THOR LAKE RARE EARTH METALS BASELINE PROJECT

Environmental Baseline Report: Volume 2 – Hydrogeology

FINAL INTERIM REPORT

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Project No.:

123510050 and 103510051

January 2010

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EXECUTIVE SUMMARY

This report presents methods and results for the baseline hydrogeology studies conducted from 2008 to 2009 for Avalon Rare Metals Inc (Avalon), related to their Thor Lake Project (Project). The objectives were to:

- Describe hydrogeologic and hydrostratigraphic units and their spatial variability
- Measure occurrence of groundwater
- Quantify hydraulic properties of the hydrostratigraphic units
- Sample, analyze and summarize groundwater chemistry.

The 2008/2009 field programs consisted of a field program that consisted of; drilling and installing wells, developing, hydraulic testing, measuring groundwater levels, and sampling monitoring wells for select analytical parameters.

During the 2008/2009 field programs, borings were drilled and monitoring wells were installed which penetrated bedrock; monitoring wells were completed to depths ranging from 8.2 to 99.7 m below ground surface (m bgs). Surficial material in the study area has been interpreted to generally consist of an upper organic rich horizon overlying till, with bedrock outcrops dominating the landscape. The surficial material thickness and physical properties varies significantly throughout the Project area. Generally groundwater elevation has been measured to be near the ground surface in all wells, although the monitoring wells have not been measured frequently enough to observe seasonal effects. Two methods of hydraulic tests were performed (packer and recovery tests) over the Project area. The results of hydraulic testing of the site indicate a range of hydraulic conductivity from 10^{-5} m/s – 10^{-8} m/s. All groundwater quality were tabulated and summarized. Results of analysis for wells sampled over multiple years were generally in the same range, and no seasonal trends were apparent.

Groundwater quality data has been compared to federal, Canadian Council of Ministers of Environment (CCME) Canadian Water Quality Guidelines for the protection of Aquatic Life (December 2007), and to the British Columbia Contaminated Sites Regulation (CSR) Schedule 6 Generic Numerical Water Standards for the protection of Freshwater Aquatic Life (January, 2009). The following parameters exceeded the CCME and/or CSR guidance parameters in the Project area: aluminum, cadmium, copper, iron, lead, and/or silver. These exceedances of the CCME and/or CSR guidelines do not imply that the groundwater at the study area is currently contaminated; only that background concentrations of these parameters are higher than typically found in groundwater at other natural sites in Canada. These background groundwater quality results merely reflect the natural geologic and hydrogeologic conditions within these specific areas of the property.

A preliminary hydrogeologic conceptual model has been developed and assumes a near-surface (within active thaw zone) aquifer perched on permafrost. A deeper bedrock aquifer is present below permafrost; the depth of permafrost is estimated to be approximately 60 to 80 m bgs in the general area based on thermistor readings collected from a single borehole and the production of groundwater from two deep (~95 m bgs) wells. The range and spatial distribution of groundwater occurrence, hydrostratigraphy, hydraulic properties, permafrost distribution, hydraulic connectivity and hydrogeochemistry can only be generally described or are not known at this time.

ABBREVIATIONS AND ACRONYMS

CCME.....Canadian Council of Ministers of Environment
cm ..... centimeter
CSR ..... Contaminated Sites Registry
K.....hydraulic conductivity
km .....kilometer
m ..... meters
m asl.....meters above sea level
m bgs .....meters below ground surface
meq .....milliequivalent
mg/L .....milligram per liter
mm .....millimeter
m/s ..... meters per second
MW..... Monitoring well
N.A. ..... Not applicable
nm ..... not measured
PVC..... Polyvinly chloride
QA/QC.....Quality Assurance, Quality Control
TDS.....total dissolved solids
µm ..... micrometer
µS/cm.....Microsiemens per centimeter

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1 INTRODUCTION

This report presents background information, methods, and results for the baseline hydrogeology studies conducted during 2008 and 2009 for Avalon Rare Metals Inc (Avalon), related to the Thor Lake Project. A data gap analysis was completed during 2008 (JWA 2008) and was used to help determine scope for this work. The objectives were to:

- Describe hydrogeologic and hydrostratigraphic units and their spatial variability
- Measure occurrence of groundwater
- Quantify hydraulic properties of the hydrostratigraphic units
- Sample, analyze, and summarize groundwater chemistry.

2 BACKGROUND

2.1 Study Area

The study area is located approximately 100 km east of Yellowknife, approximately 4 km north of the Hearne Channel in the Great Slave Lake (Figure 1, Appendix A). The local study area lies between Thor Lake and Long Lake (Figure 2, Appendix A).

2.1.1 Physical Setting

The regional area lies within the Tazin Lake Upland Ecoregion of the Taiga Shield Ecozone as defined in the National Ecological Framework for Canada (1996). The region is characterized by rolling Precambrian bedrock outcrops with many lakes and wetlands in glacially carved depressions. The study area is relatively flat with maximum elevation change of approximately 50 m. Lowlands tend to have poor drainage and are commonly wet for prolonged periods. Permafrost is discontinuous but widespread.

The property is located approximately 230 m asl, approximately 80 m in elevation above Great Slave Lake. Drainage in the area appears to flow in a variety of directions but is expected to eventually reach Great Slave Lake.

2.1.2 Surficial Geology

The study area was covered by the Laurentide ice sheet during the last glaciation, during Late Wisconsinan (10,000 years BP). During maximum glaciation, the dominant ice flow direction was southwest and retreated to the northeast of the study area. Glacial meltwater impounded along this margin and, formed Glacial Lake McConnell. Modern remains of this lake are the separated and present day Great Bear Lake, Great Slave Lake, and Lake Athabasca (Dyke and Dredge 1989; Lemmen, *et al.* 1994; Fulton 1995).

Glaciation produced a thin and discontinuous till veneer covering bedrock, as depicted on the existing map for the study area (1:5 000 000) (Fulton 1995). Figure 3 (Appendix A) shows the mapped surficial geology for the study area.

2.1.3 Bedrock Geology

The Project is located within the Archean Slave Structural Province, near the contact with the Churchill Province, Figure 4 (Appendix A).

Specifically, the property is situated on a roughly semi-circular plutonic complex approximately 40 km in diameter, as mapped by Henderson (1985), belonging to the Early Proterozoic Blachford Lake Intrusive Suite. This suite can be divided into two portions: a western, less alkaline series of gabbro anorthosites, granites and syenites, and an eastern peralkaline granite-syenite and silica-undersaturated system (Davidson 1982).

The property is predominately situated on the Thor Lake Syenite (Henderson 1985), consisting of zoned, coarse-to medium-granied, dark green, faylite-hedenbergite syenite, coarse-grained ferrorichterite syenite, and inequigranular ferrorichterite syenite. Grace Lake Granite also outcrops; where it is a light grey to pale greenish grey, massive, coarse-grained, equigranular, riebeckite-bearing granite. Small dykes and sheets of diabase and gabbro are scattered thoughout the pluton (Henderson 1985). Emplacement of both the Grace Lake Granite and the Thor Lake Syenite was followed by a body of nepheline syenite, ijolite and urtite under the lake zone on the property (Pinckston and Smith 1991).

The Blatchford Lake plutonic complex is surrounded by Archean rocks belonging to the Burwash Formation, Duncan Lake Group, Yellowknife Supergroup (Henderson 1985). These rocks are typically psammitic to pelitic schists, interlayered with amphibolite grade greywacke and siltstones. Textures are typically coarsely porphyroblastic, and the rocks contain various assemblages of quartz-plagioclase-biotite-muscovite-cordierite-andalusite-sillimanite-staurolite-garnet.

3 METHODS

The 2008 and 2009 field program consisted of drilling and installing wells, developing, hydraulic testing, measuring groundwater levels, and sampling monitoring wells for select analytical parameters.

3.1 Monitoring Well Drilling and Installation

3.1.1 Well Drilling

During the Summer 2008 and Winter 2009 exploration program eight coreholes were drilled as multipurpose holes; five were installed as monitoring wells (MW08-127, MW08-128, MW08-130, MW09-151, and MW09-152), two were left as open coreholes (L08-123 and L08-124), and a thermistor was installed in one (L08-134). All 2008 coreholes were cored by Peak Drilling of Yellowknife, NWT, using a diamond drill and NW-sized drilling tools. The borehole diameter was

89 mm and the core diameter 76 mm. The 2009 boreholes were drilled by Foraco Drilling Ltd. (Foraco) of Yellowknife, NWT, using a diamond drill and NQ-sized drilling tools. The borehole diameter was 78 mm and the core diameter 48 mm.

All core logging was completed by Avalon, after the coreholes were drilled. Stantec later reviewed the core and borehole logs to evaluate hydrostratigraphy and help design the monitoring wells. Borehole logs are in Appendix B. Depending on ground conditions, the following parameters were recorded:

- Run depth
- Run length
- Lithology
- Recovery (length and %)
- Alteration and weathering.

3.1.2 Well Completion

Due to the drilling schedule, three monitoring wells installations were overseen by a Stantec hydrogeologist (MW09-127, MW09-151, and MW09-152) and the remaining wells were designed by Stantec and installed by Avalon (MW09-128 and MW08-130), (Figure 5, Appendix A). Monitoring well completion details are in Appendix A.

The 2008 boreholes were completed as monitoring wells using 51 mm diameter schedule 40 PVC well materials. The 2009 boreholes were completed as monitoring wells using 25 mm diameter schedule 40 PVC well materials. The screen sections for both diameter monitoring wells had slot openings of 0.25 mm (0.010 inch or 10 slot). The lengths of the screened intervals ranged from 2.3 m to 15.0 m depending on well depth, water levels and hydrostratigraphic variations.

A silica sand pack (#10-20, grain size 1 mm) was placed around the screen, 0.5 m to 5.0 m above the screen section of each well. The annulus was then sealed with bentonite chips. Caution was exercised to install proper seals to prevent bridging of the bentonite chips, borehole instability and collapse, and/or to prevent surface water from entering the borehole. The seal was achieved by pouring the bentonite chips very slowly and regularly checking the depth to the bentonite seal using a downhole measuring tape.

