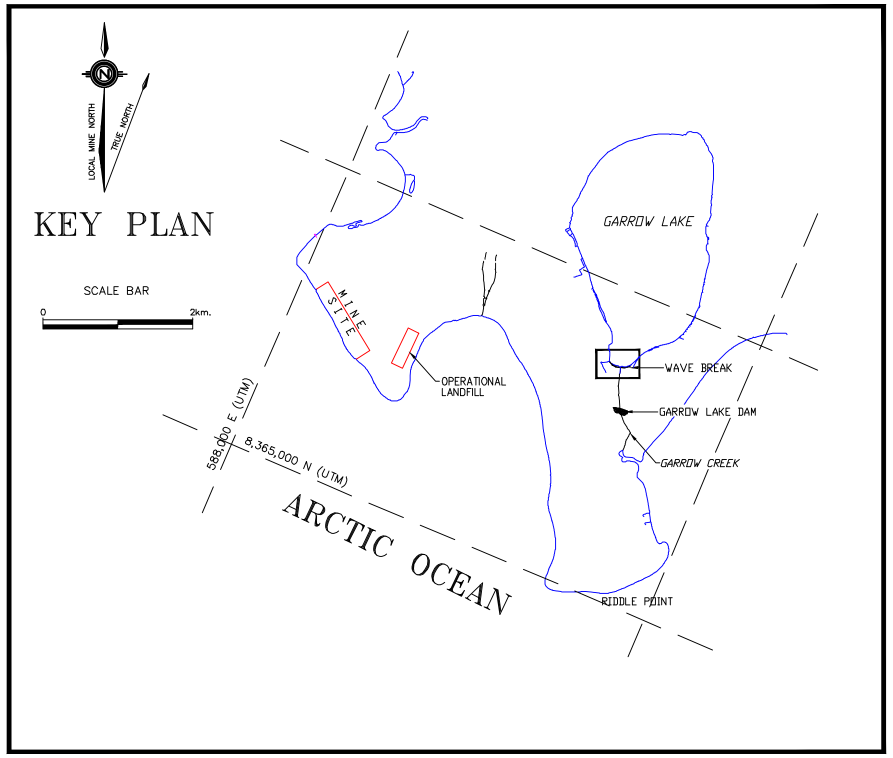
PROJECT:
POLARIS MINE POST CLOSURE
2011 ANNUAL SITE INSPECTION

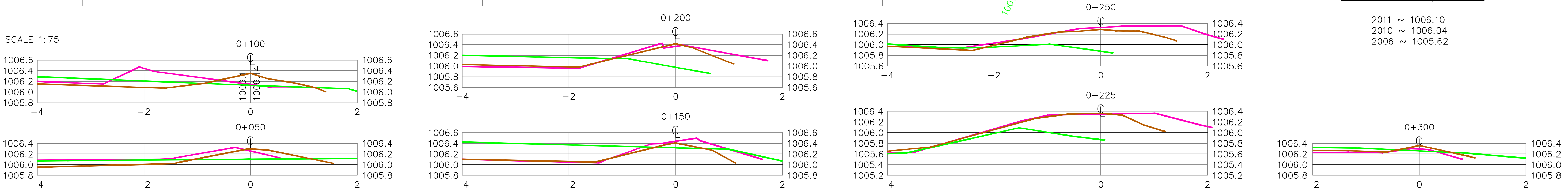
DRAWING:
MARINE FORESHORE SECTIONS

TM TECH SERVICES
CRANBROOK B.C.
(250)489–1855

DRAWN BY: T. MELNICK
11–579
DATE: August 3/11
CLIENT: Teck
SCALE: 1:100 Horz. 1:100 Vert.
FIGURE No.: PM 2011 AREA 4
SHEET: 1 OF 1







PROFILE SURFACE INDEX

- 2011 SURFACE
- 2010 SURFACE
- 2006 SURFACE

WATER ELEVATION (JULY TYP.)

2011 ~ 1006.10
2010 ~ 1006.04
2006 ~ 1005.62

No.	REVISION	DATE	BY
5			
4			
3			
2			
1			

NOTE:
1. DATA COLLECTED JULY, 2011 BY FOCUS ENGINEERING.
2. SECTION CO-ORDINATES AND ELEVATIONS REFER TO LOCAL MINE DATUM.
3. CONTOUR INTERVAL 0.1m

PROJECT:
POLARIS MINE POST CLOSURE
2011 ANNUAL SITE INSPECTION

DRAWING:
GARROW LAKE WAVE BREAK
2011

TM TECH SERVICES
CRANBROOK B.C.
(250)489-1855

DRAWN BY: T. MELNICK
11-580
CLIENT: Teck
DATE: AUGUST 6, 2011
SCALE: AS SHOWN
FIGURE No.: PM 2011 WB
SHEET: 1 OF 1

APPENDIX 8

Annual Geotechnical Inspection Report

By

Golder Associates

October 5, 2011

Annual Post-Closure Geotechnical Inspection

FORMER POLARIS MINE, NUNAVUT

Submitted to:
Teck Metals Ltd.

Report Number: 11-1118-0057

Distribution:

2 Copies – Teck Metals Ltd.

2 Copies – Golder Associates Ltd.

REPORT

A world of capabilities delivered locally

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Figure 1 Site Plan and Inspection Photograph Locations

Figure 2 Detail of Former Mine Site

Figure 3 Subsidence Area Survey, Plan and Cross-Sections

APPENDIX A
2011 Polaris Geotechnical Inspection Photographs

APPENDIX B
2011 Polaris Geotechnical Inspection Field Record Sheets

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Teck Metals Ltd. (Teck) to conduct the 2011 post-closure geotechnical inspection of the former Polaris mine located on Little Cornwallis Island, Nunavut. The geotechnical inspection was carried out by Mr. Darrin Johnson, P.Eng., on July 19 and 20, 2011.

The decommissioned Polaris mine site is located on Little Cornwallis Island approximately 120 km northwest of Resolute, Nunavut. Figure 1 presents the general arrangement of the decommissioned former Polaris mine site (the Site).

Current conditions were compared with conditions observed during previous post-closure geotechnical inspections. A summary of site conditions observed during the 2011 geotechnical inspection are presented in the following sections of this report. Photographs of current site conditions are presented in Appendix A. Field records of the inspection are attached in Appendix B.

The following areas were inspected during the July 2011 geotechnical inspection:

- Garrow Lake Area (including wave break structure and breached dam);
- Frustration Lake Jetty and Access Road;
- New Quarry Area;
- Subsidence Area;
- Operational Landfill;
- Little Red Dog Quarry Landfill;
- Mine Portals;
- Marine Foreshore Adjacent to Former Dock; and
- Former Temporary Camp Area.

The geotechnical inspection was conducted in accordance with the requirements of the approved Decommissioning and Reclamation Plan for the Site.

2.0 SITE HISTORY

The Polaris mine was operated by Teck between 1981 and 2002 and decommissioned in 2003 and 2004. Site facilities comprised an underground mine, concentrator plant, concentrate storage shed, dock, airstrip, tailings impoundment, freshwater intake on Frustration Lake, various site access roads, a limestone quarry, a shale quarry, and support infrastructure including fuel storage, camp, warehouse, etc. Decommissioning and reclamation of the site involved demolition of all structures and excavation of all soils contaminated by metals and hydrocarbons. All demolition waste and contaminated soil was either placed underground or in engineered landfills. Access roads between Garrow Lake, Frustration Lake and in the immediate vicinity of the previously active mining operations were decommissioned by rounding the shoulders of each road, removing culverts, and re-establishing natural drainage patterns. Facilities related to the airstrip were removed during decommissioning but the landing surface remains intact and has been used during the post-closure monitoring period. Little Cornwallis Island airstrip (referred to as LCI by local pilots) is also used occasionally by passing airplanes for emergency landings. Teck maintained a small portable camp near Loon Lake during the post-closure monitoring period that was relocated near the ocean in 2010 and removed from the Site in September 2011. The temporary camp area was regraded after the camp and other remaining post-closure equipment and supplies were relocated to the shore of Polaris Bay in preparation for removal from the Site.

The marine foreshore area and slope in the vicinity of the former concentrate storage shed on the west side of the island were regraded to relatively gentle slopes during decommissioning. The graded slopes are interrupted by access roads and ramps. The shoreline area in the immediate vicinity of the former dock structure is almost flat. Four portals for mine access and exploration activities have been sealed, backfilled and graded to match the surrounding slopes.

Little Red Dog Quarry, located at the northwest end of the airstrip was backfilled partially with demolition debris and metals contaminated soils and subsequently capped with rockfill. The remnant quarry walls above the level of the capping layer are benched and serve to catch ravelling material as the slopes gradually weather. Safety berms extend around the quarry perimeter, and additional safety measures in the form of a ditch and a high berm exist at the end of the airstrip. Thermistors were installed through the rockfill capping layer into the underlying landfilled materials at Little Red Dog Quarry. The Operational Landfill, located at the south end of the former mine facility area, was regraded and capped with rockfill during decommissioning. Thermistors were installed in the Operational Landfill at four locations during operation of the mine. The existing thermistor installations were modified following closure of the landfill to monitor the new cap, however only two of the four installations were successfully modified in 2005. The following year all four thermistor installations were restored to full function along with improvements to the data collection system and insulation at ground surface. Thermistors and dataloggers have been continuously monitoring ground temperature in the Operational Landfill since 2006. Landfill thermistor data has been downloaded and reported annually since 2007 by Teck. Ground temperature data measured by thermistors installed at the Little Red Dog Quarry Landfill and Operational Landfill indicates that the landfilled waste is frozen and that permafrost has extended up into the overlying rockfill cover effectively encapsulating waste materials in ice as designed.

The Subsidence Area is located over top of former underground mine workings and experienced significant settlement during mine operations. During decommissioning, the Subsidence Area was backfilled with non-hazardous solid waste, covered with rockfill, and regraded. No further ground deformations have been detected since annual post-closure topographic survey monitoring commenced in 2004. Detailed topographic survey measurements of this area are carried out annually and reported on separately by Teck. The New Quarry area was a source of shale during mine construction, operations and decommissioning. It has been reclaimed by backfilling stripped materials against the quarry perimeter walls. Two erosion gullies at the south end of the New Quarry were repaired and lined with rip-rap to form an erosion resistant channel for drainage from Loon Lake. Access roads across the site were decommissioned and culverts were removed to restore natural drainage crossings that would not require ongoing maintenance. All-Terrain-Vehicles (ATVs) were driven on these access roads to facilitate post-closure inspection and monitoring. A rockfill jetty remains at Frustration Lake that was constructed for the freshwater supply intake during operation of the mine. Freshwater pumps and piping were removed during decommissioning.

At Garrow Lake, the former tailings disposal area, the impoundment dam and wave break structure were breached during decommissioning to return water levels to pre-development levels and to eliminate structures requiring long-term monitoring and maintenance. The central part of the main dam was breached and a rip-rap lined channel was constructed. Decommissioning of the impoundment dam lowered the water level in Garrow Lake by approximately two and one half metres to its pre-development level. The condition and stability of the reinstated Garrow Lake shoreline was monitored for several years after the dam was breached and appears to be stable. Since the site was decommissioned and pre-development water levels were reinstated, natural wave and ice processes have resulted in the deposition of gravel along the south shore of Garrow Lake in front of the

former wave break structure. Topographic survey measurements of the natural gravel berm near the former wave break structure have been carried out bi-annually and reported on separately by Teck.

3.0 OBJECTIVES AND LIMITATIONS OF GEOTECHNICAL INSPECTION

The primary objective of the geotechnical inspection is to assess the physical condition of decommissioned mine areas for evidence of slope instability, erosion or other landform instabilities that could present a safety hazard to either humans or wildlife. The stability of embankments and slopes was assessed by looking for visual indications of instability (i.e., tension cracks, slumping, etc). The stability of underground mine openings was not assessed. Where inspection comments in this report rely on information collected and reported by others (e.g., thermistor and topographic survey data), Golder cannot take responsibility for measurements taken by others.

Appendix A includes a series of annotated photographs taken during the 2011 geotechnical inspection. Photograph locations were recorded using a hand-held Global Positioning System (GPS) and are shown in plan on Figure 1. Figure 2 presents a detail of the former mine site area with photograph locations. A summary of inspection photographs and approximate Northing and Easting coordinates are listed in Table 1. Conditions observed during the 2011 inspection were compared to previous annual inspections to identify if any changes have occurred that may indicate instability or a potential safety hazard. Conditions that were observed to have changed from previous inspections were documented on field inspection forms and photographed. Where observed conditions appeared unchanged from previous inspections or decommissioning, a general comment noting such was documented on the field inspection forms.

Teck contracted a land surveyor again in 2011 to carry out topographic surveying of the subsidence area and the Garrow Lake wave break structure to document any changes over time. Teck also downloaded ground temperature data from the thermistor dataloggers at the Operations Landfill and Little Red Dog Quarry Landfill. Topographic survey and thermistor data are reported under separate cover by Teck.

4.0 GEOTECHNICAL INSPECTION OBSERVATIONS

4.1 Operational Landfill

Photographs 1 through 23 illustrate conditions observed at the Operational Landfill during the July 2011 inspection. No indications of slope instability or exposed waste were observed. No tension cracks or settlement depressions were observed on the landfill crest. No indications of erosion or slope instability were observed on the landfill slopes.

Photo 5 illustrates typical undulations in the rockfill cover at the top of the slope (Waypoint 2 on Figure 2) from minor settlement or construction that are not considered a concern. Photo 7 illustrates some typical construction vehicle tire rutting on the crest.

Minor clear seepage from normal thaw was observed at a few locations along the toe of the Operational Landfill (Photos 12 and 13) but no significant seepage or staining was observed on the slope or along the toe.

Ground temperature versus depth through the rockfill cover and waste is monitored at the Operational Landfill by thermistor strings installed at four locations on the landfill crest. The purpose of the thermistors is to monitor ground temperature in the landfilled waste and cover material to confirm that permafrost has migrated up through the waste into the rockfill cover. Recent post-closure ground temperature monitoring at the Operational Landfill indicates the active (i.e., seasonally thawed) zone is about 1.25 m deep or less confirming that active

(thaw) zone is within the 1.8 m thick shale rockfill cover.. Ground temperature data are reported by Teck separately.

Photograph 24 is an erosion gully on the slope above the Operational Landfill crest. The erosion gully appears to be self-armouring and erosion has not extended onto the rockfill landfill cover or exposed any waste.

4.2 Garrow Lake Dam and Wave Break Structure

A wave break structure was originally constructed to reduce the fetch of the Garrow Lake and protect the upstream slope of Garrow Lake Dam from wave action. During decommissioning a section of the wave break structure was excavated in the area of the original creek channel to return the lake water level to its original elevation. Photograph 25 is a view of the wave break structure from the access road west of the wave break structure and Photograph 26 is a view of the wave break structure from the breached dam facing Garrow Lake.

Photographs 27 through 34 illustrate the condition of the breached Garrow Lake Dam and creek channel. Minor thaw settlement on the crest of the breached dam has been unchanged during recent post-closure annual geotechnical inspections (Photos 27 and 34). The sideslopes of the dam breach were observed to be free of erosion or indications of slope instability during the July 2011 inspection (Photos 28, 31, and 32). Photographs 29 and 30 are views of the creek and channel through the breached dam. Rip-rap at the base of the breach slopes appears to be in good condition and effectively protects the breach slopes from channel erosion (Photo 33).

Since decommissioning, a ridge of gravel has been accumulating across the breached wave break outlet channel. The ridge or berm of gravel across the breached outlet has been increasing in size (i.e., elevation and width) each year as a result of additional gravel accumulation. The mechanism creating the ridge of gravel is considered to be ice and wave action that relocates gravel from the shallow water near the south shore of Garrow Lake. This appears to be a natural process that likely also occurred prior to mine site development. The relatively coarse nature of the gravel permits a steady flow of water through the gravel ridge from the lake into the creek channel during the summer. However, the gravel ridge appears to be retaining some water and may be influencing the lake water level. The gravel berm at the time of the July 2011 inspection is documented in Photographs 35 through 38. The lake water level and gravel berm elevation are surveyed annually to quantify any changes in lake level and/or outlet elevation (survey reported by Teck under separate cover). At the east end of the wave break structure, seepage through the gravel berm and wave break rockfill has caused some settlement (Photo 39). Recent collection of high density polyethylene (HDPE) pipe with a bull dozer has created tracks on the wave break structure (Photo 40).

4.3 Little Red Dog Quarry Landfill

No protruding waste, tension cracks or settlement depressions were observed on the Little Red Dog Quarry Landfill cover during the July 2011 inspection. Photographs 41, 42, 43, 47, 48 49 and 50 document the condition of the Little Red Dog Quarry Landfill cover during the July 2011 inspection.

In August of 2010, all non-hazardous solid waste materials that remained on-site after decommissioning and miscellaneous debris collected during the post-closure monitoring period (e.g., wood and steel) was placed in a 1.5 m deep excavation into the existing rockfill cover at the southeast end of the Little Red Dog Quarry. The debris was placed into the excavation up to an elevation approximately 0.5 m below the top of the existing rockfill cover. The debris was buried with a 0.5 m thick layer of fine-grained rockfill up to the existing cover grade and

an additional 3 m thick rockfill berm extending 2.5 m out to the north, south and west. Photographs 44 and 45 are views of the top of the rockfill berm and Photograph 46 is a view of the rockfill berm sideslopes.

Ground temperature versus depth through the rockfill cover and waste is monitored at the Little Red Dog Quarry Landfill by thermistor strings installed at four locations. The purpose of the thermistors is to monitor ground temperature in the landfilled waste and cover material to confirm that permafrost has migrated up through the waste into the rockfill cover. Recent post-closure ground temperature monitoring at the Little Red Dog Quarry indicates the active (i.e., seasonally thawed) zone is about 1.3 m deep or less confirming that active (thaw) zone is within the 1.8 m thick shale rockfill cover. Ground temperature data are reported by Teck separately.

4.4 Mine Portals

The Polaris Mine was an underground mining operation. There were four portals used to access the mine and/or to convey ore out of the mine. During mine decommissioning, the portals were sealed and covered with rockfill to prevent access to the underground mine workings. One of the objectives of the annual post-closure geotechnical inspection is to look for evidence of settlement, erosion, or slope instability at the closed mine portals that might present a safety risk to humans or wildlife. All four portals were observed to be in good condition and free of any signs of instability or erosion during the July 2011 inspection (Photographs 51, 89, 107-112).

The slope in front of the main portal that was regraded and flattened in 2009 to repair a slope failure was observed to be in good condition (i.e., as repaired in 2009 and unchanged from the 2010 inspection). Photograph 109 is a close-up of some thaw creep on the upper half of the Main Portal slope above the repaired area where the slope remains a bit steep and may continue to experience some thaw creek and/or slumping. However, this upper section of slope is supported by the lower, flatter slope which should prevent a large slope failure in front of the Main Portal. Photograph 111 is a view of the backfilled Main Portal slope from above (i.e., facing downslope).

4.5 Subsidence Area

There were no significant visual changes to the mine subsidence area observed during the July 2011 geotechnical inspection compared to previous post-closure inspections. No features were observed in the subsidence area during the July 2011 inspection that present a risk to either humans or wildlife.

Photographs 52 through 67 document subsidence area conditions observed during the July 2011 geotechnical inspection. Photographs 54, 55, 63, 64, 65 and 66 illustrate typical settlement in the subsidence area likely caused by thaw of frozen backfilled material. Some of these thaw settlement areas have associated tension cracks around the perimeter and all have gentle slopes that do not present a risk to either humans or wildlife.

There are some longer tension cracks in the subsidence area (see Photos 57 and 60) that have been observed during previous post-closure inspections (i.e., are not new) and may be related to larger-scale settlement of the area. Photograph 61 is a tension crack on the access road east of the subsidence area that is likely related to movement of the road embankment slope towards the New Quarry (i.e., not related to settlement in the subsidence area).

There is an area of ponded water in the subsidence area (Photo 62) indicating that permafrost prevents drainage of surface water from the settlement depression.

Teck retained Focus Engineering again in 2011 to conduct a topographic survey of the subsidence area (reported separately by Teck). Figure 3 compares the 2011 topographic survey to previous post-closure surveys. Annual topographic surveying indicates that no significant settlement has occurred during the post-closure monitoring period (i.e., since 2005).

4.6 New Quarry Area

Photographs 68 through 71 are rip-rap lined ditches draining to the west side of the New Quarry that have been performing well since they were repaired in 2006. Backfilled perimeter sideslopes around the New Quarry have not changed significantly from previous post-closure inspections (Photographs 72 through 81).

Some larger erosion gullies on the perimeter sideslopes have resulted in localized slope flattening (Photograph 73). Photograph 78 illustrates typical erosion gully development on New Quarry slopes that appears self-armouring. Photograph 75 illustrates an area with minor slope slumping and some related erosion. Minor erosion and slumping of slopes is a normal process in the arctic as slopes reach a state of equilibrium. Minor erosion and slumping of the backfilled sideslopes around the perimeter of the New Quarry is not considered problematic and does not pose a safety hazard to humans or wildlife.

Previously observed settlement on the backfilled slopes was generally unchanged from previous inspections (Photos 80, 81 and 82). Settlement of backfilled slopes is likely the result of buried snow and ice that has melted and is not considered problematic.

Photographs 83 through 85 are views of the New Quarry central drainage ditches that appear to be functioning as intended. Photographs 86 through 88 are old tension cracks along the top of the backfilled slopes at the south side of the New Quarry. These old tension cracks appear to be drainage gullies that have healed with self-armouring erosion confirming they are not new and are not considered cause for concern.

4.7 Marine Foreshore Adjacent to Former Dock

The slopes adjacent to the former dock structure were observed to be stable. No active erosion features discharging sediment were observed in the foreshore area during the July 2011 inspection. The water adjacent to the shoreline has been clear during the current and previous geotechnical inspections indicating that sediment is not being discharged to the ocean from the reclaimed foreshore area. Photographs 90 through 106 document the condition of the marine foreshore area during the July 2011 inspection.

Thaw settlement and the formation of gravel bars in response to ocean wave and ice action has been observed along the shoreline during previous post-closure inspections. Photograph 95 documents one of the larger thaw settlement areas that is now connected to the ocean. Photographs 100 and 103 are examples of smaller thaw settlement areas along the shoreline. Photographs 101 and 102 highlight the gravel berm that is accumulating along the shoreline. Overall the foreshore area appears to be stable and is not expected to require further attention.

4.8 Frustration Lake Access Road and Jetty

The Frustration Lake access road remains in good condition, with some self-armouring erosion at drainage crossings. Previously repaired erosion gullies were all observed to be stable during the July 2011 inspection and should not require further attention (Photographs 113 through 119).

A rockfill jetty was constructed out into Frustration Lake for the freshwater supply pump station. The pump house and associated water lines were removed during site decommissioning but the rockfill jetty remains. Displacement of some jetty rockfill due to ice being pushed up onto the end of the jetty was observed during the July 2011 inspection. Photographs 120 through 123 document the condition of the jetty crest and edges at the time of the inspection. Lake water around the jetty was observed to be clear during the July 2011 inspection.

5.0 DISCUSSION

Conditions observed during the July 2011 geotechnical inspection have not changed significantly from previous post-closure geotechnical inspections. Previously identified minor erosion appears to be stable and self-armouring. The slope in front of the main portal that was repaired in 2009 was observed to be stable and unchanged from the 2010 inspection. During the 2011 inspection there were no observed indications of slope instability or problematic erosion that could present a safety hazard to either humans or wildlife. Overall the site appears to be stable and should not require ongoing maintenance. The following is a summary of the current status of each area inspected.

5.1 Operational Landfill

No exposed waste, significant erosion or indications of slope instability were observed on the landfill crest or slopes of the Operational Landfill during the July 2011 inspection. No significant or problematic seepage was observed from the toe of the Operational Landfill during the July 2011 inspection. In general, post-closure visual inspections indicate that the Operational Landfill rockfill cover is physically stable.

5.2 Garrow Lake Area

The breached slopes of the decommissioned Garrow Lake Dam have been stable during post-closure inspections. Channel rip-rap along the lower slopes of the dam breach has also been stable and has resisted creek flows experienced in the channel since decommissioning (i.e., post-closure inspections have not indicated problematic erosion of the creek channel).

A natural gravel berm has formed across the breached wave break structure outlet as a result of gravel deposition from ice and wave action. The gravel berm and remaining rockfill wave break structure allow seepage of water during the summer months, however the gravel berm appears to retain some water when frozen, resulting in a minor influence on the water level in Garrow Lake. Teck has been monitoring and reporting water levels in Garrow Lake annually during the post-closure monitoring period. The wave break structure is constructed of rockfill which is more resistant to erosion from overtopping than the gravel berm deposited by wave and ice action. If overtopping of the gravel berm were to occur, it could result in some displacement of gravel downstream of the breached wave break structure. The formation of a gravel berm across the breached wave break structure outlet is considered a natural process and is not expected to be problematic or require attention.

5.3 Little Red Dog Quarry Landfill

The rockfill cover at the Little Red Dog Quarry Landfill continues to show no indications of instability or settlement. No waste was observed to be protruding through the rockfill cover. A small quantity of remaining non-hazardous solid waste materials and debris collected during the post-closure monitoring period was buried beneath a thick rockfill cover in August 2010.

5.4 Mine Portals

All four portals were observed to be in good condition and free of any signs of instability or erosion during the July 2011 inspection. A slope failure at the main portal that was first observed in August 2008 and repaired in July 2009, was observed to be as repaired in 2009 (and as observed during the July 2010 inspection). The lower half of the main portal slope that was repaired in 2009 is flatter than the upper slope so there may be some future thaw creep and slumping of the steeper slope above the main portal (i.e., above the repaired area). However, the flatter lower half of the slope should resist large scale slope failures in front of the sealed main portal. Minor slumping of backfill material in front of the sealed mine portals should not expose the mine seals or allow access into the underground mine workings.

5.5 Subsidence Area

No features in the subsidence area were observed during the July 2011 inspection that present a risk to either humans or wildlife. There were no visual changes at surface in the subsidence area from previous post-closure inspections. Furthermore, annual topographic surveying during the post-closure monitoring period has not detected any settlement in the subsidence area.

5.6 New Quarry Area

Previously repaired erosion gullies crossing an access road south of the New Quarry appear to be stable and performing well. Previously observed settlement at the bottom of backfilled slopes appears to be stable and is not considered problematic. Previously observed minor erosion and slumping does not pose a safety hazard to humans or wildlife, is considered a normal process as slopes reach a state of equilibrium and is not considered problematic.

5.7 Marine Foreshore Adjacent to Former Dock

Previously observed gravel bar formation and thaw settlement along the former dock area shoreline appears to be an ongoing response to natural processes including ocean wave and ice action. The water adjacent to the shoreline has been clear during post-closure geotechnical inspections indicating that the decommissioned foreshore area is not actively discharging sediment to the ocean. Overall the foreshore area appears to be stable and should not require further attention.

5.8 Frustration Lake Jetty and Access Road

The lake water around the jetty has been clear during post-closure inspections indicating that water quality in Frustration Lake has not been impacted by suspended sediment as a result of jetty erosion. Repaired drainage crossings and water bars across the Frustration Lake access road are stable and should not require any further attention.

6.0 POST-CLOSURE STATUS AND RECOMMENDATIONS

The following is a summary of the geotechnical status of the former Polaris mine site based on recent post-closure visual inspections:

1. No repairs or maintenance are recommended at the present time to stabilize slopes or control erosion. Any future erosion should be self-armouring and consistent with ongoing natural processes at the site.

2. The landfills appear to be stable and should not require ongoing maintenance. No waste materials have protruded the final cover during the post-closure monitoring period. Ground temperature monitoring indicates that permafrost has moved up into the final cover and encapsulated the waste.

3. No significant settlement has been observed in the subsidence area during the post-closure monitoring period. However, according to BGC Engineering Inc. report dated March 23, 2010 (BGC, 2010) there may be some risk of future subsidence. Should future settlement occur in the subsidence area that presents a risk to humans or wildlife, then installation of a perimeter safety fence could be considered to prevent access to the area. Installation of safety fencing around areas of mine subsidence is a common and accepted practice in more populated areas so it should also be considered acceptable at a remote site like Polaris.

4. Geotechnical inspections have been carried out annually during the 7 year post-closure monitoring period. The focus of any future geotechnical monitoring should be the landfills, breached dam channel and subsidence area. Visual monitoring of the ponded water in the subsidence area (e.g., increased pond size or disappearance of ponded water) may provide an indication of changing subsurface conditions in the subsidence area. Use of aerial (i.e., fly-over) inspections and/or possibly satellite imagery should be considered to monitor the subsidence area, dam breach and landfills. This would make the need for ground inspections less frequent (e.g., if aerial inspections identify an issue or concern).

7.0 REFERENCES

BGC Engineering Inc. (2010), “July 24, 2009 Site Visit and Inspection, Polaris Mine Decommissioning and Reclamation” Report Number 0131-062-01, Submitted to Indian and Northern Affairs Canada, dated March 23, 2010.

Golder Associates Ltd. (2010), “Report on 2010 Geotechnical Inspection, Former Polaris Mine, Nunavut”, Report Number 10-1118-0019, Submitted to Teck Resources Ltd., dated January 2011.

Report Signature Page

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TABLES

Table 1 - Summary of 2011 Polaris Geotechnical Inspection Waypoints and Photographs

Waypoint	Date	Inspection Area	Location Description	Photographs	Northing (m)	Easting (m)	Elevation (m)
1	19-Jul-11	Operational Landfill	Central Crest	1,2,3,4	8,367,511	558,848	35
2	19-Jul-11	Operational Landfill	Central Slope	5	8,367,563	558,892	34
3	19-Jul-11	Operational Landfill	Northeast Crest	6,7	8,367,708	558,928	40
4	19-Jul-11	Operational Landfill	Northeast Slope	8	8,367,681	558,949	36
5	19-Jul-11	Operational Landfill	North Toe	9	8,367,745	558,993	26
6	19-Jul-11	Operational Landfill	Northeast Toe	10,11,12	8,367,615	558,997	20
7	19-Jul-11	Operational Landfill	Central Toe	13,14	8,367,444	558,935	13
8	19-Jul-11	Operational Landfill	South Toe	15,16,17	8,367,350	558,874	21
9	19-Jul-11	Operational Landfill	South Crest	18,19,20	8,367,385	558,812	45
10	19-Jul-11	Operational Landfill	South Slope	21	8,367,280	558,806	27
11	19-Jul-11	Operational Landfill	Back of Crest	22,23,24	8,367,525	558,793	42
12	19-Jul-11	Garrow Lake (Wave Break)	Road to Dam	25	8,367,194	561,353	34
13	19-Jul-11	Garrow Lake (Breached Dam)	West Dam Abutment	26,27,28	8,366,981	561,617	18
14	19-Jul-11	Garrow Lake (Breached Dam)	Creek	29,30	8,366,914	561,665	8
15	19-Jul-11	Garrow Lake (Breached Dam)	East Dam Abutment	31,32,33	8,366,982	561,687	3
16	19-Jul-11	Garrow Lake (Breached Dam)	East Abutment Crest	34	8,366,943	561,719	10
17	19-Jul-11	Garrow Lake (Wave Break)	Downstream of Wave Break	35,36	8,367,438	561,578	6
18	19-Jul-11	Garrow Lake (Wave Break)	Breached end of Wave Break	37	8,367,496	561,587	9
19	19-Jul-11	Garrow Lake (Wave Break)	East end of Wave Break	38,39,40	8,367,475	561,724	9
20	19-Jul-11	Little Red Dog Quarry	Entrance to Quarry	41,42,43	8,368,701	557,614	39
21	19-Jul-11	Little Red Dog Quarry	New Waste Berm	44,45,46	8,368,629	557,717	39
22	19-Jul-11	Little Red Dog Quarry	South end of Landfill	47,48	8,368,596	557,682	34
23	19-Jul-11	Little Red Dog Quarry	North end of Landfill	49,50	8,368,788	557,714	39
24	19-Jul-11	Mine Portals	North Portal	51	8,369,079	558,032	0
25	19-Jul-11	Subsidence Area	Northwest end	52,53	8,369,073	558,270	5
26	19-Jul-11	Subsidence Area	North end	54	8,369,107	558,323	3
27	19-Jul-11	Subsidence Area	South end	55,56	8,368,792	558,609	20
28	19-Jul-11	Subsidence Area	Central backfilled area	57,58,59	8,368,912	558,545	16
29	19-Jul-11	Subsidence Area	Central backfilled area	60	8,368,953	558,550	13
30	19-Jul-11	Subsidence Area	East road	61	8,368,963	558,586	13
31	19-Jul-11	Subsidence Area	North of ponded water	62,63	8,369,037	558,436	1
32	19-Jul-11	Subsidence Area	West of ponded water	64,65	8,369,018	558,384	11
33	19-Jul-11	Subsidence Area	Northeast end	66,67	8,369,070	558,439	5
34	19-Jul-11	New Quarry Area	Drainage ditch at West end	68,69	8,368,706	558,672	24
35	19-Jul-11	New Quarry Area	Drainage ditch at West end	70,71	8,368,639	558,792	29
36	19-Jul-11	New Quarry Area	Southwest perimeter slope	72,73,74	8,368,876	559,030	15
37	19-Jul-11	New Quarry Area	South perimeter slope	75	8,368,956	559,077	16
38	19-Jul-11	New Quarry Area	Southeast end	76,77	8,369,331	559,181	19
39	19-Jul-11	New Quarry Area	Northeast end	78,79	8,369,422	559,079	17
40	19-Jul-11	New Quarry Area	North central perimeter slope	80,81,82	8,369,347	558,961	20
41	19-Jul-11	New Quarry Area	Central drainage ditch	83,84,85	8,369,110	558,932	14
42	19-Jul-11	New Quarry Area	Top of South slope	86,87	8,369,101	559,143	30
43	19-Jul-11	New Quarry Area	Top of Southwest slope	88	8,368,759	559,007	29
44	19-Jul-11	Mine Portals	North Portal	89	8,369,075	558,038	6
45	20-Jul-11	Marine Foreshore	South elevated pad	90,91,92,93	8,367,481	558,234	13
46	20-Jul-11	Marine Foreshore	South shoreline	94,95	8,367,629	558,040	1
47	20-Jul-11	Marine Foreshore	Central elevated pad	96,97,98,99	8,367,795	558,011	13
48	20-Jul-11	Marine Foreshore	Central shoreline	100,101	8,367,764	557,931	3
49	20-Jul-11	Marine Foreshore	Central-North shoreline	102,103,104	8,367,954	557,804	0
50	20-Jul-11	Marine Foreshore	North shoreline	105,106	8,368,130	557,762	2
51	20-Jul-11	Mine Portals	Conveyor Portal	107,110	8,367,958	557,928	-1
52	20-Jul-11	Mine Portals	Main Portal	108,109,111	8,368,037	557,864	3
53	20-Jul-11	Mine Portals	Exploration Portal	112	8,368,182	557,830	18
54	20-Jul-11	Frustration Lake Road and Jetty	Drainage ditch across road	113	8,370,846	560,059	76
55	20-Jul-11	Frustration Lake Road and Jetty	Drainage ditch across road	114	8,370,944	560,076	67
56	20-Jul-11	Frustration Lake Road and Jetty	Drainage ditch across road	115	8,370,985	560,105	69
57	20-Jul-11	Frustration Lake Road and Jetty	Drainage ditch across road	116	8,371,020	560,121	61
58	20-Jul-11	Frustration Lake Road and Jetty	Drainage ditch across road	117	8,371,265	560,184	51
59	20-Jul-11	Frustration Lake Road and Jetty	Drainage ditch across road	118	8,371,619	560,286	30
60	20-Jul-11	Frustration Lake Road and Jetty	Drainage ditch across road	119	8,371,814	560,355	28
61	20-Jul-11	Frustration Lake Road and Jetty	End of Jetty	120,121,122,123	8,372,048	560,320	23
62	20-Jul-11	Former Temporary Camp Area	Regraded area	124	8,368,409	558,517	44

FIGURES

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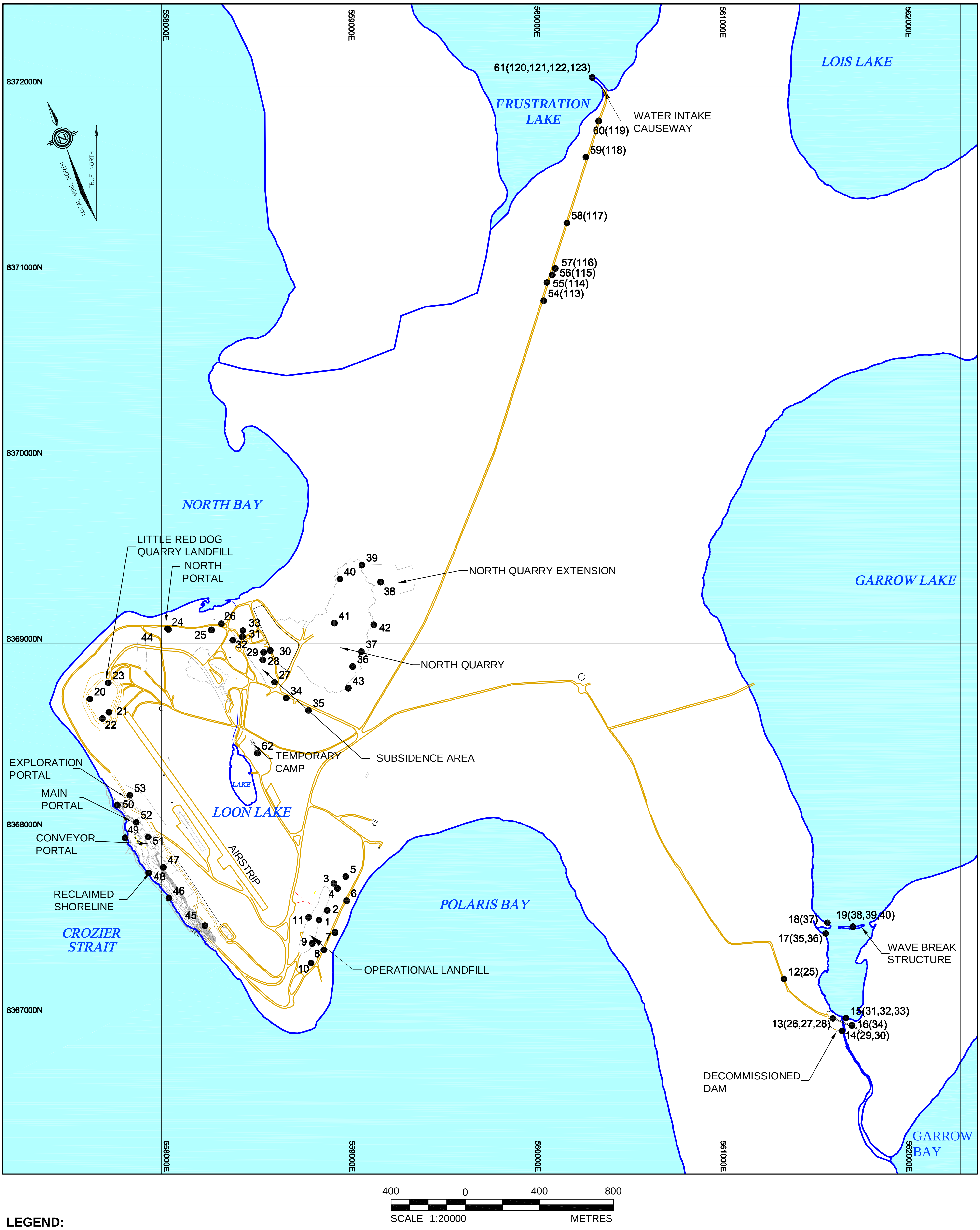

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● 16(36,37) LOCATION NUMBER (PHOTOGRAPH NUMBER)

REFERENCES:

1. GRID IS REFERENCED TO NAD83 ZONE 17.
2. SITE PLAN PROVIDED BY TECK METALS INC.
3. FOR PHOTOGRAPH NUMBERS IN AREA OF FORMER MINE REFER TO FIGURE 2.