One thermistor string was installed in one of the boreholes (L08-134) during the 2009 field program. The thermistor was installed inside 51 mm diameter schedule 40 PVC and backfilled with sand to hold it in place. Ground temperature readings were collected with a TH2016 (RST Instruments Inc.) portable thermistor readout unit.

3.2 Groundwater Level Measurements

Instantaneous groundwater levels were recorded at monitoring wells using a Solinst water level meter. Groundwater levels were measured at various dates during August – October 2008, and during March and June – October 2009.

Groundwater elevations at the 2008 well locations were surveyed using ground-based differential GPS methods. The casing stick-up and ground elevation was measured at each monitoring well location and groundwater elevation was calculated.

3.3 Hydraulic Testing

Hydrualic tests were conducted in all new monitoring wells to determine the hydraulic conductivity of the hydrogeologic units. Two types of hydraulic tests were performed: hydraulic recovery tests and packer tests.

3.3.1 Recovery Tests

Hydraulic recovery tests were performed in the 2008 monitoring wells to determine the hydraulic conductivity of hydrogeological units. All wells were developed prior to testing to remove suspended sediments, develop the sand pack, and remove possible drill water that had been lost into the formation during drilling. Tests were performed once the wells had been developed and recovered to static water levels. For this project the slug was a one meter, single use bailer. A minimum of three rising head tests were performed on each well. To ensure the most accurate results possible, all testing was done in the following manner:

- A Solinst pressure transducer was placed one meter below the bottom of the slug and was used to continuously record the changes in water levels.
- Approximately 10 minutes after the pressure transducer was installed, and water levels had stabilized, tests were performed.
- Water level readings were confirmed with manual measurements taken with the Solinst water level meter.

The hydraulic tests results from the 2009 field program were interpreted using methods within the Aquifer Test version 3.0 software by Waterloo Hydrogeologic (now Schlumberger Water Services).

Hydraulic conductivity was estimated using an analytical relation between the instantaneous displacement of water in a well bore and the resulting rate of head change. These analyses were based on Bouwer and Rice (1976) for fully or partially penetrating wells in unconfined aquifers. Both methods of analysis used a modified version of the Theim equation (Freeze and Cherry, 1979) to estimate hydraulic conductivity:

$$K = \frac{r_c^2 \ln({}^{R_e}/_{r_w})}{2L} \frac{1}{t} ln \frac{y_0}{y_t}$$

Where:

K = hydraulic conductivity [L/T]

r_c= radius of the well casing [L]

R_e= effective radial distance over which the head difference is dissipated [L]

r_w = radial distance between well center and undisturbed aquifer [L]

L = screened interval [L]

y_0 = difference between static (undisturbed pre-test) and slug displaced water level at time 0 [L]

y_t = difference between static (undisturbed pre-test) and slug displaced water levels at time t [L]

t = time [T].

The equation assumes that the aquifer over the test section is homogeneous and isotropic, the water level change around the well is negligible, and no water flows through an unsaturated material above the water table. In general, this assumption implies that groundwater flow is primarily through bedrock fractures which are distributed more or less similarly across the hydrostratigraphic unit.

3.3.2 Packer Tests

Packer tests are used to determine in-situ hydraulic conductivity of a rock mass over a specific interval under constant pressure head conditions. Packer tests were performed in one of the 2009 boreholes (L09-152) over selected and representative intervals. The packer test intervals were selected after an inspection of the drill core to determine representative depth intervals for lithology, fracture frequency, and fault zones over the entire depth of the borehole.

The packer test system was composed of the following three main components:

- A downhole assembly of two or three inflatable packer glands used to seal the tested interval within the borehole
- A packer inflation system that used nitrogen to inflate the packer glands and seal the test section
- A water pressure system that facilitated water injection at a constant pressure (head) into the tested interval and provided a measurement of the flow rate.

The tests were conducted after the borehole was completed. The drill rods were pulled back to allow water levels to stabilize. The water level was used to determine the maximum (P^{max}) and minimum (P^{min}) inflation pressure to be applied over the tested interval, calculated as follows:

$$P^{max} = P_{hydrostatic} + P_{packer}$$
$$P^{min} = P_{hydro-test} + P_{infl} + P_{seal} + P_{gauge\ max}$$

Where,

$P_{hydrostatic}$ = the hydrostatic pressure prior to the test at packer (psi)

P_{packer} = maximum inflation pressure of the packer (from manufacturers curve) (psi)

$P_{hydro\text{-}test}$ = the hydrostatic pressure during test with zero gauge pressure (psi)

P_{infl} = pressure inflate the packer (from manufacturers curve) (psi)

P_{seal} = pressure to seal/seat the packer (from manufacturers curve) (psi)

$P_{gauge\ max}$ = maximum pressure of injected water at gauge during tests (psi).

The packer inflation pressures insure that the tested interval is properly sealed, prevents slippage, and avoids damage to the packer gland.

The borehole was thoroughly flushed with water until clear, prior to testing to ensure the hole was free of any cuttings. The downhole assembly was lowered through the drill rods into the open borehole. The packer glands were slowly inflated using nitrogen gas; once inflated the water pressure system was connected to the system. Water was injected down the rods into the tested interval under staged but a constant pressure. The injected rate was measured using a flow meter and recorded for selected pressures. The packer tests were conducted in stages where the maximum injection pressure increased from 25%, 50%, 75%, to 100%. The data collected from these stages was then used to calculate the hydraulic properties of the rock mass within the test interval.

3.4 Groundwater Sampling

Groundwater samples were collected from existing and new monitoring wells using disposable bailers. Sample bottles were provided by ALS Laboratory Group (ALS). Non-powdered nitril gloves were worn at all stages of the sampling procedure to prevent sampling contamination.

The samples were analyzed for physical parameters, nutrients, total metals, dissolved metals, and total organic carbon. The samples to be analyzed for dissolved metals were filtered using a 0.45 µm sterilized membrane in the field. The appropriate preservatives were added to the samples, as outlined by ALS. The samples were labeled and stored in a chilled cooler with ice packs while transported to the lab. A chain of custody form detailing the sampling handling information and analysis required was prepared and included with the samples prior to shipping via air cargo to ALS in Vancouver, BC. All samples were received by lab within QA/QC protocol.

Field and duplicate samples were also collected based on standard QA/QC protocols.

4 RESULTS

4.1 Geologic Setting

Borings penetrated unconsolidated surficial material and/or bedrock with boring depths ranging from 193.9 m bgs to 215.2 m bgs; a summary of boring logs is available in Table 1, Appendix C. Additional surficial geology information was available from the concurrent baseline studies regarding soils and terrain which are reported in a separate technical data report, the following information, from the Terrain and Permafrost Interim Report – Volume 4, is available here. Surficial material in the study area has been interpreted to generally consist of an upper organic rich horizon overlying till.

Organic deposits generally occupy topographic lows and either rest directly on bedrock or overlie poorly drained surficial deposits (lacustrine, glaciolacustrine material or fine grained till deposits). Due to the poor drainage, the accumulations form bogs and fens varying in thickness.

Till is the dominant unconsolidated surficial deposit, consisting of material deposited by ice due to lodgement, melt out, or post-melt out gravity flow. Facies vary throughout the study area but generally consist of poorly compact, stony matrix supported diamicton. Deposits are generally discontinuous veneers and blankets directly overlying the bedrock.

Bedrock outcrops are the dominant landscape elements throughout the region and within the study area. Evidence of former ice-flow patterns is found throughout the area, including striations, crag-and-tail hills, glacially-smoothed outcrops, and roche moutonnées. Outcrops show variable degree of weathering in relation with surficial processes associated with thermal expansion (freeze and thaw cycles, frost heave).

4.2 Boring and Monitoring Well Logs

In 2008 and 2009 eight borings were cored for both exploration and groundwater study purposes in the general area between Thor Lake and Long Lake. Monitoring wells were installed in five of these borings. Locations are shown on Figure 5, Appendix A. Wells were completed in bedrock with total well depths ranging from 10.3 m bgs to 99.7 m bgs; Table 1, Appendix C is a summary of boring logs and well completion data. Borehole logs are in Appendix B.

In September/October 2008, three monitoring wells (MW08-127, MW08-128, and MW08-130) were completed as shallow wells in bedrock. The depths of completion ranged from 10.3 m bgs to 16.1 m bgs.

In March 2009, two deep monitoring wells (MW09-151 and MW09-152), were completed to 95.2 m bgs and 99.7 m bgs to evaluate sub-permafrost aquifer conditions.

Two 2008 coreholes (L08-123 and L08-124) were left as open wells to collect samples and measure water levels. A thermistor was installed in another 2008 corehole (L08-134) to provide data on permafrost temperature and depth.

4.3 Groundwater Elevation

Groundwater level measurements were attempted in the seven monitoring wells from three to five separate times during 2008 (September and October) and 2009 (March, June and October). In March 2009, ice was encountered in the five 2008 wells; in all cases the ice level was at or ~1.0 to 3.0 m below the previous autumn measurement, so that the depth to ice could reflect a lower wintertime water surface. Subsequent measurements in June and/or October 2009 had recovered to a similar level measured in the previous autumn, but in some cases these water levels were measured on top of an ice level in the well. Table 2, Appendix C, summarizes groundwater level measurements.

Generally groundwater elevation has been measured to be near the ground surface (0.7 m bgs to 4.5 m bgs) in all the wells. Although the monitoring wells have not been measured frequently enough to observe seasonal effects or responses to extended wet or dry periods, groundwater levels are expected to have some seasonal response so that higher groundwater levels would be expected during the spring freshet, and lower groundwater levels related to late summer.

Due to the general shallow depths to groundwater in all the wells, the relatively long distance between wells and the small overall difference in depths to groundwater levels, horizontal gradients (and as a result flow directions) are expected to follow the general topographic surface.

4.4 Ground Temperature

Near surface ground temperatures can vary substantially and are subject to seasonal temperature variations. Below the level of zero annual amplitude (i.e., below the depth of penetration of seasonal temperature variations), ground temperatures and permafrost thickness generally reflect the mean annual air temperature and local physical conditions. The depth of zero annual amplitude and thickness of permafrost also varies depending on local environmental conditions (soil properties, land cover, vegetation, insulation, proximity to large water bodies, and other factors). At some depth, the effect of the geothermal gradient is greater than the effect of surface effects, and ground temperatures steadily increase with further increasing depth.

The active layer is defined as the shallow soil zone that freezes and thaws with the changing seasons. Field observations at the Thor Lake study area in the late summer and early fall showed that existing boreholes in some low-lying areas were plugged by ice at a depth of about 3.3 mbg to 4.5 mbg in October 2009. Further, thermistor readings in L08-134 indicate subzero ground temperatures were reached at approximately 3 mbg (Figure 6, Appendix A). Taken together these data suggest the thickness of the active layer is about 3 – 4 mbg. More detailed observations of the depth of the active layer were made as part of the soils and terrain baseline assessment (see Terrain and Permafrost Interim Report – Volume 4).

The thermistor reading in L08-124 had a minimum temperature of -0.75 °C at 14 mbg which was at the end of the string. The temperature-depth data also suggest that permafrost temperature is rather warm (< 1 ºC), and appeared to approach isothermal character with depth. A minimum permafrost thickness of 44 to 59 m at this location is estimated by assuming ground temperatures increase from -0.75 ºC at -14.0 mbgs based on a geothermal gradient of 1ºC per 30 to 60 m (Lachenbruch, 1968). Further, two of the deeper monitoring wells (i.e., MW09-151 and MW09-152) obtained groundwater from the 80 to 100 m bgs range, indicating that in those locations permafrost thickness was no deeper than approximately 80 m. Thus, it is reasonable to assume an approximately 60 to 80 m permafrost thickness at these well locations.

4.5 Hydraulic Tests

Results of the hydraulic tests have been summarized in Tables 3 and 4, Appendix C. Detailed results of the 2008 and 2009 hydraulic tests are presented in Appendix D.

4.5.1 Recovery Tests

Recovery tests were performed in the three shallow monitoring wells (MW08-127, MW08-128, and MW08-130) and two open coreholes (L08-123, and L08-124) during the 2008 field program. All three shallow monitoring wells were completed in bedrock. The data were analyzed with methods applicable to fully penetrating and partially penetrating wells in unconfined aquifers as described

above in Section 3.3.1. Although it is likely that the assumptions regarding isotropic, homogenous, and fully penetrating conditions are not likely met, the curves generated by the analytical methods described in Section 3.3.1 match fairly well to the observed conditions, so that the calculated hydraulic conductivities are reasonable as bulk (or average) conductivities over the screen length. .

In the area of study, estimated hydraulic conductivity values in bedrock varied over three orders of magnitude 6.06 X 10^{-8} m/s to 3.08 X 10^{-5} m/s.

4.5.2 Packer Tests

One borehole was tested over five depth intervals in the local study area, during the 2009 winter field program. The test intervals ranged from 3.3 m to 139.4 m in length, and the depth of the test intervals ranged from 20.0 m bgs to 208.6 m bgs. Table 3, Appendix C is a summary of the packer test results. In general, hydraulic conductivity decreased with depth; this was expected due to the higher density of vugs in bedrock near surface, and the decreasing fractures and joints with depth. . Based on the method of analyses described above, the hydraulic conductivities were estimated to range from to 1.66 X 10^{-6} m/s in tests performed near surface and 2.90 x 10^{-8} m/s at depth.

4.5.3 Summary of Hydraulic Tests

The results of hydraulic testing of the wells suggest a range of hydraulic conductivity from 2.90 x 10^{-8} to 3.08 x 10^{-5} m/s. The variable hydraulic conductivity seen in the bedrock is typical of vuggy crystalline rock (Freeze and Cherry, 1979), which also showed decreasing hydraulic conductivity with depth. There are insufficient data to distinguish between the hydraulic conductivities of bedrock types, variability spatially throughout the study area, and with depth.

4.6 Hydrogeochemistry

All groundwater quality data have been compared to federal, Canadian Council of Ministers of Environment (CCME), Canadian Water Quality Guidelines for the protection of Aquatic Life (December 2007). In addition, data has been compared to the British Columbia Contaminated Sites Regulation (CSR), Schedule 6 Generic Numerical Water Standards for the protection of Freshwater Aquatic Life (January, 2009). These criteria were selected due to the absence of any other existing federal or territorial guidelines for groundwater quality. These criteria are meant to represent approximate background concentrations to a representative ambient level which may reflect natural geologic variations in relatively undeveloped areas. In addition, these criteria are to provide general guidance only and have been used for comparison to existing background groundwater quality conditions at the study area.

Monitoring wells were sampled up to three times during the 2008 and 2009 field programs. The analytical results of all groundwater samples collected as part of the hydrogeology field program are presented in Table 5-7, Appendix C. Laboratory certificates are provided in Appendix F.

Results of analysis for wells sampled over multiple events were generally in the same range. Although no seasonal trends were apparent this may be due to short term and infrequent data collection.

4.6.1 General and Physical Parameters, Major Ion Chemistry, and Hydrochemical Facies

Groundwater is classified based on major ion chemical compositions, while taking into account major anions and cations exceeding 10 meq-%. The water type (hydrochemical facies) is determined by listing the ions with concentrations greater than 10 meq-% in decreasing order (cations are listed first). Charts 1 – 5, Appendix E, show the major ion chemistry and hydrochemical facies.

Chart 6 (Appendix E) is a Piper Diagram which shows cations (represented on the right triangle), anions (represented on the left triangle), and both cations and anions in the diamond. Cations typically indicate mixing, solubility, and ion exchange processes; anions typically indicate solubility and precipitation reactions. The diamond field is used to represent waters of two or more chemistries. Groundwater samples plotted from the study area suggest two groundwater sources; one consisting of samples from L08-124, MWL08-127, and MWL08-130, and the second consisting of samples from MWL08-127 and MWL09-152. The chemistry indicates the samples from L08-124, MWL08-127, and MWL08-130 are in a near surface oxidizing environment. The chemistry for the remaining samples suggests a deeper more oxygen reducing environment. The grouping of the deep and shallow aquifers is consistent with that of the hydrogeochemical facies from Charts 1 – 5 (Appendix E) and as summarized in Table 8, Appendix C.

Magnesium is the dominating cation in two of monitoring wells sampled (L08-124 and MW08-130), while sodium dominates in the other two sample locations (MW08-127 and MW09-152), and both sodium and magnesium dominate MW08-128 depending on the sampling event. Carbonate was the dominating anion in all samples.

All groundwater samples were analyzed for their concentrations of total and dissolved metals. The measured dissolved metal concentrations were compared to CSR and CCME water quality guidelines for the protection of aquatic life. The CSR guideline values apply to both surface and groundwater, whereas the CCME guidelines only apply to surface water. However, as groundwater ultimately discharges to surface water bodies, the CCME guideline values are included here for reference. All exceedances are marked in Tables 5 – 7, Appendix C.

These exceedances of the CCME and/or CSR guidelines do not imply that the groundwater at the study area is currently contaminated; only that background concentrations of these parameters are higher than typically found in groundwater at other natural sites in Canada. These background groundwater quality results merely reflect the natural geologic and hydrogeologic conditions within these specific areas of the property.

4.6.2 QA/QC of Analytical Results

The duplicate samples MW09-152 (June and October) had very similar analytical results for most analyzed species. Notable differences are only present in concentrations low and close to the detection limits of the analytical method. The field duplicate results are within acceptable limits of reproducibility for the purpose of this study.

In addition, a QA/QC procedure has been implemented by ALS, and all analytical results have been approved by a laboratory representative.

5 DISCUSSION

Based on analyses and interpretation of the information gathered during the 2008 and 2009 fieldwork and data interpretation, the local hydrogeological conceptual model of the area between Thor Lake and Long Lake consists of shallow (perched) and deep aquifers separated by permafrost. The shallow aquifer is composed of unconsolidated surficial material and, in some places the bedrock is porous and vuggy, perched on the permafrost. The deep aquifer likely occurs below permafrost and is comprised of different bedrock lithologies in which groundwater flow mainly occurs along fractures and other rock discontinuities. Although this conceptual model can likely be extrapolated to other places in the proposed project footprint, more data (i.e., greater spatial – both vertically and horizontally - coverage of groundwater elevations and hydraulic properties) and information (i.e., surficial and bedrock maps, distribution of permafrost map) would be required to develop a more detailed concept. The following summarizes our understanding of the hydrogeology based on the data gathered to date.

5.1 Shallow Aquifer

The shallow aquifer is composed of unconsolidated surficial material and, where spatially present, porous and vuggy bedrock within the active zone, which has been interpreted to be perched on the permafrost. The unconsolidated surficial material mainly consists of till and organic deposits in topographically low areas. The till varies throughout the study area but generally consists of a poorly compact, stony, matrix supported diamicton. The organic deposits are poorly drained fine materials.

Recovery tests performed in shallow monitoring wells showed a hydraulic conductivity range over several orders of magnitude, from 7.56×10^{-7} m/s to 3.08×10^{-5} m/s. There is little spatial hydrostratigraphic and hydraulic conductivity data available, especially for areas north and west of Thor Lake.

Groundwater flow within the shallow aquifer occurs in the active layer (i.e., in the layer of seasonal thawing and freezing). The highest groundwater levels are expected to occur during the snowmelt in late spring after thawing the shallow sediments. Groundwater flow is expected to be characterized by local, small-scale flow, and the flow direction is assumed to follow the local topography.

5.2 Deep Aquifer

A deeper bedrock aquifer underlies permafrost. The bedrock lithology mainly consists of intrusive zoned syenite and granite, with dykes and sills throughout the pluton.

Groundwater flow in the bedrock aquifer is expected to occur, predominantly, in fractures and fault zones. Groundwater flow in fractured media is complex, depending on the local hydrogeological and structural geological conditions. Transmissivity values can differ over several orders of magnitude within the same rock mass, and groundwater flow may be largely controlled by a few conductive fractures or other rock mass discontinuities.