Teck

Golder Associates
Mississauga, Ontario, Canada

FILE No.	1111180057AA001.dwg
PROJECT No.	11-1118-0057
REV.	A
SCALE	AS SHOWN
DATE	SEPT. 2011
DESIGN	DCJ
CAD	TDR
CHECK	DCJ
REVIEW	IW

TITLE

SITE PLAN AND PHOTOGRAPH LOCATIONS

TECK METALS INC. - 2011 POLARIS GEOTECHNICAL INSPECTION

FIGURE 1

PLOT DATE: October 5, 2011
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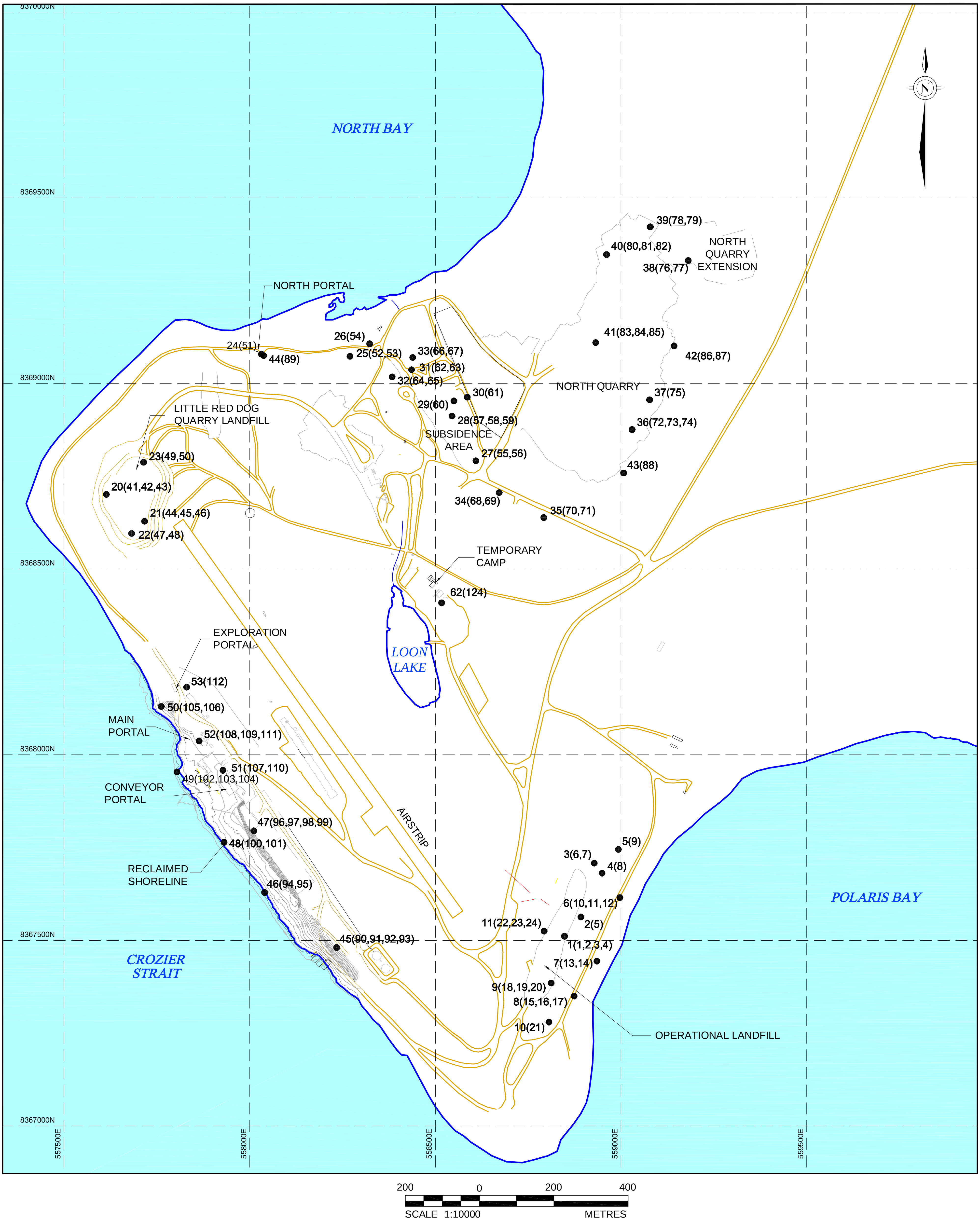

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• 16(36,37) LOCATION NUMBER (PHOTOGRAPH NUMBER)

REFERENCES:

1. GRID IS REFERENCED TO NAD83 ZONE 17.
2. SITE PLAN PROVIDED BY TECK METALS INC.

Teck

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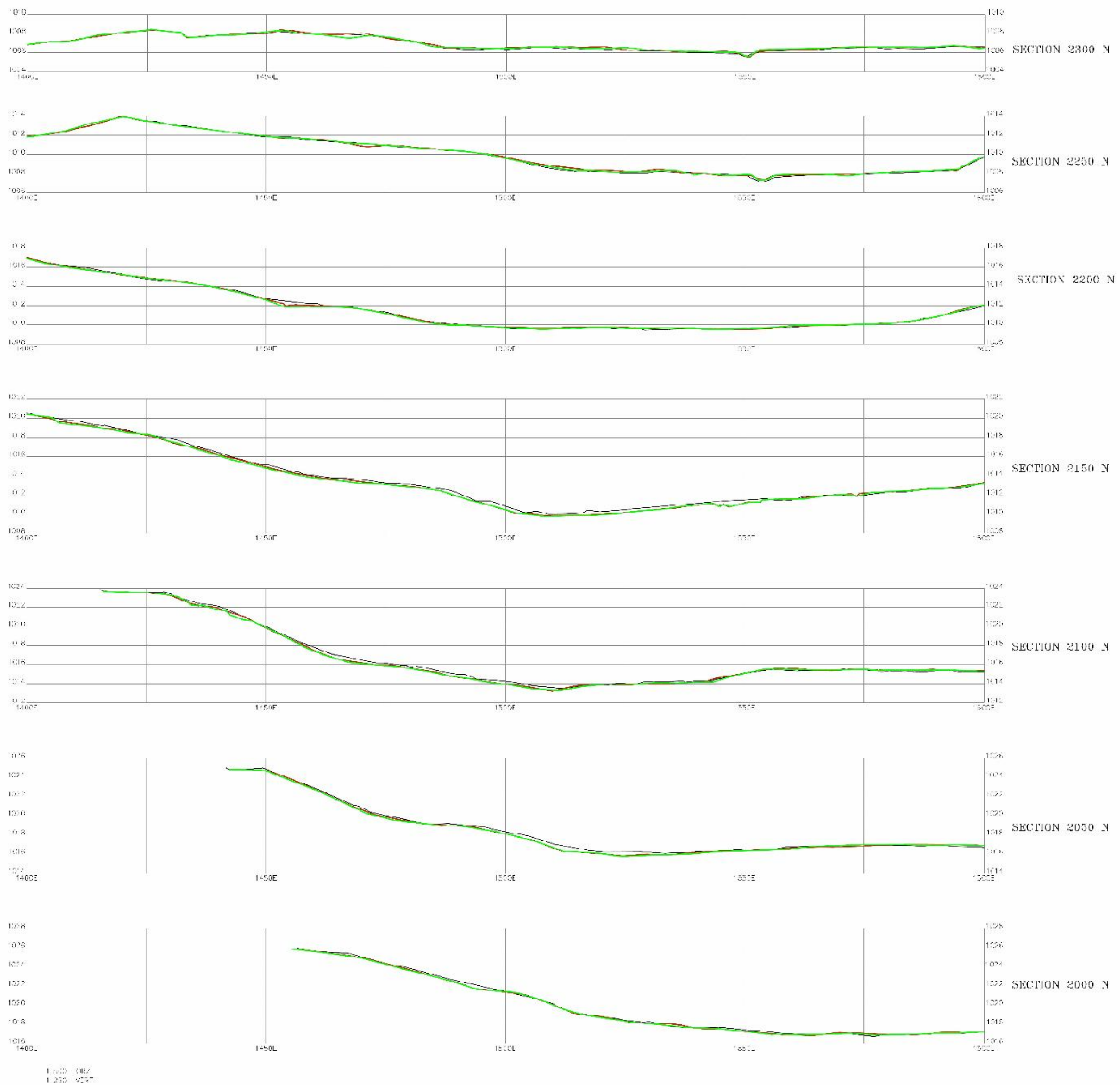
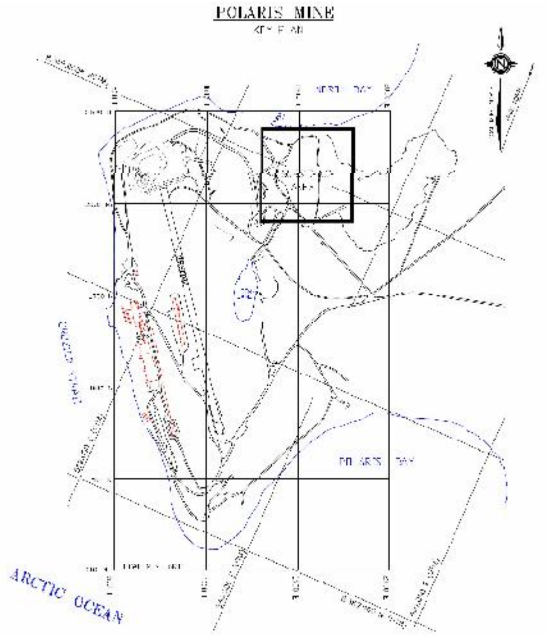
Mississauga, Ontario, Canada

SCALE	AS SHOWN	TITLE	
DATE	SEPT. 2011	**DETAIL OF FORMER MINE SITE**	
DESIGN	DCJ		
CAD	TDR		
CHECK	DCJ	TECK METALS INC. - 2011 POLARIS GEOTECHNICAL INSPECTION	FIGURE
REVIEW	IW		2

FILE No. 1111180057AA002.dwg

PROJECT No. 11-1118-0057 REV. A





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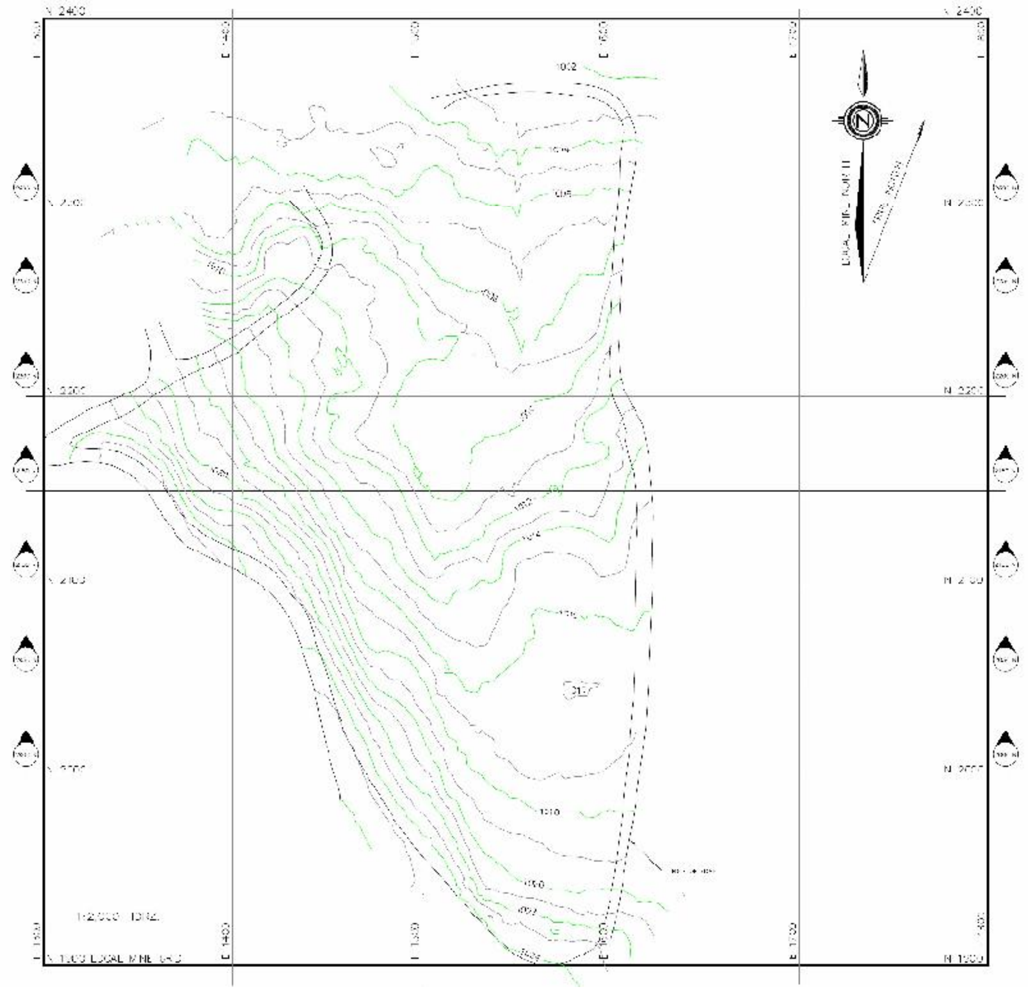
AREA 8



LEGEND:

- DENOTES 2011 SURFACE
- DENOTES 2010 SURFACE
- DENOTES 2005 SURFACE

NOTES:

1. SECTION COORDINATES AND ELEVATIONS REFER TO LOCAL DATUM.
2. CONTOUR INTERVAL IS 1m.

REFERENCE:

BASE PLAN DRAWN BY T.M. TECH SERVICES, REF. NO. 10-542, DATED AUG.3, 2011.

HORIZONTAL SCALE 1:2000
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20 0 20
VERTICAL SCALE 1:1000

Golder Associates
Mississauga, Ontario, Canada

SCALE	AS SHOWN
DATE	SEPT. 2011
DESIGN	DCJ
CAD	TDR
CHECK	DCJ
REVIEW	DCJ

FILE No. 1111180057AA003.dwg
PROJECT No. 11-1118-0057 REV. A

TITLE
SUBSIDENCE AREA SURVEY PLAN AND CROSS-SECTIONS

TECK METALS INC.
2011 POLARIS GEOTECHNICAL INSPECTION

FIGURE 3

PLOT DATE: October 5, 2011
FILENAME: T:\Projects\2011\11-1118-0057 (TRL, Polaris)\-AA-\1111180057AA003.dwg

APPENDIX A

2011 Polaris Geotechnical Inspection Photographs

Appendix A - Polaris 2011 Geotechnical Inspection

Photo 1, Operational Landfill, Central Crest, Facing North

Photo 2, Operational Landfill, Central Crest, Facing South

Appendix A - Polaris 2011 Geotechnical Inspection

Photo 3, Operational Landfill, Central Crest, Facing Northwest

Photo 4, Operational Landfill, Central Crest, Facing Southwest

Date: July 2011
Project: 11-1118-0057

Golder Associates

Drawn: AJ
Checked: DJ

Photo 5, Operational Landfill, Central Slope, Undulations (~0.5 m deep) at top of slope

Photo 6, Operational Landfill, Northeast Crest, Facing Northwest

Photo 7, Operational Landfill, Northeast Crest, Facing Southwest

Photo 8, Operational Landfill, Northeast Slope, Facing South

Photo 9, Operational Landfill, North Toe, Facing upslope from the North toe

Photo 10, Operational Landfill, Northeast Toe, Facing upslope from toe

Appendix A - Polaris 2011 Geotechnical Inspection

Photo 11, Operational Landfill, Northeast Toe, Facing South across slope

Photo 12, Operational Landfill, Northeast Toe, Minor thaw seepage (clear) at toe

Appendix A - Polaris 2011 Geotechnical Inspection

Photo 13, Operational Landfill, Central Toe, Facing Northwest across slope, Minor thaw seepage (clear) at toe

Photo 14, Operational Landfill, Central Toe, Facing upslope

Photo 15, Operational Landfill, South Toe, Facing Northwest

Photo 16, Operational Landfill, South Toe, Facing Upslope

Photo 17, Operational Landfill, South Toe, Facing Southwest (undulations ~0.5m)

Photo 18, Operational Landfill, South Crest, Facing North along crest

Photo 19, Operational Landfill, South Crest, Facing Downslope

Photo 20, Operational Landfill, South Crest, Facing Southwest along crest

Appendix A - Polaris 2011 Geotechnical Inspection

Photo 21, Operational Landfill, South Slope, Facing upslope from toe

Photo 22, Operational Landfill, Back of Crest, Facing South

Photo 23, Operational Landfill, Back of Crest, Facing North

Photo 24, Operational Landfill, Back of Crest, Upslope erosion gulley above landfill

Photo 25 , Garrow Lake, View of wave break structure from access road above

Photo 26, Garrow Lake, Facing wave break structure from West dam abutment

Photo 27, Garrow Lake Dam, West abutment, Settlement on crest

Photo 28, Garrow Lake Dam, West abutment, Breach slope from the crest

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Photo 29, Garrow Lake Creek, Facing Downstream

Photos 30, Garrow Lake Dam, Creek, Facing upstream through breach

Photo 31, Garrow Lake Dam, East abutment, Facing West breach slope

Photo 32, Garrow Lake Dam, East abutment, Upslope of East breach slope

Photo 33, Garrow Lake Dam, Channel from East abutment

Photo 34, Garrow Lake Dam, East abutment crest, Minor settlement (8.5”x11” book for scale)

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Photo 35, Garrow Lake, Downstream of Wave Break, Facing Northeast

Photo 36, Garrow Lake, Downstream of Wave Break, Facing wave break structure

Photo 37, Garrow Lake, Wave Break Breach, Along crest of gravel berm forming at outlet

Photo 38, Garrow Lake, East end of Wave Break, Gravel berm

Photo 39, Garrow Lake, East end of Wave Break, Seepage/thaw settlement channel

Photo 40, Garrow Lake, East end of Wave Break, Facing East (tracks from dragging pipe)

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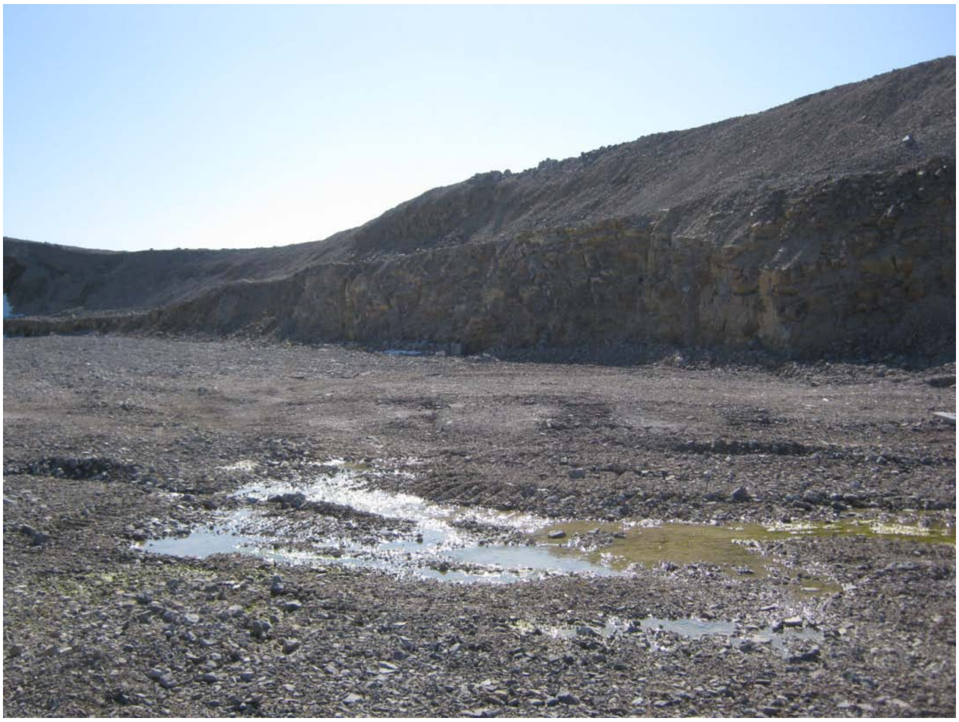

Photo 41, Little Red Dog Quarry Landfill, Entrance to Quarry, Facing South quarry wall

Photo 42, Little Red Dog Quarry Landfill, Entrance to Quarry, Facing airstrip

Photo 43, Little Red Dog Quarry Landfill, Entrance to quarry, Facing North quarry wall

Photo 44, Little Red Dog Quarry Landfill, New waste berm, Facing South

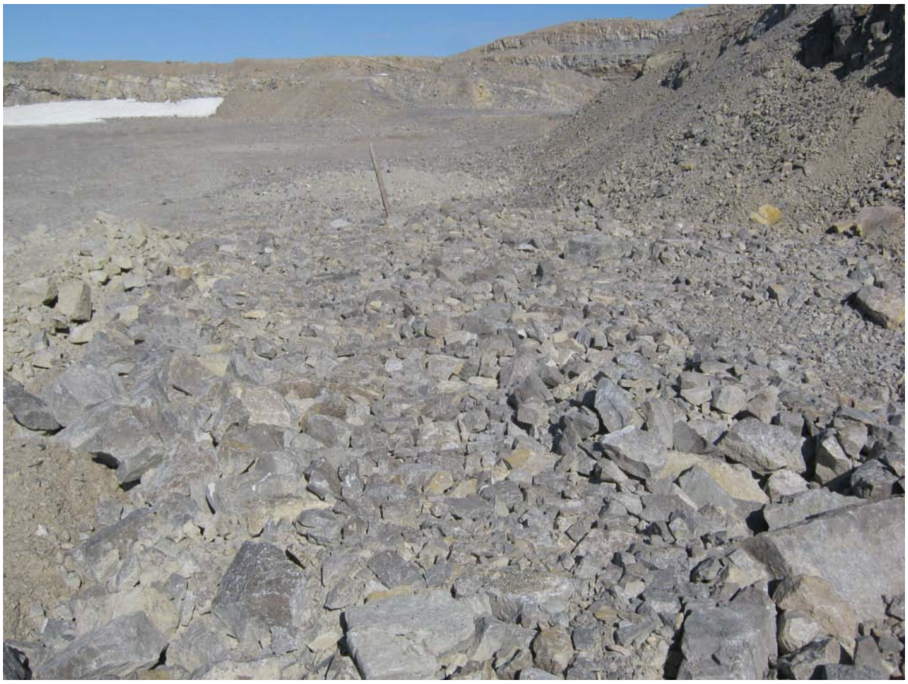

Photo 45, Little Red Dog Quarry Landfill, New waste berm, Top of berm

Photo 46, Little Red Dog Quarry Landfill, New waste berm, Facing berm slopes

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Photo 47, Little Red Dog Quarry Landfill, South end, Facing West

Photo 48, Little Red Dog Quarry Landfill, South end, Facing Northwest

Photo 49, Little Red Dog Quarry Landfill, North end, Facing South towards new waste berm

Photo 50, Little Red Dog Quarry Landfill, North end, Facing Southwest

Photo 51, Mine Portals, North Portal, Gravel backfilled slope over North portal

Photo 52, Subsidence Area, Northwest end, Facing South

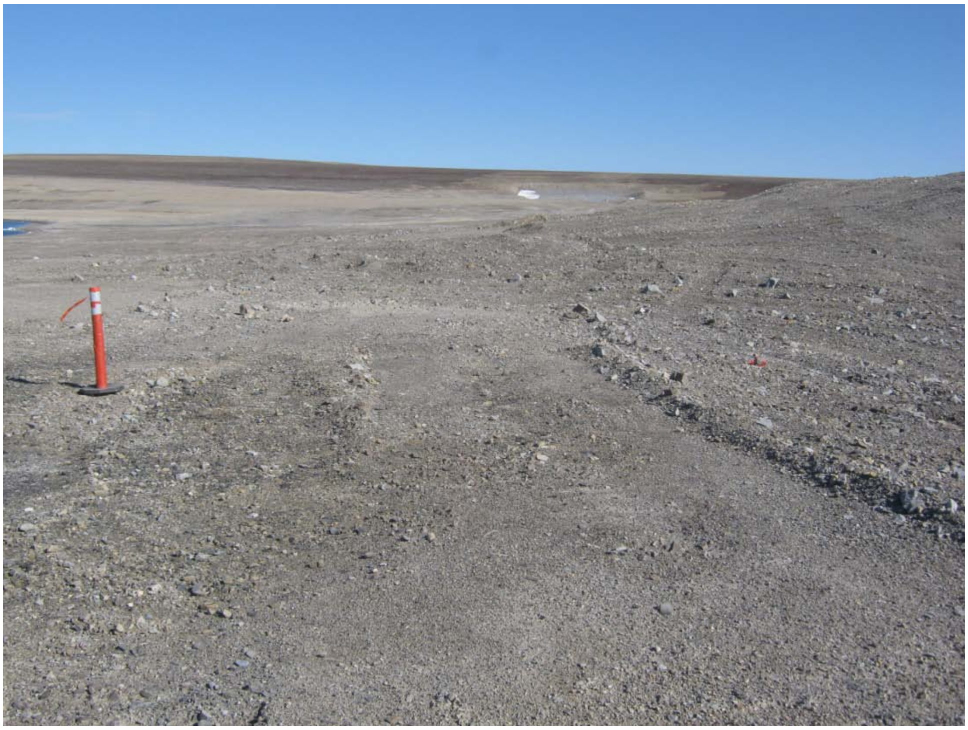

Photo 53, Subsidence Area, Northwest end, Facing East

Photo 54, Subsidence Area, North end, Thaw settlement (~8m x 5m x 1m deep)

Photo 55, Subsidence Area, South end, Thaw settlement (~8m x 8m x 1m deep)

Photo 56, Subsidence Area, South end, Facing North towards the ocean

Photo 57, Subsidence Area, Central backfilled area, Old tension crack (~30m x 0.3m)

Photo 58, Subsidence Area, Central backfilled area, Facing South

Photo 59, Subsidence Area, Central backfilled area, Facing North towards the ocean

Photo 60, Subsidence Area, Central backfilled area, Two old tension cracks (~40m x 0.3m)

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Photo 61, Subsidence Area, Tension crack on road west of New Quarry (~25m x 0.1m)

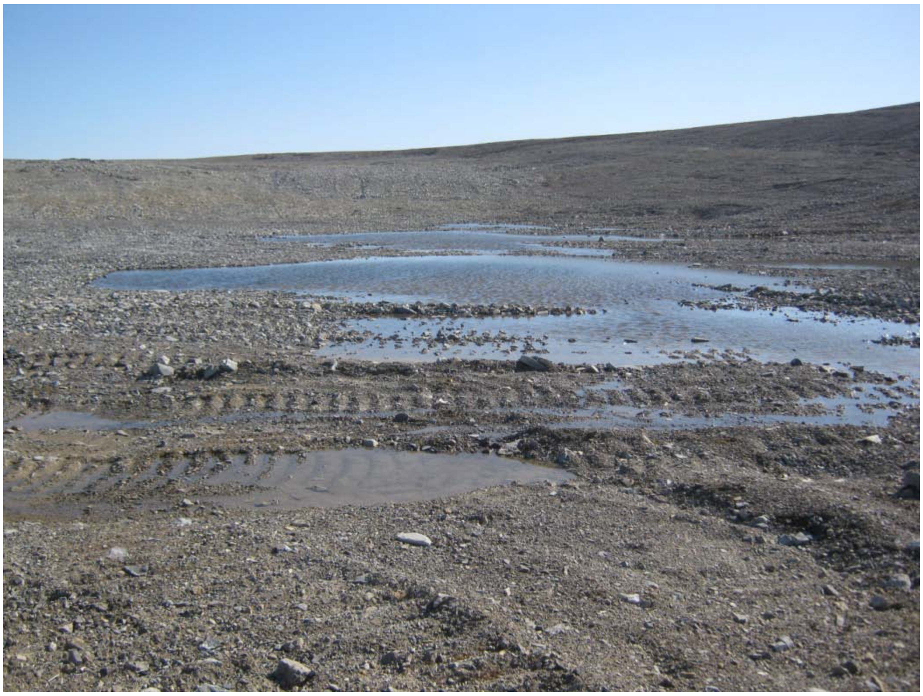

Photo 62, Subsidence Area, North of ponded water, Facing South towards ponded water

Date: July 2011
Project: 11-1118-0057

Golder Associates

Drawn: AJ
Checked: DJ

Photo 63, Subsidence Area, North of ponded water, Thaw settlement (~10m x 5m x 1m deep) beside backfilled vent raise

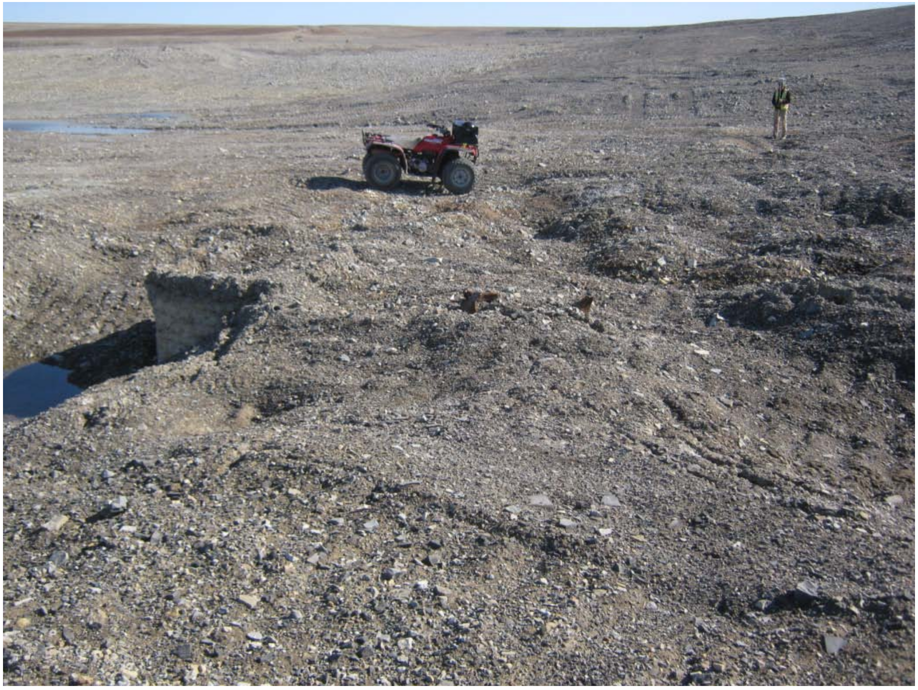

Photo 64, Subsidence Area, West of ponded water, Thaw settlement (~5m x 5m x 1m deep) beside backfilled vent raise

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Photo 65, Subsidence Area, West of ponded water, Thaw settlement (~5m x 5m x 1m deep) beside backfilled vent raise

Photo 66, Subsidence Area, Northeast end, Thaw settlement (~10m x 10m x1m deep)

Photo 67, Subsidence Area, Northeast end, Facing North towards the ocean

Photo 68, New Quarry, Drainage Ditch at West end, Rip-Rap lined ditch facing upstream

Photo 69, New Quarry, Drainage ditch at West end, Rip-Rap lined ditch facing downstream

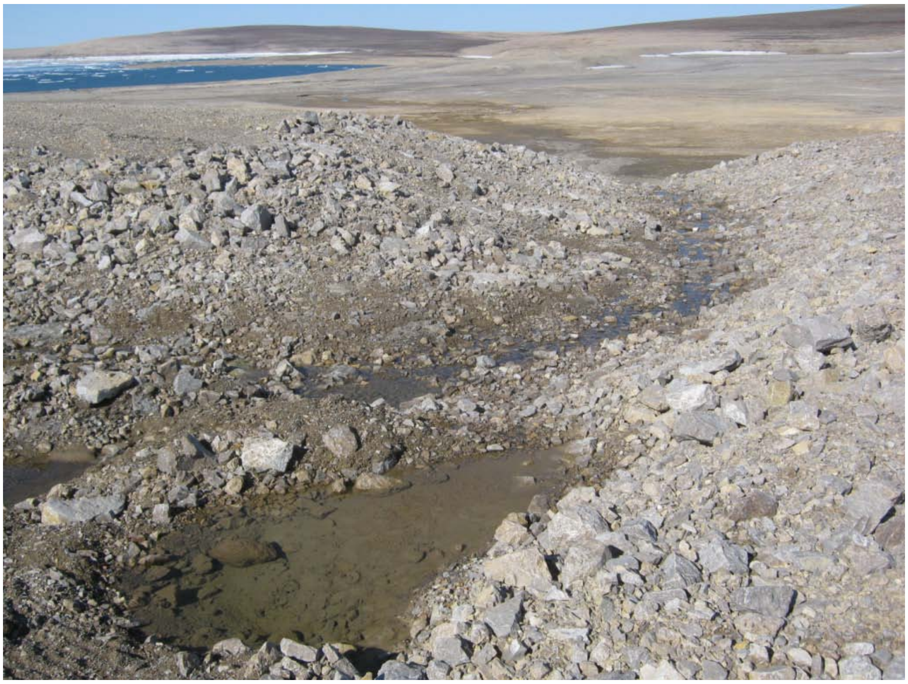

Photo 70, New Quarry, Drainage Ditch at West end, Rip-Rap lined ditch facing downstream (from top)

Photo 71, New Quarry, Drainage ditch at West end, Rip-Rap lined ditch facing upstream (from bottom)

Photo 72, New Quarry, Southwest perimeter slope, Facing Southwest along slope

Photo 73, New Quarry, Southwest perimeter slope, Facing upslope (erosion gully)

Photo 74, New Quarry, Southwest perimeter slope, Facing Southeast along the slope

Photo 75, New Quarry, South perimeter slope, Minor slumping and erosion of slope bottom

Photo 76, New Quarry, Southeast end, Facing South slope

Photo 77, New Quarry, Southeast end, Facing East end of the quarry

Photo 78, New Quarry, Northeast end, Typical self-amouring erosion gully, Facing East

Photo 79, New Quarry, Northeast end, Typical self-amouring erosion gully, Facing Northeast

Photo 80, New Quarry, North central perimeter, Minor thaw settlement along slope bottom

Photo 81, New Quarry, North central perimeter, Facing Northwest

Photo 82, New Quarry, North central perimeter, From top of slope

Photo 83, New Quarry, Central drainage ditch, Facing East

Photo 84, New Quarry, Central drainage ditch, Facing West

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Photo 85, New Quarry, Central drainage ditch, Facing North

Photo 86, New Quarry, Top of South slope, Old tension crack healed with erosion

Photo 87, New Quarry, Top of South slope, Old tension crack healed with erosion

Photo 88, New Quarry, Top of Southwest slope, Old tension crack healed with erosion

Photo 89, Mine Portals, North Portal, Gravel backfilled slope over North Portal

Photo 90, Foreshore, South end, Facing Southwest from slope

Photo 91, Foreshore, South end, Facing Northwest from slope

Photo 92, Foreshore, South end, Facing Southeast upslope

Photo 93, Foreshore, South end, Facing Northeast upslope

Photo 94, Foreshore, South end, Facing South along shoreline

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Photo 95, Foreshore, South end, Facing North along shoreline (thaw settlement)

Photo 96, Foreshore, Central, Facing Southwest from elevated pad

Photo 97, Foreshore, Central, Facing Northwest from elevated pad (gravel berm along shore)

Photo 98, Foreshore, Crest of central elevated pad, Facing South

Photo 99, Foreshore, Crest of central elevated pad, Facing Northeast upslope

Photo 100, Foreshore, Central, Facing South along shoreline (thaw settlement)

Photo 101, Foreshore, Central, Facing North (accumulated gravel berm along shoreline)

Photo 102, Foreshore, North end, Facing South (gravel berm along shoreline)

Photo 103, Foreshore, North end, Facing North (minor thaw settlement)

Photo 104, Foreshore, North end, Facing upslope towards Main and Conveyor Portals

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Photo 105, Foreshore, Shoreline near Exploration Portal, Facing South