Groundwater within the bedrock aquifer is thought to occur beneath the permafrost, which may or may not be in hydraulic connection with some of the taliks surrounding the larger and deeper lakes. In general, though it is expected that there is very little connection between the shallow and deep aquifers. Due to the limited number of groundwater monitoring wells there is little information to estimate flow direction of water in the bedrock. From a conceptual perspective, it is likely that the deep aquifer flows southward and is ultimately in hydraulic connection with deeper sections of Great Slave Lake.

Packer tests performed in the deep aquifer suggest a hydraulic conductivity that ranges over several orders of magnitude (4.1×10^{-8} m/s to 1.7×10^{-6} m/s). The range of hydraulic conductivity is within the expected range for fractured crystalline rock, (Freeze and Cherry, 1979). Hydraulic conductivity generally decreased with depth, which is expected due to the increasing competence of the bedrock with depth. Although the hydraulic conductivity data is consistent with fractured crystalline rock, the spatial variability across the study area is not well known at this time.

6 CLOSURE

Stantec has prepared this report for the sole benefit of Avalon Rare Metals for the purpose of documenting baseline conditions at its Thor Lake site. The report may not be relied upon by any other person or entity, other than for its intended purposes, without the express written consent of Stantec and Avalon. Any use of this report by a third party, or any reliance on decisions made based upon it, are the responsibility of such third parties.

The information provided in this report was compiled from existing documents and data provided by Avalon and field data compiled by Stantec (formerly Jacques Whitford AXYS Ltd.).This report represents the best professional judgment of our personnel available at the time of its preparation. Stantec reserves the right to modify the contents of this report, in whole or in part, to reflect any new information that becomes available. If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

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APPENDIX A

Figures

Scale:	1:2,000,000
Date:	01/12/2009
Drawn By:	KS
Approved By:	NL

AVALON RARE METALS INC

Avalon Rare Metals INC.

Site Location

Draft Technical Data Report

Thor Lake Project, Nechalacho Deposit

PREPARED BY Stantec

Figure: 1

Draft Technical Data Report
Thor Lake Project, Nechalacho Deposit

Local Study Area

AVALON RARE METALS INC.

Stantec

DRAFT DATE 21/12/2009			SCALE 1:25,000	
REVISION DATE			PROJECT 1036222	FIGURE NO. 2
DRAWN KS	CHECKED RH	APPROVED NL	VOL	

N

BUCK

DRIZZLE

RING

MURKY

CRESSY

FRED

THOR

MEGHAN

NORTH TARDIFF

SOUTH TARDIFF

WASP

LONG

PORK CHOP

ELBOW

Great Slave Lake

Study Area

A	Anthropogenic	T	Till
F	Fluvial	O	Organic
L	Lacustrine	B	Bedrock

Surficial Expression

b	Blanket	Deposit greater than 1m thick; minor irregularities of the underlying unit (generally bedrock) are masked but the topographic form is still evident
v	Veneer	Deposit less than 1 m thick; minor irregularities of the underlying unit (generally bedrock) are masked but the topographic form is obvious
u	Undulating	Low relief, rolling terrain with no trend or parallelism; bedrock topography is masked
r	Ridge	Narrow, elongate and commonly steep-sided feature that rises above surrounding landscape; bedrock topography is masked (unless a bedrock ridge – Rr). Includes string bogs (Or).
a	Apron	Relatively gentle slope at foot of steeper slope; bedrock topography is masked

Terrain Code

Example: GLACIOLACUSTRINE Veneer

^{10}GL v

Decile — Surficial Material — Surface Expression

Complex Notation:

Where two or more surficial deposits and/or surficial expressions are present, the proportion of each component is given by the decile unit. For example

^{6}Gl^{4}Ob — Means that about 60% of the area is covered by a glaciolacustrine plain and bout 40% is coverd by organic blanket.

^{7}Fb^{2}Fv^{1}Ov — Means that about 70% of the area is covered by a fluvial blanket about 20% is covered by a fluvial veneer and about 10% is covered by organic veneer.

Draft Technical Data Report
Thor Lake Project, Nechalacho Deposit

Surficial Geology of Thor Lake Study Area

Area of Detail

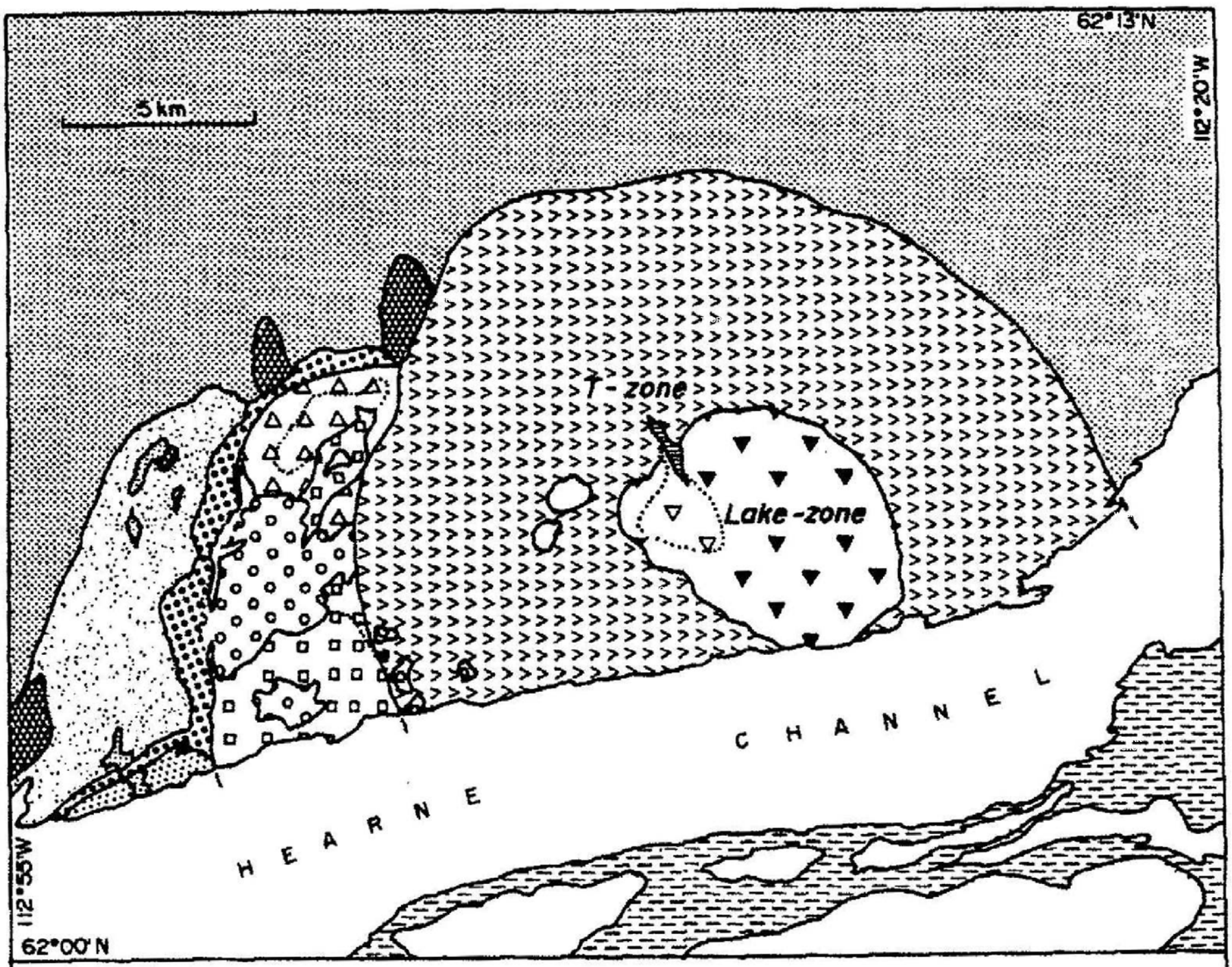
0 0.25 0.5 1
Kilometres

AVALON RARE METALS INC.

PREPARED BY Stantec

DRAFT DATE 21/12/2009			SCALE 1:20,000
REVISION DATE			PROJECT 1036222
DRAWN KS	CHECKED RH	APPROVED NL	VOL

FIGURE NO. 3



Great Slave Lake

Source: Avalon Ventures 2007

Draft Technical Data Report
Thor Lake Project, Nechalacho Deposit

Bedrock Geology

AVALON RARE METALS INC.

PREPARED BY Stantec

DRAFT DATE	SCALE
21/12/2009	Not to scale
REVISION DATE	PROJECT 1036222
DRAWN KS / CHECKED RH / APPROVED JT	VOL

FIGURE NO. 4

Draft Technical Data Report
Thor Lake Project, Nechalacho Deposit

Monitoring Well Locations

AVALON RARE METALS INC.

PREPARED BY Stantec

DRAFT DATE 18/12/2009				SCALE 1:10,000	
REVISION DATE				PROJECT 1036222	FIGURE NO. 5
DRAWN RH	CHECKED JT	APPROVED NL		VOL	

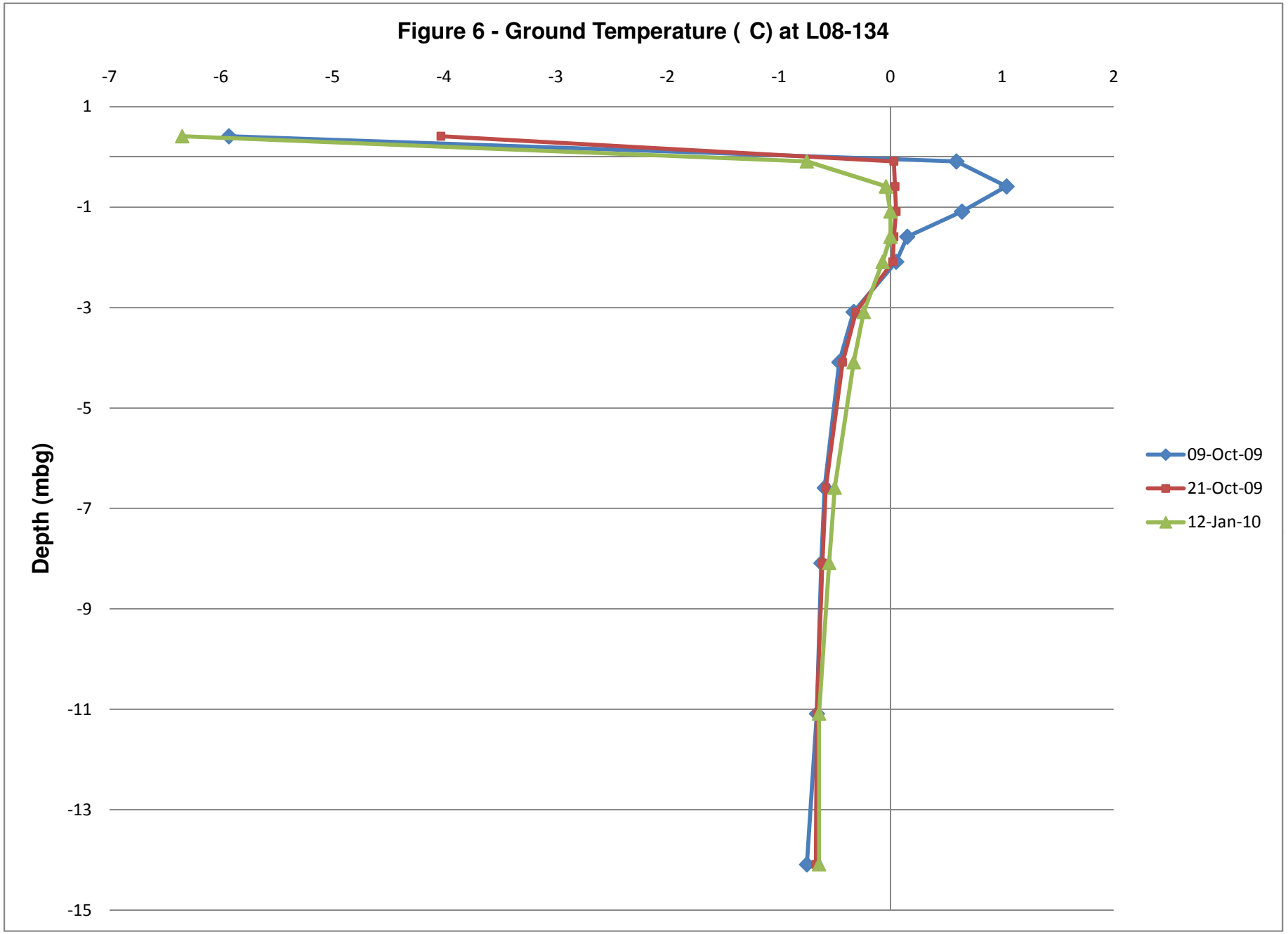


Figure 6 - Ground Temperature (C) at L08-134
-7
-6
-5
-4
-3
-2
-1
0
1
2
1
-1
-3
-5
-7
-9
-11
-13
-15
Depth (mbg)
09-Oct-09
21-Oct-09
12-Jan-10

APPENDIX B

Borehole Logs

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **238.46 m**
SITE DATUM: N/A

BOREHOLE NO:
L08-123

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		Undifferentiated Surficial Deposits			GW = 0.32 mbg	
		Altered Aegirine Syenite			steel casing	
10.0						230.0
20.0						220.0
		- Albitized Syenite at 26.7 m				210.0
30.0		- Altered Aegirine Syenite at 31.9 m				
40.0						200.0
		- Pegmatite at 42.7 m				
		- Altered Aegirine Syenite 46.6 m				190.0
50.0						
60.0		- Albitized Syenite at 60.0 m				180.0
						170.0
70.0		- Altered Aegirine Syenite at 70.7 m				
80.0						160.0
90.0						150.0
		- Albitized Syenite at 94.6 m				140.0
100.0		- Altered Aegirine Syenite at 101.2 m				
110.0					open corehole	130.0
						120.0

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 1, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **238.46 m**
SITE DATUM: N/A

BOREHOLE NO:
L08-123

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
130.0						110.0
140.0		- Layered Aegirine Syenite Cumulate at 141.6 m				100.0
150.0						90.0
160.0						80.0
170.0						70.0
180.0						60.0
190.0						50.0
200.0						40.0
		End of borehole at 207.4 m Top of Pipe (TOP) Elevation = **238.957** m Groundwater Information: Depth to groundwater from TOP = **0.82** m () Open Borehole				

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 1, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **241.59 m**
SITE DATUM: N/A

BOREHOLE NO:
L08-124

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		Undifferentiated Surfical Deposits		▼	GW = 2.25 mbg	240.0
		Albitized Syenite			steel casing	
10.0						230.0
20.0						220.0
		- Altered Syenite at 24.6 m				
30.0						210.0
40.0						200.0
50.0						190.0
		- Aegirine Foyaite at 54.6 m				
		- Altered Aegirine Syenite at 58.3 m				
60.0						180.0
70.0						170.0
80.0						160.0
		- Aegirine Foyaite at 83.4 m				
90.0						150.0
		- Heterogeneous Altered Syenite at 95.3 m				
100.0						140.0
					open corehole	
110.0						130.0

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 4, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **241.59 m**
SITE DATUM: N/A

BOREHOLE NO:
L08-124

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
130.0						120.0
140.0						110.0
150.0						100.0
160.0						90.0
170.0						80.0
180.0		- Nepheline Aegirine Syenite at 179.25 m				70.0
190.0						60.0
						50.0
		End of borehole at 198.3 m Top of Pipe (TOP) Elevation = **241.714** m Groundwater Information: Depth to groundwater from TOP = **2.37** m () Open Borehole				

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 4, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT:	**Avalon Ventures**	**BOREHOLE RECORD**	BOREHOLE NO:
PROJECT:	**Thor Lake**	PROJECT NO: **1036222**	**MW08-127**
	Thor Lake	SURFACE ELEVATION: **238.04 m**	
	NWT	SITE DATUM: N/A	

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		Undifferentiated Surficial Deposits			GW box, 0.53 m stickup, jplug	
		Altered Syenite			steel casing keyed into bedrock at 2.5 mbg	
					bentonite seal	
					10/20 silica sand	230.0
10.0					50 mm 010 slot PVC pipe	
					end cap	220.0
20.0					Van Duzen plug	
		- MRZ at 23.0 m				210.0
30.0						200.0
40.0						190.0
50.0						180.0
60.0						170.0
70.0						160.0
80.0						
		- Heterogeneous Altered Syenite at 84.7 m				150.0
90.0						140.0
100.0						130.0
110.0					Open Corehole	
						120.0

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 13, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **238.04 m**
SITE DATUM: N/A

BOREHOLE NO:
MW08-127

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
130.0						110.0
140.0		- Layered Cumulate at 144.6 m				100.0
150.0						90.0
160.0						80.0
170.0						70.0
180.0		- Aegirine Foyaite at 182.5 m - Altered Aegirine Syenite at 184.6 m				60.0
190.0						50.0
200.0						40.0
		End of borehole at 201.3 m Completion Information: Screened interval from 6.9 m to 16.4 m below surface Top of Pipe (TOP) Elevation = **238.543** m Groundwater Information: Depth to groundwater from TOP = **1.00** m () Borehole plugged with Van Duzen Plug				

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 13, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **240.28 m**
SITE DATUM: N/A

BOREHOLE NO:
MW08-128

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		Undifferentiated Surficial Material		GW = 0.89 mbg	well box, ø 53 m stickup, jplug bentonite seal steel casing keyed into bedrock at 8.0 mbg	
10.0		**Albitized Syenite** vuggy in more intensely albitized sections, porous			50 mm 010 slot PVC pipe end cap Van Duzen plug	230.0
20.0						220.0
30.0						210.0
40.0						200.0
50.0		- Altered Porphyritic Syenite at 52.1 m				190.0
60.0		- Albitized Syenite at 64.0 m				180.0
70.0		- Altered Porphyritic Syenite at 72.7 m				170.0
80.0						160.0
90.0						150.0
100.0						140.0
110.0		- Albitized Syenite at 110.5 m, locally vuggy			Open Corehole	130.0

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 16, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **240.28 m**
SITE DATUM: N/A

BOREHOLE NO:
MW08-128

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		- Very vuggy from 123.0 m to 149.0 m				
130.0						110.0
140.0						100.0
150.0		- Pegmatitic Syenite at 148.0 m, fractured and locally vuggy - Foyaite at 151.0 m				90.0
160.0						80.0
170.0						70.0
180.0						60.0
190.0						50.0
200.0		- Pegmatitic Syenite at 199.4m				40.0
210.0						30.0
		End of borehole at 213.5 m Completion Information: Screened interval from 8.0 m to 10.3 m below surface Top of Pipe (TOP) Elevation = **240.820** m Groundwater Information: Depth to groundwater from TOP = **1.44** m () Borehole plugged with Van Duzen Plug				

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 16, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **246.04 m**
SITE DATUM: N/A

BOREHOLE NO:
MW08-130

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		Undifferentiated Surficial Deposits		GW = 1.09 mbg	well box, 0.53 m stickup, jplug	
					bentonite seal	240.0
					steel casing keyed into bedrock at 8.8 mbg	
10.0		**Albitized Syenite**			50 mm 010 slot PVC pipe	
					end cap	230.0
					Van Duzen plug	
20.0						
						220.0
30.0						
						210.0
40.0						
						200.0
50.0						
						190.0
60.0		- Altered Nepheline Aegirine Foyaite at 59.4 m				
						180.0
70.0						
						170.0
80.0						
						160.0
90.0						
						150.0
100.0						
					Open Corehole	140.0
110.0						
						130.0

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 24, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **246.04 m**
SITE DATUM: N/A

BOREHOLE NO:
MW08-130

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
130.0		- Very vuggy after 134.0 m				120.0
140.0						110.0
150.0		- Nepheline Aegirine Syenite at 153.6 m				100.0
160.0						90.0
170.0						80.0
180.0						70.0
190.0						60.0
						50.0
		End of borehole at 198.3 m Completion Information: Screened interval from 7.6 m to 13.7 m below surface Top of Pipe (TOP) Elevation = **246.131** m Groundwater Information: Depth to groundwater from TOP = **1.18** m () Borehole plugged with Van Duzen Plug				