Photo 106, Foreshore, Shoreline near Exploration Portal, Facing North

Photo 107, Mine Portals, Conveyor Portal, Gravel backfilled slope over Conveyor Portal

Photo 108, Mine Portals, Main Portal, Gravel backfilled slope over Main Portal

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Photo 109, Mine Portals, Main Portal, Thaw creep on upper slope

Photo 110, Mine Portals, Conveyor Portal, View from top of backfilled slope

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Photo 111, Mine Portals, Main Portal, View from top of backfilled slope

Photo 112, Mine Portals, Exploration Portal, Gravel backfilled slope (exposed ventilation pipe)

Photo 113, Frustration Lake, Rip-Rap lined drainage ditch across road

Photo 114, Frustration Lake, Water bar and self-armouring drainage ditch across road

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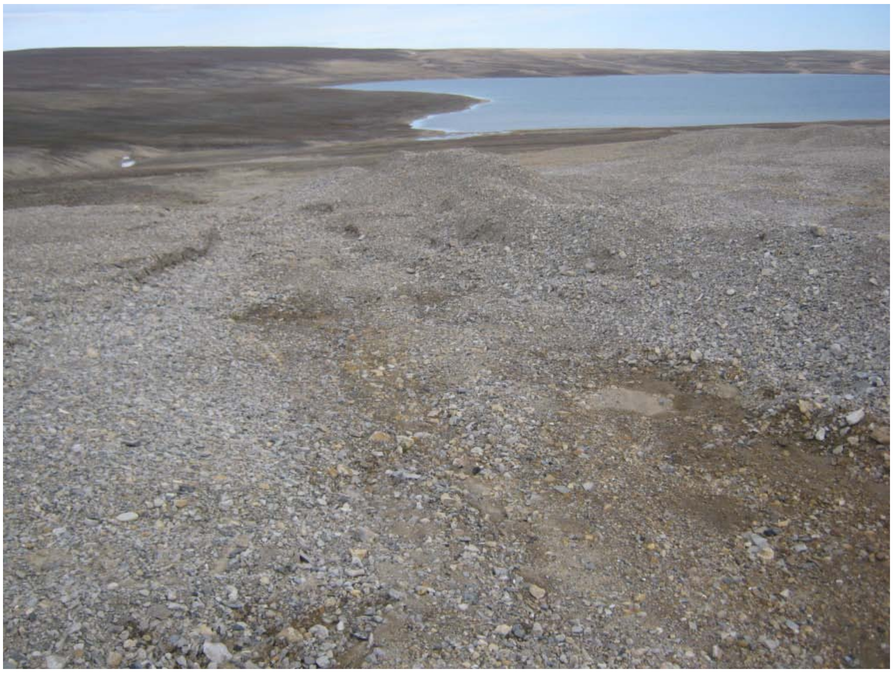

Photo 115, Frustration Lake, Water bar and self-armouring drainage ditch across road

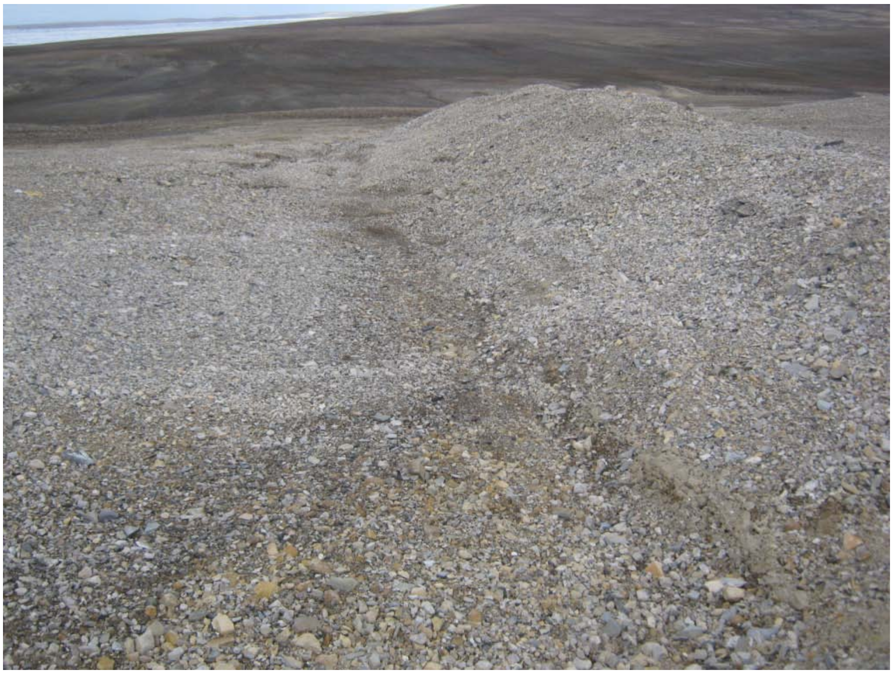

Photo 116, Frustration Lake, Water bar and self-armouring drainage ditch across road

Photo 117, Frustration Lake, Self-armouring erosion gully on west side of road

Photo 118, Frustration Lake, Self-armouring drainage ditch across road

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Photo 119, Frustration Lake, Self-armouring drainage ditch across road

Photo 120, Frustration Lake, End of Jetty (0.5m diameter boulders pushed onto end of jetty)

Date: July 2011
Project: 11-1118-0057

Golder Associates

Drawn: AJ
Checked: DJ

Photo 121, Frustration Lake, North end of the jetty (rockfill pushed by ice)

Photo 122, Frustration Lake, West side of jetty, Facing lake shoreline

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Photo 123, Frustration Lake, East side of jetty, Facing lake shoreline

Photo 124, Regraded Former Temporary Camp Area, Facing Loon Lake

APPENDIX B

2011 Polaris Geotechnical Inspection Field Record Sheets

2011 Polaris Post-Closure Geotechnical Inspection Summary

Area	Inspection Completed	Observed Visual Inspection Concerns
Garrow Lake Area (Wave Break and Breached Dam)	19-Jul-11	None
Frustration Lake Jetty and Access Road	20-Jul-11	None
New Quarry Area	19-Jul-11	None
Subsidence Area	19-Jul-11	None
Operational Landfill	19-Jul-11	None
Little Red Dog Quarry Landfill	19-Jul-11	None
Mine Portals	20-Jul-11	Some thaw creep mid-slope at Main Portal
Marine Foreshore	20-Jul-11	None
Regraded Former Temporary Camp Area	20-Jul-11	None

2011 Polaris Post-Closure Geotechnical Inspection

Area:	**Garrow Lake (Wave Break and Breached Dam)**
Inspector:	**Darrin Johnson**
Date:	**19-Jul-11**
Time Started:	**11:00 AM**
Weather:	**Clear sky, sunny, 10°C**

Location	Waypoint	Photographs	Photograph Description
Road to Dam	12	25	View of wave break structure from road above
West Dam Abutment	13	26,27,28	Facing wave break, settlement on crest, breach slope from crest
Creek	14	29,30	Facing downstream and upstream through breach
East Dam Abutment	15	31,32,33	Facing west breach slope, upslope of east breach slope, channel
East Abutment Crest	16	34	Minor settlement on crest (8.5" x 11" field notebook for scale)
Downstream of Wave Break	17	35,36	Facing NE, facing wave break upstream through breached section
Breached end of Wave Break	18	37	Along crest of gravel berm forming upstream of wave break structure
East end of Wave Break	19	38,39,40	Gravel berm, seepage/thaw settlement channel, facing east (note bulldozer tracks from dragging HDPE pipe)

Checklist Item	Present (Yes/No)	Length (m) x Width (m)	Depth (m)	Description / Comments
Settlement	Yes (minor)	10 m x 5 m	0.5 m	Thaw settlement on east and west crest of breached dam (Photographs 27 and 34)
Erosion	No			
Slope Instability	No			
Seepage	Yes (not a concern)	N/A	N/A	Through wave break structure rockfill (not a concern)
Staining	No			
Exposed Debris	N/A			

2011 Polaris Post-Closure Geotechnical Inspection

Area:	**Frustration Lake Jetty and Access Road**
Inspector:	**Darrin Johnson**
Date:	**20-Jul-11**
Time Started:	**10:00 AM**
Weather:	**Overcast, light wind, 8°C**

Location	Waypoint	Photographs	Photograph Description
Drainage ditch across road	54	113	Rip-Rap lined ditch across road
Drainage ditch across road	55	114	Water bar and self-armouring ditch across road
Drainage ditch across road	56	115	Water bar and self-armouring ditch across road
Drainage ditch across road	57	116	Water bar and self-armouring ditch across road
Drainage ditch across road	58	117	Self-armouring erosion gully on west side of road
Drainage ditch across road	59	118	Self-armouring erosion gully on west side of road
Drainage ditch across road	60	119	Self-armouring ditch across road
End of Jetty	61	120,121	Large 0.5 m diameter boulders pushed onto end of jetty, north end of jetty
End of Jetty	61	122,123	West side and east side of jetty facing lake shoreline

Checklist Item	Present (Yes/No)	Length (m) x Width (m)	Depth (m)	Description / Comments
Settlement	No			
Erosion	Yes (self-armouring)	10 m x 2 m (typical)	0.3 to 0.5 m	Self-armouring drainage ditches / erosion gullies across road to Frustration Lake
Slope Instability	No			
Seepage	N/A			
Staining	No			
Exposed Debris	No			

2011 Polaris Post-Closure Geotechnical Inspection

Area:	**New Quarry Area**
Inspector:	**Darrin Johnson**
Date:	**19-Jul-11**
Time Started:	**4:00 PM**
Weather:	**Clear sky, sunny, 10°C**

Location	Waypoint	Photographs	Photograph Description
Drainage ditch at West end	34	68,69	Rip-rap lined ditch facing upstream and downstream
Drainage ditch at West end	35	70,71	Rip-rap lined ditch facing downstream (from top) and upstream (from bottom)
Southwest perimeter slope	36	72,73,74	Facing SW along slope, facing upslope (erosion gully), facing SE along slope
South perimeter slope	37	75	Minor slumping about 2/3 from slope bottom with some erosion
Southeast end	38	76,77	Facing south slope, facing east end of quarry
Northeast end	39	78,79	Typical self-armouring erosion gully (facing east), facing NE slope
North central perimeter slope	40	80,81,82	Minor thaw settlement along bottom of slope, facing NW and NE
Central drainage ditch	41	83,84,85	Drainage ditches facing east, west and north
Top of South slope	42	86,87	Old tension cracks that have become erosion/drainage gullies
Top of Southwest slope	43	88	Old tension cracks that have become erosion/drainage gullies

Checklist Item	Present (Yes/No)	Length (m) x Width (m)	Depth (m)	Description / Comments
Settlement	Yes (at toe of slope)	Varies	0.3 m (typical)	Thaw settlement in fill along toe of slopes (Photographs 80, 81 and 82)
Erosion	Yes (self-armouring)	Varies	0.5 m (typical)	Self-armouring erosion gullies (Photographs 73 and 78)
Slope Instability	Yes (minor)			Minor slump on bottom 2/3 of slope (Waypoint 37, Photo 75)
Seepage	No			
Staining	No			
Exposed Debris	No			

2011 Polaris Post-Closure Geotechnical Inspection

Area:	**Subsidence Area**
Inspector:	**Darrin Johnson**
Date:	**19-Jul-11**
Time Started:	**2:30 PM**
Weather:	**Clear sky, sunny, 10°C**

Location	Waypoint	Photographs	Photograph Description
Northwest end	25	52,53	Facing south, facing east
North end	26	54	Thaw settlement (8m x 5m x 1m deep)
South end	27	55,56	Thaw settlement (8m x 8m x 1m deep), facing north towards ocean
Central backfilled area	28	57,58,59	Old tension crack (30m L x 0.3m W x 0.3m D), facing south, facing north towards ocean
Central backfilled area	29	60	Two old parallel tension cracks with some erosion (40m L x 0.3m W x 0.3m D)
East road	30	61	Tension crack along road between New Quarry and Subsidence Area (25m L x 0.1m W x 0.1m D)
North of ponded water	31	62,63	Facing south (ponded water), thaw settlement (10m x 5m x 1m D) beside filled CSP vent raise
West of ponded water	32	64,65	Thaw settlement (5m x 5m x 1m D) around a filled CSP vent raise
Northeast end	33	66,67	Thaw settlement (10m x 10m x 1m D), facing north towards ocean

Checklist Item	Present (Yes/No)	Length (m) x Width (m)	Depth (m)	Description / Comments
Settlement	Yes (thaw settlement)	Varies (see above)		Previously observed thaw settlement and related tension cracks
Erosion	No			
Slope Instability	No			
Seepage	No			
Staining	No			
Exposed Debris	Yes (CSP vent raises)	1 m diameter		CSP vent raises backfilled to surface with rockfill (Waypoints 31 and 32)

Note: CSP - Corrugated Steel Pipe

2011 Polaris Post-Closure Geotechnical Inspection

Area:	**Operational Landfill**
Inspector:	**Darrin Johnson**
Date:	**19-Jul-11**
Time Started:	**9:45 AM**
Weather:	**Clear sky, sunny, 10°C**

Location	Waypoint	Photographs	Photograph Description
Central Crest	1	1,2,3,4	Facing North, South, Northwest and Southwest
Central Slope	2	5	Minor settlement or construction undulations (~0.5m) at top of slope
Northeast Crest	3	6,7	Crest facing Northwest and South
Northeast Slope	4	8	Facing South
North Toe	5	9	Facing upslope from North toe
Northeast Toe	6	10,11,12	Facing upslope from toe, facing south across slope, minor thaw seepage at toe
Central Toe	7	13,14	Facing Northwest across slope with minor thaw seepage at toe, facing upslope
South Toe	8	15,16,17	Facing Northwest, upslope and Southwest (construction undulations ~0.5 m)
South Crest	9	18,19,20	Facing North along crest, downslope, Southwest along crest
South Slope	10	21	Facing upslope from toe
Back of Crest	11	22,23,24	Facing South and North along back of crest, upslope erosion above landfill

Checklist Item	Present (Yes/No)	Length (m) x Width (m)	Depth (m)	Description / Comments
Settlement	Yes (minor)	20 m x 10 m	0.5 m	Minor settlement at top of slope (Photograph 5)
Erosion	No			
Slope Instability	No			
Seepage	Yes (thaw seepage)	5 m x 5 m	N/A	Typical thaw seepage (Photographs 12 and 13)
Staining	No			
Exposed Debris	No			

2011 Polaris Post-Closure Geotechnical Inspection

Area:	**Little Red Dog Quarry Landfill**
Inspector:	**Darrin Johnson**
Date:	**19-Jul-11**
Time Started:	**1:30 PM**
Weather:	**Clear sky, sunny, 10°C**

Location	Waypoint	Photographs	Photograph Description
Entrance to Quarry	20	41,42,43	Facing South quarry wall, facing airstrip, facing North quarry wall
New Waste Berm	21	44,45,46	Facing South and North from top of new covered waste berm, facing new covered waste berm slopes
South end of Landfill	22	47,48	Facing West and Northwest
North end of Landfill	23	49,50	Facing South towards new covered waste berm, facing Southwest towards quarry entrance

Checklist Item	Present (Yes/No)	Length (m) x Width (m)	Depth (m)	Description / Comments
Settlement	No			Note: Large rockfill and 0.3 to 0.5 m construction undulations in rockfill cover
Erosion	No			
Slope Instability	No			
Seepage	No			
Staining	No			
Exposed Debris	No			

2011 Polaris Post-Closure Geotechnical Inspection

Area:	**Mine Portals**	
Inspector:	**Darrin Johnson**	
Date:	**19-Jul-11**	**20-Jul-11**
Time Started:	**2:30pm**	**9:00am**
Weather:	**Clear, sunny, 10°C**	**Overcast, light wind, 8°C**

Location	**Waypoint**	**Photographs**	**Photograph Description**
North Portal	24	51,89	Gravel backfilled slope over North Portal
Conveyor Portal	51	107,110	Gravel backfilled slope over Conveyor Portal, view from top of backfilled slope
Main Portal	52	108,109,111	Gravel backfilled slope over Main Portal (bottom snow covered), thaw creep on upper half, view from top
Exploration Portal	53	112	Gravel backfilled slope over Exploration Portal with exposed ventilation pipe

Checklist Item	**Present (Yes/No)**	**Length (m) x Width (m)**	**Depth (m)**	**Description / Comments**
Settlement	No			
Erosion	No			
Slope Instability	Yes (thaw creep)	1m x 1m	N/A	Some thaw creep mid-slope above regraded slope at Main Portal
Seepage	No			Melting snow at Main Portal slope
Staining	No			
Exposed Debris	No			Ventiltation pipe at Exploration Portal

2011 Polaris Post-Closure Geotechnical Inspection

Area:	**Marine Foreshore**
Inspector:	**Darrin Johnson**
Date:	**20-Jul-11**
Time Started:	**8:00 AM**
Weather:	**Overcast, calm, 6°C**

Location	Waypoint	Photographs	Photograph Description
South end on slope	45	90,91,92,93	Facing Southwest, facing Northwest, facing Southeast upslope, facing Northeast upslope
South end on shore	46	94,95	Facing South, facing North (thaw settlement)
Central on elevated pad	47	96,97,98,99	Facing Southwest, facing Northwest (accumulated gravel berm), top of pad facing South, facing Northeast upslope
Central on shore	48	100,101	Facing South (thaw settlement), facing North (accumulated gravel berm along shore)
North end on shore	49	102,103,104	Facing South, facing North (minor thaw settlement), facing upslope towards Main & Conveyor Portals
Shore near Exploration Portal	50	105, 106	Facing South, facing North along shoreline

Checklist Item	Present (Yes/No)	Length (m) x Width (m)	Depth (m)	Description / Comments
Settlement	Yes (thaw settlement)	50m x 10m (typical)	2 m (typical)	Thaw settlement along shoreline (Photographs 95, 100, 103)
Erosion	No			Note: Water along shoreline clear
Slope Instability	No			
Seepage	No			
Staining	No			
Exposed Debris	No			

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Golder Associates

APPENDIX 9

WIND SPEED DATA

FROM SEPTEMBER 2011

FROM

RESOLUTE BAY

(ENVIRONMENT CANADA)

Station Name	**RESOLUTE CARS**
Province	NUNAVUT
Latitude	74.72
Longitude	-94.97
Elevation	67.7
Climate Identifier	2403500
WMO Identifier	71924
TC Identifier	YRB

e specified in Local Standard Time (LST).
our to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/1/2011 0:00	0	28		
9/1/2011 1:00	-0.2	20		
9/1/2011 2:00	-0.6	35		
9/1/2011 3:00	-0.5	28		
9/1/2011 4:00				
9/1/2011 5:00	-0.6	24		
9/1/2011 6:00	-0.7	22		
9/1/2011 7:00	0	32		
9/1/2011 8:00	-0.2	26		
9/1/2011 9:00	0.6	26		
9/1/2011 10:00	1.4	26		
9/1/2011 11:00	1.6	19		
9/1/2011 12:00	2.1	22		
9/1/2011 13:00	3.5	26		
9/1/2011 14:00	4	32		
9/1/2011 15:00	4.2	24		
9/1/2011 16:00	3.6	30		
9/1/2011 17:00	3.7	30		
9/1/2011 18:00	2.6	22		
9/1/2011 19:00	1.8	32		
9/1/2011 20:00	1.7	24		
9/1/2011 21:00	1.3	20		
9/1/2011 22:00	0.5	15		
9/1/2011 23:00	-0.2	19		
9/2/2011 0:00	-0.8	19		
9/2/2011 1:00	-1.1	4		
9/2/2011 2:00	-1.3	9		
9/2/2011 3:00	-1.4	7		
9/2/2011 4:00	-1.4	13		
9/2/2011 5:00	-1.8	17		
9/2/2011 6:00	-1.2	26		
9/2/2011 7:00	-0.6	26		
9/2/2011 8:00	-0.2	22		
9/2/2011 9:00	0.4	24		
9/2/2011 10:00	1.1	0		
9/2/2011 11:00	1.6	9		
9/2/2011 12:00	2.4	11		
9/2/2011 13:00	2.7	13		
9/2/2011 14:00	2.8	15		
9/2/2011 15:00	3	19		
9/2/2011 16:00	2.3	22		
9/2/2011 17:00	2.3	20		
9/2/2011 18:00	2.1	22		
9/2/2011 19:00	2.2	11		
9/2/2011 20:00	2	17		
9/2/2011 21:00	1.5	15		
9/2/2011 22:00	1.8	7		
9/2/2011 23:00	1.7	11		
9/3/2011 0:00	1.4	9		
9/3/2011 1:00	1.3	11		
9/3/2011 2:00	1.6	20		
9/3/2011 3:00	1.5	11		
9/3/2011 4:00	1.3	17		
9/3/2011 5:00	1.3	13		
9/3/2011 6:00	1.1	11		
9/3/2011 7:00	1.4	11		
9/3/2011 8:00	2	20		
9/3/2011 9:00	2	19		
9/3/2011 10:00	2.2	20		
9/3/2011 11:00	1.5	17		
9/3/2011 12:00	1.6	20		
9/3/2011 13:00	2.2	15		
9/3/2011 14:00	1.6	15		
9/3/2011 15:00	1.9	15		
9/3/2011 16:00	2.1	11		
9/3/2011 17:00	1.4	13		
9/3/2011 18:00	1.9	15		
9/3/2011 19:00	1.4	17		
9/3/2011 20:00	0.4	22		
9/3/2011 21:00	-0.8	26		
9/3/2011 22:00	-1.8	20		
9/3/2011 23:00	-2	19		
9/4/2011 0:00	-1.8	19		
9/4/2011 1:00	-1.6	15		
9/4/2011 2:00	-1.4	17		
9/4/2011 3:00	-1.5	7		
9/4/2011 4:00	-1.4	13		
9/4/2011 5:00	-1.3	11		

Station Name **RESOLUTE CARS**
Province NUNAVUT
Latitude 74.72
Longitude -94.97
Elevation 67.7
Climate Identifier 2403500
WMO Identifier 71924
TC Identifier YRB
e specified in Local Standard Time (LST).
our to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/4/2011 6:00	-1	9		
9/4/2011 7:00	-1	20		
9/4/2011 8:00	-0.8	7		
9/4/2011 9:00	-0.7	7		
9/4/2011 10:00	-0.3	6		
9/4/2011 11:00	-0.4	9		
9/4/2011 12:00	-0.1	19		
9/4/2011 13:00	-0.3	9		
9/4/2011 14:00	-0.3	13		
9/4/2011 15:00	-0.1	11		
9/4/2011 16:00	-0.6	13		
9/4/2011 17:00	-0.9	11		
9/4/2011 18:00	-1	7		
9/4/2011 19:00	-0.9	13		
9/4/2011 20:00	-1	13		
9/4/2011 21:00	-1	0		
9/4/2011 22:00	-1.1	0		
9/4/2011 23:00	-1.3	7		
9/5/2011 0:00	-1	11		
9/5/2011 1:00	-0.9	15		
9/5/2011 2:00	-1	7		
9/5/2011 3:00	-0.8	9		
9/5/2011 4:00	-0.9	15		
9/5/2011 5:00	-0.9	7		
9/5/2011 6:00	-0.6	15		
9/5/2011 7:00	-0.6	19		
9/5/2011 8:00	-0.7	15		
9/5/2011 9:00	-1.5	15		
9/5/2011 10:00	-1.1	15		
9/5/2011 11:00	-0.6	20		
9/5/2011 12:00	-0.9	22		
9/5/2011 13:00	-1	24		
9/5/2011 14:00	-1.5	22		
9/5/2011 15:00	-2.6	13		
9/5/2011 16:00	-2.8	15		
9/5/2011 17:00	-2.5	9		
9/5/2011 18:00	-2.4	9		
9/5/2011 19:00	-2.5	11		
9/5/2011 20:00	-2.8	15		
9/5/2011 21:00	-2.7	9		
9/5/2011 22:00	-2.7	15		
9/5/2011 23:00	-2.9	7		
9/6/2011 0:00	-3	17		
9/6/2011 1:00	-2.9	11		
9/6/2011 2:00	-3.1	9		
9/6/2011 3:00	-2.3	6		
9/6/2011 4:00	-2	15		
9/6/2011 5:00	-2	19		
9/6/2011 6:00	-2.1	15		
9/6/2011 7:00	-2.1	15		
9/6/2011 8:00	-2.4	19		
9/6/2011 9:00	-2.7	19		
9/6/2011 10:00	-2.9	15		
9/6/2011 11:00	-2.5	15		
9/6/2011 12:00	-2.8	11		
9/6/2011 13:00	-2.3	4		
9/6/2011 14:00	-2	7		
9/6/2011 15:00	-1.8	11		
9/6/2011 16:00	-1.6	13		
9/6/2011 17:00	-1.4	17		
9/6/2011 18:00	-1.5	17		
9/6/2011 19:00	-1.1	13		
9/6/2011 20:00	-1.2	11		
9/6/2011 21:00	-1.1	9		
9/6/2011 22:00	-1.1	11		
9/6/2011 23:00	-1.2	6		
9/7/2011 0:00	-1.1	6		
9/7/2011 1:00	-1.3	11		
9/7/2011 2:00	-1.3	7		
9/7/2011 3:00	-1.2	6		
9/7/2011 4:00	-1.2	6		
9/7/2011 5:00	-1.1	7		
9/7/2011 6:00	-1.2	7		
9/7/2011 7:00	-1.3	6		
9/7/2011 8:00	-1.4	7		
9/7/2011 9:00	-1.3	11		
9/7/2011 10:00	-1.4	9		
9/7/2011 11:00	-1.4	11		

Station Name	**RESOLUTE CARS**
Province	NUNAVUT
Latitude	74.72
Longitude	-94.97
Elevation	67.7
Climate Identifier	2403500
WMO Identifier	71924
TC Identifier	YRB

e specified in Local Standard Time (LST).
our to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/7/2011 12:00	-1.1	6		
9/7/2011 13:00	-0.8	0		
9/7/2011 14:00	-0.6	7		
9/7/2011 15:00	-0.4	11		
9/7/2011 16:00	-0.7	7		
9/7/2011 17:00	-0.5	13		
9/7/2011 18:00	-0.7	17		
9/7/2011 19:00	-0.4	19		
9/7/2011 20:00	-0.4	19		
9/7/2011 21:00	-1	15		
9/7/2011 22:00	-0.7	15		
9/7/2011 23:00	-0.6	13		
9/8/2011 0:00	-0.5	13		
9/8/2011 1:00	-0.8	26		
9/8/2011 2:00	-1	17		
9/8/2011 3:00	-1.1	22		
9/8/2011 4:00	-1	20		
9/8/2011 5:00	-1.3	24		
9/8/2011 6:00	-1.7	24		
9/8/2011 7:00	-1.4	28		
9/8/2011 8:00	-1.1	20		
9/8/2011 9:00	-0.9	28		
9/8/2011 10:00	-0.7	28		
9/8/2011 11:00	-0.3	33		
9/8/2011 12:00	-0.3	30		
9/8/2011 13:00	-0.4	28		
9/8/2011 14:00	-0.5	28		
9/8/2011 15:00	-0.4	26		
9/8/2011 16:00	-0.7	32		
9/8/2011 17:00	-0.8	35		
9/8/2011 18:00	-0.8	32		
9/8/2011 19:00	-0.9	24		
9/8/2011 20:00	-1	28		
9/8/2011 21:00	-1	28		
9/8/2011 22:00	-1.3	30		
9/8/2011 23:00	-1.3	24		
9/9/2011 0:00	-1.8	24		
9/9/2011 1:00	-2	17		
9/9/2011 2:00	-2.2	19		
9/9/2011 3:00	-2	15		
9/9/2011 4:00	-1.8	15		
9/9/2011 5:00	-1.9	15		
9/9/2011 6:00	-1.8	15		
9/9/2011 7:00	-1.6	20		
9/9/2011 8:00	-1.5	15		
9/9/2011 9:00	-1.5	15		
9/9/2011 10:00	-1.4	9		
9/9/2011 11:00	-1.3	11		
9/9/2011 12:00	-1	7		
9/9/2011 13:00	-0.8	11		
9/9/2011 14:00	-0.8	7		
9/9/2011 15:00	0.1	0		
9/9/2011 16:00	-0.2	6		
9/9/2011 17:00	-0.8	7		
9/9/2011 18:00	-0.8	13		
9/9/2011 19:00	-0.9	13		
9/9/2011 20:00	-0.7	15		
9/9/2011 21:00	-0.7	17		
9/9/2011 22:00	-0.3	17		
9/9/2011 23:00	0	17		
9/10/2011 0:00	0.4	9		
9/10/2011 1:00	0.8	7		
9/10/2011 2:00	0.8	7		
9/10/2011 3:00	0.8	15		
9/10/2011 4:00	-0.2	15		
9/10/2011 5:00	0.5	28		
9/10/2011 6:00	0.1	26		
9/10/2011 7:00	-0.3	30		
9/10/2011 8:00	-0.5	28		
9/10/2011 9:00	0.1	28		
9/10/2011 10:00	0.1	28		
9/10/2011 11:00	0.2	32		
9/10/2011 12:00	0.4	26		
9/10/2011 13:00	0.4	24		
9/10/2011 14:00	0.4	30		
9/10/2011 15:00	0.4	32		
9/10/2011 16:00	0.7	26		
9/10/2011 17:00	0.7	26		

Station Name **RESOLUTE CARS**
Province NUNAVUT
Latitude 74.72
Longitude -94.97
Elevation 67.7
Climate Identifier 2403500
WMO Identifier 71924
TC Identifier YRB
e specified in Local Standard Time (LST).
our to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/10/2011 18:00	0.6	22		
9/10/2011 19:00	0.5	19		
9/10/2011 20:00				
9/10/2011 21:00	0.6	20		
9/10/2011 22:00	0.5	22		
9/10/2011 23:00	0.5	19		
9/11/2011 0:00	0	22		
9/11/2011 1:00	-0.2	22		
9/11/2011 2:00	-0.3	17		
9/11/2011 3:00	-0.3	22		
9/11/2011 4:00	-0.6	19		
9/11/2011 5:00	-0.6	22		
9/11/2011 6:00	-0.9	24		
9/11/2011 7:00	-0.5	19		
9/11/2011 8:00	-0.3	24		
9/11/2011 9:00	-0.5	26		
9/11/2011 10:00	-0.6	24		
9/11/2011 11:00	-0.2	17		
9/11/2011 12:00	0	22		
9/11/2011 13:00	-0.2	17		
9/11/2011 14:00	0.2	15		
9/11/2011 15:00	0.3	17		
9/11/2011 16:00	0.3	17		
9/11/2011 17:00	0.4	15		
9/11/2011 18:00	0.4	6		
9/11/2011 19:00	0.3	7		
9/11/2011 20:00	-0.2	13		
9/11/2011 21:00	-0.4	11		
9/11/2011 22:00	-0.7	11		
9/11/2011 23:00	-0.9	11		
9/12/2011 0:00	-1.4	22		
9/12/2011 1:00	-1.6	20		
9/12/2011 2:00	-1.8	24		
9/12/2011 3:00	-2	24		
9/12/2011 4:00	-1.9	24		
9/12/2011 5:00	-2	24		
9/12/2011 6:00	-2.2	24		
9/12/2011 7:00	-2.3	22		
9/12/2011 8:00	-2	19		
9/12/2011 9:00	-1.8	13		
9/12/2011 10:00	-1.1	13		
9/12/2011 11:00	-0.8	13		
9/12/2011 12:00	-1	17		
9/12/2011 13:00	-1	17		
9/12/2011 14:00	-0.1	17		
9/12/2011 15:00	-0.3	20		
9/12/2011 16:00	-0.3	24		
9/12/2011 17:00	-0.6	17		
9/12/2011 18:00	-1	17		
9/12/2011 19:00	-0.8	19		
9/12/2011 20:00	-0.8	24		
9/12/2011 21:00	-0.7	19		
9/12/2011 22:00	-0.4	22		
9/12/2011 23:00	-0.4	32		
9/13/2011 0:00	-0.3	28		
9/13/2011 1:00	-0.4	24		
9/13/2011 2:00	-0.2	30		
9/13/2011 3:00	0	41		
9/13/2011 4:00	0.3	33		
9/13/2011 5:00	0.4	33		
9/13/2011 6:00	0	33		
9/13/2011 7:00	-1	28		
9/13/2011 8:00	-2	33		
9/13/2011 9:00	-3.4	28		
9/13/2011 10:00	-3.1	44		
9/13/2011 11:00	-3.2	46		
9/13/2011 12:00	-4.5	43		
9/13/2011 13:00	-4.2	39		
9/13/2011 14:00	-4.1	28		
9/13/2011 15:00	-4.1	32		
9/13/2011 16:00	-4.4	35		
9/13/2011 17:00	-4.3	32		
9/13/2011 18:00	-4.5	22		
9/13/2011 19:00	-4.5	22		
9/13/2011 20:00	-4.3	30		
9/13/2011 21:00	-4.3	24		
9/13/2011 22:00	-4.3	19		
9/13/2011 23:00	-3.7	24		

Station Name	**RESOLUTE CARS**
Province	NUNAVUT
Latitude	74.72
Longitude	-94.97
Elevation	67.7
Climate Identifier	2403500
WMO Identifier	71924
TC Identifier	YRB

e specified in Local Standard Time (LST).
our to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/14/2011 0:00	-3.8	26		
9/14/2011 1:00	-3.4	17		
9/14/2011 2:00	-3	15		
9/14/2011 3:00	-3	15		
9/14/2011 4:00	-3	6		
9/14/2011 5:00	-2.8	0		
9/14/2011 6:00	-2.1	11		
9/14/2011 7:00	-2.2	24		
9/14/2011 8:00	-2.3	22		
9/14/2011 9:00	-1.9	28		
9/14/2011 10:00	-1.6	37		
9/14/2011 11:00	-1	28		
9/14/2011 12:00	0.1	28		
9/14/2011 13:00	0.2	32		
9/14/2011 14:00	0.7	28		
9/14/2011 15:00	0.4	35		
9/14/2011 16:00	0.4	35		
9/14/2011 17:00	0.8	22		
9/14/2011 18:00	0.8	22		
9/14/2011 19:00	0.8	26		
9/14/2011 20:00	0.8	28		
9/14/2011 21:00	0.7	28		
9/14/2011 22:00	0.5	32		
9/14/2011 23:00	0	24		
9/15/2011 0:00	-1.9	59		
9/15/2011 1:00	-3	61		
9/15/2011 2:00	-3.9	61		
9/15/2011 3:00	-4.2	56	59	4
9/15/2011 4:00	-4.6	46		
9/15/2011 5:00	-4.6	56		
9/15/2011 6:00	-5.3	44		
9/15/2011 7:00	-6.2	46		
9/15/2011 8:00	-6.5	48		
9/15/2011 9:00	-7	56		
9/15/2011 10:00	-5.9	56		
9/15/2011 11:00	-5.6	46		
9/15/2011 12:00	-5.4	52		
9/15/2011 13:00	-5	56		
9/15/2011 14:00	-5.2	50		
9/15/2011 15:00	-5.4	54		
9/15/2011 16:00	-5	56		
9/15/2011 17:00	-5	56		
9/15/2011 18:00	-5.2	56		
9/15/2011 19:00	-5.2	56	55	8
9/15/2011 20:00	-4.8	37		
9/15/2011 21:00	-4.7	52		
9/15/2011 22:00	-5	56		
9/15/2011 23:00	-4.8	46		
9/16/2011 0:00	-4.1	41		
9/16/2011 1:00	-5.2	44		
9/16/2011 2:00	-5	43		
9/16/2011 3:00	-5	41		
9/16/2011 4:00	-5	37		
9/16/2011 5:00	-4.4	44		
9/16/2011 6:00	-4.6	41		
9/16/2011 7:00	-4.6	46		
9/16/2011 8:00	-5.2	50		
9/16/2011 9:00	-5.1	33		
9/16/2011 10:00	-5.2	30		
9/16/2011 11:00	-5.1	33		
9/16/2011 12:00	-4.9	30		
9/16/2011 13:00	-4.9	26		
9/16/2011 14:00	-4.9	24		
9/16/2011 15:00	-4.4	32		
9/16/2011 16:00	-4.3	37		
9/16/2011 17:00	-4.4	28		
9/16/2011 18:00	-4.4	28		
9/16/2011 19:00	-4.7	28		
9/16/2011 20:00	-5	22		
9/16/2011 21:00	-5.7	15		
9/16/2011 22:00	-6.2	15		
9/16/2011 23:00	-6.1	6		
9/17/2011 0:00	-7.3	24		
9/17/2011 1:00	-6.8	24		
9/17/2011 2:00	-7.4	26		
9/17/2011 3:00	-7.8	22		
9/17/2011 4:00	-8.1	15		
9/17/2011 5:00	-7.9	22		