INVESTIG. METHOD: Diamond Drill - NW
INVESTIG. DATE: August 24, 2009
LOGGED BY: AM
BOREHOLE DIAMETER: 0.0889 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **240.55 m**
SITE DATUM: N/A

BOREHOLE NO:
MW09-151

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		Undifferentiated surficial deposits			well box, 0.53 m stickup, jplug steel casing keyed into bedrock at 2.5 mbg	240.0
		Feldspathite homogeneous, very porous and vuggy, negligible fracture fill or vein development				
10.0						230.0
20.0						220.0
30.0						210.0
40.0		- Abrupt end to vuggyness at 37.4 m				200.0
50.0		- Altered Syenite at 51.2 m				190.0
		- MRZ / Altered Chlorite Syenite at 55.6 m				
60.0					bentonite seal	180.0
70.0		- Albitized Syenite at 67.9 m				170.0
80.0					10/20 silica sand	160.0
		- Altered Syenite at 82.7 m				
90.0					50 mm 010 slot PVC pipe	150.0
					end cap	
100.0					Van Ruth plug	140.0
110.0		- Altered Foyaitic Syenite at 112.2 m				130.0

INVESTIG. METHOD: Diamond Drill - NQ
INVESTIG. DATE: March 21, 2009
LOGGED BY: CP
BOREHOLE DIAMETER: 0.0757 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **240.55 m**
SITE DATUM: N/A

BOREHOLE NO:
MW09-151

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		- MRZ at 120.3 m				120.0
		- Heterogeneous Altered Albitized Syenite / MRZ at 125.4 m				
130.0		- Altered Foyaitic / Heterogeneous Syenite / MRZ at 131.4 m				110.0
140.0						100.0
150.0						90.0
					open corehole	
160.0						80.0
170.0		- Altered Porphyritic Syenite at 167.0 m, subvertical fracturing infilled with carbonate and chlorite				70.0
180.0						60.0
190.0		- Altered Aegiring Syenite at 189.5 m				50.0
200.0						40.0
210.0						30.0
		End of borehole at 215.2 m Completion Information: Screened interval from 81.2 m to 95.2 m below surface Groundwater Information: Depth to groundwater from TOP = **1.88** m () Borehole plugged with Van Ruth Plug				

INVESTIG. METHOD: Diamond Drill - NQ
INVESTIG. DATE: March 21, 2009
LOGGED BY: CP
BOREHOLE DIAMETER: 0.0757 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **241.05 m**
SITE DATUM: N/A

BOREHOLE NO:
MW09-152

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
		Undifferentiated Surficial Material			well box, 0.53 m stickup, jplug steel casing keyed into bedrock at 2.5 mbg	240.0
		Albitized Syenite / Feldspathite occasional finely porous interval				
10.0						230.0
20.0						220.0
30.0		- Heterogeneous Syenite / MRZ at 28.0 m				210.0
40.0						200.0
50.0		- Feldspathite / Albitized Syenite at 52.0 m				190.0
60.0					bentonite seal	180.0
70.0						170.0
80.0					10/20 silica sand	160.0
90.0		- Altered / Albitized Syenite at 88.5 m			50 mm 010 slot PVC pipe	150.0
100.0					end cap Van Ruth plug	140.0
110.0		- Feldspathaite at 105.5 m, vuggy - Altered / Albitized Syenite at 112.0 m				130.0

INVESTIG. METHOD: Diamond Drill - NQ
INVESTIG. DATE: March 26, 2009
LOGGED BY: CP
BOREHOLE DIAMETER: 0.0757 m (OD)

Stantec

CLIENT: **Avalon Ventures**
PROJECT: **Thor Lake**
Thor Lake
NWT

BOREHOLE RECORD

PROJECT NO: **1036222**
SURFACE ELEVATION: **241.05 m**
SITE DATUM: N/A

BOREHOLE NO:
MW09-152

DEPTH [m]	SOIL TYPE	SOIL DESCRIPTION	WELL COMPLETION	WATER LEVEL	COMPLETION NOTES	ELEVATION [m]
130.0		- MRZ / Foyaitic Syenite at 128.1 m				120.0
140.0						110.0
150.0					open corehole	100.0
160.0		- Aegirine Syenite / Foyaitic Syenite at 153.0 m				90.0
170.0						80.0
180.0						70.0
190.0						60.0
						50.0
		End of borehole at 193.9 m				

Completion Information:
Screened interval from 84.7 m to 99.7 m below surface

Groundwater Information:
Depth to groundwater from TOP = **1.54** m ()

Borehole plugged with Van Ruth Plug

INVESTIG. METHOD: Diamond Drill - NQ
INVESTIG. DATE: March 26, 2009
LOGGED BY: CP
BOREHOLE DIAMETER: 0.0757 m (OD)

Stantec

AVALON VENTURES LTD. / THOR LAKE PROJECT

Diamond Drill Log

Hole_id:	L08-123	**Drilled By:**	Peak Drilling	**Objective:**	Lake Zone Delineation Drilling	**Downhole Survey Tests**
Zone:	Lake Zone	**Started:**	2008-07-29			
Easting_GPS:	417,400	**Finished:**	2008-08-01	**Summary:**		
Northing_GPS:	6,886,675	**Core Size:**	NQ2			
Elev_GPS:	-999	**Surveyed?:**	☐			
East_Plot:	-999.00	**Logged By:**	Emma Sheard			
North_Plot:	-999.00	**Length (m):**	207.40			
Elev_Plot:	-999.00	**Note: Collar Coords in NAD83 / Zone 12**				

Hole No. L08-123

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
0.00	3.05	9	OVERBURDEN													
3.05	26.70	1a	ALTERED AEGIRINE SYENITE Medium grained to locally pegmatitic syenite, altered by biotite, chlorite, magnetite, albite and strong hematization. Remnant k-spar laths (0.5cm in length on average) are randomly oriented in a mafic matrix of minor biotite, chlorite and sericite but predominantly hematite. Primary aegirines are completely replaced by hematite and more rarely specular hematite. At the start of the hole are several patches of relatively fresh apple green secondary aegirine. There is also an orange feldspar in the matrix around 4.00m, which could be altered nepheline? Often rims k-spar laths. Locally pegmatitic between 7.70-8.50m: anhedral k-spar megacrysts with angular spaces filled by interstitial albite, hematite, specular hematite and minor magnetite. 9.20m: 3cm wide band of albite (cleavelandite) and secondary aegirine, almost subhorizontal. Rare patches of weak mineralization, for example @ 11.80m (0.1Dy, all else is relatively low). 18.75-19.00m: coarse rhomb shaped primary aegirines are entirely replaced by hematite and specular hematite. Below is a 10cm wide band of pervasive albitization. Porphyritic texture created by coarser primary aegirines altered by biotite, chlorite and sericite, rimmed by dark green serpentine. More euhedral aegirines replaced entirely by hematite and specular hematite are rimmed by biotite.												

Hole No.		L08-123																		
Depth (m)				Samp_id	From	To	Length	TREO	HREO	Y	Ce	Nd	Dy	Nb	Ta	P2O5
From	To	Lithocode	Description		(m)	(m)	(m)	%	%	ppm	ppm	ppm	ppm	ppm	ppm	%
			More abundant patches of mineralization towards the end of this unit @ for example 25.00m: 0.2Ce, 0.1La, 0.1Dy, 0.08Nd, 0.02Y and @ 24.85m: 0.08Dy, 0.16Nd, 0.33Ce, 0.16La, 0.2Nb, 0.3Zr, 0.2Y (mix of zircon and other REE minerals).															
26.70	31.85	4a	ALBITIZED SYENITE Gradational contact into this zone with white albite (cleavelandite) a pervasive secondary phase in the matrix; replaced both mafic and felsic minerals. Porphyritic texture with remnant anhedral biotite, chlorite and sericite (aegirine precursor?) - replaced around the margins by cleavelandite. Others are entirely replaced by clay minerals. Weak mineralization throughout. Gradational contact with a decrease in the degree of albitization.															
31.85	42.70	1ac	ALTERED AEGIRINE SYENITE Medium grained aegirine syenite as previous. Minor albitization and more pervasive hematization. Randomly oriented k-spar laths (0.5cm in length on average) in a mafic matrix of blue-green biotite, chlorite and sericite and red hematite. Minor magnetite, specular hematite and albite (cleavelandite). Becomming locally coarser grained downhole with more abundant clay and sericite alteration.															
42.70	46.55	1ah	PEGMATITE Gradational contact into this unit. K-spar megacrysts are cut by silver muscovite and in other places, biotite. Relict rhomb shaped primary aegirines are replaced by cleavelandite, muscovite and hematite (different alteration events). 44.00-44.50m: vugs and cavities - k-spar megacrysts being resorbed and replaced by cleavelandite, muscovite and hematite. Fine grained disseminated zircon, associated with Nb enrichment @ for example 45.30m: 0.02Nd, 0.04Ce, 0.03La, 0.5Zr, 0.2Nb, 0.06Y.															
46.55	59.95	1ac	ALTERED AEGIRINE SYENITE Same unit as above the pegmatite, characterized by strong hematization and pervasive alteration by biotite, chlorite and sericite. Heterogeneous unit which is medium grained to locally pegmatitic between 48.50-49.00m. 54.80-55.20m: locally strongly albitized with primary textures almost entirely overprinted by cleavelandite. 55.75m: calcite vein @ 80 degrees to core axis. Downhole, mafics are replaced by hematite and k-spars are brecciated into angular fragments of variable sizes. Trace interstitial fine grained bastnaesite (weakly mineralized).															

Hole No.		L08-123																		
Depth (m)				Samp_id	From	To	Length	TREO	HREO	Y	Ce	Nd	Dy	Nb	Ta	P2O5
From	To	Lithocode	Description		(m)	(m)	(m)	%	%	ppm	ppm	ppm	ppm	ppm	ppm	%
59.95	70.70	4a	ALBITIZED SYENITE Gradational contact into this unit which is strongly albitized. White cleavelandite overprints primary textures and replaces both mafic and felsic minerals. Remnant randomly oriented k-spar laths are visible beneath the albite overprint. Precursor: same unit as above, this horizon has just been intensely albitized.															
70.70	94.60	1a	ALTERED AEGIRINE SYENITE Same as aegirine syenite above the albitized syenite: altered predominantly by hematite and biotite, chlorite, sericite (green and red alteration overprint). 80.70m: fine grained red bastnaesite is pseudomorphing a subhedral unknown mineral. Downhole, specular hematite becomes a more pervasive phase with little or no magnetite. Minor patches of albitization, associated with a patchy grey-white type 2 zircon. This is interstitial between k-spar laths and in places is rimmed by biotite. Zircon becomes increasingly abundant downhole and between 89.30-89.50m is more locally concentrated. Until 89.90m, the primary lithology is brecciated, perhaps as a result of hydrothermal brecciation. From 93.00m, primary textures are more visible with randomly oriented k-spar laths in a mafic matrix of biotite, chlorite, sericite, magnetite and moderately pervasive hematization. Patchy albitization throughout.															
94.60	101.20	4a	ALBITIZED SYENITE Precursor lithology is the same - this unit has a strong albitization overprint. Several bands up to 70cm thick of pure white cleavelandite. Between these bands, the aegirine syenite is only weakly albitized. Gradational upper contact and a more sharp lower contact.															
101.20	141.55	1a	ALTERED AEGIRINE SYENITE Coarse grained to locally pegmatitic syenite, altered by biotite, chlorite, sericite, albite, hematite and specular hematite. Heterogeneous unit with finer grained sections characterized by hematite and specular hematite alteration. Repeated pegmatitic intervals with k-spars commonly fractured and these fractures infilled by hematite. Local patches of serpentinization (green, waxy lustre). Minor disseminated pyrite throughout. Contacts between these pegmatitic intervals are obscured by alteration, therefore it is difficult to confirm whether or not these represent a separate intrusive event. They are often characterized by brecciation. Pervasive hematization along fracture planes. Rare subhedral patches of bastnaesite and zircon intergrown. 116.00m: begin to see different phenocryst phases. (1) elongate lath shaped phenocrysts and (2) flattened rectangular/square shaped phenocrysts. Both are															

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
			typically altered by hematite and/or specular hematite and are inclusions within larger k-spar megacrysts. Often these phases grow inwards into spaces infilled by albite (cleavelandite). Some coarse k-spar laths are euhedral with sharp crystal termination. 134.20m: calcite vein along fracture plane, infilled by disseminated pyrite. Hematization along upper contact of this vein. Downhole the phenocryst phases are entirely replaced by hematite and occasionally rimmed by biotite. 139.00-139.50m: pervasive calcite veining @ 80 degrees to core axis. Becoming finer grained into the next layered unit.													
141.55	207.40	1ade	LAYERED AEGIRINE SYENITE CUMULATE With the exception of one pegmatitic interval, the layers become coarser grained downhole, though there is variation in grain size within each layer. At the top of the unit: alternating fine grained red and green layers. Generally see sharp, knife-edge igneous contacts between these layers @ 60 degrees to core axis. These could also be alteration fronts where either hematization (red) or serpentinization (green) dominate. Pervasive calcite veining @ 80 degrees to core axis and one or two patches of fine grained zircon, associated with weak mineralization. Fine grained red layers are very homogeneous; composed of hematite and cleavelandite; up to 2m in thickness. Within these red layers, often see rounded patches of white cleavelandite @ for example 148.85m. Becomes locally pegmatitic @ 150.00m after the first red, fine grained layer. No clear upper contact. Relict patches where primary textures are more evident and alteration is less strong @ for example 153.80m. Patchy disseminated zircon and REE mineralization in places, for example 156.00-156.50m. Cumulate layering becomes clearer downhole as there is less of an alteration overprint. Some of the red, hematized layers display an overall coarsening upwards in grain size up to the contact with the serpentinized layer above. Between 156.60-171.50m: the alternating red and green layers are well developed. Pervasive calcite veining throughout @ 80 degrees to core axis and subvertical. 178.00m: disseminated carbonates (mix of calcite and ankerite) and trace pyrite. 182.30-183.50m: no change in the phenocryst sizes through this medium grained layer. Primary phenocrysts are replaced by chlorite and sericite and rimmed by biotite (petrographic confirmation needed) and are fairly subheral to anhedral in shape. Sharp lower contact with phenocrysts bound by a 5mm layer of albite. 184.40-186.00m: rectangular shaped phenocrysts from 0.5-2cm in length (unknown precursor, could be aegirine?) rimemd by hematite in a fine grained matrix of feldspar													

Hole No. L08-123																			
Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %			
			and secondary aegirine which is wrapped around the phenocrysts. Grain size increase downhole to the bottom of the layer, attributed to crystal settling. Some phenocrysts are aligned subhorizontally but most are randomly oriented. Could be a component of flow differentiation also? 186.55-186.95m: phenocrysts now in a matrix of white/pink cleavelandite. Sharp upper and lower contacts - alteration fronts? 191.20-192.00m: patches of zircon and REE mineralization in the matrix. Locally well mineralized (0.16Nd, 0.34Ce, 0.21La, 0.15Nb, 0.2Zr, 0.15Y). Downhole, see repeated cycles of fining upward cumulates with mineralized patches decreasing in abundance towards the end of the hole. 198.20m: secondary aegirine cuts phenocrysts rimmed by hematite. Thus, the aegirine is part of a relatively late stage alteration event. Bands of secondary green aegirine from 5-10cm thick in the last 2.5m of the hole.															

AVALON VENTURES LTD. / THOR LAKE PROJECT

Diamond Drill Log

Hole_id:	L08-124	**Drilled By:**	Peak Drilling	**Objective:**	Lake Zone Delineation Drilling	**Downhole Survey Tests**	
Zone:	Lake Zone	**Started:**	2008-08-01				
Easting_GPS:	417,400	**Finished:**	2008-08-04	**Summary:**			
Northing_GPS:	6,886,575	**Core Size:**	NQ2				
Elev_GPS:	-999	**Surveyed?:**	☐				
East_Plot:	-999.00	**Logged By:**	Angela Martin				
North_Plot:	-999.00	**Length (m):**	198.25				
Elev_Plot:	-999.00	**Note: Collar Coords in NAD83 / Zone 12**					

Hole No. L08-124

Depth (m) From	Depth (m) To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
0.00	4.00	9	Overburden													
4.00	24.60	4a	Aibitized Syenite Buff to pink kspar phenocrysts in dark mafic matrix up to 5m, with abundant medium grained silver zircon pseudomorphs. Generally, highly feldpathic; kspar ranges from megacrystic to more commonly coarse to medium grained and anhedral (fractured megacrysts?). Commonly strongly albitized (cleavelandite). Remnant coarse grained mafics, weakly to strongly chloritized, often partially replaced by magnetite. Silver zircon commonly associated with more altered mafic sections. Matrix composed mainly of coarse grained, salmon pink kspar and prismatic albite. Minor light green intersertal clay alteration. Common thick (4-6cm) carbonate veins, with open fracture filling eudhedral kspar and pyrite. Vein/fracture is approximately parallel to core axis. Partial white calcite replacement of remnant mafic laths. Common local intersertal purple fluorite. Unmineralized.												
24.60	54.60	3a	Altered Syenite													

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
			Weakly to strongly altered; textures partially obscured by hematite/biotite/chlorite alteration. Local bright pink, hematite-stained kspar. Matrix becoming increasingly albitized downhole. Texture fairly heterogeneous, with variations in grain size. Mafics strongly chloritized. Shear zones @ 36.1 and 36.4; abrupt reduction in grain size, with abundant chlorite/illite. Contact crumbly and ~ 80 degrees to core axis. Short foyaitic sections. 31.0-31.65: alternating bands of sub-pegmatitic, coarse to medium grained and highly albitized sections. 46.5-46.85; foyaitic, albitized and mafics chloritized.													
54.60	58.30	1ac	Aegirine Foyaite Coarse to very coarse grained; two generations of aegirine (?), very coarse grained, amorphous, green (chloritized) and medium to coarse grained hematized prisms, pointed terminations. Possible bastnaesite at 58; red, amorphous; 1.8 Ce, 0.56 Nd, 0.67 La, 0.59 Nb. Coarse grained whitish k-spar laths, generally randomly oriented.													
58.30	83.40	1a	Altered aegirine syenite Moderately altered; hematized/albitized/chloritized throughout. Marked increase in very coarse granined amorphous, partially chloritized, green/black mafic mineral.													
83.40	95.25	1c	Aegirine Foyaite Same as previous. Abundant coarse to very coarse grained, angular, subhedral green aegirine. Medium to coarse grained, randomly oriented kspar laths. Matrix moderately to strongly hematized. Common short, intensely hematized sections, often with specular hematite.													
95.25	179.25	3c	Heterogeneous Altered syenite Matrix moderately to strongly albitized locally, mafics strongly hematized. Common albite (cleavelandite) lenses and bands. Minor intersertal calcite. Common coarse to													

Hole No.	L08-124																				
Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
			very coarse grained amorphous, green chloritized aegirine. 132-144: layered; alternating coarse grained foyaitic with 1-2m pegmatitic sections. 144-179.25: pervasie hematite staining. 161.4-179.25: increasingly albitized, with lenses of white and pink cleavelandite. Common specular hematite. Brecciated sections: 170-172. 172-179.25: spotted texture: hematized phenocrysts in albitized and/or dark altered matrix. Possible nepheline; bright orange, amorphous, very coarse grained. Shear zone @ 178, sub-horizontal to core axis.															
179.25	198.25	1a	Nepheline Aegirine syenite Weakly altered, both medium to coarse grained of relatively fresh looking, yet altered, aegirine. Also minor coarse grained hematite-replaced aegirine (commonly specular). Strongly albitized throughout, locally slightly vuggy, with magnetite and pyrite infilling vugs. Minor kspar partially/completely replaced by orange/red nepheline; very coarse grained and amorphous. Generally kspar is coarse grained and albitized. Non magnetic. EOH															