Station Name	**RESOLUTE CARS**
Province	NUNAVUT
Latitude	74.72
Longitude	-94.97
Elevation	67.7
Climate Identifier	2403500
WMO Identifier	71924
TC Identifier	YRB

e specified in Local Standard Time (LST).
ɔur to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/17/2011 6:00	-8	13		
9/17/2011 7:00	-8.9	15		
9/17/2011 8:00	-8.3	15		
9/17/2011 9:00	-7.8	15		
9/17/2011 10:00	-7.9	28		
9/17/2011 11:00	-7.8	22		
9/17/2011 12:00	-7	28		
9/17/2011 13:00	-6.4	19		
9/17/2011 14:00	-6.3	28		
9/17/2011 15:00	-6.6	22		
9/17/2011 16:00	-6.9	24		
9/17/2011 17:00	-6.7	22		
9/17/2011 18:00	-7	32		
9/17/2011 19:00	-6.9	24		
9/17/2011 20:00	-6.9	22		
9/17/2011 21:00	-6.8	17		
9/17/2011 22:00	-7.2	17		
9/17/2011 23:00	-7	15		
9/18/2011 0:00	-6.4	13		
9/18/2011 1:00	-6.1	13		
9/18/2011 2:00	-5.9	7		
9/18/2011 3:00	-5.4	4		
9/18/2011 4:00	-3	19		
9/18/2011 5:00	-2.9	24		
9/18/2011 6:00	-2.6	30		
9/18/2011 7:00	-2.5	22		
9/18/2011 8:00	-2.2	32		
9/18/2011 9:00	-2.1	30		
9/18/2011 10:00	-2.1	32		
9/18/2011 11:00	-1.4	26		
9/18/2011 12:00	-2.2	32		
9/18/2011 13:00	-2.2	39		
9/18/2011 14:00	-2.3	32		
9/18/2011 15:00	-2.3	41		
9/18/2011 16:00	-2.2	28		
9/18/2011 17:00	-1.9	33		
9/18/2011 18:00	-1.8	28		
9/18/2011 19:00	-1.6	37		
9/18/2011 20:00	-1.4	33		
9/18/2011 21:00				
9/18/2011 22:00	-1.6	30		
9/18/2011 23:00	-1.5	32		
9/19/2011 0:00	-1.8	24		
9/19/2011 1:00	-1.8	24		
9/19/2011 2:00	-1.9	22		
9/19/2011 3:00	-2.1	24		
9/19/2011 4:00	-2.1	22		
9/19/2011 5:00	-2	22		
9/19/2011 6:00	-2.1	24		
9/19/2011 7:00	-2.3	20		
9/19/2011 8:00	-2.1	24		
9/19/2011 9:00	-1.9	17		
9/19/2011 10:00	-1.8	19		
9/19/2011 11:00	-1.9	11		
9/19/2011 12:00	-1.5	17		
9/19/2011 13:00	-1.4	15		
9/19/2011 14:00	-1.4	13		
9/19/2011 15:00	-1.4	13		
9/19/2011 16:00	-1.3	13		
9/19/2011 17:00	-1.3	19		
9/19/2011 18:00	-1.2	17		
9/19/2011 19:00	-1.1	24		
9/19/2011 20:00	-1	17		
9/19/2011 21:00	-1.1	20		
9/19/2011 22:00	-1.1	22		
9/19/2011 23:00	-1.1	15		
9/20/2011 0:00	-0.9	26		
9/20/2011 1:00	-0.6	19		
9/20/2011 2:00	-0.6	20		
9/20/2011 3:00	-0.6	22		
9/20/2011 4:00	-0.6	20		
9/20/2011 5:00	-0.6	24		
9/20/2011 6:00	-0.6	24		
9/20/2011 7:00	-0.9	20		
9/20/2011 8:00	-0.7	17		
9/20/2011 9:00	-0.7	24		
9/20/2011 10:00	-0.6	22		
9/20/2011 11:00	-0.4	24		

Station Name	**RESOLUTE CARS**
Province	NUNAVUT
Latitude	74.72
Longitude	-94.97
Elevation	67.7
Climate Identifier	2403500
WMO Identifier	71924
TC Identifier	YRB

e specified in Local Standard Time (LST).
our to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/20/2011 12:00	-0.4	20		
9/20/2011 13:00	-0.6	30		
9/20/2011 14:00	-0.5	24		
9/20/2011 15:00	-1	28		
9/20/2011 16:00	-1.2	20		
9/20/2011 17:00	-1	7		
9/20/2011 18:00	-1.3	7		
9/20/2011 19:00	-1.4	9		
9/20/2011 20:00	-1.4	17		
9/20/2011 21:00	-1.4	19		
9/20/2011 22:00	-2.5	19		
9/20/2011 23:00	-2.5	17		
9/21/2011 0:00	-1.9	17		
9/21/2011 1:00	-1.6	24		
9/21/2011 2:00	-1.8	24		
9/21/2011 3:00	-2.1	20		
9/21/2011 4:00	-2.5	15		
9/21/2011 5:00	-2.7	15		
9/21/2011 6:00	-1.8	17		
9/21/2011 7:00	-1.9	20		
9/21/2011 8:00	-1.8	24		
9/21/2011 9:00	-1.7	30		
9/21/2011 10:00	-1.2	30		
9/21/2011 11:00	-1	35		
9/21/2011 12:00	-1.3	50		
9/21/2011 13:00	-0.7	46		
9/21/2011 14:00	-0.5	39		
9/21/2011 15:00	-0.7	43		
9/21/2011 16:00	-0.9	41		
9/21/2011 17:00	-0.9	41		
9/21/2011 18:00	-1.1	43		
9/21/2011 19:00	-0.9	46		
9/21/2011 20:00	-0.5	48		
9/21/2011 21:00	-0.2	52		
9/21/2011 22:00	0.1	52		
9/21/2011 23:00	0.1	46		
9/22/2011 0:00	0	52		
9/22/2011 1:00	-0.1	56		
9/22/2011 2:00	-0.2	59		
9/22/2011 3:00	-0.4	65		
9/22/2011 4:00	-0.4	63		
9/22/2011 5:00	-0.7	61		
9/22/2011 6:00	-0.7	65		
9/22/2011 7:00	-0.6	61		
9/22/2011 8:00	-0.6	59		
9/22/2011 9:00	-1.4	59		
9/22/2011 10:00	-1.3	63		
9/22/2011 11:00	-1.1	70		
9/22/2011 12:00	-1	70		
9/22/2011 13:00	-1	63		
9/22/2011 14:00	-1.1	59		
9/22/2011 15:00	-1.3	80		
9/22/2011 16:00	-1.4	69		
9/22/2011 17:00	-1.3	70		
9/22/2011 18:00	-1.3	70		
9/22/2011 19:00	-1	59		
9/22/2011 20:00	-0.7	74		
9/22/2011 21:00	-0.7	80		
9/22/2011 22:00	-0.9	74		
9/22/2011 23:00	-0.8	69		
9/23/2011 0:00	-1	83		
9/23/2011 1:00	-1.2	83		
9/23/2011 2:00	-1.1	70		
9/23/2011 3:00	-1.1	78		
9/23/2011 4:00	-1.1	74		
9/23/2011 5:00	-1	70		
9/23/2011 6:00	-0.9	52		
9/23/2011 7:00	-1	59		
9/23/2011 8:00	-1	52		
9/23/2011 9:00	-0.8	54	66	34
9/23/2011 10:00	-0.5	48		
9/23/2011 11:00	-0.2	44		
9/23/2011 12:00	-0.1	57		
9/23/2011 13:00	-0.2	48		
9/23/2011 14:00	0.1	35		
9/23/2011 15:00	-0.7	32		
9/23/2011 16:00	-0.1	46		
9/23/2011 17:00	-0.8	33		

Station Name **RESOLUTE CARS**
Province NUNAVUT
Latitude 74.72
Longitude -94.97
Elevation 67.7
Climate Identifier 2403500
WMO Identifier 71924
TC Identifier YRB
e specified in Local Standard Time (LST).
our to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/23/2011 18:00	-1.6	24		
9/23/2011 19:00	-2.5	33		
9/23/2011 20:00	-3.9	32		
9/23/2011 21:00	-4.3	35		
9/23/2011 22:00	-3.6	32		
9/23/2011 23:00	-4.3	39		
9/24/2011 0:00	-4.6	37		
9/24/2011 1:00	-4.7	39		
9/24/2011 2:00	-5.5	35		
9/24/2011 3:00	-4.9	37		
9/24/2011 4:00	-4.2	37		
9/24/2011 5:00	-5.4	43		
9/24/2011 6:00	-3.8	43		
9/24/2011 7:00	-5.9	37		
9/24/2011 8:00	-5.4	43		
9/24/2011 9:00	-4.6	35		
9/24/2011 10:00	-4.4	39		
9/24/2011 11:00	-4.2	35		
9/24/2011 12:00	-3.4	32		
9/24/2011 13:00	-3.3	39		
9/24/2011 14:00	-3.7	26		
9/24/2011 15:00	-4	24		
9/24/2011 16:00	-4.5	32		
9/24/2011 17:00	-3.8	28		
9/24/2011 18:00	-5.2	33		
9/24/2011 19:00	-5.2	24		
9/24/2011 20:00	-5.2	30		
9/24/2011 21:00	-5.4	32		
9/24/2011 22:00	-6	7		
9/24/2011 23:00	-4.2	0		
9/25/2011 0:00	-5.5	0		
9/25/2011 1:00	-5.4	9		
9/25/2011 2:00	-6.4	9		
9/25/2011 3:00	-5.4	4		
9/25/2011 4:00	-5.7	0		
9/25/2011 5:00	-5.9	13		
9/25/2011 6:00	-5.6	19		
9/25/2011 7:00	-5.9	41		
9/25/2011 8:00	-5.2	32		
9/25/2011 9:00	-3.9	26		
9/25/2011 10:00	-3.5	13		
9/25/2011 11:00	-3.8	26		
9/25/2011 12:00	-4.2	33		
9/25/2011 13:00	-4.7	35		
9/25/2011 14:00	-4.9	39		
9/25/2011 15:00	-5.4	26		
9/25/2011 16:00	-6	30		
9/25/2011 17:00	-6.4	24		
9/25/2011 18:00	-6.8	26		
9/25/2011 19:00	-6.8	26		
9/25/2011 20:00	-6.6	28		
9/25/2011 21:00	-6.5	33		
9/25/2011 22:00	-6.2	24		
9/25/2011 23:00	-5.6	32		
9/26/2011 0:00	-5.7	33		
9/26/2011 1:00	-5.8	28		
9/26/2011 2:00	-6.1	37		
9/26/2011 3:00	-6.9	32		
9/26/2011 4:00	-7.9	32		
9/26/2011 5:00	-8.3	28		
9/26/2011 6:00	-8.7	35		
9/26/2011 7:00	-8.4	32		
9/26/2011 8:00	-8.5	30		
9/26/2011 9:00	-8.6	20		
9/26/2011 10:00	-9.1	15		
9/26/2011 11:00	-9.4	20		
9/26/2011 12:00	-9.6	17		
9/26/2011 13:00	-9.4	20		
9/26/2011 14:00	-9.4	20		
9/26/2011 15:00	-9.4	19		
9/26/2011 16:00	-9.2	15		
9/26/2011 17:00	-9.7	19		
9/26/2011 18:00	-9.6	20		
9/26/2011 19:00	-9.6	17		
9/26/2011 20:00	-9.7	17		
9/26/2011 21:00	-9.4	15		
9/26/2011 22:00	-10.8	9		
9/26/2011 23:00	-11.2	17		

Station Name	**RESOLUTE CARS**
Province	NUNAVUT
Latitude	74.72
Longitude	-94.97
Elevation	67.7
Climate Identifier	2403500
WMO Identifier	71924
TC Identifier	YRB

e specified in Local Standard Time (LST).
›ur to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/27/2011 0:00	-10	15		
9/27/2011 1:00	-9.1	15		
9/27/2011 2:00	-8.8	9		
9/27/2011 3:00	-7.9	15		
9/27/2011 4:00	-8.1	19		
9/27/2011 5:00	-8.4	19		
9/27/2011 6:00	-8.5	11		
9/27/2011 7:00	-9.7	6		
9/27/2011 8:00	-8.9	11		
9/27/2011 9:00	-8.6	13		
9/27/2011 10:00	-7.6	13		
9/27/2011 11:00	-7.4	20		
9/27/2011 12:00	-7.4	19		
9/27/2011 13:00	-8.8	22		
9/27/2011 14:00	-7.4	32		
9/27/2011 15:00	-8	39		
9/27/2011 16:00	-8.6	32		
9/27/2011 17:00	-7.9	39		
9/27/2011 18:00	-8.6	46		
9/27/2011 19:00	-9	46		
9/27/2011 20:00	-9	41		
9/27/2011 21:00	-9.3	44		
9/27/2011 22:00	-9.2	44		
9/27/2011 23:00	-9.9	43		
9/28/2011 0:00	-9.7	46		
9/28/2011 1:00	-9.9	41		
9/28/2011 2:00	-9.5	37		
9/28/2011 3:00	-10	37		
9/28/2011 4:00	-10.6	32		
9/28/2011 5:00	-10.9	28		
9/28/2011 6:00	-11	33		
9/28/2011 7:00	-10.5	32		
9/28/2011 8:00	-10.7	32		
9/28/2011 9:00	-11.2	39		
9/28/2011 10:00	-12.2	32		
9/28/2011 11:00	-11.7	30		
9/28/2011 12:00	-10.1	30		
9/28/2011 13:00	-9	32		
9/28/2011 14:00	-9.4	24		
9/28/2011 15:00	-9.2	24		
9/28/2011 16:00	-8.7	32		
9/28/2011 17:00	-8.6	22		
9/28/2011 18:00	-7.6	24		
9/28/2011 19:00	-7.3	22		
9/28/2011 20:00	-6.8	26		
9/28/2011 21:00	-6.6	26		
9/28/2011 22:00	-6.1	30		
9/28/2011 23:00	-6.8	22		
9/29/2011 0:00	-5.8	26		
9/29/2011 1:00	-5.8	28		
9/29/2011 2:00	-7.1	26		
9/29/2011 3:00	-6.9	33		
9/29/2011 4:00	-7	33		
9/29/2011 5:00	-6.7	32		
9/29/2011 6:00	-5.7	32		
9/29/2011 7:00	-5.4	28		
9/29/2011 8:00	-5.1	30		
9/29/2011 9:00	-5	13		
9/29/2011 10:00	-4.6	15		
9/29/2011 11:00	-4.3	15		
9/29/2011 12:00	-4.1	15		
9/29/2011 13:00	-4.3	19		
9/29/2011 14:00	-4.4	24		
9/29/2011 15:00	-4.6	19		
9/29/2011 16:00	-5.1	24		
9/29/2011 17:00	-5.8	22		
9/29/2011 18:00	-6.1	24		
9/29/2011 19:00	-7.1	24		
9/29/2011 20:00	-7.6	26		
9/29/2011 21:00	-8.1	30		
9/29/2011 22:00	-7.7	22		
9/29/2011 23:00	-7.5	30		
9/30/2011 0:00	-7.7	33		
9/30/2011 1:00	-7.5	32		
9/30/2011 2:00	-7.2	30		
9/30/2011 3:00	-6.3	28		
9/30/2011 4:00	-6.6	33		
9/30/2011 5:00	-8.5	28		

Station Name	**RESOLUTE CARS**
Province	NUNAVUT
Latitude	74.72
Longitude	-94.97
Elevation	67.7
Climate Identifier	2403500
WMO Identifier	71924
TC Identifier	YRB

e specified in Local Standard Time (LST).
›ur to adjust for Daylight Saving Time.

Date/Time	Temp (°C)	Wind Spd (km/h)	Av. Wind Spd When Over 50 Km/Hr	Consecutive Hours Duration
9/30/2011 6:00	-10.1	28		
9/30/2011 7:00	-9.3	30		
9/30/2011 8:00	-9.4	26		
9/30/2011 9:00	-9.5	30		
9/30/2011 10:00	-9.5	26		
9/30/2011 11:00	-9	20		
9/30/2011 12:00	-9.3	20		
9/30/2011 13:00	-9	13		
9/30/2011 14:00	-8.3	26		
9/30/2011 15:00	-7.6	26		
9/30/2011 16:00	-7.4	20		
9/30/2011 17:00	-8.8	19		
9/30/2011 18:00	-8.7	22		
9/30/2011 19:00	-8.4	19		
9/30/2011 20:00	-7.8	22		
9/30/2011 21:00	-7.2	24		
9/30/2011 22:00	-7.2	24		
9/30/2011 23:00	-7.5	24		

APPENDIX 10

Landfill Thermistor Monitoring Data

Including the

Operational Landfill

And

Little Red Dog Quarry Landfill

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL1

Bulb	TH1_1	TH1_2	TH1_3	TH1_4	TH1_5	TH1_6	TH1_7	TH1_8	TH1_9	TH1_10	TH1_11	TH1_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
15-Jul-10	-0.928	-2.026	-3.409	-4.217	-4.817	-6.176	-7.230	-7.860	-9.800	-12.030	-14.090	-14.580
16-Jul-10	-0.928	-1.974	-3.356	-4.165	-4.739	-6.072	-7.120	-7.750	-9.690	-11.950	-14.030	-14.550
17-Jul-10	-0.902	-1.921	-3.278	-4.061	-4.634	-5.993	-7.020	-7.620	-9.560	-11.870	-13.970	-14.490
18-Jul-10	-0.910	-1.929	-3.233	-4.015	-4.563	-5.895	-6.917	-7.550	-9.460	-11.740	-13.890	-14.440
19-Jul-10	-0.876	-1.869	-3.174	-3.930	-4.504	-5.810	-6.832	-7.440	-9.350	-11.650	-13.830	-14.400
20-Jul-10	-0.824	-1.869	-3.148	-3.878	-4.426	-5.731	-6.727	-7.330	-9.240	-11.570	-13.770	-14.380
21-Jul-10	-0.786	-1.805	-3.084	-3.815	-4.363	-5.643	-6.638	-7.240	-9.150	-11.450	-13.710	-14.340
22-Jul-10	-0.786	-1.779	-3.058	-3.763	-4.284	-5.564	-6.560	-7.110	-9.040	-11.360	-13.650	-14.280
23-Jul-10	-0.783	-1.750	-3.002	-3.706	-4.254	-5.480	-6.475	-7.050	-8.930	-11.270	-13.580	-14.240
24-Jul-10	-0.783	-1.724	-2.976	-3.680	-4.202	-5.428	-6.396	-6.973	-8.850	-11.160	-13.530	-14.210
25-Jul-10	-0.757	-1.698	-2.924	-3.628	-4.150	-5.376	-6.318	-6.895	-8.770	-11.080	-13.470	-14.150
26-Jul-10	-0.769	-1.683	-2.909	-3.587	-4.108	-5.308	-6.249	-6.799	-8.670	-11.010	-13.390	-14.100
27-Jul-10	-0.705	-1.672	-2.872	-3.524	-4.045	-5.219	-6.187	-6.711	-8.580	-10.950	-13.360	-14.070
28-Jul-10	-0.626	-1.646	-2.820	-3.498	-3.993	-5.167	-6.108	-6.658	-8.530	-10.840	-13.300	-14.040
29-Jul-10	-0.653	-1.594	-2.794	-3.446	-3.941	-5.115	-6.056	-6.553	-8.420	-10.760	-13.240	-13.980
30-Jul-10	-0.626	-1.567	-2.768	-3.393	-3.915	-5.063	-5.977	-6.501	-8.340	-10.700	-13.160	-13.920
31-Jul-10	-0.602	-1.544	-2.719	-3.345	-3.867	-4.989	-5.904	-6.428	-8.270	-10.600	-13.080	-13.880
1-Aug-10	-0.588	-1.504	-2.678	-3.304	-3.826	-4.948	-5.862	-6.360	-8.180	-10.530	-13.070	-13.860
2-Aug-10	-0.615	-1.504	-2.652	-3.252	-3.774	-4.896	-5.784	-6.281	-8.120	-10.420	-12.980	-13.800
3-Aug-10	-0.602	-1.466	-2.615	-3.241	-3.711	-4.833	-5.721	-6.219	-8.060	-10.360	-12.920	-13.760
4-Aug-10	-0.643	-1.454	-2.577	-3.178	-3.673	-4.770	-5.659	-6.156	-7.970	-10.300	-12.850	-13.700
5-Aug-10	-0.681	-1.413	-2.563	-3.163	-3.632	-4.728	-5.617	-6.088	-7.900	-10.220	-12.800	-13.650
6-Aug-10	-0.681	-1.413	-2.537	-3.111	-3.606	-4.676	-5.564	-6.035	-7.850	-10.140	-12.750	-13.620
7-Aug-10	-0.713	-1.419	-2.516	-3.090	-3.559	-4.629	-5.517	-5.962	-7.770	-10.070	-12.700	-13.570
8-Aug-10	-0.681	-1.387	-2.484	-3.058	-3.528	-4.572	-5.460	-5.904	-7.720	-9.980	-12.640	-13.540
9-Aug-10	-0.666	-1.372	-2.469	-3.017	-3.486	-4.556	-5.417	-5.862	-7.650	-9.940	-12.590	-13.490
10-Aug-10	-0.614	-1.373	-2.444	-2.991	-3.461	-4.504	-5.366	-5.810	-7.600	-9.860	-12.530	-13.430
11-Aug-10	-0.602	-1.387	-2.432	-2.980	-3.424	-4.441	-5.303	-5.747	-7.510	-9.820	-12.470	-13.400
12-Aug-10	-0.590	-1.349	-2.395	-2.943	-3.386	-4.404	-5.266	-5.685	-7.440	-9.760	-12.400	-13.360
13-Aug-10	-0.651	-1.358	-2.403	-2.925	-3.342	-4.386	-5.221	-5.640	-7.400	-9.680	-12.380	-13.310
14-Aug-10	-0.695	-1.349	-2.368	-2.891	-3.334	-4.352	-5.162	-5.606	-7.340	-9.620	-12.290	-13.270
15-Aug-10	-0.696	-1.325	-2.344	-2.866	-3.283	-4.301	-5.137	-5.529	-7.290	-9.570	-12.270	-13.220
16-Aug-10	-0.721	-1.323	-2.342	-2.838	-3.282	-4.274	-5.083	-5.502	-7.230	-9.490	-12.210	-13.190
17-Aug-10	-0.759	-1.335	-2.328	-2.824	-3.241	-4.232	-5.042	-5.434	-7.160	-9.440	-12.160	-13.140
18-Aug-10	-0.771	-1.347	-2.339	-2.809	-3.226	-4.191	-5.026	-5.418	-7.150	-9.370	-12.090	-13.090
19-Aug-10	-0.761	-1.310	-2.303	-2.773	-3.190	-4.182	-4.991	-5.383	-7.090	-9.310	-12.050	-13.060
20-Aug-10	-0.771	-1.347	-2.313	-2.783	-3.174	-4.139	-4.948	-5.339	-7.040	-9.270	-12.010	-13.010
21-Aug-10	-0.745	-1.321	-2.287	-2.757	-3.148	-4.113	-4.922	-5.287	-6.990	-9.210	-11.950	-12.980
22-Aug-10	-0.719	-1.321	-2.287	-2.757	-3.122	-4.087	-4.895	-5.235	-6.937	-9.160	-11.920	-12.950
23-Aug-10	-0.693	-1.295	-2.261	-2.730	-3.122	-4.061	-4.843	-5.209	-6.885	-9.130	-11.870	-12.900
24-Aug-10	-0.667	-1.295	-2.261	-2.704	-3.096	-4.034	-4.817	-5.157	-6.858	-9.080	-11.810	-12.870
25-Aug-10	-0.655	-1.283	-2.249	-2.693	-3.058	-3.997	-4.780	-5.120	-6.796	-9.020	-11.780	-12.800
26-Aug-10	-0.654	-1.256	-2.223	-2.693	-3.032	-3.971	-4.754	-5.094	-6.769	-8.960	-11.720	-12.780
27-Aug-10	-0.707	-1.282	-2.223	-2.667	-3.032	-3.945	-4.728	-5.041	-6.717	-8.940	-11.690	-12.750
28-Aug-10	-0.707	-1.230	-2.223	-2.641	-3.006	-3.919	-4.702	-5.015	-6.691	-8.830	-11.640	-12.690
29-Aug-10	-0.721	-1.245	-2.186	-2.603	-2.995	-3.908	-4.665	-4.979	-6.655	-8.820	-11.580	-12.660
30-Aug-10	-0.721	-1.219	-2.160	-2.603	-2.943	-3.882	-4.639	-4.953	-6.576	-8.770	-11.550	-12.600
31-Aug-10	-0.759	-1.230	-2.171	-2.589	-2.954	-3.867	-4.598	-4.911	-6.560	-8.720	-11.500	-12.580
1-Sep-10	-0.785	-1.230	-2.171	-2.588	-2.928	-3.841	-4.571	-4.885	-6.533	-8.670	-11.470	-12.550
2-Sep-10	-0.785	-1.230	-2.145	-2.562	-2.901	-3.814	-4.545	-4.858	-6.507	-8.620	-11.420	-12.500
3-Sep-10	-0.786	-1.204	-2.119	-2.537	-2.876	-3.789	-4.519	-4.833	-6.455	-8.590	-11.360	-12.470
4-Sep-10	-0.800	-1.219	-2.133	-2.525	-2.864	-3.752	-4.509	-4.796	-6.392	-8.560	-11.330	-12.430
5-Sep-10	-0.814	-1.207	-2.122	-2.514	-2.854	-3.741	-4.472	-4.760	-6.382	-8.490	-11.290	-12.400
6-Sep-10	-0.823	-1.215	-2.130	-2.496	-2.835	-3.723	-4.454	-4.741	-6.337	-8.450	-11.240	-12.370
7-Sep-10	-0.868	-1.209	-2.098	-2.489	-2.803	-3.690	-4.421	-4.709	-6.305	-8.410	-11.210	-12.310
8-Sep-10	-0.852	-1.218	-2.107	-2.473	-2.812	-3.699	-4.404	-4.691	-6.287	-8.370	-11.160	-12.270
9-Sep-10	-0.903	-1.244	-2.106	-2.472	-2.785	-3.673	-4.377	-4.664	-6.260	-8.340	-11.140	-12.240
10-Sep-10	-0.903	-1.217	-2.106	-2.471	-2.785	-3.646	-4.351	-4.612	-6.207	-8.310	-11.080	-12.210
11-Sep-10	-0.905	-1.219	-2.107	-2.447	-2.760	-3.647	-4.326	-4.613	-6.182	-8.260	-11.060	-12.180
12-Sep-10	-0.945	-1.233	-2.096	-2.436	-2.723	-3.610	-4.315	-4.550	-6.146	-8.200	-11.020	-12.150
13-Sep-10	-0.957	-1.245	-2.107	-2.421	-2.734	-3.595	-4.300	-4.535	-6.130	-8.180	-10.970	-12.100
14-Sep-10	-0.983	-1.271	-2.081	-2.447	-2.708	-3.595	-4.274	-4.535	-6.104	-8.160	-10.950	-12.070
15-Sep-10	-0.983	-1.245	-2.081	-2.421	-2.708	-3.569	-4.248	-4.509	-6.051	-8.100	-10.920	-12.040
16-Sep-10	-0.997	-1.259	-2.096	-2.409	-2.697	-3.532	-4.237	-4.446	-6.015	-8.070	-10.860	-12.010
17-Sep-10	-1.023	-1.285	-2.096	-2.409	-2.697	-3.532	-4.211	-4.446	-6.015	-8.040	-10.830	-11.980
18-Sep-10	-1.038	-1.273	-2.084	-2.398	-2.685	-3.521	-4.200	-4.435	-5.978	-8.010	-10.770	-11.940

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL1

Bulb Depth	TH1_1 0.75 M	TH1_2 1.00 M	TH1_3 1.25 M	TH1_4 1.50 M	TH1_5 1.75 M	TH1_6 2.00 M	TH1_7 2.25 M	TH1_8 2.50 M	TH1_9 3.0 M	TH1_10 5.0 M	TH1_11 7.0 M	TH1_12 11.0 M
19-Sep-10	-1.052	-1.288	-2.073	-2.386	-2.674	-3.484	-4.189	-4.398	-5.942	-7.970	-10.760	-11.910
20-Sep-10	-1.064	-1.273	-2.084	-2.372	-2.659	-3.495	-4.174	-4.383	-5.926	-7.930	-10.740	-11.830
21-Sep-10	-1.102	-1.311	-2.096	-2.409	-2.644	-3.480	-4.159	-4.367	-5.884	-7.910	-10.690	-11.840
22-Sep-10	-1.102	-1.311	-2.095	-2.383	-2.644	-3.479	-4.132	-4.341	-5.857	-7.880	-10.660	-11.810
23-Sep-10	-1.169	-1.326	-2.110	-2.398	-2.633	-3.469	-4.122	-4.331	-5.847	-7.850	-10.630	-11.780
24-Sep-10	-1.355	-1.328	-2.114	-2.375	-2.636	-3.447	-4.100	-4.257	-5.801	-7.830	-10.610	-11.730
25-Sep-10	-1.616	-1.355	-2.087	-2.401	-2.636	-3.447	-4.100	-4.283	-5.774	-7.770	-10.560	-11.710
26-Sep-10	-2.122	-1.415	-2.096	-2.384	-2.619	-3.430	-4.084	-4.267	-5.759	-7.760	-10.520	-11.690
27-Sep-10	-2.619	-1.520	-2.122	-2.384	-2.619	-3.430	-4.083	-4.240	-5.733	-7.730	-10.460	-11.640
28-Sep-10	-2.846	-1.669	-2.166	-2.401	-2.610	-3.421	-4.074	-4.231	-5.722	-7.670	-10.480	-11.620
29-Sep-10	-2.805	-1.785	-2.203	-2.413	-2.622	-3.405	-4.059	-4.215	-5.706	-7.650	-10.400	-11.580
30-Sep-10	-2.831	-1.994	-2.334	-2.465	-2.648	-3.432	-4.058	-4.215	-5.706	-7.630	-10.400	-11.520
1-Oct-10	-2.883	-2.177	-2.491	-2.543	-2.674	-3.405	-4.032	-4.189	-5.654	-7.630	-10.380	-11.490
2-Oct-10	-2.946	-2.372	-2.633	-2.633	-2.738	-3.469	-4.069	-4.174	-5.638	-7.580	-10.330	-11.500
3-Oct-10	-3.331	-2.521	-2.782	-2.704	-2.808	-3.514	-4.063	-4.168	-5.607	-7.500	-10.280	-11.480
4-Oct-10	-3.608	-2.718	-2.928	-2.849	-2.875	-3.555	-4.104	-4.209	-5.623	-7.520	-10.270	-11.440
5-Oct-10	-4.026	-2.928	-3.111	-2.954	-2.980	-3.608	-4.157	-4.209	-5.597	-7.490	-10.270	-11.410
6-Oct-10	-4.074	-3.133	-3.264	-3.107	-3.081	-3.682	-4.204	-4.257	-5.591	-7.480	-10.230	-11.380
7-Oct-10	-4.257	-3.368	-3.473	-3.264	-3.211	-3.786	-4.231	-4.283	-5.617	-7.430	-10.180	-11.350
8-Oct-10	-4.387	-3.603	-3.682	-3.394	-3.342	-3.891	-4.335	-4.335	-5.617	-7.430	-10.150	-11.290
9-Oct-10	-4.492	-3.812	-3.891	-3.603	-3.473	-3.943	-4.387	-4.387	-5.643	-7.400	-10.120	-11.270
10-Oct-10	-4.597	-3.969	-4.048	-3.760	-3.603	-4.100	-4.466	-4.440	-5.643	-7.380	-10.120	-11.270
11-Oct-10	-4.780	-4.126	-4.231	-3.917	-3.760	-4.204	-4.570	-4.518	-5.670	-7.380	-10.100	-11.240
12-Oct-10	-4.901	-4.326	-4.405	-4.091	-3.908	-4.326	-4.666	-4.587	-5.712	-7.370	-10.060	-11.230
13-Oct-10	-4.984	-4.461	-4.566	-4.226	-4.017	-4.461	-4.749	-4.670	-5.743	-7.350	-10.030	-11.200
14-Oct-10	-4.982	-4.538	-4.669	-4.355	-4.172	-4.564	-4.852	-4.721	-5.767	-7.340	-10.010	-11.170
15-Oct-10	-5.005	-4.586	-4.769	-4.482	-4.299	-4.665	-4.952	-4.796	-5.790	-7.340	-10.000	-11.140
16-Oct-10												
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23-Nov-10												

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL1

Bulb	TH1_1	TH1_2	TH1_3	TH1_4	TH1_5	TH1_6	TH1_7	TH1_8	TH1_9	TH1_10	TH1_11	TH1_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
24-Nov-10												
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OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL1

Bulb	TH1_1	TH1_2	TH1_3	TH1_4	TH1_5	TH1_6	TH1_7	TH1_8	TH1_9	TH1_10	TH1_11	TH1_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
29-Jan-11												
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OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL1

Bulb Depth	TH1_1 0.75 M	TH1_2 1.00 M	TH1_3 1.25 M	TH1_4 1.50 M	TH1_5 1.75 M	TH1_6 2.00 M	TH1_7 2.25 M	TH1_8 2.50 M	TH1_9 3.0 M	TH1_10 5.0 M	TH1_11 7.0 M	TH1_12 11.0 M
5-Apr-11												
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OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL1

Bulb	TH1_1	TH1_2	TH1_3	TH1_4	TH1_5	TH1_6	TH1_7	TH1_8	TH1_9	TH1_10	TH1_11	TH1_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
10-Jun-11												
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18-Jul-11												
19-Jul-11	-0.807	-2.112	-3.545	-4.353	-4.953	-6.233	-7.230	-7.550	-9.720	-11.920	-13.910	-14.340
20-Jul-11	-0.795	-2.049	-3.483	-4.291	-4.864	-6.144	-7.140	-7.430	-9.610	-11.830	-13.850	-14.310
21-Jul-11	-0.626	-1.959	-3.394	-4.202	-4.776	-6.056	-7.030	-7.320	-9.490	-11.740	-13.780	-14.240
22-Jul-11	-0.545	-1.905	-3.339	-4.121	-4.695	-5.949	-6.945	-7.230	-9.410	-11.630	-13.720	-14.210
23-Jul-11	-0.457	-1.817	-3.252	-4.034	-4.582	-5.862	-6.858	-7.120	-9.290	-11.540	-13.630	-14.170
24-Jul-11	-0.469	-1.776	-3.185	-3.967	-4.515	-5.768	-6.763	-7.030	-9.200	-11.440	-13.580	-14.120
25-Jul-11	-0.403	-1.684	-3.118	-3.874	-4.421	-5.700	-6.668	-6.931	-9.100	-11.360	-13.510	-14.080
26-Jul-11	-0.365	-1.646	-3.055	-3.811	-4.358	-5.611	-6.580	-6.816	-9.010	-11.270	-13.470	-14.040
27-Jul-11	-0.246	-1.605	-3.014	-3.769	-4.265	-5.517	-6.511	-6.747	-8.940	-11.170	-13.390	-13.990
28-Jul-11	-0.179	-1.565	-2.973	-3.702	-4.223	-5.449	-6.416	-6.678	-8.840	-11.070	-13.340	-13.970
29-Jul-11	-0.115	-1.501	-2.883	-3.613	-4.134	-5.386	-6.328	-6.590	-8.750	-10.980	-13.280	-13.900
30-Jul-11	0.002	-1.437	-2.846	-3.550	-4.071	-5.298	-6.265	-6.475	-8.640	-10.920	-13.210	-13.870
31-Jul-11	0.042	-1.396	-2.779	-3.509	-4.030	-5.230	-6.171	-6.406	-8.570	-10.820	-13.170	-13.820
1-Aug-11	0.042	-1.370	-2.753	-3.457	-3.952	-5.177	-6.118	-6.328	-8.490	-10.740	-13.080	-13.790
2-Aug-11	0.133	-1.280	-2.664	-3.394	-3.889	-5.089	-6.030	-6.239	-8.400	-10.670	-13.020	-13.720
3-Aug-11	0.137	-1.251	-2.635	-3.339	-3.860	-5.034	-5.948	-6.184	-8.320	-10.560	-12.990	-13.690
4-Aug-11	0.133	-1.202	-2.585	-3.289	-3.785	-4.958	-5.899	-6.082	-8.240	-10.510	-12.910	-13.640
5-Aug-11	0.158	-1.151	-2.534	-3.212	-3.734	-4.881	-5.821	-6.031	-8.160	-10.430	-12.850	-13.610
6-Aug-11	0.212	-1.123	-2.507	-3.185	-3.706	-4.854	-5.768	-5.977	-8.080	-10.350	-12.790	-13.550
7-Aug-11	0.305	-1.082	-2.466	-3.143	-3.639	-4.786	-5.699	-5.882	-8.010	-10.280	-12.750	-13.510
8-Aug-11	0.280	-0.533	-1.448	-3.065	-3.586	-4.733	-5.620	-5.830	-7.930	-10.220	-12.690	-13.480
9-Aug-11	0.567	-0.952	-2.362	-3.014	-3.535	-4.656	-5.569	-5.752	-7.850	-10.140	-12.630	-13.420
10-Aug-11	0.620	-0.900	-2.310	-2.988	-3.483	-4.604	-5.491	-5.700	-7.800	-10.030	-12.580	-13.390
11-Aug-11	0.667	-0.852	-2.262	-2.940	-3.435	-4.555	-5.442	-5.651	-7.720	-9.980	-12.530	-13.340
12-Aug-11	0.816	-0.783	-2.220	-2.898	-3.394	-4.489	-5.376	-5.559	-7.660	-9.920	-12.460	-13.300
13-Aug-11	0.829	-0.693	-2.209	-2.861	-3.356	-4.426	-5.313	-5.496	-7.570	-9.860	-12.390	-13.260
14-Aug-11	0.736	-0.576	-2.145	-2.797	-3.293	-4.389	-5.251	-5.434	-7.510	-9.790	-12.360	-13.200

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL1

Bulb Depth	TH1_1 0.75 M	TH1_2 1.00 M	TH1_3 1.25 M	TH1_4 1.50 M	TH1_5 1.75 M	TH1_6 2.00 M	TH1_7 2.25 M	TH1_8 2.50 M	TH1_9 3.0 M	TH1_10 5.0 M	TH1_11 7.0 M	TH1_12 11.0 M
15-Aug-11	0.457	-0.566	-2.083	-2.762	-3.258	-4.328	-5.190	-5.373	-7.450	-9.700	-12.290	-13.160
16-Aug-11	0.247	-0.619	-2.057	-2.710	-3.206	-4.276	-5.138	-5.321	-7.370	-9.650	-12.240	-13.130
17-Aug-11	0.080	-0.628	-2.014	-2.667	-3.162	-4.232	-5.094	-5.276	-7.320	-9.580	-12.190	-13.080
18-Aug-11	0.001	-0.655	-2.014	-2.641	-3.137	-4.180	-5.042	-5.224	-7.270	-9.500	-12.140	-13.060
19-Aug-11	0.015	-0.667	-1.974	-2.600	-3.096	-4.139	-5.000	-5.183	-7.200	-9.450	-12.090	-13.010
20-Aug-11	0.067	-0.693	-1.974	-2.574	-3.043	-4.087	-4.948	-5.130	-7.150	-9.400	-12.030	-12.950
21-Aug-11	0.184	-0.681	-1.936	-2.537	-3.006	-4.050	-4.885	-5.068	-7.080	-9.340	-12.000	-12.920
22-Aug-11	0.164	-0.701	-1.955	-2.503	-2.999	-4.016	-4.850	-5.007	-7.020	-9.270	-11.930	-12.870
23-Aug-11	0.224	-0.693	-1.921	-2.496	-2.965	-3.956	-4.791	-4.974	-6.990	-9.210	-11.900	-12.840
24-Aug-11	0.263	-0.681	-1.910	-2.458	-2.928	-3.919	-4.754	-4.911	-6.927	-9.150	-11.830	-12.800
25-Aug-11	0.228	-0.690	-1.892	-2.440	-2.910	-3.901	-4.710	-4.866	-6.856	-9.100	-11.780	-12.750
26-Aug-11	0.183	-0.682	-1.859	-2.408	-2.877	-3.842	-4.677	-4.808	-6.797	-9.040	-11.750	-12.720
27-Aug-11	0.142	-0.697	-1.874	-2.396	-2.840	-3.806	-4.615	-4.772	-6.735	-8.980	-11.690	-12.680
28-Aug-11	0.039	-0.695	-1.846	-2.368	-2.838	-3.778	-4.587	-4.744	-6.707	-8.930	-11.630	-12.630
29-Aug-11	-0.114	-0.717	-1.842	-2.365	-2.783	-3.748	-4.558	-4.714	-6.651	-8.870	-11.600	-12.600
30-Aug-11	-0.276	-0.721	-1.820	-2.342	-2.786	-3.726	-4.509	-4.665	-6.602	-8.820	-11.550	-12.570
31-Aug-11		-0.709	-1.808	-2.331	-2.749	-3.663	-4.472	-4.629	-6.540	-8.780	-11.510	-12.510
1-Sep-11	-0.538	-0.747	-1.820	-2.290	-2.734	-3.647	-4.456	-4.587	-6.497	-8.710	-11.470	-12.490
2-Sep-11	-0.570	-0.753	-1.799	-2.295	-2.713	-3.626	-4.409	-4.540	-6.449	-8.670	-11.410	-12.440

NOTES:

Signifies the warmest temperature recorded for individual thermistor strings during the calendar year.

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL2

Bulb	TH2_1	TH2_2	TH2_3	TH2_4	TH2_5	TH2_6	TH2_7	TH2_8	TH2_9	TH2_10	TH2_11	TH2_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
15-Jul-10	1.804	1.382	-0.719	-1.843	-2.991	-4.034	-4.843	-6.203	-7.890	-10.580	-12.640	-13.940
16-Jul-10	1.804	1.329	-0.719	-1.843	-2.965	-4.008	-4.765	-6.098	-7.780	-10.480	-12.590	-13.860
17-Jul-10	1.672	1.303	-0.719	-1.791	-2.887	-3.930	-4.661	-6.019	-7.670	-10.370	-12.480	-13.800
18-Jul-10	1.954	1.321	-0.701	-1.772	-2.868	-3.885	-4.589	-5.948	-7.580	-10.270	-12.400	-13.720
19-Jul-10	2.518	1.434	-0.693	-1.739	-2.809	-3.826	-4.530	-5.862	-7.490	-10.150	-12.280	-13.630
20-Jul-10	1.962	1.461	-0.667	-1.739	-2.783	-3.774	-4.452	-5.784	-7.410	-10.040	-12.200	-13.570
21-Jul-10	1.896	1.368	-0.655	-1.701	-2.745	-3.711	-4.389	-5.695	-7.320	-9.950	-12.110	-13.510
22-Jul-10	1.289	1.210	-0.628	-1.675	-2.693	-3.658	-4.337	-5.617	-7.240	-9.870	-12.000	-13.420
23-Jul-10	1.158	1.079	-0.653	-1.672	-2.664	-3.628	-4.254	-5.585	-7.160	-9.780	-11.930	-13.360
24-Jul-10	2.055	1.263	-0.653	-1.620	-2.637	-3.602	-4.202	-5.507	-7.080	-9.680	-11.850	-13.270
25-Jul-10	2.690	1.474	-0.653	-1.620	-2.611	-3.550	-4.150	-5.428	-7.000	-9.600	-11.770	-13.210
26-Jul-10	2.809	1.541	-0.612	-1.605	-2.596	-3.509	-4.134	-5.386	-6.957	-9.530	-11.690	-13.140
27-Jul-10	3.327	1.685	-0.626	-1.594	-2.559	-3.472	-4.071	-5.324	-6.868	-9.440	-11.600	-13.070
28-Jul-10	3.008	1.685	-0.600	-1.568	-2.533	-3.446	-4.019	-5.271	-6.790	-9.360	-11.520	-13.020
29-Jul-10	2.716	1.580	-0.574	-1.541	-2.481	-3.394	-3.967	-5.219	-6.737	-9.280	-11.440	-12.960
30-Jul-10	2.637	1.553	-0.548	-1.541	-2.455	-3.367	-3.941	-5.167	-6.658	-9.200	-11.350	-12.880
31-Jul-10	2.716	1.579	-0.524	-1.492	-2.406	-3.319	-3.893	-5.094	-6.612	-9.120	-11.280	-12.830
1-Aug-10	2.226	1.434	-0.510	-1.477	-2.391	-3.278	-3.852	-5.052	-6.543	-9.030	-11.240	-12.760
2-Aug-10	1.935	1.302	-0.484	-1.452	-2.339	-3.252	-3.800	-5.000	-6.465	-8.970	-11.150	-12.670
3-Aug-10	1.711	1.210	-0.471	-1.440	-2.328	-3.215	-3.763	-4.963	-6.428	-8.910	-11.060	-12.610
4-Aug-10	1.117	1.012	-0.459	-1.402	-2.290	-3.178	-3.726	-4.900	-6.366	-8.820	-11.000	-12.540
5-Aug-10	0.841	0.841	-0.471	-1.387	-2.249	-3.137	-3.684	-4.859	-6.297	-8.750	-10.930	-12.500
6-Aug-10	0.815	0.789	-0.471	-1.387	-2.249	-3.111	-3.632	-4.807	-6.245	-8.700	-10.850	-12.410
7-Aug-10	0.783	0.809	-0.477	-1.367	-2.229	-3.064	-3.611	-4.759	-6.197	-8.620	-10.800	-12.360
8-Aug-10	0.947	0.789	-0.471	-1.361	-2.197	-3.058	-3.580	-4.702	-6.140	-8.560	-10.740	-12.300
9-Aug-10	1.040	0.803	-0.483	-1.346	-2.182	-3.017	-3.538	-4.686	-6.097	-8.520	-10.660	-12.250
10-Aug-10	1.250	0.855	-0.483	-1.347	-2.183	-2.991	-3.513	-4.634	-6.046	-8.440	-10.580	-12.200
11-Aug-10	1.368	0.894	-0.471	-1.335	-2.145	-2.980	-3.476	-4.598	-5.983	-8.380	-10.520	-12.140
12-Aug-10	1.170	0.854	-0.459	-1.323	-2.133	-2.943	-3.439	-4.561	-5.947	-8.320	-10.460	-12.070
13-Aug-10	0.635	0.661	-0.468	-1.305	-2.115	-2.925	-3.420	-4.516	-5.901	-8.270	-10.410	-12.020
14-Aug-10	0.486	0.565	-0.485	-1.297	-2.107	-2.891	-3.413	-4.483	-5.842	-8.210	-10.350	-11.960
15-Aug-10	0.353	0.511	-0.461	-1.298	-2.083	-2.866	-3.388	-4.458	-5.817	-8.160	-10.300	-11.880
16-Aug-10	0.354	0.459	-0.485	-1.297	-2.081	-2.865	-3.334	-4.404	-5.763	-8.080	-10.210	-11.820
17-Aug-10	0.342	0.447	-0.498	-1.283	-2.067	-2.850	-3.319	-4.389	-5.747	-8.030	-10.170	-11.780
18-Aug-10	0.855	0.540	-0.510	-1.268	-2.052	-2.835	-3.304	-4.347	-5.705	-7.990	-10.100	-11.760
19-Aug-10	1.340	0.708	-0.525	-1.284	-2.042	-2.799	-3.269	-4.312	-5.670	-7.960	-10.060	-11.700
20-Aug-10	1.382	0.750	-0.510	-1.295	-2.052	-2.809	-3.252	-4.295	-5.627	-7.910	-9.990	-11.620
21-Aug-10	1.513	0.776	-0.510	-1.295	-2.052	-2.809	-3.226	-4.269	-5.575	-7.860	-9.960	-11.570
22-Aug-10	1.777	0.855	-0.510	-1.295	-2.026	-2.783	-3.226	-4.243	-5.548	-7.810	-9.880	-11.540
23-Aug-10	1.883	0.881	-0.510	-1.295	-2.026	-2.757	-3.226	-4.217	-5.522	-7.750	-9.830	-11.480
24-Aug-10	1.883	0.908	-0.483	-1.268	-2.026	-2.730	-3.174	-4.191	-5.470	-7.700	-9.800	-11.430
25-Aug-10	1.870	0.920	-0.471	-1.257	-1.988	-2.719	-3.163	-4.180	-5.434	-7.660	-9.770	-11.390
26-Aug-10	1.263	0.736	-0.471	-1.256	-1.988	-2.719	-3.136	-4.154	-5.433	-7.610	-9.690	-11.340
27-Aug-10	1.000	0.605	-0.471	-1.230	-1.962	-2.693	-3.110	-4.128	-5.381	-7.590	-9.630	-11.280
28-Aug-10	0.841	0.526	-0.471	-1.230	-1.962	-2.667	-3.111	-4.102	-5.355	-7.530	-9.600	-11.230
29-Aug-10	0.828	0.512	-0.459	-1.219	-1.951	-2.682	-3.073	-4.065	-5.319	-7.500	-9.570	-11.190
30-Aug-10	0.538	0.433	-0.485	-1.219	-1.924	-2.656	-3.047	-4.039	-5.292	-7.440	-9.520	-11.140
31-Aug-10	0.473	0.368	-0.497	-1.204	-1.910	-2.641	-3.058	-4.024	-5.277	-7.400	-9.440	-11.120
1-Sep-10	0.447	0.369	-0.497	-1.204	-1.910	-2.614	-3.032	-3.997	-5.224	-7.370	-9.420	-11.060
2-Sep-10	0.474	0.395	-0.497	-1.204	-1.909	-2.614	-3.006	-3.971	-5.198	-7.320	-9.360	-11.010
3-Sep-10	0.526	0.421	-0.498	-1.204	-1.884	-2.615	-2.980	-3.945	-5.146	-7.270	-9.310	-10.960
4-Sep-10	0.486	0.407	-0.512	-1.192	-1.872	-2.577	-2.969	-3.934	-5.136	-7.260	-9.270	-10.920
5-Sep-10	0.104	0.261	-0.500	-1.181	-1.861	-2.566	-2.932	-3.898	-5.099	-7.220	-9.240	-10.860
6-Sep-10	-0.220	0.148	-0.508	-1.189	-1.895	-2.548	-2.940	-3.879	-5.080	-7.180	-9.190	-10.830
7-Sep-10	-0.370	0.102	-0.528	-1.156	-1.862	-2.542	-2.907	-3.847	-5.048	-7.150	-9.130	-10.800
8-Sep-10	-0.407	0.066	-0.538	-1.218	-1.872	-2.551	-2.917	-3.856	-5.031	-7.100	-9.110	-10.760
9-Sep-10	-0.432	0.067	-0.563	-1.191	-1.871	-2.524	-2.916	-3.829	-5.004	-7.070	-9.090	-10.700
10-Sep-10	-0.431	0.041	-0.562	-1.217	-1.871	-2.524	-2.889	-3.802	-5.003	-7.050	-9.030	-10.670
11-Sep-10	-0.459	0.013	-0.590	-1.219	-1.872	-2.525	-2.865	-3.778	-4.953	-6.996	-9.010	-10.620
12-Sep-10	-0.447	0.025	-0.631	-1.233	-1.861	-2.514	-2.853	-3.767	-4.916	-6.960	-8.970	-10.560
13-Sep-10	-0.459	0.013	-0.669	-1.245	-1.872	-2.525	-2.838	-3.752	-4.927	-6.944	-8.930	-10.540
14-Sep-10	-0.459	-0.040	-0.695	-1.245	-1.898	-2.525	-2.865	-3.752	-4.900	-6.865	-8.870	-10.510
15-Sep-10	-0.485	-0.066	-0.721	-1.297	-1.898	-2.499	-2.865	-3.726	-4.874	-6.891	-8.850	-10.480
16-Sep-10	-0.473	-0.106	-0.762	-1.311	-1.913	-2.514	-2.853	-3.741	-4.864	-6.828	-8.810	-10.420
17-Sep-10	-0.473	-0.132	-0.814	-1.338	-1.939	-2.540	-2.853	-3.741	-4.838	-6.802	-8.780	-10.390
18-Sep-10	-0.487	-0.173	-0.854	-1.378	-1.954	-2.555	-2.842	-3.704	-4.827	-6.792	-8.750	-10.360

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.0 M	TH2_10 5.0 M	TH2_11 7.0 M	TH2_12 11.0 M
19-Sep-10	-0.475	-0.239	-0.895	-1.393	-1.968	-2.569	-2.857	-3.693	-4.816	-6.756	-8.690	-10.300
20-Sep-10	-0.514	-0.278	-0.933	-1.430	-1.980	-2.581	-2.842	-3.704	-4.775	-6.740	-8.640	-10.280
21-Sep-10	-0.552	-0.342	-0.997	-1.468	-2.017	-2.592	-2.879	-3.715	-4.785	-6.697	-8.630	-10.260
22-Sep-10	-0.683	-0.420	-1.075	-1.520	-2.043	-2.618	-2.879	-3.688	-4.759	-6.670	-8.600	-10.200
23-Sep-10	-1.012	-0.619	-1.195	-1.587	-2.110	-2.633	-2.894	-3.704	-4.749	-6.635	-8.560	-10.170
24-Sep-10	-1.590	-0.909	-1.302	-1.695	-2.166	-2.663	-2.898	-3.708	-4.727	-6.614	-8.540	-10.120
25-Sep-10	-2.453	-1.381	-1.590	-1.826	-2.218	-2.715	-2.924	-3.734	-4.754	-6.588	-8.520	-10.100
26-Sep-10	-3.456	-1.992	-1.965	-2.018	-2.332	-2.803	-2.986	-3.744	-4.738	-6.573	-8.480	-10.030
27-Sep-10	-4.580	-2.724	-2.436	-2.305	-2.541	-2.907	-3.038	-3.770	-4.763	-6.547	-8.420	-10.030
28-Sep-10	-5.355	-3.447	-3.002	-2.715	-2.819	-3.081	-3.133	-3.839	-4.780	-6.536	-8.410	-9.990
29-Sep-10	-5.549	-3.928	-3.536	-3.144	-3.118	-3.275	-3.275	-3.876	-4.816	-6.519	-8.370	-9.970
30-Sep-10	-5.261	-4.085	-3.876	-3.510	-3.484	-3.536	-3.432	-3.980	-4.816	-6.519	-8.370	-9.920
1-Oct-10	-5.052	-4.111	-4.059	-3.771	-3.745	-3.771	-3.614	-4.111	-4.895	-6.519	-8.340	-9.890
2-Oct-10	-5.115	-4.174	-4.200	-3.965	-3.965	-4.017	-3.834	-4.252	-4.958	-6.503	-8.300	-9.870
3-Oct-10	-5.240	-4.246	-4.272	-4.115	-4.141	-4.168	-3.985	-4.377	-5.031	-6.473	-8.290	-9.820
4-Oct-10	-5.754	-4.497	-4.471	-4.261	-4.287	-4.314	-4.157	-4.497	-5.099	-6.515	-8.230	-9.780
5-Oct-10	-6.384	-4.889	-4.732	-4.444	-4.444	-4.497	-4.287	-4.601	-5.203	-6.542	-8.210	-9.760
6-Oct-10	-6.825	-5.277	-5.067	-4.727	-4.675	-4.649	-4.414	-4.754	-5.277	-6.536	-8.220	-9.750
7-Oct-10	-6.851	-5.539	-5.355	-4.989	-4.910	-4.832	-4.597	-4.884	-5.329	-6.562	-8.200	-9.720
8-Oct-10	-6.878	-5.670	-5.565	-5.198	-5.120	-5.041	-4.754	-4.989	-5.434	-6.588	-8.200	-9.690
9-Oct-10	-6.956	-5.774	-5.722	-5.408	-5.303	-5.224	-4.910	-5.120	-5.539	-6.614	-8.150	-9.670
10-Oct-10	-6.878	-5.853	-5.827	-5.539	-5.460	-5.382	-5.067	-5.251	-5.643	-6.641	-8.150	-9.640
11-Oct-10	-7.040	-5.932	-5.932	-5.643	-5.591	-5.512	-5.224	-5.382	-5.748	-6.693	-8.150	-9.610
12-Oct-10	-6.999	-6.027	-6.053	-5.791	-5.712	-5.660	-5.372	-5.529	-5.843	-6.709	-8.160	-9.600
13-Oct-10	-6.687	-5.978	-6.083	-5.900	-5.847	-5.743	-5.481	-5.612	-5.926	-6.766	-8.140	-9.580
14-Oct-10	-6.423	-5.846	-6.030	-5.925	-5.925	-5.872	-5.584	-5.715	-6.030	-6.817	-8.140	-9.550
15-Oct-10	-6.288	-5.711	-5.973	-5.921	-5.947	-5.947	-5.659	-5.816	-6.104	-6.840	-8.160	-9.550
16-Oct-10												
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23-Nov-10												

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.0 M	TH2_10 5.0 M	TH2_11 7.0 M	TH2_12 11.0 M
24-Nov-10												
25-Nov-10												
26-Nov-10												
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29-Nov-10												
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28-Jan-11												

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.0 M	TH2_10 5.0 M	TH2_11 7.0 M	TH2_12 11.0 M
29-Jan-11												
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3-Apr-11												
4-Apr-11												

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL2

Bulb	TH2_1	TH2_2	TH2_3	TH2_4	TH2_5	TH2_6	TH2_7	TH2_8	TH2_9	TH2_10	TH2_11	TH2_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
5-Apr-11												
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9-Jun-11												

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.0 M	TH2_10 5.0 M	TH2_11 7.0 M	TH2_12 11.0 M
10-Jun-11												
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17-Jul-11												
18-Jul-11												
19-Jul-11	3.779	1.475	-0.859	-1.851	-3.024	-4.040	-4.718	-6.050	-7.620	-10.180	-12.140	-13.340
20-Jul-11	4.245	1.593	-0.822	-1.788	-2.962	-3.978	-4.630	-5.961	-7.540	-10.090	-12.050	-13.280
21-Jul-11	4.019	1.659	-0.783	-1.776	-2.898	-3.915	-4.541	-5.899	-7.450	-9.970	-11.960	-13.190
22-Jul-11	3.462	1.556	-0.729	-1.722	-2.844	-3.835	-4.486	-5.818	-7.370	-9.890	-11.870	-13.130
23-Jul-11	2.836	1.408	-0.693	-1.660	-2.783	-3.774	-4.374	-5.732	-7.250	-9.800	-11.790	-13.070
24-Jul-11	2.637	1.316	-0.679	-1.646	-2.742	-3.732	-4.306	-5.637	-7.180	-9.700	-11.710	-12.990
25-Jul-11	2.941	1.330	-0.638	-1.605	-2.701	-3.665	-4.239	-5.569	-7.110	-9.630	-11.610	-12.940
26-Jul-11	3.699	1.632	-0.626	-1.568	-2.637	-3.602	-4.176	-5.507	-7.030	-9.520	-11.550	-12.850
27-Jul-11	3.898	1.725	-0.586	-1.527	-2.597	-3.561	-4.108	-5.439	-6.957	-9.450	-11.470	-12.800
28-Jul-11	4.231	1.897	-0.572	-1.512	-2.556	-3.494	-4.041	-5.370	-6.888	-9.370	-11.370	-12.750
29-Jul-11	4.619	2.147	-0.534	-1.475	-2.518	-3.431	-4.004	-5.308	-6.799	-9.280	-11.310	-12.660
30-Jul-11	4.419	2.160	-0.495	-1.437	-2.455	-3.394	-3.915	-5.245	-6.711	-9.200	-11.250	-12.600
31-Jul-11	4.432	2.121	-0.455	-1.423	-2.414	-3.352	-3.874	-5.177	-6.642	-9.120	-11.170	-12.550
1-Aug-11	4.405	2.174	-0.429	-1.396	-2.388	-3.300	-3.822	-5.125	-6.590	-9.040	-11.090	-12.470
2-Aug-11	4.366	2.213	-0.365	-1.332	-2.351	-3.237	-3.758	-5.036	-6.501	-8.980	-11.000	-12.430
3-Aug-11	3.996	2.111	-0.335	-1.303	-2.295	-3.208	-3.730	-5.008	-6.446	-8.900	-10.920	-12.340
4-Aug-11	3.699	1.976	-0.312	-1.280	-2.246	-3.159	-3.680	-4.932	-6.396	-8.820	-10.860	-12.290
5-Aug-11	3.778	1.974	-0.287	-1.229	-2.221	-3.108	-3.629	-4.881	-6.319	-8.740	-10.780	-12.240
6-Aug-11	4.072	2.108	-0.260	-1.228	-2.194	-3.081	-3.628	-4.828	-6.265	-8.690	-10.730	-12.150
7-Aug-11	3.899	2.122	-0.245	-1.187	-2.153	-3.039	-3.560	-4.759	-6.196	-8.620	-10.660	-12.110
8-Aug-11	4.166	2.201	-0.192	-1.160	-2.126	-2.987	-3.534	-4.733	-6.143	-8.540	-10.600	-12.050
9-Aug-11	4.512	2.359	-0.141	-1.109	-2.075	-2.936	-3.483	-4.656	-6.092	-8.490	-10.520	-12.000
10-Aug-11	4.700	2.544	-0.089	-1.109	-2.023	-2.909	-3.457	-4.604	-6.014	-8.410	-10.440	-11.940
11-Aug-11	4.935	2.671	-0.015	-1.061	-2.001	-2.862	-3.409	-4.555	-5.965	-8.360	-10.390	-11.860
12-Aug-11	5.304	2.928	0.107	-1.045	-1.959	-2.820	-3.367	-4.515	-5.925	-8.290	-10.320	-11.820
13-Aug-11	4.916	2.915	0.224	-0.981	-1.922	-2.783	-3.330	-4.452	-5.862	-8.230	-10.260	-11.760
14-Aug-11	3.673	2.504	0.289	-0.969	-1.884	-2.745	-3.293	-4.415	-5.774	-8.140	-10.200	-11.690

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.0 M	TH2_10 5.0 M	TH2_11 7.0 M	TH2_12 11.0 M
15-Aug-11	2.807	1.960	0.195	-0.933	-1.848	-2.710	-3.258	-4.354	-5.739	-8.110	-10.130	-11.630
16-Aug-11	2.091	1.563	0.116	-0.907	-1.822	-2.658	-3.232	-4.328	-5.687	-8.030	-10.080	-11.600
17-Aug-11	1.685	1.237	0.027	-0.916	-1.805	-2.641	-3.189	-4.284	-5.642	-7.980	-10.030	-11.530
18-Aug-11	1.526	1.105	-0.026	-0.890	-1.779	-2.615	-3.137	-4.232	-5.590	-7.930	-9.950	-11.500
19-Aug-11	1.645	1.118	-0.038	-0.876	-1.765	-2.600	-3.122	-4.191	-5.548	-7.860	-9.910	-11.430
20-Aug-11	1.909	1.250	-0.038	-0.876	-1.739	-2.548	-3.096	-4.139	-5.496	-7.810	-9.830	-11.400
21-Aug-11	2.213	1.394	0.001	-0.864	-1.727	-2.537	-3.058	-4.102	-5.434	-7.770	-9.790	-11.340
22-Aug-11	2.271	1.426	0.033	-0.858	-1.720	-2.503	-3.051	-4.068	-5.425	-7.710	-9.750	-11.270
23-Aug-11	2.571	1.566	0.067	-0.850	-1.686	-2.496	-2.991	-4.061	-5.366	-7.650	-9.670	-11.240
24-Aug-11	2.584	1.632	0.106	-0.838	-1.675	-2.458	-2.980	-3.997	-5.329	-7.590	-9.600	-11.170
25-Aug-11	2.336	1.543	0.070	-0.847	-1.657	-2.440	-2.936	-3.979	-5.284	-7.570	-9.580	-11.130
26-Aug-11	2.264	1.498	0.078	-0.813	-1.650	-2.434	-2.929	-3.947	-5.226	-7.480	-9.530	-11.070
27-Aug-11	2.198	1.432	0.063	-0.828	-1.639	-2.396	-2.892	-3.910	-5.190	-7.450	-9.460	-11.030
28-Aug-11	1.803	1.249	0.039	-0.800	-1.637	-2.395	-2.865	-3.882	-5.162	-7.420	-9.410	-10.970
29-Aug-11	1.200	0.937	-0.009	-0.796	-1.607	-2.365	-2.861	-3.853	-5.132	-7.360	-9.380	-10.940
30-Aug-11	0.643	0.643	-0.092	-0.800	-1.611	-2.368	-2.838	-3.830	-5.083	-7.310	-9.330	-10.890
31-Aug-11	0.314	0.446	-0.132	-0.814	-1.599	-2.331	-2.827	-3.793	-5.047	-7.250	-9.270	-10.860
1-Sep-11	0.039	0.276	-0.197	-0.800	-1.585	-2.316	-2.786	-3.752	-5.005	-7.210	-9.220	-10.810
2-Sep-11	0.217	0.270	-0.203	-0.805	-1.590	-2.295	-2.765	-3.731	-4.984	-7.160	-9.170	-10.760

NOTES:

(highlighted) Signifies the warmest temperature recorded for individual thermistor strings during the calendar year.

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL3

Bulb	TH3_1	TH3_2	TH3_3	TH3_4	TH3_5	TH3_6	TH3_7	TH3_8	TH3_9	TH3_10	TH3_11	TH3_12
Depth	**0.75 M**	**1.00 M**	**1.25 M**	**1.50 M**	**1.75 M**	**2.00 M**	**2.25 M**	**2.50 M**	**3.0 M**	**5.0 M**	**7.0 M**	**11.0 M**
15-Jul-10	0.802	-0.798	-2.104	-3.226	-4.478	-5.444	-6.124	-6.963	-8.520	-11.180	-13.290	-14.170
16-Jul-10	0.802	-0.798	-2.078	-3.174	-4.400	-5.339	-6.019	-6.858	-8.410	-11.070	-13.210	-14.120
17-Jul-10	0.776	-0.798	-2.052	-3.122	-4.347	-5.261	-5.941	-6.780	-8.310	-10.960	-13.120	-14.060
18-Jul-10	0.873	-0.779	-2.007	-3.051	-4.276	-5.190	-5.869	-6.681	-8.210	-10.860	-13.010	-13.980
19-Jul-10	1.171	-0.745	-2.000	-3.017	-4.217	-5.130	-5.784	-6.596	-8.120	-10.750	-12.950	-13.920
20-Jul-10	1.013	-0.745	-1.947	-2.991	-4.165	-5.078	-5.705	-6.517	-8.020	-10.660	-12.870	-13.860
21-Jul-10	0.841	-0.707	-1.936	-2.954	-4.102	-4.989	-5.617	-6.428	-7.930	-10.570	-12.780	-13.790
22-Jul-10	0.605	-0.707	-1.910	-2.902	-4.050	-4.937	-5.538	-6.350	-7.820	-10.490	-12.720	-13.740
23-Jul-10	0.448	-0.705	-1.855	-2.846	-3.993	-4.880	-5.480	-6.265	-7.740	-10.380	-12.630	-13.670
24-Jul-10	0.711	-0.731	-1.855	-2.820	-3.967	-4.828	-5.428	-6.213	-7.660	-10.300	-12.540	-13.610
25-Jul-10	1.132	-0.705	-1.855	-2.794	-3.941	-4.749	-5.376	-6.134	-7.600	-10.210	-12.490	-13.550
26-Jul-10	1.330	-0.690	-1.814	-2.753	-3.873	-4.734	-5.308	-6.066	-7.540	-10.140	-12.410	-13.510
27-Jul-10	1.580	-0.653	-1.803	-2.716	-3.837	-4.645	-5.245	-6.003	-7.420	-10.050	-12.320	-13.440
28-Jul-10	1.580	-0.626	-1.776	-2.716	-3.811	-4.593	-5.167	-5.925	-7.370	-9.970	-12.240	-13.380
29-Jul-10	1.395	-0.626	-1.750	-2.664	-3.758	-4.567	-5.115	-5.873	-7.290	-9.890	-12.180	-13.300
30-Jul-10	1.343	-0.600	-1.724	-2.637	-3.732	-4.515	-5.063	-5.820	-7.240	-9.810	-12.100	-13.270
31-Jul-10	1.289	-0.576	-1.701	-2.589	-3.658	-4.467	-5.015	-5.747	-7.140	-9.740	-12.020	-13.200
1-Aug-10	1.224	-0.562	-1.660	-2.574	-3.617	-4.400	-4.974	-5.705	-7.090	-9.640	-11.950	-13.120
2-Aug-10	1.013	-0.562	-1.634	-2.522	-3.591	-4.348	-4.896	-5.653	-7.020	-9.590	-11.900	-13.070
3-Aug-10	0.894	-0.550	-1.623	-2.484	-3.554	-4.337	-4.859	-5.590	-6.954	-9.500	-11.830	-13.000
4-Aug-10	0.486	-0.564	-1.585	-2.473	-3.517	-4.274	-4.822	-5.528	-6.891	-9.410	-11.740	-12.940
5-Aug-10	0.289	-0.576	-1.570	-2.406	-3.476	-4.232	-4.754	-5.460	-6.848	-9.360	-11.690	-12.890
6-Aug-10	0.316	-0.576	-1.570	-2.406	-3.450	-4.206	-4.728	-5.434	-6.796	-9.280	-11.610	-12.830
7-Aug-10	0.336	-0.582	-1.550	-2.385	-3.403	-4.159	-4.681	-5.360	-6.722	-9.230	-11.530	-12.780
8-Aug-10	0.368	-0.602	-1.544	-2.354	-3.371	-4.102	-4.624	-5.329	-6.665	-9.150	-11.470	-12.720
9-Aug-10	0.383	-0.614	-1.555	-2.339	-3.330	-4.086	-4.582	-5.287	-6.622	-9.110	-11.430	-12.670
10-Aug-10	0.461	-0.614	-1.530	-2.313	-3.304	-4.034	-4.530	-5.235	-6.570	-9.050	-11.370	-12.620
11-Aug-10	0.552	-0.602	-1.518	-2.328	-3.293	-4.024	-4.493	-5.198	-6.481	-8.960	-11.280	-12.550
12-Aug-10	0.433	-0.590	-1.532	-2.290	-3.256	-3.961	-4.456	-5.136	-6.445	-8.900	-11.250	-12.490
13-Aug-10	0.162	-0.625	-1.515	-2.272	-3.238	-3.942	-4.438	-5.091	-6.399	-8.850	-11.170	-12.470
14-Aug-10	0.039	-0.616	-1.506	-2.264	-3.230	-3.908	-4.378	-5.057	-6.340	-8.790	-11.110	-12.400
15-Aug-10	-0.015	-0.644	-1.508	-2.239	-3.179	-3.884	-4.353	-5.006	-6.288	-8.740	-11.060	-12.350
16-Aug-10	-0.013	-0.669	-1.506	-2.238	-3.178	-3.856	-4.326	-4.979	-6.261	-8.690	-11.000	-12.290
17-Aug-10	0.001	-0.681	-1.492	-2.197	-3.137	-3.815	-4.284	-4.937	-6.193	-8.620	-10.960	-12.220
18-Aug-10	0.146	-0.693	-1.504	-2.209	-3.148	-3.800	-4.269	-4.922	-6.150	-8.570	-10.910	-12.200
19-Aug-10	0.419	-0.682	-1.493	-2.199	-3.138	-3.790	-4.234	-4.860	-6.115	-8.510	-10.820	-12.140
20-Aug-10	0.487	-0.667	-1.504	-2.183	-3.096	-3.748	-4.191	-4.843	-6.072	-8.470	-10.800	-12.090
21-Aug-10	0.540	-0.667	-1.504	-2.183	-3.070	-3.721	-4.165	-4.791	-6.046	-8.410	-10.720	-12.030
22-Aug-10	0.671	-0.667	-1.477	-2.156	-3.070	-3.695	-4.139	-4.791	-6.019	-8.360	-10.670	-11.980
23-Aug-10	0.724	-0.641	-1.477	-2.156	-3.043	-3.669	-4.113	-4.765	-5.967	-8.340	-10.640	-11.920
24-Aug-10	0.724	-0.614	-1.451	-2.130	-3.043	-3.669	-4.087	-4.713	-5.915	-8.280	-10.560	-11.900
25-Aug-10	0.736	-0.602	-1.466	-2.145	-3.006	-3.658	-4.050	-4.676	-5.878	-8.220	-10.520	-11.830
26-Aug-10	0.552	-0.602	-1.439	-2.119	-3.006	-3.606	-4.023	-4.650	-5.852	-8.170	-10.470	-11.780
27-Aug-10	0.316	-0.602	-1.439	-2.092	-2.980	-3.606	-3.997	-4.624	-5.799	-8.140	-10.440	-11.750
28-Aug-10	0.211	-0.602	-1.413	-2.093	-2.954	-3.580	-3.971	-4.598	-5.774	-8.060	-10.360	-11.690
29-Aug-10	0.197	-0.616	-1.428	-2.081	-2.917	-3.543	-3.934	-4.561	-5.737	-8.050	-10.320	-11.660
30-Aug-10	0.170	-0.616	-1.402	-2.055	-2.917	-3.543	-3.908	-4.509	-5.685	-7.970	-10.270	-11.600
31-Aug-10	0.106	-0.655	-1.413	-2.040	-2.902	-3.528	-3.893	-4.519	-5.669	-7.930	-10.220	-11.560
1-Sep-10	0.106	-0.654	-1.413	-2.040	-2.902	-3.475	-3.867	-4.493	-5.642	-7.900	-10.170	-11.530
2-Sep-10	0.106	-0.654	-1.387	-2.040	-2.875	-3.475	-3.867	-4.441	-5.616	-7.880	-10.140	-11.470
3-Sep-10	0.106	-0.655	-1.413	-2.014	-2.876	-3.450	-3.815	-4.415	-5.564	-7.820	-10.090	-11.420
4-Sep-10	0.092	-0.643	-1.376	-2.003	-2.838	-3.413	-3.804	-4.404	-5.554	-7.760	-10.050	-11.380
5-Sep-10	-0.054	-0.657	-1.390	-1.992	-2.828	-3.402	-3.767	-4.368	-5.518	-7.750	-10.020	-11.350
6-Sep-10	-0.220	-0.692	-1.398	-2.000	-2.835	-3.409	-3.749	-4.349	-5.473	-7.680	-9.940	-11.300
7-Sep-10	-0.292	-0.711	-1.392	-1.967	-2.803	-3.377	-3.716	-4.317	-5.441	-7.650	-9.910	-11.240
8-Sep-10	-0.354	-0.721	-1.402	-1.977	-2.786	-3.360	-3.699	-4.300	-5.423	-7.630	-9.890	-11.220
9-Sep-10	-0.353	-0.746	-1.401	-1.976	-2.785	-3.359	-3.699	-4.273	-5.370	-7.570	-9.840	-11.190
10-Sep-10	-0.353	-0.772	-1.426	-1.975	-2.785	-3.333	-3.672	-4.272	-5.369	-7.550	-9.780	-11.140
11-Sep-10	-0.381	-0.800	-1.428	-1.977	-2.760	-3.308	-3.647	-4.222	-5.319	-7.520	-9.730	-11.080
12-Sep-10	-0.395	-0.814	-1.416	-1.965	-2.749	-3.297	-3.637	-4.211	-5.308	-7.460	-9.690	-11.050
13-Sep-10	-0.433	-0.852	-1.454	-1.977	-2.760	-3.308	-3.647	-4.195	-5.266	-7.420	-9.650	-11.000
14-Sep-10	-0.433	-0.905	-1.480	-1.977	-2.760	-3.282	-3.621	-4.169	-5.266	-7.390	-9.620	-10.970
15-Sep-10	-0.485	-0.931	-1.480	-1.977	-2.760	-3.282	-3.595	-4.143	-5.214	-7.360	-9.570	-10.950
16-Sep-10	-0.526	-0.971	-1.521	-1.991	-2.723	-3.245	-3.584	-4.132	-5.204	-7.330	-9.560	-10.880
17-Sep-10	-0.578	-0.997	-1.547	-2.017	-2.749	-3.271	-3.584	-4.132	-5.177	-7.300	-9.510	-10.860
18-Sep-10	-0.619	-1.038	-1.561	-2.006	-2.738	-3.234	-3.573	-4.122	-5.141	-7.270	-9.470	-10.820
19-Sep-10	-0.659	-1.078	-1.602	-2.020	-2.752	-3.223	-3.536	-4.085	-5.130	-7.230	-9.430	-10.760

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL3

Bulb	TH3_1	TH3_2	TH3_3	TH3_4	TH3_5	TH3_6	TH3_7	TH3_8	TH3_9	TH3_10	TH3_11	TH3_12
Depth	**0.75 M**	**1.00 M**	**1.25 M**	**1.50 M**	**1.75 M**	**2.00 M**	**2.25 M**	**2.50 M**	**3.0 M**	**5.0 M**	**7.0 M**	**11.0 M**
20-Sep-10	-0.723	-1.143	-1.640	-2.058	-2.764	-3.208	-3.547	-4.069	-5.115	-7.190	-9.390	-10.740
21-Sep-10	-0.814	-1.181	-1.651	-2.070	-2.775	-3.245	-3.532	-4.054	-5.099	-7.170	-9.350	-10.690
22-Sep-10	-0.997	-1.259	-1.703	-2.095	-2.748	-3.271	-3.532	-4.080	-5.072	-7.140	-9.320	-10.660
23-Sep-10	-1.195	-1.378	-1.771	-2.137	-2.790	-3.260	-3.521	-4.069	-5.062	-7.110	-9.280	-10.660
24-Sep-10	-1.407	-1.485	-1.852	-2.166	-2.819	-3.264	-3.551	-4.048	-5.041	-7.090	-9.260	-10.610
25-Sep-10	-1.800	-1.669	-1.957	-2.218	-2.846	-3.238	-3.525	-4.048	-5.041	-7.040	-9.210	-10.560
26-Sep-10	-2.279	-1.939	-2.070	-2.306	-2.881	-3.273	-3.535	-4.005	-4.999	-7.020	-9.170	-10.540
27-Sep-10	-2.828	-2.305	-2.279	-2.410	-2.933	-3.299	-3.561	-4.031	-4.999	-6.994	-9.140	-10.490
28-Sep-10	-3.421	-2.767	-2.558	-2.584	-3.002	-3.368	-3.551	-4.048	-5.015	-6.956	-9.100	-10.450
29-Sep-10	-3.797	-3.144	-2.909	-2.778	-3.144	-3.432	-3.614	-4.085	-4.999	-6.940	-9.090	-10.430
30-Sep-10	-3.980	-3.432	-3.196	-3.014	-3.275	-3.510	-3.667	-4.111	-4.999	-6.914	-9.030	-10.400
1-Oct-10	-4.006	-3.588	-3.405	-3.223	-3.458	-3.614	-3.745	-4.137	-4.999	-6.887	-8.980	-10.320
2-Oct-10	-4.069	-3.704	-3.573	-3.390	-3.625	-3.730	-3.808	-4.200	-5.010	-6.871	-8.990	-10.330
3-Oct-10	-4.141	-3.828	-3.697	-3.540	-3.749	-3.854	-3.906	-4.246	-5.031	-6.868	-8.960	-10.300
4-Oct-10	-4.418	-3.974	-3.869	-3.686	-3.895	-3.947	-4.000	-4.314	-5.073	-6.858	-8.920	-10.240
5-Oct-10	-4.732	-4.209	-4.026	-3.843	-4.000	-4.078	-4.078	-4.418	-5.073	-6.831	-8.900	-10.210
6-Oct-10	-5.224	-4.544	-4.283	-4.022	-4.152	-4.204	-4.178	-4.492	-5.146	-6.825	-8.860	-10.200
7-Oct-10	-5.512	-4.858	-4.544	-4.204	-4.309	-4.335	-4.283	-4.570	-5.198	-6.825	-8.840	-10.180
8-Oct-10	-5.670	-5.094	-4.754	-4.414	-4.466	-4.440	-4.414	-4.649	-5.251	-6.825	-8.810	-10.150
9-Oct-10	-5.774	-5.224	-4.910	-4.623	-4.649	-4.597	-4.492	-4.701	-5.303	-6.825	-8.810	-10.120
10-Oct-10	-5.801	-5.355	-5.094	-4.754	-4.806	-4.727	-4.623	-4.832	-5.355	-6.825	-8.780	-10.100
11-Oct-10	-5.879	-5.460	-5.224	-4.910	-4.937	-4.858	-4.727	-4.937	-5.382	-6.851	-8.760	-10.070
12-Oct-10	-5.974	-5.555	-5.346	-5.058	-5.084	-5.006	-4.849	-5.032	-5.477	-6.867	-8.720	-10.030
13-Oct-10	-5.900	-5.612	-5.429	-5.141	-5.219	-5.115	-4.984	-5.141	-5.559	-6.871	-8.720	-10.030
14-Oct-10	-5.767	-5.584	-5.479	-5.244	-5.296	-5.218	-5.087	-5.244	-5.637	-6.896	-8.690	-9.980
15-Oct-10	-5.685	-5.580	-5.502	-5.319	-5.397	-5.292	-5.188	-5.319	-5.685	-6.919	-8.690	-9.980
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OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL3

Bulb	TH3_1	TH3_2	TH3_3	TH3_4	TH3_5	TH3_6	TH3_7	TH3_8	TH3_9	TH3_10	TH3_11	TH3_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
26-Nov-10												
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OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL3

Bulb	TH3_1	TH3_2	TH3_3	TH3_4	TH3_5	TH3_6	TH3_7	TH3_8	TH3_9	TH3_10	TH3_11	TH3_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
1-Feb-11												
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OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL3

Bulb Depth	TH3_1 0.75 M	TH3_2 1.00 M	TH3_3 1.25 M	TH3_4 1.50 M	TH3_5 1.75 M	TH3_6 2.00 M	TH3_7 2.25 M	TH3_8 2.50 M	TH3_9 3.0 M	TH3_10 5.0 M	TH3_11 7.0 M	TH3_12 11.0 M
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OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL3

Bulb	TH3_1	TH3_2	TH3_3	TH3_4	TH3_5	TH3_6	TH3_7	TH3_8	TH3_9	TH3_10	TH3_11	TH3_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
15-Jun-11												
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18-Jul-11												
19-Jul-11	0.162	-1.303	-2.477	-3.493	-4.692	-5.579	-6.233	-7.020	-8.520	-11.070	-13.060	-13.880
20-Jul-11	0.383	-1.240	-2.414	-3.405	-4.604	-5.491	-6.144	-6.931	-8.410	-10.950	-12.970	-13.820
21-Jul-11	0.553	-1.176	-2.351	-3.341	-4.515	-5.402	-6.056	-6.842	-8.290	-10.860	-12.880	-13.750
22-Jul-11	0.556	-1.121	-2.296	-3.287	-4.460	-5.322	-5.975	-6.761	-8.210	-10.750	-12.790	-13.690
23-Jul-11	0.487	-1.059	-2.209	-3.200	-4.374	-5.235	-5.862	-6.648	-8.100	-10.670	-12.730	-13.630
24-Jul-11	0.422	-1.019	-2.168	-3.133	-4.306	-5.167	-5.794	-6.553	-8.000	-10.570	-12.630	-13.580
25-Jul-11	0.620	-0.978	-2.127	-3.066	-4.239	-5.073	-5.726	-6.485	-7.900	-10.470	-12.550	-13.510
26-Jul-11	0.948	-0.940	-2.064	-3.002	-4.150	-5.010	-5.637	-6.396	-7.820	-10.380	-12.490	-13.440
27-Jul-11	1.172	-0.900	-2.049	-2.962	-4.108	-4.969	-5.569	-6.328	-7.750	-10.280	-12.410	-13.360
28-Jul-11	1.422	-0.859	-1.982	-2.920	-4.041	-4.901	-5.501	-6.259	-7.650	-10.210	-12.340	-13.320
29-Jul-11	1.672	-0.795	-1.945	-2.857	-3.978	-4.812	-5.412	-6.171	-7.590	-10.120	-12.240	-13.250
30-Jul-11	1.685	-0.731	-1.907	-2.794	-3.941	-4.749	-5.350	-6.108	-7.470	-10.030	-12.180	-13.190
31-Jul-11	1.883	-0.691	-1.840	-2.753	-3.874	-4.682	-5.282	-6.040	-7.430	-9.950	-12.110	-13.140
1-Aug-11	2.015	-0.665	-1.788	-2.727	-3.795	-4.630	-5.230	-5.935	-7.350	-9.870	-12.020	-13.080
2-Aug-11	2.081	-0.600	-1.750	-2.664	-3.758	-4.567	-5.141	-5.873	-7.260	-9.780	-11.960	-13.020
3-Aug-11	1.952	-0.571	-1.721	-2.608	-3.704	-4.486	-5.086	-5.791	-7.180	-9.700	-11.900	-12.960
4-Aug-11	1.843	-0.522	-1.672	-2.559	-3.654	-4.462	-5.036	-5.742	-7.100	-9.620	-11.790	-12.910
5-Aug-11	1.869	-0.497	-1.621	-2.508	-3.603	-4.385	-4.959	-5.664	-7.050	-9.540	-11.740	-12.850
6-Aug-11	2.081	-0.469	-1.594	-2.481	-3.550	-4.332	-4.906	-5.637	-6.973	-9.460	-11.680	-12.790
7-Aug-11	2.201	-0.428	-1.579	-2.414	-3.508	-4.290	-4.864	-5.569	-6.904	-9.390	-11.610	-12.720
8-Aug-11	2.307	-0.349	-1.526	-2.387	-3.456	-4.238	-4.785	-5.490	-6.851	-9.340	-11.530	-12.690
9-Aug-11	2.544	-0.324	-1.501	-2.362	-3.405	-4.160	-4.734	-5.439	-6.773	-9.260	-11.470	-12.610
10-Aug-11	2.703	-0.272	-1.449	-2.310	-3.352	-4.134	-4.682	-5.386	-6.695	-9.180	-11.420	-12.550
11-Aug-11	2.883	-0.224	-1.427	-2.262	-3.305	-4.086	-4.608	-5.312	-6.646	-9.130	-11.340	-12.530
12-Aug-11	3.088	-0.155	-1.385	-2.246	-3.263	-4.019	-4.593	-5.245	-6.580	-9.040	-11.270	-12.430
13-Aug-11	2.995	-0.090	-1.347	-2.183	-3.226	-3.982	-4.504	-5.209	-6.517	-9.000	-11.210	-12.390
14-Aug-11	2.372	-0.104	-1.335	-2.145	-3.189	-3.945	-4.467	-5.146	-6.455	-8.910	-11.150	-12.330
15-Aug-11	1.669	-0.147	-1.299	-2.109	-3.153	-3.884	-4.406	-5.085	-6.394	-8.850	-11.080	-12.290
16-Aug-11	1.273	-0.199	-1.273	-2.083	-3.102	-3.832	-4.380	-5.033	-6.342	-8.800	-11.030	-12.210
17-Aug-11	0.973	-0.235	-1.256	-2.040	-3.058	-3.789	-4.310	-4.989	-6.297	-8.720	-10.980	-12.190
18-Aug-11	0.894	-0.262	-1.230	-2.014	-3.032	-3.763	-4.284	-4.937	-6.245	-8.640	-10.900	-12.110
19-Aug-11	0.908	-0.274	-1.216	-2.000	-3.017	-3.721	-4.243	-4.895	-6.176	-8.600	-10.860	-12.060
20-Aug-11	1.013	-0.274	-1.216	-1.974	-2.965	-3.695	-4.191	-4.843	-6.124	-8.550	-10.800	-12.030

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL3

Bulb	TH3_1	TH3_2	TH3_3	TH3_4	TH3_5	TH3_6	TH3_7	TH3_8	TH3_9	TH3_10	TH3_11	TH3_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.0 M	5.0 M	7.0 M	11.0 M
21-Aug-11	1.184	-0.262	-1.204	-1.962	-2.954	-3.658	-4.154	-4.807	-6.062	-8.480	-10.710	-11.970
22-Aug-11	1.241	-0.256	-1.198	-1.955	-2.921	-3.624	-4.120	-4.746	-6.026	-8.420	-10.670	-11.930
23-Aug-11	1.329	-0.248	-1.216	-1.921	-2.887	-3.591	-4.087	-4.713	-5.967	-8.360	-10.610	-11.870
24-Aug-11	1.447	-0.209	-1.204	-1.884	-2.850	-3.554	-4.050	-4.650	-5.931	-8.300	-10.550	-11.800
25-Aug-11	1.385	-0.218	-1.187	-1.892	-2.858	-3.536	-4.005	-4.632	-5.886	-8.250	-10.500	-11.780
26-Aug-11	1.340	-0.211	-1.153	-1.885	-2.825	-3.503	-3.973	-4.599	-5.827	-8.190	-10.440	-11.720
27-Aug-11	1.273	-0.199	-1.142	-1.848	-2.814	-3.467	-3.936	-4.563	-5.791	-8.160	-10.400	-11.690
28-Aug-11	1.117	-0.223	-1.140	-1.846	-2.786	-3.439	-3.908	-4.509	-5.737	-8.100	-10.350	-11.630
29-Aug-11	0.753	-0.246	-1.136	-1.816	-2.757	-3.409	-3.879	-4.479	-5.708	-8.050	-10.290	-11.570
30-Aug-11	0.354	-0.328	-1.140	-1.768	-2.734	-3.386	-3.830	-4.456	-5.659	-8.000	-10.240	-11.550
31-Aug-11	0.130	-0.368	-1.128	-1.782	-2.697	-3.349	-3.793	-4.420	-5.622	-7.940	-10.180	-11.480
1-Sep-11	-0.040	-0.407	-1.140	-1.794	-2.682	-3.334	-3.778	-4.378	-5.580	-7.890	-10.130	-11.440
2-Sep-11	-0.019	-0.439	-1.146	-1.773	-2.661	-3.313	-3.757	-4.357	-5.533	-7.840	-10.080	-11.390

NOTES:

Signifies the warmest temperature recorded for individual thermistor strings during the calendar year.

THE BULBS WITH NEGATIVE DEPTHS WERE INSTALLED ABOVE GROUND
IN JULY 2006 THE ABOVE GROUND BULBS WERE BURIED NEAR SURFACE TO KEEP THEM SAFE BUT DATA IS TO BE IGNORED
DO NOT USE DATA FOR BULBS WITH NEGATIVE DEPTHS (I.E. ERASED THEIR DATA)
FOR GRAPH USED DATA FROM TH4-7 AND DEEPER

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	-1.33	-1.08	-0.83	-0.58	-0.33	-0.08	0.17 M	0.42 M	0.92 M	2.92 M	4.92 M	8.92 M
15-Jul-10							4.755	2.756	0.120	-4.661	-7.860	-10.260
16-Jul-10							4.086	2.730	0.120	-4.582	-7.750	-10.150
17-Jul-10							4.916	2.756	0.120	-4.504	-7.670	-10.040
18-Jul-10							5.309	3.066	0.138	-4.459	-7.580	-9.970
19-Jul-10							4.220	3.686	0.198	-4.400	-7.490	-9.860
20-Jul-10							3.846	2.624	0.172	-4.321	-7.410	-9.770
21-Jul-10							2.637	2.372	0.158	-4.258	-7.320	-9.660
22-Jul-10							2.876	1.737	0.158	-4.206	-7.240	-9.580
23-Jul-10							6.221	1.976	0.107	-4.176	-7.160	-9.520
24-Jul-10							7.280	3.141	0.133	-4.123	-7.100	-9.440
25-Jul-10							6.708	3.886	0.212	-4.097	-7.030	-9.360
26-Jul-10							8.550	4.192	0.253	-4.030	-6.957	-9.280
27-Jul-10							6.464	4.687	0.291	-3.993	-6.895	-9.200
28-Jul-10							6.194	4.206	0.317	-3.967	-6.816	-9.140
29-Jul-10							7.280	3.966	0.317	-3.915	-6.763	-9.060
30-Jul-10							6.709	3.886	0.343	-3.863	-6.685	-8.980
31-Jul-10							4.100	3.380	0.342	-3.815	-6.638	-8.910
1-Aug-10							3.766	2.809	0.330	-3.774	-6.570	-8.840
2-Aug-10							4.996	2.968	0.329	-3.722	-6.491	-8.760
3-Aug-10							2.081	2.187	0.316	-3.711	-6.455	-8.700
4-Aug-10							1.381	1.249	0.223	-3.647	-6.366	-8.610
5-Aug-10							2.081	1.184	0.211	-3.606	-6.324	-8.560
6-Aug-10							2.213	1.368	0.184	-3.580	-6.271	-8.480
7-Aug-10							2.551	1.415	0.205	-3.533	-6.197	-8.440
8-Aug-10							3.567	1.711	0.211	-3.502	-6.140	-8.380
9-Aug-10							4.381	1.936	0.199	-3.486	-6.124	-8.310
10-Aug-10							4.434	2.015	0.224	-3.435	-6.046	-8.230
11-Aug-10							2.743	2.240	0.289	-3.424	-5.983	-8.190
12-Aug-10							1.618	1.592	0.275	-3.386	-5.947	-8.130
13-Aug-10							1.583	0.898	0.214	-3.368	-5.901	-8.080
14-Aug-10							1.302	0.670	0.197	-3.334	-5.842	-8.000
15-Aug-10							1.379	0.616	0.169	-3.309	-5.817	-7.950
16-Aug-10							1.249	0.538	0.144	-3.282	-5.763	-7.890
17-Aug-10							3.221	0.789	0.106	-3.267	-5.721	-7.850
18-Aug-10							5.857	1.804	0.120	-3.226	-5.679	-7.810
19-Aug-10							3.938	2.450	0.209	-3.216	-5.618	-7.750
20-Aug-10							4.594	2.809	0.224	-3.174	-5.601	-7.700
21-Aug-10							5.265	2.809	0.251	-3.148	-5.548	-7.620
22-Aug-10							5.426	3.154	0.277	-3.148	-5.496	-7.570
23-Aug-10							4.782	3.021	0.329	-3.122	-5.470	-7.540
24-Aug-10							5.104	2.809	0.329	-3.122	-5.444	-7.490
25-Aug-10							3.141	2.478	0.368	-3.084	-5.381	-7.450
26-Aug-10							2.982	1.738	0.316	-3.084	-5.355	-7.400
27-Aug-10							1.949	1.421	0.290	-3.058	-5.329	-7.350
28-Aug-10							2.531	1.236	0.263	-3.006	-5.251	-7.300
29-Aug-10							1.355	1.091	0.249	-2.995	-5.240	-7.260
30-Aug-10							1.223	0.775	0.223	-2.969	-5.188	-7.210
31-Aug-10							1.368	0.868	0.184	-2.954	-5.172	-7.190
1-Sep-10							2.002	0.894	0.185	-2.954	-5.146	-7.140
2-Sep-10							2.081	1.026	0.159	-2.928	-5.093	-7.080
3-Sep-10							2.557	1.157	0.184	-2.902	-5.068	-7.060
4-Sep-10							0.986	0.854	0.170	-2.891	-5.031	-7.020
5-Sep-10							-0.185	0.393	0.156	-2.880	-4.995	-6.987
6-Sep-10							0.016	-0.036	0.095	-2.861	-4.976	-6.915
7-Sep-10							-0.213	-0.160	0.076	-2.829	-4.944	-6.909
8-Sep-10							-0.118	-0.171	0.013	-2.838	-4.900	-6.865
9-Sep-10							0.224	-0.170	0.014	-2.811	-4.873	-6.838
10-Sep-10							0.198	-0.169	-0.038	-2.785	-4.873	-6.785
11-Sep-10							-0.092	-0.197	-0.066	-2.786	-4.822	-6.760
12-Sep-10							-0.395	-0.211	-0.080	-2.775	-4.785	-6.697
13-Sep-10							-0.459	-0.249	-0.118	-2.786	-4.770	-6.681
14-Sep-10							-0.302	-0.223	-0.171	-2.760	-4.770	-6.655
15-Sep-10							-0.066	-0.197	-0.171	-2.760	-4.744	-6.628

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL4

Bulb Depth	TH4_1 -1.33	TH4_2 -1.08	TH4_3 -0.83	TH4_4 -0.58	TH4_5 -0.33	TH4_6 -0.08	TH4_7 0.17 M	TH4_8 0.42 M	TH4_9 0.92 M	TH4_10 2.92 M	TH4_11 4.92 M	TH4_12 8.92 M
16-Sep-10							-0.290	-0.237	-0.211	-2.749	-4.707	-6.592
17-Sep-10							-1.442	-0.368	-0.263	-2.749	-4.707	-6.539
18-Sep-10							-1.875	-0.461	-0.278	-2.764	-4.670	-6.529
19-Sep-10							-2.465	-0.606	-0.318	-2.726	-4.660	-6.493
20-Sep-10							-3.469	-1.064	-0.330	-2.738	-4.644	-6.477
21-Sep-10							-2.670	-1.416	-0.473	-2.749	-4.629	-6.461
22-Sep-10							-2.957	-1.808	-0.630	-2.748	-4.602	-6.408
23-Sep-10							-3.417	-2.058	-0.776	-2.764	-4.592	-6.398
24-Sep-10							-4.387	-2.532	-0.935	-2.767	-4.570	-6.352
25-Sep-10							-5.670	-3.342	-1.197	-2.793	-4.518	-6.352
26-Sep-10							-7.050	-4.058	-1.494	-2.803	-4.554	-6.310
27-Sep-10							-7.570	-4.921	-1.860	-2.855	-4.528	-6.257
28-Sep-10							-7.380	-5.801	-2.375	-2.924	-4.544	-6.273
29-Sep-10							-5.863	-5.628	-2.857	-3.014	-4.503	-6.231
30-Sep-10							-5.340	-4.816	-3.040	-3.170	-4.555	-6.231
1-Oct-10							-5.287	-4.555	-3.092	-3.327	-4.581	-6.204
2-Oct-10							-4.879	-4.618	-3.181	-3.495	-4.618	-6.214
3-Oct-10							-7.420	-5.057	-3.279	-3.645	-4.664	-6.184
4-Oct-10							-8.290	-5.859	-3.555	-3.791	-4.706	-6.200
5-Oct-10							-8.840	-6.489	-3.869	-3.921	-4.758	-6.174
6-Oct-10							-7.750	-6.588	-4.204	-4.022	-4.806	-6.194
7-Oct-10							-7.800	-6.667	-4.466	-4.204	-4.884	-6.194
8-Oct-10							-7.590	-6.667	-4.675	-4.387	-4.963	-6.220
9-Oct-10							-7.880	-6.851	-4.832	-4.544	-5.015	-6.247
10-Oct-10							-7.620	-6.614	-4.937	-4.701	-5.094	-6.273
11-Oct-10							-7.910	-7.040	-5.041	-4.832	-5.146	-6.273
12-Oct-10							-5.477	-6.263	-5.189	-4.980	-5.241	-6.289
13-Oct-10							-5.115	-5.690	-5.167	-5.115	-5.324	-6.319
14-Oct-10							-5.270	-5.506	-5.009	-5.218	-5.401	-6.344
15-Oct-10							-5.528	-5.397	-4.926	-5.266	-5.476	-6.393
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OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL4

Bulb Depth	TH4_1 -1.33	TH4_2 -1.08	TH4_3 -0.83	TH4_4 -0.58	TH4_5 -0.33	TH4_6 -0.08	TH4_7 0.17 M	TH4_8 0.42 M	TH4_9 0.92 M	TH4_10 2.92 M	TH4_11 4.92 M	TH4_12 8.92 M
23-Nov-10												
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29-Jan-11												

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	-1.33	-1.08	-0.83	-0.58	-0.33	-0.08	0.17 M	0.42 M	0.92 M	2.92 M	4.92 M	8.92 M
30-Jan-11												
31-Jan-11												
1-Feb-11												
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6-Apr-11												
7-Apr-11												

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL4

Bulb Depth	TH4_1 -1.33	TH4_2 -1.08	TH4_3 -0.83	TH4_4 -0.58	TH4_5 -0.33	TH4_6 -0.08	TH4_7 0.17 M	TH4_8 0.42 M	TH4_9 0.92 M	TH4_10 2.92 M	TH4_11 4.92 M	TH4_12 8.92 M
8-Apr-11												
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13-Jun-11												
14-Jun-11												

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	**-1.33**	**-1.08**	**-0.83**	**-0.58**	**-0.33**	**-0.08**	**0.17 M**	**0.42 M**	**0.92 M**	**2.92 M**	**4.92 M**	**8.92 M**
15-Jun-11												
16-Jun-11												
17-Jun-11												
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15-Jul-11												
16-Jul-11												
17-Jul-11												
18-Jul-11												
19-Jul-11							11.720	5.868	0.057	-4.614	-7.650	-9.990
20-Jul-11							9.800	6.017	0.147	-4.525	-7.560	-9.900
21-Jul-11							7.960	5.439	0.160	-4.462	-7.470	-9.810
22-Jul-11							7.500	4.529	0.188	-4.408	-7.390	-9.700
23-Jul-11							6.588	3.526	0.198	-4.347	-7.310	-9.610
24-Jul-11							7.580	3.194	0.186	-4.280	-7.240	-9.540
25-Jul-11							10.270	4.486	0.226	-4.212	-7.140	-9.450
26-Jul-11							9.310	5.089	0.265	-4.176	-7.080	-9.360
27-Jul-11							11.290	5.774	0.305	-4.108	-7.010	-9.280
28-Jul-11							12.930	6.381	0.371	-4.067	-6.941	-9.210
29-Jul-11							11.970	6.504	0.410	-4.004	-6.852	-9.120
30-Jul-11							9.840	5.600	0.422	-3.941	-6.790	-9.060
31-Jul-11							9.520	5.801	0.462	-3.900	-6.721	-8.960
1-Aug-11							11.310	6.422	0.567	-3.848	-6.642	-8.910
2-Aug-11							10.570	6.329	0.737	-3.785	-6.580	-8.820
3-Aug-11							7.390	5.308	0.846	-3.730	-6.525	-8.770
4-Aug-11							8.570	5.089	0.842	-3.680	-6.475	-8.690
5-Aug-11							9.620	5.168	0.894	-3.629	-6.397	-8.610
6-Aug-11							7.580	5.304	0.948	-3.602	-6.344	-8.560
7-Aug-11							10.440	5.425	1.014	-3.560	-6.275	-8.490
8-Aug-11							10.810	6.153	1.120	-3.508	-6.222	-8.430
9-Aug-11							11.570	6.395	1.224	-3.457	-6.144	-8.350
10-Aug-11							11.710	6.612	1.382	-3.431	-6.092	-8.270
11-Aug-11							13.030	7.150	1.509	-3.383	-6.044	-8.230
12-Aug-11							9.060	6.980	1.712	-3.341	-5.977	-8.160
13-Aug-11							6.588	6.019	1.777	-3.304	-5.941	-8.100
14-Aug-11							4.823	4.153	1.553	-3.267	-5.852	-8.010
15-Aug-11							3.472	3.259	1.221	-3.232	-5.817	-7.970
16-Aug-11							3.232	2.515	1.036	-3.180	-5.765	-7.920
17-Aug-11							3.088	2.187	0.868	-3.136	-5.721	-7.850
18-Aug-11							4.073	2.213	0.815	-3.111	-5.669	-7.800
19-Aug-11							5.453	2.836	0.829	-3.070	-5.601	-7.730
20-Aug-11							5.211	3.021	0.855	-3.043	-5.548	-7.700
21-Aug-11							4.127	2.982	0.947	-3.006	-5.512	-7.610

OPERATIONAL LANDFILL - THERMISTOR DATA FOR #OL4

Bulb Depth	TH4_1 -1.33	TH4_2 -1.08	TH4_3 -0.83	TH4_4 -0.58	TH4_5 -0.33	TH4_6 -0.08	TH4_7 0.17 M	TH4_8 0.42 M	TH4_9 0.92 M	TH4_10 2.92 M	TH4_11 4.92 M	TH4_12 8.92 M
22-Aug-11							7.750	3.943	1.031	-2.999	-5.451	-7.580
23-Aug-11							5.669	3.953	1.224	-2.965	-5.418	-7.520
24-Aug-11							4.742	3.407	1.210	-2.928	-5.381	-7.480
25-Aug-11							6.321	3.264	1.148	-2.910	-5.337	-7.410
26-Aug-11							5.009	3.006	1.077	-2.877	-5.278	-7.380
27-Aug-11							3.179	2.648	1.010	-2.840	-5.242	-7.310
28-Aug-11							2.147	2.015	0.907	-2.838	-5.214	-7.260
29-Aug-11							1.411	1.438	0.753	-2.809	-5.158	-7.200
30-Aug-11							1.328	0.907	0.538	-2.786	-5.109	-7.150
31-Aug-11							0.393	0.524	0.419	-2.749	-5.073	-7.120
1-Sep-11							1.750	0.354	0.328	-2.734	-5.031	-7.080
2-Sep-11							2.220	0.690	0.296	-2.713	-5.010	-7.030

NOTES:

(highlighted) Signifies the warmest temperature recorded for individual thermistor strings during the calendar year.

LRD LANDFILL THERMISTOR DATA - #LRD1

Bulb	TH1_1	TH1_2	TH1_3	TH1_4	TH1_5	TH1_6	TH1_7	TH1_8	TH1_9	TH1_10	TH1_11	TH1_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.00 M	5.00 M	7.00 M	11.0 M
15-Jul-10	0.344	-0.585		-2.462	-3.437		-5.029	-5.801	-7.270	-11.030	-12.170	-11.000
16-Jul-10	0.318	-0.585		-2.411	-3.386		-4.926	-5.723	-7.140	-10.950	-12.110	-11.000
17-Jul-10	0.292	-0.585		-2.385	-3.335		-4.849	-5.620	-7.060	-10.870	-12.080	-11.000
18-Jul-10	0.263	-0.588		-2.337	-3.261		-4.775	-5.546	-6.938	-10.770	-12.030	-11.010
19-Jul-10	0.370	-0.585		-2.308	-3.232		-4.721	-5.466	-6.858	-10.680	-12.000	-11.000
20-Jul-10	0.396	-0.584		-2.282	-3.180		-4.643	-5.388	-6.780	-10.600	-11.920	-11.000
21-Jul-10	0.330	-0.573		-2.245	-3.144		-4.582	-5.302	-6.693	-10.510	-11.890	-11.020
22-Jul-10	0.201	-0.599		-2.220	-3.093		-4.505	-5.250	-6.590	-10.430	-11.830	-11.000
23-Jul-10	0.124	-0.572		-2.192	-3.039		-4.450	-5.169	-6.507	-10.350	-11.790	-10.990
24-Jul-10	0.271	-0.580		-2.174	-3.020		-4.405	-5.098	-6.436	-10.270	-11.720	-10.990
25-Jul-10	0.487	-0.571		-2.140	-2.961		-4.346	-5.039	-6.377	-10.190	-11.690	-10.990
26-Jul-10	0.604	-0.531		-2.150	-2.946		-4.305	-4.972	-6.309	-10.120	-11.640	-10.990
27-Jul-10	0.745	-0.520		-2.088	-2.910		-4.244	-4.937	-6.223	-10.030	-11.580	-10.990
28-Jul-10	0.797	-0.494		-2.063	-2.858		-4.192	-4.885	-6.171	-9.970	-11.550	-10.990
29-Jul-10	0.750	-0.463		-2.032	-2.828		-4.137	-4.830	-6.090	-9.890	-11.490	-10.980
30-Jul-10	0.596	-0.462		-2.005	-2.801		-4.110	-4.777	-6.037	-9.810	-11.440	-10.980
31-Jul-10	0.534	-0.447		-1.991	-2.762		-4.071	-4.713	-5.973	-9.750	-11.400	-11.000
1-Aug-10	0.474	-0.455		-1.973	-2.744		-4.053	-4.669	-5.929	-9.670	-11.350	-10.980
2-Aug-10	0.388	-0.438		-1.930	-2.700		-3.958	-4.625	-5.859	-9.600	-11.300	-10.960
3-Aug-10	0.356	-0.444		-1.911	-2.682		-3.940	-4.582	-5.816	-9.530	-11.260	-10.970
4-Aug-10	0.213	-0.432		-1.900	-2.645		-3.878	-4.520	-5.755	-9.470	-11.200	-10.960
5-Aug-10	0.072	-0.470		-1.860	-2.605		-3.837	-4.479	-5.688	-9.400	-11.180	-10.940
6-Aug-10	0.072	-0.470		-1.834	-2.579		-3.812	-4.428	-5.636	-9.380	-11.100	-10.970
7-Aug-10	0.065	-0.502		-1.841	-2.560		-3.766	-4.382	-5.590	-9.280	-11.050	-10.950
8-Aug-10	0.046	-0.496		-1.809	-2.528		-3.735	-4.351	-5.533	-9.220	-11.020	-10.940
9-Aug-10	0.034	-0.508		-1.794	-2.513		-3.694	-4.310	-5.492	-9.150	-10.980	-10.920
10-Aug-10	0.060	-0.507		-1.794	-2.487		-3.668	-4.284	-5.440	-9.100	-10.920	-10.920
11-Aug-10	0.096	-0.524		-1.785	-2.479		-3.634	-4.250	-5.406	-9.040	-10.860	-10.940
12-Aug-10	0.083	-0.511		-1.772	-2.441		-3.622	-4.213	-5.344	-8.970	-10.830	-10.910
13-Aug-10	-0.019	-0.510		-1.771	-2.440		-3.570	-4.160	-5.317	-8.920	-10.800	-10.910
14-Aug-10	-0.123	-0.535		-1.771	-2.414		-3.544	-4.135	-5.266	-8.870	-10.750	-10.910
15-Aug-10	-0.152	-0.539		-1.749	-2.417		-3.522	-4.112	-5.243	-8.820	-10.690	-10.880
16-Aug-10	-0.174	-0.535		-1.746	-2.388		-3.493	-4.058	-5.214	-8.760	-10.670	-10.880
17-Aug-10	-0.164	-0.551		-1.735	-2.378		-3.481	-4.046	-5.151	-8.700	-10.600	-10.860
18-Aug-10	-0.121	-0.559		-1.717	-2.359		-3.437	-4.002	-5.106	-8.650	-10.550	-10.840
19-Aug-10	-0.095	-0.585		-1.717	-2.359		-3.437	-3.976	-5.080	-8.600	-10.520	-10.840
20-Aug-10	-0.018	-0.585		-1.717	-2.334		-3.412	-3.951	-5.029	-8.550	-10.470	-10.840
21-Aug-10	0.060	-0.559		-1.717	-2.334		-3.386	-3.925	-5.003	-8.490	-10.420	-10.820
22-Aug-10	0.132	-0.564		-1.722	-2.313		-3.365	-3.904	-4.982	-8.450	-10.370	-10.820
23-Aug-10	0.189	-0.559		-1.691	-2.308		-3.335	-3.874	-4.926	-8.390	-10.340	-10.820
24-Aug-10	0.215	-0.533		-1.691	-2.282		-3.335	-3.848	-4.901	-8.340	-10.280	-10.790
25-Aug-10	0.201	-0.521		-1.680	-2.297		-3.298	-3.863	-4.890	-8.300	-10.270	-10.810
26-Aug-10	0.051	-0.517		-1.676	-2.267		-3.294	-3.833	-4.861	-8.250	-10.220	-10.780
27-Aug-10	-0.031	-0.522		-1.654	-2.271		-3.273	-3.786	-4.813	-8.220	-10.170	-10.750
28-Aug-10	-0.057	-0.522		-1.654	-2.245		-3.247	-3.760	-4.787	-8.150	-10.120	-10.750
29-Aug-10	-0.072	-0.536		-1.644	-2.235		-3.237	-3.750	-4.752	-8.110	-10.080	-10.750
30-Aug-10	-0.123	-0.561		-1.617	-2.208		-3.210	-3.724	-4.726	-8.080	-10.050	-10.720
31-Aug-10	-0.186	-0.573		-1.629	-2.194		-3.196	-3.709	-4.710	-8.020	-10.010	-10.730
1-Sep-10	-0.186	-0.573		-1.602	-2.194		-3.169	-3.683	-4.659	-7.990	-9.980	-10.730
2-Sep-10	-0.185	-0.571		-1.601	-2.193		-3.143	-3.656	-4.658	-7.940	-9.930	-10.700
3-Sep-10	-0.208	-0.595		-1.625	-2.165		-3.141	-3.628	-4.630	-7.910	-9.900	-10.700
4-Sep-10	-0.226	-0.613		-1.617	-2.157		-3.133	-3.621	-4.597	-7.850	-9.870	-10.670
5-Sep-10	-0.297	-0.633		-1.611	-2.151		-3.102	-3.590	-4.566	-7.820	-9.810	-10.660
6-Sep-10	-0.380	-0.638		-1.616	-2.156		-3.107	-3.595	-4.545	-7.800	-9.790	-10.660
7-Sep-10	-0.424	-0.656		-1.609	-2.150		-3.075	-3.563	-4.513	-7.740	-9.760	-10.630
8-Sep-10	-0.482	-0.714		-1.615	-2.155		-3.080	-3.542	-4.493	-7.720	-9.710	-10.640
9-Sep-10	-0.523	-0.730		-1.631	-2.146		-3.071	-3.533	-4.458	-7.660	-9.670	-10.600
10-Sep-10	-0.551	-0.784		-1.659	-2.148		-3.047	-3.510	-4.460	-7.630	-9.650	-10.600
11-Sep-10	-0.613	-0.845		-1.669	-2.157		-3.056	-3.518	-4.443	-7.590	-9.600	-10.590
12-Sep-10	-0.684	-0.890		-1.689	-2.177		-3.051	-3.487	-4.412	-7.560	-9.570	-10.580
13-Sep-10	-0.742	-0.948		-1.720	-2.208		-3.031	-3.493	-4.392	-7.510	-9.520	-10.560
14-Sep-10	-0.819	-0.999		-1.771	-2.234		-3.056	-3.493	-4.366	-7.490	-9.500	-10.560
15-Sep-10	-0.871	-1.077		-1.797	-2.260		-3.056	-3.467	-4.366	-7.460	-9.470	-10.530
16-Sep-10	-0.936	-1.142		-1.837	-2.274		-3.071	-3.482	-4.355	-7.420	-9.440	-10.520
17-Sep-10	-1.039	-1.219		-1.889	-2.300		-3.097	-3.508	-4.355	-7.420	-9.380	-10.520
18-Sep-10	-1.156	-1.285		-1.929	-2.340		-3.086	-3.497	-4.319	-7.360	-9.350	-10.490
19-Sep-10	-1.660	-1.557		-1.994	-2.355		-3.100	-3.512	-4.309	-7.330	-9.370	-10.480

LRD LANDFILL THERMISTOR DATA - #LRD1

Bulb	TH1_1	TH1_2	TH1_3	TH1_4	TH1_5	TH1_6	TH1_7	TH1_8	TH1_9	TH1_10	TH1_11	TH1_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.00 M	5.00 M	7.00 M	11.0 M
20-Sep-10	-1.980	-1.877		-2.057	-2.417		-3.111	-3.497	-4.319	-7.290	-9.300	-10.460
21-Sep-10	-2.146	-2.069		-2.171	-2.480		-3.148	-3.508	-4.304	-7.270	-9.280	-10.440
22-Sep-10	-2.272	-2.195		-2.298	-2.555		-3.171	-3.531	-4.302	-7.240	-9.220	-10.440
23-Sep-10	-2.469	-2.366		-2.417	-2.649		-3.214	-3.574	-4.319	-7.210	-9.190	-10.430
24-Sep-10	-2.876	-2.799		-2.721	-2.773		-3.262	-3.596	-4.316	-7.180	-9.170	-10.440
25-Sep-10												
26-Sep-10												
27-Sep-10												
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24-Nov-10												
25-Nov-10												

LRD LANDFILL THERMISTOR DATA - #LRD1

Bulb Depth	TH1_1 0.75 M	TH1_2 1.00 M	TH1_3 1.25 M	TH1_4 1.50 M	TH1_5 1.75 M	TH1_6 2.00 M	TH1_7 2.25 M	TH1_8 2.50 M	TH1_9 3.00 M	TH1_10 5.00 M	TH1_11 7.00 M	TH1_12 11.0 M
26-Nov-10												
27-Nov-10												
28-Nov-10												
29-Nov-10												
30-Nov-10												
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30-Jan-11												
31-Jan-11												

LRD LANDFILL THERMISTOR DATA - #LRD1

Bulb	TH1_1	TH1_2	TH1_3	TH1_4	TH1_5	TH1_6	TH1_7	TH1_8	TH1_9	TH1_10	TH1_11	TH1_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.00 M	5.00 M	7.00 M	11.0 M
1-Feb-11												
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8-Apr-11												

LRD LANDFILL THERMISTOR DATA - #LRD1

Bulb	TH1_1	TH1_2	TH1_3	TH1_4	TH1_5	TH1_6	TH1_7	TH1_8	TH1_9	TH1_10	TH1_11	TH1_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.00 M	5.00 M	7.00 M	11.0 M
9-Apr-11												
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13-Jun-11												
14-Jun-11												

LRD LANDFILL THERMISTOR DATA - #LRD1

Bulb Depth	TH1_1 0.75 M	TH1_2 1.00 M	TH1_3 1.25 M	TH1_4 1.50 M	TH1_5 1.75 M	TH1_6 2.00 M	TH1_7 2.25 M	TH1_8 2.50 M	TH1_9 3.00 M	TH1_10 5.00 M	TH1_11 7.00 M	TH1_12 11.0 M
15-Jun-11												
16-Jun-11												
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17-Jul-11												
18-Jul-11												
19-Jul-11	0.308	-1.032		-2.957	-3.905		-5.496	-6.242	-7.660	-11.460	-12.630	-11.460
20-Jul-11	0.442	-0.975		-2.875	-3.849		-5.389	-6.135	-7.580	-11.370	-12.600	-11.480
21-Jul-11	0.487	-0.932		-2.833	-3.782		-5.322	-6.042	-7.460	-11.310	-12.560	-11.470
22-Jul-11	0.385	-0.878		-2.779	-3.703		-5.243	-5.963	-7.360	-11.230	-12.500	-11.470
23-Jul-11	0.313	-0.847		-2.698	-3.622		-5.162	-5.882	-7.280	-11.140	-12.440	-11.460
24-Jul-11	0.280	-0.803		-2.653	-3.551		-5.065	-5.785	-7.180	-11.040	-12.390	-11.470
25-Jul-11	0.318	-0.791		-2.589	-3.486		-5.000	-5.719	-7.090	-10.940	-12.350	-11.480
26-Jul-11	0.461	-0.777		-2.525	-3.423		-4.911	-5.631	-6.997	-10.880	-12.280	-11.470
27-Jul-11	0.552	-0.737		-2.485	-3.382		-4.844	-5.564	-6.929	-10.780	-12.240	-11.480
28-Jul-11	0.643	-0.698		-2.444	-3.316		-4.778	-5.471	-6.836	-10.710	-12.190	-11.460
29-Jul-11	0.817	-0.654		-2.402	-3.274		-4.710	-5.404	-6.769	-10.620	-12.150	-11.470
30-Jul-11	0.814	-0.631		-2.353	-3.225		-4.636	-5.355	-6.694	-10.540	-12.100	-11.480
31-Jul-11	0.837	-0.583		-2.305	-3.177		-4.587	-5.281	-6.593	-10.460	-12.050	-11.480
1-Aug-11	0.914	-0.531		-2.279	-3.126		-4.536	-5.204	-6.542	-10.380	-11.990	-11.480
2-Aug-11	0.870	-0.498		-2.221	-3.067		-4.453	-5.146	-6.458	-10.320	-11.960	-11.470
3-Aug-11	0.824	-0.493		-2.190	-3.012		-4.423	-5.090	-6.403	-10.270	-11.900	-11.470
4-Aug-11	0.745	-0.468		-2.165	-2.961		-4.346	-5.014	-6.326	-10.190	-11.850	-11.470
5-Aug-11	0.745	-0.442		-2.114	-2.935		-4.295	-4.962	-6.249	-10.080	-11.790	-11.470
6-Aug-11	0.802	-0.438		-2.084	-2.880		-4.240	-4.907	-6.193	-10.020	-11.740	-11.470
7-Aug-11	0.865	-0.400		-2.046	-2.841		-4.200	-4.842	-6.127	-9.950	-11.690	-11.450
8-Aug-11	0.916	-0.401		-2.021	-2.791		-4.150	-4.791	-6.051	-9.900	-11.640	-11.450
9-Aug-11	1.017	-0.351		-1.971	-2.767		-4.075	-4.742	-6.001	-9.800	-11.590	-11.450
10-Aug-11	1.115	-0.331		-1.951	-2.720		-4.028	-4.669	-5.928	-9.750	-11.560	-11.430
11-Aug-11	1.225	-0.274		-1.920	-2.690		-3.998	-4.639	-5.872	-9.670	-11.510	-11.420
12-Aug-11	1.315	-0.262		-1.883	-2.653		-3.936	-4.577	-5.811	-9.600	-11.470	-11.420
13-Aug-11	1.327	-0.224		-1.871	-2.616		-3.899	-4.541	-5.775	-9.570	-11.410	-11.410
14-Aug-11	1.075	-0.217		-1.814	-2.584		-3.868	-4.484	-5.718	-9.490	-11.380	-11.400
15-Aug-11	0.745	-0.237		-1.808	-2.553		-3.811	-4.427	-5.661	-9.450	-11.320	-11.400
16-Aug-11	0.514	-0.261		-1.754	-2.525		-3.783	-4.400	-5.608	-9.370	-11.260	-11.400
17-Aug-11	0.330	-0.315		-1.757	-2.502		-3.735	-4.351	-5.559	-9.320	-11.240	-11.400
18-Aug-11	0.253	-0.315		-1.731	-2.451		-3.709	-4.299	-5.507	-9.240	-11.180	-11.400
19-Aug-11	0.241	-0.353		-1.717	-2.411		-3.643	-4.259	-5.440	-9.200	-11.140	-11.380
20-Aug-11	0.317	-0.354		-1.692	-2.386		-3.618	-4.208	-5.416	-9.120	-11.090	-11.380

LRD LANDFILL THERMISTOR DATA - #LRD1

Bulb Depth	TH1_1 0.75 M	TH1_2 1.00 M	TH1_3 1.25 M	TH1_4 1.50 M	TH1_5 1.75 M	TH1_6 2.00 M	TH1_7 2.25 M	TH1_8 2.50 M	TH1_9 3.00 M	TH1_10 5.00 M	TH1_11 7.00 M	TH1_12 11.0 M
21-Aug-11	0.434	-0.341		-1.680	-2.374		-3.581	-4.171	-5.353	-9.060	-11.050	-11.340
22-Aug-11	0.489	-0.311		-1.675	-2.343		-3.549	-4.139	-5.320	-9.020	-10.980	-11.360
23-Aug-11	0.577	-0.301		-1.640	-2.334		-3.514	-4.105	-5.286	-8.960	-10.950	-11.350
24-Aug-11	0.581	-0.297		-1.636	-2.304		-3.485	-4.075	-5.231	-8.910	-10.890	-11.350
25-Aug-11	0.525	-0.301		-1.614	-2.308		-3.463	-4.027	-5.183	-8.860	-10.870	-11.330
26-Aug-11	0.476	-0.272		-1.611	-2.279		-3.435	-3.999	-5.129	-8.810	-10.810	-11.320
27-Aug-11	0.435	-0.288		-1.602	-2.296		-3.400	-3.965	-5.121	-8.750	-10.780	-11.320
28-Aug-11	0.394	-0.303		-1.566	-2.234		-3.390	-3.955	-5.060	-8.710	-10.720	-11.280
29-Aug-11	0.265	-0.303		-1.566	-2.234		-3.364	-3.904	-5.034	-8.660	-10.690	-11.280
30-Aug-11	0.084	-0.329		-1.566	-2.208		-3.313	-3.878	-4.983	-8.610	-10.640	-11.280
31-Aug-11	-0.065	-0.375		-1.560	-2.177		-3.308	-3.847	-4.952	-8.550	-10.610	-11.280
1-Sep-11	-0.123	-0.381		-1.540	-2.183		-3.262	-3.827	-4.906	-8.500	-10.560	-11.260
2-Sep-11	-0.128	-0.386		-1.520	-2.163		-3.241	-3.780	-4.885	-8.450	-10.510	-11.230

NOTES:

Signifies data deleted as clearly a malfunction indicated by substantial short term change of temperature.
Original data is available upon request but has been removed to make graphs easier to read and understand.
This normally occurs in spring when must be having a snow melting event.

Signifies the warmest temperature recorded for individual thermistor strings during the calendar year.

LRD LANDFILL THERMISTOR DATA - #LRD2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.00 M	TH2_10 5.00 M	TH2_11 7.00 M	TH2_12 11.0 M
15-Jul-10	0.421	-0.585	-1.434	-2.462	-3.360	-4.002	-4.978	-5.775	-7.300	-11.250	-12.490	-11.460
16-Jul-10	0.396	-0.585	-1.409	-2.411	-3.309	-3.925	-4.901	-5.672	-7.220	-11.160	-12.440	-11.460
17-Jul-10	0.370	-0.585	-1.383	-2.385	-3.258	-3.848	-4.824	-5.569	-7.090	-11.080	-12.380	-11.460
18-Jul-10	0.366	-0.562	-1.360	-2.337	-3.209	-3.774	-4.724	-5.495	-6.990	-10.980	-12.330	-11.440
19-Jul-10	0.499	-0.533	-1.332	-2.308	-3.155	-3.694	-4.670	-5.415	-6.910	-10.900	-12.300	-11.430
20-Jul-10	0.474	-0.507	-1.305	-2.256	-3.103	-3.668	-4.592	-5.337	-6.806	-10.820	-12.250	-11.430
21-Jul-10	0.434	-0.496	-1.268	-2.220	-3.067	-3.606	-4.531	-5.276	-6.719	-10.730	-12.210	-11.450
22-Jul-10	0.330	-0.496	-1.243	-2.194	-3.016	-3.529	-4.454	-5.199	-6.667	-10.650	-12.130	-11.430
23-Jul-10	0.253	-0.521	-1.241	-2.141	-2.962	-3.475	-4.399	-5.092	-6.559	-10.560	-12.090	-11.420
24-Jul-10	0.426	-0.503	-1.223	-2.122	-2.918	-3.431	-4.328	-5.047	-6.488	-10.460	-12.020	-11.420
25-Jul-10	0.668	-0.468	-1.215	-2.088	-2.884	-3.397	-4.269	-4.988	-6.403	-10.400	-11.980	-11.420
26-Jul-10	0.760	-0.428	-1.174	-2.073	-2.894	-3.356	-4.253	-4.921	-6.335	-10.300	-11.940	-11.400
27-Jul-10	0.926	-0.365	-1.163	-2.037	-2.807	-3.294	-4.167	-4.860	-6.249	-10.240	-11.880	-11.420
28-Jul-10	0.952	-0.339	-1.137	-2.011	-2.781	-3.269	-4.115	-4.808	-6.197	-10.160	-11.850	-11.420
29-Jul-10	0.906	-0.334	-1.107	-1.981	-2.751	-3.213	-4.060	-4.753	-6.116	-10.100	-11.790	-11.410
30-Jul-10	0.829	-0.307	-1.080	-1.954	-2.724	-3.186	-4.033	-4.700	-6.063	-10.020	-11.740	-11.410
31-Jul-10	0.767	-0.318	-1.065	-1.940	-2.685	-3.147	-3.994	-4.661	-5.999	-9.930	-11.700	-11.400
1-Aug-10	0.681	-0.301	-1.022	-1.896	-2.667	-3.103	-3.924	-4.592	-5.929	-9.890	-11.620	-11.380
2-Aug-10	0.594	-0.309	-1.030	-1.879	-2.623	-3.060	-3.881	-4.548	-5.884	-9.790	-11.570	-11.390
3-Aug-10	0.563	-0.315	-1.011	-1.860	-2.579	-3.016	-3.837	-4.505	-5.816	-9.740	-11.530	-11.370
4-Aug-10	0.368	-0.355	-0.999	-1.823	-2.543	-2.979	-3.801	-4.443	-5.755	-9.660	-11.500	-11.360
5-Aug-10	0.253	-0.367	-0.985	-1.809	-2.528	-2.939	-3.760	-4.402	-5.688	-9.590	-11.450	-11.370
6-Aug-10	0.201	-0.393	-1.011	-1.783	-2.502	-2.913	-3.709	-4.351	-5.636	-9.530	-11.400	-11.340
7-Aug-10	0.194	-0.425	-0.992	-1.764	-2.483	-2.894	-3.689	-4.305	-5.590	-9.460	-11.350	-11.350
8-Aug-10	0.201	-0.418	-0.985	-1.757	-2.451	-2.862	-3.658	-4.274	-5.533	-9.400	-11.290	-11.340
9-Aug-10	0.189	-0.430	-0.997	-1.743	-2.436	-2.847	-3.617	-4.233	-5.492	-9.330	-11.250	-11.330
10-Aug-10	0.267	-0.430	-0.997	-1.742	-2.410	-2.795	-3.591	-4.181	-5.440	-9.280	-11.190	-11.330
11-Aug-10	0.302	-0.395	-0.987	-1.734	-2.402	-2.787	-3.531	-4.147	-5.406	-9.220	-11.160	-11.320
12-Aug-10	0.264	-0.407	-0.974	-1.721	-2.389	-2.749	-3.519	-4.136	-5.344	-9.160	-11.120	-11.310
13-Aug-10	0.136	-0.406	-0.948	-1.720	-2.363	-2.748	-3.493	-4.083	-5.291	-9.100	-11.070	-11.280
14-Aug-10	0.032	-0.458	-0.974	-1.694	-2.363	-2.722	-3.493	-4.058	-5.266	-9.050	-11.010	-11.280
15-Aug-10	-0.049	-0.462	-0.951	-1.698	-2.340	-2.700	-3.419	-4.010	-5.217	-9.000	-10.960	-11.280
16-Aug-10	-0.019	-0.484	-0.974	-1.669	-2.311	-2.671	-3.390	-3.981	-5.188	-8.950	-10.910	-11.280
17-Aug-10	-0.035	-0.500	-0.963	-1.658	-2.300	-2.660	-3.379	-3.943	-5.151	-8.880	-10.860	-11.270
18-Aug-10	0.034	-0.482	-0.971	-1.666	-2.282	-2.616	-3.335	-3.925	-5.080	-8.830	-10.820	-11.250
19-Aug-10	0.138	-0.481	-0.971	-1.665	-2.282	-2.616	-3.334	-3.899	-5.054	-8.780	-10.790	-11.250
20-Aug-10	0.189	-0.482	-0.946	-1.666	-2.257	-2.591	-3.284	-3.848	-5.029	-8.730	-10.740	-11.220
21-Aug-10	0.266	-0.430	-0.946	-1.640	-2.257	-2.591	-3.284	-3.848	-4.978	-8.680	-10.680	-11.220
22-Aug-10	0.339	-0.436	-0.951	-1.645	-2.236	-2.570	-3.263	-3.827	-4.957	-8.600	-10.630	-11.200
23-Aug-10	0.421	-0.405	-0.946	-1.640	-2.231	-2.565	-3.232	-3.797	-4.926	-8.570	-10.600	-11.190
24-Aug-10	0.447	-0.379	-0.920	-1.614	-2.205	-2.539	-3.207	-3.771	-4.901	-8.520	-10.550	-11.160
25-Aug-10	0.460	-0.367	-0.908	-1.603	-2.194	-2.528	-3.195	-3.734	-4.864	-8.480	-10.510	-11.180
26-Aug-10	0.309	-0.362	-0.903	-1.598	-2.164	-2.498	-3.166	-3.730	-4.835	-8.430	-10.480	-11.150
27-Aug-10	0.175	-0.393	-0.882	-1.577	-2.168	-2.477	-3.144	-3.709	-4.813	-8.380	-10.430	-11.160
28-Aug-10	0.149	-0.393	-0.882	-1.551	-2.143	-2.477	-3.119	-3.658	-4.762	-8.330	-10.410	-11.130
29-Aug-10	0.135	-0.407	-0.897	-1.541	-2.132	-2.440	-3.108	-3.648	-4.726	-8.290	-10.370	-11.120
30-Aug-10	0.032	-0.432	-0.871	-1.540	-2.131	-2.440	-3.082	-3.621	-4.700	-8.240	-10.320	-11.120
31-Aug-10	-0.031	-0.444	-0.882	-1.526	-2.117	-2.400	-3.067	-3.606	-4.685	-8.200	-10.270	-11.100
1-Sep-10	-0.031	-0.444	-0.882	-1.525	-2.091	-2.399	-3.041	-3.580	-4.659	-8.150	-10.250	-11.100
2-Sep-10	-0.030	-0.468	-0.906	-1.524	-2.090	-2.372	-3.040	-3.553	-4.606	-8.120	-10.190	-11.070
3-Sep-10	-0.027	-0.466	-0.904	-1.522	-2.088	-2.370	-3.012	-3.526	-4.579	-8.090	-10.170	-11.070
4-Sep-10	-0.045	-0.484	-0.896	-1.540	-2.080	-2.363	-3.005	-3.518	-4.546	-8.030	-10.130	-11.040
5-Sep-10	-0.142	-0.529	-0.890	-1.508	-2.074	-2.331	-2.974	-3.487	-4.541	-7.980	-10.080	-11.040
6-Sep-10	-0.225	-0.509	-0.896	-1.514	-2.079	-2.336	-2.953	-3.492	-4.519	-7.950	-10.050	-11.010
7-Sep-10	-0.270	-0.528	-0.914	-1.507	-2.047	-2.330	-2.946	-3.460	-4.487	-7.920	-10.020	-11.030
8-Sep-10	-0.301	-0.559	-0.920	-1.512	-2.052	-2.309	-2.926	-3.440	-4.467	-7.870	-9.970	-11.010
9-Sep-10	-0.343	-0.575	-0.910	-1.528	-2.043	-2.300	-2.917	-3.430	-4.432	-7.840	-9.940	-11.000
10-Sep-10	-0.345	-0.577	-0.938	-1.530	-2.045	-2.302	-2.893	-3.407	-4.409	-7.790	-9.890	-10.980
11-Sep-10	-0.381	-0.613	-0.948	-1.540	-2.054	-2.286	-2.902	-3.390	-4.392	-7.750	-9.870	-10.960
12-Sep-10	-0.400	-0.633	-0.968	-1.534	-2.049	-2.280	-2.897	-3.385	-4.361	-7.720	-9.840	-10.960
13-Sep-10	-0.432	-0.664	-0.999	-1.540	-2.054	-2.286	-2.876	-3.364	-4.340	-7.690	-9.790	-10.930
14-Sep-10	-0.432	-0.690	-0.999	-1.566	-2.054	-2.286	-2.876	-3.364	-4.340	-7.640	-9.760	-10.910
15-Sep-10	-0.458	-0.716	-1.025	-1.566	-2.054	-2.286	-2.851	-3.339	-4.289	-7.620	-9.710	-10.910
16-Sep-10	-0.498	-0.730	-1.039	-1.580	-2.043	-2.274	-2.865	-3.328	-4.278	-7.580	-9.700	-10.920
17-Sep-10	-0.549	-0.781	-1.091	-1.606	-2.069	-2.274	-2.865	-3.328	-4.253	-7.550	-9.650	-10.870
18-Sep-10	-0.641	-0.821	-1.105	-1.620	-2.083	-2.289	-2.854	-3.317	-4.242	-7.520	-9.610	-10.860
19-Sep-10	-0.964	-0.913	-1.145	-1.634	-2.097	-2.277	-2.843	-3.306	-4.231	-7.480	-9.580	-10.850

LRD LANDFILL THERMISTOR DATA - #LRD2

Bulb	TH2_1	TH2_2	TH2_3	TH2_4	TH2_5	TH2_6	TH2_7	TH2_8	TH2_9	TH2_10	TH2_11	TH2_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.00 M	5.00 M	7.00 M	11.0 M
20-Sep-10	-1.130	-1.027	-1.182	-1.671	-2.109	-2.289	-2.854	-3.291	-4.216	-7.440	-9.560	-10.840
21-Sep-10	-1.194	-1.116	-1.271	-1.709	-2.146	-2.300	-2.840	-3.302	-4.201	-7.420	-9.520	-10.820
22-Sep-10	-1.346	-1.243	-1.346	-1.783	-2.169	-2.323	-2.863	-3.300	-4.199	-7.400	-9.490	-10.820
23-Sep-10	-1.594	-1.465	-1.517	-1.877	-2.237	-2.366	-2.880	-3.317	-4.191	-7.360	-9.450	-10.810
24-Sep-10	-2.078	-1.795	-1.821	-2.078	-2.336	-2.413	-2.902	-3.339	-4.188	-7.340	-9.430	-10.810
25-Sep-10												
26-Sep-10												
27-Sep-10												
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25-Nov-10												

LRD LANDFILL THERMISTOR DATA - #LRD2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.00 M	TH2_10 5.00 M	TH2_11 7.00 M	TH2_12 11.0 M
26-Nov-10												
27-Nov-10												
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LRD LANDFILL THERMISTOR DATA - #LRD2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.00 M	TH2_10 5.00 M	TH2_11 7.00 M	TH2_12 11.0 M
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LRD LANDFILL THERMISTOR DATA - #LRD2

Bulb	TH2_1	TH2_2	TH2_3	TH2_4	TH2_5	TH2_6	TH2_7	TH2_8	TH2_9	TH2_10	TH2_11	TH2_12
Depth	0.75 M	1.00 M	1.25 M	1.50 M	1.75 M	2.00 M	2.25 M	2.50 M	3.00 M	5.00 M	7.00 M	11.0 M
9-Apr-11												
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14-Jun-11												

LRD LANDFILL THERMISTOR DATA - #LRD2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.00 M	TH2_10 5.00 M	TH2_11 7.00 M	TH2_12 11.0 M
15-Jun-11												
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18-Jul-11												
19-Jul-11	0.592	-0.800	-1.725	-2.777	-3.726	-4.264	-5.316	-6.191	-7.610	-11.460	-12.660	-11.590
20-Jul-11	0.753	-0.718	-1.669	-2.721	-3.644	-4.208	-5.235	-6.109	-7.500	-11.400	-12.620	-11.620
21-Jul-11	0.823	-0.623	-1.600	-2.653	-3.577	-4.090	-5.142	-6.017	-7.410	-11.310	-12.560	-11.630
22-Jul-11	0.747	-0.595	-1.521	-2.574	-3.498	-4.037	-5.063	-5.912	-7.310	-11.230	-12.530	-11.630
23-Jul-11	0.649	-0.564	-1.465	-2.518	-3.416	-3.955	-4.956	-5.831	-7.200	-11.110	-12.470	-11.630
24-Jul-11	0.590	-0.545	-1.420	-2.447	-3.346	-3.833	-4.885	-5.733	-7.100	-11.040	-12.420	-11.630
25-Jul-11	0.679	-0.507	-1.382	-2.383	-3.281	-3.794	-4.795	-5.642	-7.010	-10.940	-12.350	-11.610
26-Jul-11	0.849	-0.494	-1.343	-2.345	-3.217	-3.705	-4.706	-5.553	-6.920	-10.880	-12.310	-11.630
27-Jul-11	0.914	-0.428	-1.303	-2.279	-3.151	-3.639	-4.639	-5.487	-6.826	-10.780	-12.260	-11.610
28-Jul-11	1.031	-0.389	-1.263	-2.239	-3.111	-3.573	-4.547	-5.394	-6.733	-10.710	-12.190	-11.590
29-Jul-11	1.179	-0.345	-1.220	-2.196	-3.043	-3.505	-4.479	-5.327	-6.666	-10.620	-12.150	-11.610
30-Jul-11	1.203	-0.322	-1.171	-2.147	-2.994	-3.456	-4.430	-5.252	-6.591	-10.540	-12.100	-11.610
31-Jul-11	1.199	-0.299	-1.174	-2.099	-2.946	-3.408	-4.357	-5.204	-6.516	-10.460	-12.050	-11.610
1-Aug-11	1.250	-0.274	-1.123	-2.074	-2.895	-3.357	-4.306	-5.127	-6.413	-10.380	-12.020	-11.610
2-Aug-11	1.284	-0.240	-1.090	-2.015	-2.837	-3.298	-4.247	-5.043	-6.355	-10.320	-11.960	-11.610
3-Aug-11	1.238	-0.210	-1.059	-1.985	-2.806	-3.242	-4.192	-5.013	-6.274	-10.240	-11.900	-11.600
4-Aug-11	1.185	-0.210	-1.009	-1.934	-2.756	-3.192	-4.115	-4.937	-6.223	-10.160	-11.850	-11.600
5-Aug-11	1.211	-0.184	-0.983	-1.883	-2.704	-3.166	-4.064	-4.860	-6.145	-10.080	-11.790	-11.580
6-Aug-11	1.294	-0.154	-0.979	-1.853	-2.649	-3.086	-4.009	-4.805	-6.065	-10.020	-11.760	-11.570
7-Aug-11	1.305	-0.142	-0.941	-1.814	-2.610	-3.046	-3.944	-4.739	-5.999	-9.930	-11.690	-11.580
8-Aug-11	1.408	-0.117	-0.890	-1.790	-2.585	-2.996	-3.893	-4.689	-5.948	-9.880	-11.640	-11.560
9-Aug-11	1.562	-0.042	-0.866	-1.766	-2.536	-2.946	-3.844	-4.639	-5.872	-9.800	-11.610	-11.560
10-Aug-11	1.685	0.004	-0.820	-1.720	-2.490	-2.900	-3.797	-4.567	-5.825	-9.720	-11.560	-11.560
11-Aug-11	1.795	0.036	-0.789	-1.689	-2.459	-2.844	-3.741	-4.536	-5.744	-9.670	-11.510	-11.560
12-Aug-11	1.912	0.074	-0.777	-1.652	-2.422	-2.807	-3.705	-4.475	-5.708	-9.600	-11.470	-11.520
13-Aug-11	1.873	0.111	-0.740	-1.640	-2.385	-2.796	-3.668	-4.438	-5.646	-9.540	-11.430	-11.540
14-Aug-11	1.568	0.067	-0.733	-1.608	-2.353	-2.738	-3.611	-4.381	-5.589	-9.490	-11.380	-11.540
15-Aug-11	1.211	-0.005	-0.753	-1.576	-2.322	-2.707	-3.580	-4.350	-5.533	-9.430	-11.320	-11.530
16-Aug-11	0.954	-0.028	-0.776	-1.574	-2.294	-2.679	-3.527	-4.297	-5.479	-9.350	-11.290	-11.530
17-Aug-11	0.718	-0.109	-0.831	-1.603	-2.297	-2.656	-3.504	-4.248	-5.430	-9.300	-11.240	-11.510
18-Aug-11	0.563	-0.186	-0.857	-1.629	-2.297	-2.631	-3.452	-4.222	-5.379	-9.240	-11.180	-11.510
19-Aug-11	0.499	-0.250	-0.894	-1.640	-2.282	-2.616	-3.437	-4.182	-5.338	-9.170	-11.140	-11.490
20-Aug-11	0.627	-0.225	-0.921	-1.641	-2.283	-2.591	-3.413	-4.131	-5.261	-9.120	-11.090	-11.490

LRD LANDFILL THERMISTOR DATA - #LRD2

Bulb Depth	TH2_1 0.75 M	TH2_2 1.00 M	TH2_3 1.25 M	TH2_4 1.50 M	TH2_5 1.75 M	TH2_6 2.00 M	TH2_7 2.25 M	TH2_8 2.50 M	TH2_9 3.00 M	TH2_10 5.00 M	TH2_11 7.00 M	TH2_12 11.0 M
21-Aug-11	0.796	-0.160	-0.934	-1.654	-2.297	-2.579	-3.401	-4.120	-5.224	-9.060	-11.050	-11.480
22-Aug-11	0.851	-0.130	-0.903	-1.649	-2.266	-2.574	-3.369	-4.087	-5.191	-9.000	-10.980	-11.470
23-Aug-11	0.991	-0.069	-0.868	-1.640	-2.282	-2.565	-3.360	-4.053	-5.158	-8.940	-10.950	-11.460
24-Aug-11	1.099	0.013	-0.838	-1.610	-2.253	-2.535	-3.331	-4.024	-5.102	-8.910	-10.920	-11.460
25-Aug-11	1.043	0.034	-0.816	-1.588	-2.231	-2.513	-3.309	-4.002	-5.080	-8.830	-10.870	-11.430
26-Aug-11	1.020	0.037	-0.814	-1.560	-2.202	-2.511	-3.281	-3.974	-5.026	-8.780	-10.810	-11.430
27-Aug-11	0.978	0.021	-0.804	-1.550	-2.193	-2.476	-3.246	-3.939	-5.018	-8.750	-10.780	-11.420
28-Aug-11	0.886	-0.019	-0.793	-1.540	-2.157	-2.465	-3.236	-3.929	-4.983	-8.680	-10.750	-11.390
29-Aug-11	0.679	-0.097	-0.819	-1.540	-2.157	-2.440	-3.210	-3.904	-4.931	-8.630	-10.690	-11.390
30-Aug-11	0.394	-0.200	-0.845	-1.540	-2.131	-2.414	-3.185	-3.878	-4.906	-8.580	-10.640	-11.390
31-Aug-11	0.142	-0.349	-0.865	-1.534	-2.126	-2.408	-3.153	-3.847	-4.875	-8.520	-10.610	-11.390
1-Sep-11	-0.045	-0.432	-0.922	-1.540	-2.131	-2.388	-3.133	-3.801	-4.828	-8.480	-10.560	-11.360
2-Sep-11	-0.051	-0.464	-0.953	-1.571	-2.137	-2.394	-3.113	-3.780	-4.808	-8.430	-10.540	-11.340

NOTES:

Signifies data deleted as clearly a malfunction indicated by substantial short term change of temperature. Original data is available upon request but has been removed to make graphs easier to read and understand. This normally occurs in spring when must be having a snow melting event.

Signifies the warmest temperature recorded for individual thermistor strings during the calendar year.

LRD LANDFILL THERMISTOR DATA - #LRD3

Bulb	TH3_1	TH3_2	TH3_3	TH3_4	TH3_5	TH3_6	TH3_7	TH3_8	TH3_9	TH3_10	TH3_11	TH3_12
Depth	Above Ground	0.2 M	0.45 M	0.70 M	0.95 M	1.20 M	1.45 M	1.70 M	2.20 M	4.20 M	6.20 M	10.2 M
15-Jul-10	3.726	3.359	2.575	1.276	0.163	-0.894	-1.820	-2.719	-4.387	-9.890	-12.580	-12.440
16-Jul-10	3.962	3.490	2.549	1.224	0.163	-0.843	-1.769	-2.668	-4.284	-9.780	-12.490	-12.440
17-Jul-10	3.594	3.228	2.445	1.198	0.163	-0.817	-1.743	-2.591	-4.182	-9.620	-12.440	-12.440
18-Jul-10	3.984	3.355	2.415	1.169	0.160	-0.794	-1.695	-2.517	-4.108	-9.490	-12.360	-12.410
19-Jul-10	4.619	3.962	2.784	1.353	0.292	-0.791	-1.666	-2.488	-4.002	-9.380	-12.280	-12.410
20-Jul-10	3.595	3.412	2.785	1.588	0.577	-0.558	-1.614	-2.436	-3.976	-9.280	-12.220	-12.410
21-Jul-10	3.346	3.294	2.614	1.444	0.434	-0.496	-1.500	-2.374	-3.863	-9.170	-12.130	-12.400
22-Jul-10	2.562	2.641	2.250	1.288	0.408	-0.496	-1.449	-2.297	-3.786	-9.060	-12.080	-12.380
23-Jul-10	3.318	2.691	2.066	1.106	0.356	-0.521	-1.396	-2.218	-3.706	-8.950	-11.980	-12.370
24-Jul-10	4.648	3.728	2.579	1.280	0.374	-0.528	-1.377	-2.174	-3.636	-8.820	-11.910	-12.340
25-Jul-10	5.001	4.342	3.162	1.678	0.513	-0.520	-1.369	-2.140	-3.551	-8.740	-11.850	-12.340
26-Jul-10	5.675	4.750	3.542	1.952	0.630	-0.479	-1.354	-2.099	-3.484	-8.640	-11.750	-12.320
27-Jul-10	6.406	5.556	4.105	2.250	0.771	-0.468	-1.343	-2.063	-3.448	-8.560	-11.690	-12.310
28-Jul-10	6.087	5.397	4.211	2.458	0.900	-0.416	-1.292	-2.037	-3.371	-8.450	-11.630	-12.310
29-Jul-10	5.377	5.033	4.059	2.437	0.932	-0.386	-1.261	-2.006	-3.341	-8.370	-11.550	-12.310
30-Jul-10	4.902	4.560	3.719	2.256	0.907	-0.359	-1.234	-1.954	-3.289	-8.290	-11.490	-12.280
31-Jul-10	3.552	3.867	3.395	2.116	0.871	-0.344	-1.194	-1.940	-3.249	-8.200	-11.430	-12.270
1-Aug-10	3.412	3.386	2.915	1.847	0.784	-0.326	-1.202	-1.896	-3.206	-8.130	-11.350	-12.250
2-Aug-10	4.189	3.612	2.802	1.683	0.698	-0.335	-1.159	-1.879	-3.162	-8.060	-11.280	-12.250
3-Aug-10	3.111	3.137	2.614	1.600	0.666	-0.341	-1.140	-1.860	-3.119	-7.960	-11.240	-12.210
4-Aug-10	1.690	2.132	2.080	1.379	0.601	-0.303	-1.128	-1.823	-3.082	-7.900	-11.150	-12.200
5-Aug-10	2.067	1.989	1.677	1.055	0.460	-0.315	-1.088	-1.809	-3.067	-7.830	-11.080	-12.180
6-Aug-10	2.171	2.041	1.626	0.951	0.408	-0.341	-1.088	-1.783	-2.990	-7.760	-11.020	-12.180
7-Aug-10	2.190	1.982	1.567	0.892	0.375	-0.348	-1.069	-1.764	-2.971	-7.680	-10.950	-12.160
8-Aug-10	1.807	1.859	1.548	0.874	0.356	-0.367	-1.063	-1.731	-2.939	-7.600	-10.890	-12.130
9-Aug-10	2.263	1.977	1.535	0.861	0.318	-0.353	-1.074	-1.717	-2.899	-7.530	-10.840	-12.110
10-Aug-10	2.159	2.029	1.613	0.888	0.344	-0.378	-1.074	-1.717	-2.872	-7.480	-10.760	-12.110
11-Aug-10	2.534	2.273	1.753	0.949	0.354	-0.395	-1.065	-1.734	-2.838	-7.420	-10.700	-12.080
12-Aug-10	1.637	1.923	1.689	0.989	0.393	-0.356	-1.052	-1.695	-2.826	-7.360	-10.670	-12.100
13-Aug-10	0.834	1.223	1.275	0.808	0.342	-0.355	-1.051	-1.669	-2.799	-7.300	-10.590	-12.040
14-Aug-10	0.472	0.834	0.886	0.549	0.213	-0.381	-1.051	-1.669	-2.774	-7.250	-10.530	-12.040
15-Aug-10	0.416	0.701	0.701	0.365	0.106	-0.410	-1.054	-1.646	-2.751	-7.180	-10.480	-12.020
16-Aug-10	0.394	0.601	0.575	0.265	0.058	-0.432	-1.051	-1.643	-2.722	-7.120	-10.430	-11.990
17-Aug-10	0.792	0.740	0.585	0.249	0.042	-0.448	-1.066	-1.658	-2.711	-7.060	-10.360	-12.000
18-Aug-10	1.457	1.172	0.809	0.318	0.034	-0.456	-1.074	-1.640	-2.693	-7.010	-10.310	-11.950
19-Aug-10	2.498	1.951	1.302	0.551	0.086	-0.481	-1.074	-1.640	-2.667	-6.987	-10.260	-11.920
20-Aug-10	3.306	2.549	1.717	0.809	0.189	-0.456	-1.074	-1.640	-2.668	-6.910	-10.180	-11.890
21-Aug-10	3.542	2.888	2.054	1.042	0.266	-0.456	-1.074	-1.640	-2.642	-6.858	-10.120	-11.870
22-Aug-10	3.929	3.222	2.335	1.218	0.339	-0.436	-1.079	-1.645	-2.621	-6.837	-10.080	-11.870
23-Aug-10	3.752	3.359	2.549	1.379	0.447	-0.405	-1.074	-1.640	-2.616	-6.781	-10.020	-11.840
24-Aug-10	3.411	3.228	2.575	1.483	0.499	-0.379	-1.048	-1.614	-2.591	-6.729	-9.970	-11.810
25-Aug-10	2.354	2.693	2.380	1.418	0.511	-0.367	-1.062	-1.628	-2.605	-6.693	-9.960	-11.800
26-Aug-10	1.345	1.786	1.812	1.189	0.438	-0.362	-1.058	-1.624	-2.575	-6.664	-9.870	-11.770
27-Aug-10	1.651	1.729	1.444	0.874	0.304	-0.393	-1.037	-1.603	-2.554	-6.616	-9.820	-11.750
28-Aug-10	1.703	1.677	1.366	0.770	0.253	-0.393	-1.011	-1.577	-2.528	-6.564	-9.800	-11.720
29-Aug-10	1.378	1.533	1.300	0.704	0.212	-0.407	-1.026	-1.592	-2.543	-6.529	-9.740	-11.710
30-Aug-10	0.705	1.015	1.015	0.575	0.162	-0.406	-1.025	-1.566	-2.517	-6.503	-9.680	-11.690
31-Aug-10	1.288	1.133	0.848	0.408	0.072	-0.444	-1.011	-1.577	-2.502	-6.461	-9.640	-11.670
1-Sep-10	1.185	1.133	0.848	0.382	0.047	-0.444	-1.036	-1.577	-2.476	-6.409	-9.610	-11.640
2-Sep-10	1.212	1.134	0.849	0.358	0.022	-0.468	-1.035	-1.550	-2.475	-6.382	-9.560	-11.610
3-Sep-10	1.163	1.163	0.878	0.386	0.024	-0.492	-1.033	-1.548	-2.447	-6.354	-9.500	-11.580
4-Sep-10	0.472	0.782	0.757	0.343	0.007	-0.484	-1.051	-1.566	-2.440	-6.296	-9.470	-11.580
5-Sep-10	-0.117	0.323	0.452	0.193	-0.065	-0.504	-1.045	-1.560	-2.434	-6.265	-9.410	-11.570
6-Sep-10	-0.432	-0.044	0.111	-0.019	-0.122	-0.535	-1.050	-1.565	-2.439	-6.244	-9.390	-11.520
7-Sep-10	-0.656	-0.270	-0.115	-0.166	-0.218	-0.553	-1.069	-1.558	-2.407	-6.186	-9.330	-11.520
8-Sep-10	-0.559	-0.275	-0.198	-0.275	-0.275	-0.559	-1.075	-1.564	-2.412	-6.165	-9.310	-11.500
9-Sep-10	-0.858	-0.420	-0.265	-0.317	-0.317	-0.601	-1.090	-1.554	-2.377	-6.131	-9.250	-11.460
10-Sep-10	-0.706	-0.397	-0.268	-0.345	-0.345	-0.629	-1.093	-1.556	-2.379	-6.107	-9.200	-11.440
11-Sep-10	-0.510	-0.329	-0.277	-0.355	-0.381	-0.664	-1.128	-1.566	-2.388	-6.064	-9.180	-11.420
12-Sep-10	-0.633	-0.349	-0.297	-0.375	-0.400	-0.684	-1.148	-1.586	-2.383	-6.033	-9.130	-11.410
13-Sep-10	-0.510	-0.329	-0.277	-0.406	-0.432	-0.716	-1.180	-1.591	-2.388	-6.012	-9.100	-11.390
14-Sep-10	-0.432	-0.303	-0.303	-0.406	-0.458	-0.742	-1.180	-1.617	-2.388	-5.987	-9.050	-11.360
15-Sep-10	-0.355	-0.277	-0.303	-0.432	-0.510	-0.793	-1.205	-1.617	-2.363	-5.935	-9.030	-11.340
16-Sep-10	-0.781	-0.420	-0.317	-0.446	-0.524	-0.833	-1.219	-1.631	-2.377	-5.925	-8.990	-11.300
17-Sep-10	-1.322	-0.678	-0.420	-0.498	-0.575	-0.859	-1.271	-1.657	-2.377	-5.899	-8.960	-11.300
18-Sep-10	-2.006	-1.053	-0.563	-0.512	-0.615	-0.899	-1.285	-1.671	-2.392	-5.863	-8.900	-11.260
19-Sep-10	-2.586	-1.480	-0.732	-0.603	-0.655	-0.938	-1.325	-1.711	-2.406	-5.853	-8.870	-11.230
20-Sep-10	-2.417	-1.594	-0.873	-0.666	-0.692	-0.976	-1.362	-1.723	-2.392	-5.812	-8.850	-11.210
21-Sep-10	-2.017	-1.528	-1.013	-0.756	-0.781	-1.039	-1.400	-1.760	-2.429	-5.796	-8.830	-11.190
22-Sep-10	-2.195	-1.655	-1.165	-0.934	-0.882	-1.088	-1.449	-1.783	-2.452	-5.768	-8.780	-11.160

LRD LANDFILL THERMISTOR DATA - #LRD4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	Above Ground	Above Ground	0.06 M	0.31 M	0.56 M	0.81 M	1.06 M	1.31 M	1.81 M	3.81 M	5.81 M	9.81 M
15-Jul-10			2.993		1.457	0.344	-0.817	-1.769	-2.488	-8.290	-11.700	-12.110
16-Jul-10			3.045	0.577	1.405	0.292	-0.817	-1.743	-2.462	-8.210	-11.650	-12.110
17-Jul-10			2.836	1.327	1.327	0.292	-0.817	-1.717	-2.411	-8.080	-11.540	-12.080
18-Jul-10			3.381	1.480	1.376	0.289	-0.794	-1.695	-2.362	-7.980	-11.460	-12.060
19-Jul-10			4.172		1.769	0.370	-0.791	-1.666	-2.334	-7.870	-11.380	-12.060
20-Jul-10			2.785	1.484	1.614	0.422	-0.765	-1.639	-2.282	-7.790	-11.300	-12.060
21-Jul-10			2.640	1.496	1.496	0.356	-0.753	-1.629	-2.245	-7.700	-11.240	-12.020
22-Jul-10			1.807	0.770	1.133	0.279	-0.753	-1.577	-2.194	-7.600	-11.180	-12.020
23-Jul-10			-1.010		0.977	0.176	-0.752	-1.576	-2.166	-7.490	-11.070	-11.980
24-Jul-10			-3.302		1.565	0.297	-0.760	-1.557	-2.148	-7.420	-10.990	-11.960
25-Jul-10			-3.012		2.146	0.487	-0.726	-1.549	-2.114	-7.330	-10.930	-11.960
26-Jul-10			-3.253		2.342	0.604	-0.737	-1.508	-2.099	-7.260	-10.860	-11.940
27-Jul-10			5.239		2.640	0.694	-0.674	-1.497	-2.063	-7.200	-10.770	-11.930
28-Jul-10			4.421		2.562	0.771	-0.648	-1.472	-2.037	-7.100	-10.720	-11.900
29-Jul-10			3.875		2.307	0.699	-0.643	-1.441	-2.006	-7.020	-10.660	-11.870
30-Jul-10			3.274		2.048	0.648	-0.617	-1.414	-1.980	-6.940	-10.550	-11.870
31-Jul-10			2.742		1.934	0.612	-0.602	-1.400	-1.940	-6.876	-10.520	-11.860
1-Aug-10			2.211		1.640	0.526	-0.610	-1.382	-1.922	-6.832	-10.440	-11.810
2-Aug-10			2.645		1.449	0.439	-0.593	-1.339	-1.879	-6.735	-10.370	-11.790
3-Aug-10					1.366	0.434	-0.599	-1.320	-1.860	-6.667	-10.300	-11.780
4-Aug-10					0.990	0.317	-0.587	-1.308	-1.823	-6.606	-10.240	-11.770
5-Aug-10					0.718	0.175	-0.599	-1.294	-1.809	-6.512	-10.170	-11.750
6-Aug-10				0.020	0.718	0.149	-0.625	-1.294	-1.783	-6.461	-10.120	-11.720
7-Aug-10				0.014	0.711	0.143	-0.631	-1.275	-1.764	-6.415	-10.070	-11.700
8-Aug-10				-0.547	0.770	0.149	-0.625	-1.294	-1.757	-6.383	-9.980	-11.670
9-Aug-10			0.680	0.628	0.809	0.163	-0.636	-1.280	-1.717	-6.290	-9.940	-11.650
10-Aug-10			-1.640	0.344	0.965	0.189	-0.636	-1.280	-1.717	-6.264	-9.860	-11.650
11-Aug-10			-2.967	0.225	1.027	0.225	-0.627	-1.245	-1.708	-6.179	-9.800	-11.620
12-Aug-10			-4.521	-6.348	0.937	0.238	-0.614	-1.258	-1.695	-6.116	-9.760	-11.580
13-Aug-10			-4.469	-0.432	0.627	0.136	-0.613	-1.257	-1.669	-6.064	-9.710	-11.550
14-Aug-10			-4.160	-2.825	0.394	0.032	-0.639	-1.231	-1.643	-6.038	-9.660	-11.520
15-Aug-10			-4.343	-2.597	0.261	-0.023	-0.642	-1.235	-1.646	-5.938	-9.580	-11.500
16-Aug-10			-4.494	-2.825	0.291	-0.019	-0.639	-1.231	-1.617	-5.909	-9.520	-11.470
17-Aug-10			-3.661	-0.809	0.300	-0.061	-0.654	-1.221	-1.607	-5.845	-9.460	-11.460
18-Aug-10			-4.233		0.551	0.008	-0.662	-1.229	-1.589	-5.775	-9.410	-11.410
19-Aug-10			-6.780		0.862	0.086	-0.662	-1.228	-1.588	-5.723	-9.360	-11.410
20-Aug-10			-3.771		0.991	0.137	-0.662	-1.229	-1.589	-5.672	-9.310	-11.380
21-Aug-10			-5.518		1.120	0.189	-0.636	-1.203	-1.563	-5.646	-9.280	-11.350
22-Aug-10			-5.059		1.270	0.235	-0.642	-1.208	-1.568	-5.599	-9.200	-11.330
23-Aug-10			-3.591		1.405	0.292	-0.636	-1.203	-1.537	-5.518	-9.170	-11.300
24-Aug-10			-3.874		1.379	0.318	-0.611	-1.177	-1.537	-5.518	-9.100	-11.270
25-Aug-10			-3.170		1.366	0.330	-0.599	-1.191	-1.526	-5.481	-9.060	-11.260
26-Aug-10			-3.397		0.982	0.232	-0.594	-1.161	-1.496	-5.452	-9.030	-11.230
27-Aug-10			-3.144		0.744	0.124	-0.599	-1.165	-1.474	-5.430	-8.980	-11.210
28-Aug-10			-4.222		0.666	0.098	-0.599	-1.140	-1.474	-5.379	-8.930	-11.160
29-Aug-10			-3.930		0.600	0.083	-0.614	-1.155	-1.463	-5.369	-8.870	-11.150
30-Aug-10			-4.315		0.394	0.032	-0.613	-1.128	-1.437	-5.317	-8.840	-11.120
31-Aug-10			-3.991		0.304	-0.057	-0.625	-1.140	-1.423	-5.302	-8.800	-11.100
1-Sep-10			-3.580		0.305	-0.031	-0.624	-1.139	-1.422	-5.301	-8.750	-11.080
2-Sep-10			-6.073		0.332	-0.030	-0.649	-1.138	-1.421	-5.223	-8.690	-11.050
3-Sep-10			-4.296		0.360	-0.027	-0.647	-1.136	-1.419	-5.195	-8.640	-11.020
4-Sep-10			-5.343		0.317	-0.045	-0.638	-1.128	-1.411	-5.163	-8.630	-11.010
5-Sep-10			-5.672		0.090	-0.091	-0.658	-1.148	-1.405	-5.132	-8.580	-10.980
6-Sep-10			-4.674		-0.122	-0.174	-0.664	-1.153	-1.385	-5.111	-8.530	-10.960
7-Sep-10			-6.186		-0.270	-0.218	-0.682	-1.146	-1.378	-5.079	-8.500	-10.930
8-Sep-10			-6.165		-0.301	-0.250	-0.714	-1.152	-1.384	-5.084	-8.450	-10.900
9-Sep-10			-6.363		-0.317	-0.265	-0.730	-1.168	-1.374	-5.024	-8.410	-10.870
10-Sep-10			-6.443	-1.453	-0.319	-0.293	-0.758	-1.222	-1.376	-5.000	-8.360	-10.850
11-Sep-10			-5.471	-1.463	-0.329	-0.329	-0.793	-1.205	-1.386	-4.983	-8.340	-10.830
12-Sep-10			-6.756	-1.483	-0.323	-0.375	-0.813	-1.225	-1.405	-4.952	-8.290	-10.790
13-Sep-10			-6.606	-1.488	-0.355	-0.406	-0.871	-1.257	-1.411	-4.931	-8.270	-10.770
14-Sep-10			-6.270	-1.488	-0.381	-0.458	-0.896	-1.283	-1.437	-4.854	-8.210	-10.750
15-Sep-10			-6.141	-1.488	-0.432	-0.510	-0.948	-1.308	-1.463	-4.777	-8.190	-10.720
16-Sep-10			-5.307	-1.554	-0.446	-0.549	-0.988	-1.348	-1.477	-4.715	-8.150	-10.680
17-Sep-10			-7.240		-0.498	-0.601	-1.039	-1.400	-1.503	-4.664	-8.130	-10.680
18-Sep-10			-1.826		-0.563	-0.666	-1.105	-1.440	-1.543	-4.602	-8.070	-10.650
19-Sep-10			-13.560		-0.706	-0.732	-1.145	-1.480	-1.557	-4.566	-8.030	-10.610
20-Sep-10			-13.960		-1.053	-0.899	-1.234	-1.543	-1.620	-4.576	-8.010	-10.590
21-Sep-10			-14.880		-1.554	-1.219	-1.400	-1.631	-1.657	-4.587	-7.970	-10.580
22-Sep-10			-14.940		-1.860	-1.526	-1.655	-1.783	-1.758	-4.610	-7.940	-10.550
23-Sep-10			-16.070		-2.134	-1.800	-1.903	-1.954	-1.877	-4.628	-7.910	-10.510
24-Sep-10			-5.140		-2.644	-2.078	-2.155	-2.155	-2.027	-4.625	-7.880	-10.520
25-Sep-10												

LRD LANDFILL THERMISTOR DATA - #LRD4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	Above Ground	Above Ground	0.06 M	0.31 M	0.56 M	0.81 M	1.06 M	1.31 M	1.81 M	3.81 M	5.81 M	9.81 M
26-Sep-10												
27-Sep-10												
28-Sep-10												
29-Sep-10												
30-Sep-10												
1-Oct-10												
2-Oct-10												
3-Oct-10												
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28-Nov-10												
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30-Nov-10												
1-Dec-10												
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3-Dec-10												
4-Dec-10												
5-Dec-10												
6-Dec-10												
7-Dec-10												

LRD LANDFILL THERMISTOR DATA - #LRD4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	Above Ground	Above Ground	0.06 M	0.31 M	0.56 M	0.81 M	1.06 M	1.31 M	1.81 M	3.81 M	5.81 M	9.81 M
8-Dec-10												
9-Dec-10												
10-Dec-10												
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29-Dec-10												
30-Dec-10												
31-Dec-10												
1-Jan-11												
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31-Jan-11												
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16-Feb-11												
17-Feb-11												
18-Feb-11												

LRD LANDFILL THERMISTOR DATA - #LRD4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	Above Ground	Above Ground	0.06 M	0.31 M	0.56 M	0.81 M	1.06 M	1.31 M	1.81 M	3.81 M	5.81 M	9.81 M
19-Feb-11												
20-Feb-11												
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30-Apr-11												
1-May-11												
2-May-11												

LRD LANDFILL THERMISTOR DATA - #LRD4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	Above Ground	Above Ground	0.06 M	0.31 M	0.56 M	0.81 M	1.06 M	1.31 M	1.81 M	3.81 M	5.81 M	9.81 M
3-May-11												
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13-Jul-11												
14-Jul-11												

LRD LANDFILL THERMISTOR DATA - #LRD4

Bulb	TH4_1	TH4_2	TH4_3	TH4_4	TH4_5	TH4_6	TH4_7	TH4_8	TH4_9	TH4_10	TH4_11	TH4_12
Depth	Above Ground	Above Ground	0.06 M	0.31 M	0.56 M	0.81 M	1.06 M	1.31 M	1.81 M	3.81 M	5.81 M	9.81 M
15-Jul-11												
16-Jul-11												
17-Jul-11												
18-Jul-11												
19-Jul-11					2.693	0.282	-1.134	-2.110	-2.777	-8.230	-11.890	-12.190
20-Jul-11					3.012	0.417	-1.078	-2.054	-2.721	-8.070	-11.810	-12.210
21-Jul-11					2.953	0.513	-1.009	-1.986	-2.653	-7.960	-11.740	-12.170
22-Jul-11					2.512	0.515	-0.955	-1.932	-2.574	-7.820	-11.660	-12.200
23-Jul-11					2.153	0.468	-0.899	-1.850	-2.518	-7.690	-11.570	-12.170
24-Jul-11					2.068	0.435	-0.854	-1.806	-2.447	-7.590	-11.500	-12.150
25-Jul-11					2.183	0.473	-0.842	-1.767	-2.383	-7.500	-11.400	-12.130
26-Jul-11					2.640	0.642	-0.803	-1.729	-2.319	-7.390	-11.330	-12.120
27-Jul-11					2.810	0.733	-0.763	-1.663	-2.279	-7.290	-11.260	-12.100
28-Jul-11					3.031	0.850	-0.723	-1.623	-2.239	-7.220	-11.160	-12.080
29-Jul-11					3.444	0.998	-0.680	-1.606	-2.196	-7.160	-11.120	-12.070
30-Jul-11					3.362	1.073	-0.631	-1.557	-2.147	-7.060	-11.050	-12.070
31-Jul-11					3.280	1.070	-0.608	-1.509	-2.099	-6.955	-10.970	-12.050
1-Aug-11					3.280	1.121	-0.583	-1.483	-2.048	-6.929	-10.890	-12.020
2-Aug-11					3.367	1.207	-0.524	-1.424	-2.015	-6.871	-10.830	-12.010
3-Aug-11					3.215	1.212	-0.493	-1.394	-1.959	-6.816	-10.770	-12.010
4-Aug-11					2.927	1.133	-0.468	-1.369	-1.908	-6.739	-10.690	-11.980
5-Aug-11					2.953	1.133	-0.442	-1.317	-1.857	-6.687	-10.610	-11.960
6-Aug-11					3.114	1.215	-0.413	-1.288	-1.828	-6.632	-10.560	-11.930
7-Aug-11					3.048	1.227	-0.374	-1.249	-1.789	-6.566	-10.490	-11.910
8-Aug-11					3.256	1.304	-0.349	-1.250	-1.764	-6.515	-10.410	-11.910
9-Aug-11					3.489	1.458	-0.300	-1.200	-1.714	-6.465	-10.350	-11.880
10-Aug-11					3.692	1.556	-0.253	-1.154	-1.694	-6.392	-10.280	-11.860
11-Aug-11					3.934	1.717	-0.196	-1.123	-1.663	-6.336	-10.220	-11.830
12-Aug-11					4.079	1.834	-0.159	-1.086	-1.600	-6.274	-10.160	-11.820
13-Aug-11					3.804	1.821	-0.095	-1.074	-1.589	-6.239	-10.100	-11.790
14-Aug-11					3.053	1.594	-0.088	-1.042	-1.556	-6.181	-10.040	-11.780
15-Aug-11					2.302	1.211	-0.134	-1.010	-1.525	-6.125	-9.980	-11.750
16-Aug-11					1.759	0.928	-0.183	-0.982	-1.471	-6.071	-9.930	-11.720
17-Aug-11					1.392	0.692	-0.238	-0.959	-1.448	-6.022	-9.880	-11.720
18-Aug-11					1.159	0.563	-0.264	-0.960	-1.423	-5.971	-9.800	-11.700
19-Aug-11					1.198	0.525	-0.276	-0.946	-1.409	-5.929	-9.750	-11.680
20-Aug-11					1.482	0.627	-0.277	-0.946	-1.384	-5.879	-9.700	-11.620
21-Aug-11					1.729	0.770	-0.238	-0.934	-1.371	-5.816	-9.640	-11.610
22-Aug-11					1.811	0.826	-0.233	-0.929	-1.366	-5.783	-9.580	-11.600
23-Aug-11					2.133	0.965	-0.198	-0.920	-1.332	-5.749	-9.520	-11.570
24-Aug-11					2.163	1.021	-0.168	-0.915	-1.327	-5.720	-9.490	-11.540
25-Aug-11					2.003	0.991	-0.172	-0.894	-1.305	-5.672	-9.410	-11.510
26-Aug-11					1.954	0.942	-0.169	-0.891	-1.303	-5.618	-9.380	-11.510
27-Aug-11					1.835	0.901	-0.185	-0.881	-1.267	-5.584	-9.320	-11.480
28-Aug-11					1.586	0.782	-0.174	-0.871	-1.257	-5.549	-9.260	-11.440
29-Aug-11					1.171	0.627	-0.226	-0.845	-1.231	-5.523	-9.240	-11.420
30-Aug-11					0.756	0.394	-0.277	-0.871	-1.231	-5.471	-9.180	-11.420
31-Aug-11					0.426	0.219	-0.323	-0.865	-1.225	-5.441	-9.130	-11.390
1-Sep-11					0.187	0.084	-0.355	-0.871	-1.205	-5.394	-9.080	-11.360
2-Sep-11					0.233	0.052	-0.386	-0.876	-1.185	-5.373	-9.030	-11.310

NOTES:

Signifies data deleted as clearly a malfunction indicated by substantial short term change of temperature.
Original data is available upon request but has been removed to make graphs easier to read and understand.
This normally occurs in spring when must be having a snow melting event.

Signifies the warmest temperature recorded for individual thermistor strings during the calendar year.

APPENDIX 11

POLARIS 2011 3RD QUARTER YTD

COST UPDATE

AND

COST ESTIMATE TO COMPLETION

TABLE 1

POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING - ACTUAL EXPENDITURES AND ESTIMATED REMAINING LIABILITY

	APPROVED CLOSURE PLAN BUDGET		ACTUAL EXPENDITURES TO DATE						FORECAST RECLAMATION EXPENDITURES AND OUTSTANING LIABILITIES TO END OF DECEMBER 31, 2011			
			Expended To December 31, 2010		Expended January 1, 2011 To September 30, 2011		Project Total To Date		2011 4th Qtr Forecast		Total Forecast to Dec 31 2011	
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals
DEMOLITION & RECLAMATION (BARE COSTS)												
MINE EQUIPMENT REMOVAL												
Hazardous Materials Removal	35,845		853				853				853	
Mine Refrigeration Plant	145,525		25,639				25,639				25,639	
Mobile & Mine Equipment	2,919		12,981				12,981				12,981	
Remove Salvaged Mine Equipment	20,754		-				-				-	
Misc Sub Contract Costs	45,957		28,540				28,540				28,540	
		$ 251,000		$ 68,013		$ -		$ 68,013		$ -		$ 68,013
MINE ACCESS SEALING												
Seal Mine Portals	60,000		20,992				20,992				20,992	
		$ 60,000		$ 20,992		$ -		$ 20,992		$ -		$ 20,992
CONCENTRATOR BUILDING												
Miscellaneous Materials	22,092		-				-				-	
Mill Equipment Clean-Up - Fuels	16,398		-				-				-	
Mill Equipment Clean-Up	99,900		40,613				40,613				40,613	
Hazardous Materials Removal	151,117		94,553				94,553				94,553	
Barge Demolition	608,592		443,526				443,526				443,526	
Misc Process Equipment Demolition & Removal	197,432		183,317				183,317				183,317	
Misc Sub Contract Costs	88,469		84,794				84,794				84,794	
		$ 1,184,000		$ 846,803		$ -		$ 846,803		$ -		$ 846,803
CONCENTRATE STORAGE STRUCTURE & EQUIPMENT											-	
Concentrate Storage Equipment Clean-Up	26,117		1,905				1,905				1,905	
Conveyors	67,600		8,421				8,421				8,421	
Concentrate Storage Structure & Equipment	555,283		93,654				93,654				93,654	
		$ 649,000		$ 103,980		$ -		$ 103,980		$ -		$ 103,980
SHIP LOADER & CONVEYOR												
Conveyors	50,000		24,592				24,592				24,592	
		$ 50,000		$ 24,592		$ -		$ 24,592		$ -		$ 24,592
DOCK & SHORELINE												
Dock & Shoreline Reclamation	869,000		837,739				837,739				837,739	
		$ 869,000		$ 837,739		$ -		$ 837,739		$ -		$ 837,739
THICKENER & TAILINGS LINES												
Hazardous Materials Removal	22,577		16,452				16,452				16,452	
Tailings Thickener	377,423		106,677				106,677				106,677	
		$ 400,000		$ 123,129		$ -		$ 123,129		$ -		$ 123,129
GARROW LAKE												
Garrow Lake Siphons & Lake Drawdown	120,391		195,965				195,965				195,965	
Dam/Spillway Modifications	95,467		269,662				269,662				269,662	
Escalation Allowance	3,142		-				-				-	
		$ 219,000		$ 465,627		$ -		$ 465,627		$ -		$ 465,627
CRF PLANT STRUCTURE & EQUIPMENT												
CRF Plant Equipment Clean-Up	7,002		1,040				1,040				1,040	
CRF Plant Equipment Removal	17,533		9,406				9,406				9,406	
CRF Plant Buildings Demolition	130,455		23,497				23,497				23,497	
Misc Sub Contract Costs	11,010		46,766				46,766				46,766	
		$ 166,000		$ 80,709		$ -		$ 80,709		$ -		$ 80,709
ACCOMMODATION COMPLEX STRUCTURE & EQUIPMENT												
Accommodation Complex Building Demolition	249,000		72,318				72,318				72,318	
		$ 249,000		$ 72,318		$ -		$ 72,318		$ -		$ 72,318
FUEL STORAGE & HANDLING EQUIPMENT												
Miscellaneous Materials	3,681		4,904				4,904				4,904	
Purge & Decommission Fuel Tanks	53,404		341,959				341,959				341,959	
Hazardous Materials Removal	50,645		547,319				547,319				547,319	
Fuel Pumping & Distribution Systems	87,270		11,173				11,173				11,173	
		$ 195,000		$ 905,355		$ -		$ 905,355		$ -		$ 905,355
BUILDINGS & CONTAINERS												
Miscellaneous Materials	1,323		-				-				-	
Misc Warehouse / Shipping Equipment	1,221		3,292				3,292				3,292	
Misc Buildings Demolition	250,456		100,053				100,053				100,053	
		$ 253,000		$ 103,345		$ -		$ 103,345		$ -		$ 103,345
MISC CONTRACTOR LABOUR												
Unallocated Labour	133,000		2,310				2,310				2,310	
		$ 133,000		$ 2,310		$ -		$ 2,310		$ -		$ 2,310
GENERAL SITE GRADING												
Hazardous Materials Removal	44,719		90,114				90,114				90,114	
General Site Grading & Reclamation	7,129		828,869				828,869				828,869	
Escalation Allowance	4,152		-		50,000 S ee note 2 below		50,000				50,000	
		$ 56,000		$ 918,983		$ 50,000		$ 968,983		$ -		$ 968,983
LANDFILL RECLAMATION												
Landfill Reclamation	432,000		821,746				821,746				821,746	
		$ 432,000		$ 821,746		$ -		$ 821,746		$ -		$ 821,746
CONTAMINATED SOILS - CLEANUP												
Metals & Hydrocarbon Contaminated Soils Cleanup & Disposal	366,623		2,627,104				2,627,104				2,627,104	
Hydrocarbon Contaminated Soils (By Polaris)	6,097		13,131				13,131				13,131	
Metals Contaminated Soils (By Polaris)	173,605		52,382				52,382				52,382	
U/G Handling & Disposal Of Contaminated Soils	48,675		1,012,154				1,012,154				1,012,154	
		$ 595,000		$ 3,704,771		$ -		$ 3,704,771		$ -		$ 3,704,771
QUARRIES & MINE SURFACE RECLAMATION (EARTHWORK)												
Backfill & Re-Contouring	263,000		273,711				273,711				273,711	
		$ 263,000		$ 273,711		$ -		$ 273,711		$ -		$ 273,711
MISC. DEMOLITION & CLEAN-UP												
Misc Unallocated Clean-Up / Demo	380,000		159,775		212,000 See note 2 below		371,775				371,775	
		$ 380,000		$ 159,775		$ 212,000		$ 371,775		$ -		$ 371,775
EQUIPMENT PURCHASE/RENTAL												
Contractor Equipment Rental	5,274,900		5,216,572				5,216,572				5,216,572	
Contractor Misc Equipment Purchase	719,407		432,906				432,906				432,906	
Escalation Allowance	59,693		-				0				-	
		$ 6,054,000		$ 5,649,478		$ -		$ 5,649,478		$ -		$ 5,649,478
MISC. SERVICES & SUPPLIES												
Misc Purchased Materials / Supplies	235,333		536,124				536,124				536,124	
Escalation Allowance	19,667		-				-				-	
		$ 255,000		$ 536,124		$ -		$ 536,124		$ -		$ 536,124
FUEL												
Fuel Supply	3,294,536		4,216,186				4,216,186				4,216,186	
Fuel Taxes (Heating & Power Generation)	68,677		-				-				-	
Fuel Taxes (Equipment)	467,343		713,101				713,101				713,101	
Escalation Allowance	157,444		-				-				-	
		$ 3,988,000		$ 4,929,287		$ -		$ 4,929,287		$ -		$ 4,929,287
MAINTENANCE OF EQUIPMENT & FACILITIES												
Mobile Equip Maintenance	1,296,759		7,682,560				7,682,560				7,682,560	
Building Maintenance	506,923		2,136,535				2,136,535				2,136,535	
Escalation Allowance	101,318		-				-				-	
		$ 1,905,000		$ 9,819,095		$ -		$ 9,819,095		$ -		$ 9,819,095
PRE - PURCHASED EQUIPMENT (BY COMINCO)												
Construction Equipment - Purchase (By Owner)	541,000		893,766				893,766				893,766	
		$ 541,000		$ 893,766		$ -		$ 893,766		$ -		$ 893,766
CONTRACTOR'S FIELD SUPPORT & SUPPLIES												
TRANSPORTATION (SHIPPING)											-	
Packing & Preparation	85,326		-				-				-	
Shipping Costs	948,661		3,411,970				3,411,970				3,411,970	
Escalation Allowance	78,013		-				-				-	
		$ 1,112,000		$ 3,411,970		$ -		$ 3,411,970		$ -		$ 3,411,970
CONTRACTOR MOB, DEMOB & SUPERVISION												
Contractor Mob/Demob	61,883		208,747				208,747				208,747	
Contractor Supervisory/Admin Personnel	2,127,339		3,758,445				3,758,445				3,758,445	
Safety Services & Supplies	36,000		521,604				521,604				521,604	
Misc Temporary Services / Modifications	223,824		1,007,843				1,007,843				1,007,843	
Escalation Allowance	13,954		-				-				-	
		$ 2,463,000		$ 5,496,639		$ -		$ 5,496,639		$ -		$ 5,496,639
MISC. SERVICES & SUPPLIES												
Communications & TV	374,000		256,412				256,412				256,412	
Escalation Allowance	31,000		-				-				-	
		$ 405,000		$ 256,412		$ -		$ 256,412		$ -		$ 256,412
ACCOMODATIONS												
Catering	1,487,166		2,153,968				2,153,968				2,153,968	
Escalation Allowance	122,834		-				-				-	
		$ 1,610,000		$ 2,153,968		$ -		$ 2,153,968		$ -		$ 2,153,968
TRAVEL & PERSONNEL												
Travel (Airfares & Expenses)	1,552,881		4,683,561				4,683,561				4,683,561	
Travel Premium - Revised Rotation Schedule	1,072,773		-				-				-	
Misc Personnel Transport	72,274		391,547				391,547				391,547	
Escalation Allowance	575,072		-				-				-	
		$ 3,273,000		$ 5,075,108		$ -		$ 5,075,108		$ -		$ 5,075,108

POLARIS MINE DECOMMISSIONING, RECLAMATION AND MONITORING - ACTUAL EXPENDITURES AND ESTIMATED REMAINING LIABILITY

	APPROVED CLOSURE PLAN BUDGET		ACTUAL EXPENDITURES TO DATE						FORECAST RECLAMATION EXPENDITURES AND OUTSTANING LIABILITIES TO END OF DECEMBER 31, 2011			
			Expended To December 31, 2010		Expended January 1, 2011 To September 30, 2011		Project Total To Date		2011 4th Qtr Forecast		Total Forecast to Dec 31 2011	
	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals	By Code	Subtotals
CONTRACTOR INDIRECTS											-	
HO MOB & DEMOB SUPPORT											-	
Mob & Demob	1,912,000		1,912,376				1,912,376				1,912,376	
		$ 1,912,000		$ 1,912,376		$ -		$ 1,912,376		$ -		$ 1,912,376
CONTRACTOR MANAGEMENT SUPPORT												
Personnel	3,928,932		3,928,932				3,928,932				3,928,932	
Safety & First Aid Personnel to Provide Overlap	184,068		183,644				183,644				183,644	
		$ 4,113,000		$ 4,112,576		$ -		$ 4,112,576		$ -		$ 4,112,576
OTHER CONTRACTOR INDIRECTS												
Contractor's General Indirects	4,952,000		7,470,401				7,470,401				7,470,401	
		$ 4,952,000		$ 7,470,401		$ -		$ 7,470,401		$ -	-	$ 7,470,401
ENGINEERING / PROJECT MANAGEMENT												
ENVIRONMENTAL SITE ASSESMENT												
Environmental Consultants - Site Assesment	275,787		354,711				354,711				354,711	
Site Assessment - Unallocated	207,874		105,263				105,263				105,263	
Escalation Allowance	2,339		-				-				-	
		$ 486,000		$ 459,974		$ -		$ 459,974		$ -		$ 459,974
CLOSURE PLAN												
Environmental Consultants - Closure Plan	415,772		372,272				372,272				372,272	
Escalation Allowance	2,228		-				-				-	
		$ 418,000		$ 372,272		$ -		$ 372,272		$ -		$ 372,272
ENGINEERING / SPECIAL CONSULTANTS												
Design Consultants - Dock / Loadout	1,316		1,320				1,320				1,320	
Design Consultants - Tailings / Garrow Lake	3,520		3,515				3,515				3,515	
Design Consultants - Dock / Loadout	79,684		65,354				65,354				65,354	
Design Consultants - Tailings / Garrow Lake	54,780		45,328				45,328				45,328	
Sitework & Demolition Procedures - Design Services	18,300		46,825				46,825				46,825	
Escalation Allowance	2,400		-				-				-	
		$ 160,000		$ 162,342		$ -		$ 162,342		$ -		$ 162,342
PROJECT MANAGEMENT CONSULTANT (HO STAFF)												
Project Management - Salaries	411,069		1,289,847				1,289,847				1,289,847	
Project Management - Reimb Expenses	100,000		85,492				85,492				85,492	
Escalation Allowance	31,931		-				-				-	
		$ 543,000		$ 1,375,339		$ -		$ 1,375,339		$ -		$ 1,375,339
CONSTRUCTION MANAGEMENT (FIELD STAFF)												
Construction Management - Salaries	2,142,878		1,915,004				1,915,004				1,915,004	
Escalation Allowance	179,122		-				-				-	
		$ 2,322,000		$ 1,915,004		$ -		$ 1,915,004		$ -		$ 1,915,004
ENVIRONMENTAL TESTING AND SAMPLING												
Environmental Reclamation Supervision - Staff	337,123		1,038,747				1,038,747				1,038,747	
Escalation Allowance	29,550		-				-				-	
Environmental Reclamation Supervision - Testing	330,000		171,498				171,498				171,498	
Additional Sampling and Consultant Services (MMER)	0		354,386				354,386				354,386	
Escalation Allowance	26,327		-				-				-	
		$ 723,000		$ 1,564,631		$ -		$ 1,564,631		$ -		$ 1,564,631
OWNER'S COSTS												
SALARIES & EXPENSES												
Teck HO Proj Mgmnt (Staff Lab)	374,631		476,911				476,911				476,911	
Teck HO Proj Mgmnt (Misc Material & Exp)	199,149		221,031				221,031				221,031	
Escalation Allowance	34,220		-				-				-	
		$ 608,000		$ 697,942		$ -		$ 697,942		$ -		$ 697,942
OVERHEAD / HO SUPPORT												
Land Leases, Licences	175,000		96,979				96,979				96,979	
Miscellaneous Permits	45,000		16,889				16,889				16,889	
Insurance	445,900		319,459				319,459				319,459	
Property Taxes	495,000		180,412				180,412				180,412	
Home Office General Admin (Labour & Exp)	722,384		16,700				16,700				16,700	
Public Relations	74,292		58,718				58,718				58,718	
Legal	57,540		48,421				48,421				48,421	
Escalation Allowance	168,560		-				-				-	
Misc Owner's Overhead	6,324		13,882				13,882				13,882	
		$ 2,190,000		$ 751,460		$ -		$ 751,460		$ -		$ 751,460
GENERAL ADMIN												
Closure Management - Polaris Personnel	54,000		-								-	
Escalation Allowance	2,880		-								-	
Closure Wrap Up	5,120		-								-	
		$ 62,000		$ -		$ -		$ -		$ -		$ -
POST RECLAMATION COSTS (2005 - 2011)												
SITE MONITORING AND HOLDING COSTS												
Annual Post Closure Environmental Monitoring (2005 to 2011)	510,000		1,423,664		212,488		1,636,152		10,000		1,646,152	
Final Sampling Program, Data Evaluation and Reporting in 2011	160,000		-				-				-	
Land Lease/Licence costs from 2005 to 2011	126,000		-				-				-	
Property Taxes - 2005 to 2011	70,000		-				-				-	
Escalation Allowance	135,000		-				-				-	
		$ 1,001,000		$ 1,423,664		$ 212,488		$ 1,636,152		$ 10,000		$ 1,646,152
TOTAL DECOMMISSIONING / RECLAMATION & MONITORING COSTS		**$ 47,500,000**		**$ 69,973,726**		**$ 474,488**		**$ 70,448,214**		**$ 10,000**		**$ 70,458,214**

Note 1: For actual and forecast expenditures have not included Land Lease costs, Licence Costs or Property Taxes as these do not represent a potential cost or liability to the government
Note 2: Committed cost not yet invoiced at end of the quarter.

APPENDIX 12

Electronic Copy of Report on CD