AVALON VENTURES LTD. / THOR LAKE PROJECT

Diamond Drill Log

Hole_id:	L08-127	**Drilled By:**	Peak Drilling	**Objective:**	**Downhole Survey Tests**
Zone:	Lake Zone	**Started:**	2008-10-08		
Easting_GPS:	417,235	**Finished:**	2008-13-08	**Summary:**	
Northing_GPS:	688,670	**Core Size:**	NQ2		
Elev_GPS:	-999	**Surveyed?:**	☐		
East_Plot:	417,235.00	**Logged By:**	Angela Martin		
North_Plot:	688,670.00	**Length (m):**	201.30		
Elev_Plot:	-999.00	**Note: Collar Coords in NAD83 / Zone 12**			

Hole No. L08-127

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
0.00	2.50	9	Overburden.													
2.50	23.00	3d	Altered Syenite Dark pink kspar-rich syenite up to 3.5m. Predominantly dark; moderate to strong chlorite/biotite alteration throughout. Altered porphyritic syenite up to 10m, with buff kspar phenocrystic laths ~3-5cm, partially resorbed. Locally weakly magnetic. After 10m; texture partially obscured by intense albitization (cleavelandite). Overall dark brown/grey, with porphyritic textures visible in places. Narrow bands of MRZ (~5cm wide) with abundant fine grained ribbony tan zircon. Strongly mineralized: 1.6 Nd, 2.9 La, 0.9 Pr, 0.3 Nb, 5.5 Ce.												
23.00	84.70	2	MRZ/3d Predominantly dark brown, texture obscured by strong chlorite/biotite alteration. Albitized throughout, except for narrow horizons. Upper boundary sharp; defined by darker colour, decrease in cleavelandite and remnant felsic minerals. Becoming increasingly albitized downhole, interlayered with darker, more mafic sections. Due to alteration, syenitic textures preserved in places; matrix composed of												

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
			grey cleavelandite with hematized coarse grained pyroxene (square cross section). Mafics often pseudomorphed by tan zircon. Local hematized bands 10-20cm. Strongly magnetic throughout. Patchy tan zircon mineralization; wide sections with abundant medium to coarse grained pseudomorphs. Common fine grained interstitial and narrow (~3cm) bands of fine grained ribbony zircon. Common whitish, repeating bands (5-10cm) and lenses of cleavelandite throughout.													
84.70	144.60	3c	Heterogeneous Altered Syenite Texture highly variable over short intervals. Strong biotite/chlorite alteration throughout. Increasingly felsic downhole. Narrow MRZ sections (10-100cm) and bands (5-10cm) ~ 70 degrees to core axis. Kspar is generally light pink, rounded and resorbed and varies in size. Repeated 10-40cm altered aegirine cumulate. Common 10-15cm sections with clusters of coarse grained chloritized aegirine in white albitized matrix. Narrow hematized/chloritized bands (5-10cm) throughout. Sporadic coarse grained tan zircon pseudomorphs. Fault guage @ 93.0: thin layers of purplish kspar, calcite and massive pyrite ~ 60 degrees to core axis. Lower boundary arbitrary due to degree of alteration.													
144.60	182.50	1deh	Layered cumulate 144.6-155: Cumulate: Coarse to medium grained, illitized/chloritized aegirine pseudomorphs in albitic matrix. Local minor sericitization of aegerine. Strongly altered: mafics coalescing into illitic lenses and bands. Narrow white bands of cleavelandite. 155-158: Pegmatitic syenite; highly altered; rounded pink kspar, megacrystic to pematitic with chloritic lenses. 158-160: dark red (hematized), higly altered with little visible texture. Vague, medium grained (kspar) foyaitic texture becoming fine grained (kspar) to 160. 160-182.5: Cumulate interlayered with pegmatitic sections (20cm to 2m) and banded													

Hole No.		L08-127																		
Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %				
			sections (50-150cm). Banded sections: red/green, aphanitic with minor fine grained aligned kspar laths. Sharp contact between bands. Aegirine becoming lighter green (illitized), matrix increasingly albitized downhole. Short hematized, lujravitic section 182-182.5, enclosing 10cm cumulate section.																	
182.50	184.60	1c	Aegirine foyaite Foyaitic, coarse grained kspar laths, with hematite/chlorite replaced aegirine prisms in hematized matrix. Minor amorphous, green phenocrysts (another generation of aegirine?). Kspars randomly oriented.																	
184.60	201.30	1a	Altered Aegirine Syenite Aegirine syenite becoming progressively altered downhole; strongly hematized. Mafics chloritized. Weak fabric @ 184.8-185.25 and near bottom; coarse grained kspar laths "flow" around both red and green phenocrysts. Kspar laths oriented perpendicular to core axis. Red phenocrysts: 1-3cm, rimmed with hematite with chloritized core. Suggesting hematite is replacing green aegirine pseudomorphs. Phenocrysts commonly lath shaped. 187.55-188.05 and 189.65-190.0: pegmatitic intervals																	

AVALON VENTURES LTD. / THOR LAKE PROJECT

Diamond Drill Log

Hole_id:	L08-128	**Drilled By:**	Peak Drilling	**Objective:**	**Downhole Survey Tests**
Zone:	Lake Zone	**Started:**	2008-13-08		
Easting_GPS:	417,224	**Finished:**	2008-16-08	**Summary:**	
Northing_GPS:	6,885,960	**Core Size:**	NQ2		
Elev_GPS:	-999	**Surveyed?:**	☐		
East_Plot:	417,224.00	**Logged By:**	Angela Martin		
North_Plot:	6,885,960.00	**Length (m):**	213.50		
Elev_Plot:	-999.00	**Note: Collar Coords in NAD83 / Zone 12**			

Hole No. **L08-128**

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
0.00	8.00	9	Overburden. 20' casing.													
8.00	52.10	4b	Albitized Syenite Overall pale pink, intensely to strongly albitized throughout. Texture obscured by albitization, except in short sections. Predominantly very coarse grained to coarse grained, rounded and resorbed Kspar, white with orange core. Matrix composed of white cleavelandite. Minor coarse grained, irregualr chloritized mafics throughout. Commonly vuggy in more intensely albitized sections, along with coarse purple intersertal fluorite. Chloritized mafics are bright green and semi translucent (ex: 46.2-48.0) 29.7-30.0: very coarse, euhedral aegirine pseudomorphs (partially albitized) in matrix of white cleavelandite. Porous.													
52.10	64.00	3a	Altered Porphyritic Syenite Megacrystic kspar, rounded and resorbed, in places with dense coarse to medium grained highly felsic groundmass consisting of coarse white, angular kspar, pink albitized kspar and partially albitized coarse grained mafics. Mafics often partially pseudomorphed by very fine grained zircon. Weakly mineralized. Upper and lower boundaries defined by increase and decrease of mafics, respectively.													

Hole No.		L08-128																			
Depth (m)				Samp_id	From	To	Length	TREO	HREO	Y	Ce	Nd	Dy	Nb	Ta	P2O5					
From	To	Lithocode	Description		(m)	(m)	(m)	%	%	ppm	ppm	ppm	ppm	ppm	ppm	%					
64.00	72.70	4a	Albitized Syenite As previous, except kspar megacrysts are fresher and more angular.																		
72.70	110.50	3a	Altered Porphyritic Syenite 72.7-77.0: white/pale pink megacrystic to coarse grained kspar fragments in dark pink cleavelandite matrix, with minor coarse grained remnant mafics. 77-80: same as previous interval, but with dark red (nepheline?) partially replacing relict coarse grained aegirine. Mafics range from medium to very coarse prisms, often in clusters. 83-96: becoming increasingly felsic and strongly albitized. Nepheline (?) appears at 93.2 and is abundant down section, enveloping kspar phenocrysts and coarse grained fluorite. Minor fine grained tan zircon pseudomorphs. 96-108.8: upper boundary abruptly gradational and defined by increase in mafic content; dark, relativcly unaltered. Possibly a 'mafic layer'? Coarse to megacrystic kspar, amorphous with medium grained orange/pink nepheline? aggregates (or skeletal crystal). Moderately albitized. Minor medium grained intersertal fluorite and fine tan zircon pseudomorphs and interstitial. Lower boundary arbitrary; becoming increasingly albitized.																		
110.50	147.95	4a	Albitized Syenite Increasingly albitized downhole. Locally vuggy. Strongly to intensely albitized; both kspar phenocrysts and matrix. Syenitic texture preserved in most places. Mafics are medium to coarse grained. Sometimes partially replaced by purple fluorite. Intensely albitized from 123.-149; composed almost completely of white cleavelandite. Abundant purple fluorite possibly replacing mafics, enveloped by pink, granular albite. Very vuggy. Minor coarse grained pseudomorphs composed of fine grained tan zircon, angular crystal outline. 130-131.2: band of purple fluorite with narrow chloritic horizons.																		

Hole No.		L08-128																			
Depth (m)				Samp_id	From	To	Length	TREO	HREO	Y	Ce	Nd	Dy	Nb	Ta	P2O5
From	To	Lithocode	Description		(m)	(m)	(m)	%	%	ppm	ppm	ppm	ppm	ppm	ppm	%
147.95	151.00	1h	Pegmatitic Syenite Fractured, often poikilitic, albitized kspar megacrysts (medium grained mafic prisms) with abundant pegmatitic to very coarse chloritized/illitized aegirine. Very coarse grained purple fluorite replacing mafics. Locally vuggy.													
151.00	199.40	1c	Foyaite Fine to very coarse foyaitic sections, strongly hematized. Short green illitic sections: @ 152.5 (25cm), @163 (35cm), @154.6 (40cm). Relatively altered; coarse mafics hematized/illitized, coalesced into irregular blebs. 183-199.4: pristine green aegirine with angular coarse grained amorphous red blebs, possibly altered nepheline. After 191: abundant bright red, megacrystic, amorphous nepheline? with white very coarse grained poikilitc kspar.													
199.40	213.50	1h	Pegmatitic Syenite Same as previous, but aegirine less altered; pristine and bright green. 209.7 down: coarse grained aggregates of aegirine, both green and replaced by specular hematite. Common megacyrstic aegirine, partially replaced by dark purple fluorite.													

Not exact collar coord.

AVALON VENTURES LTD. / THOR LAKE PROJECT

Diamond Drill Log

Hole_id:	L08-130	**Drilled By:**	Peak Drilling	**Objective:**	**Downhole Survey Tests**
Zone:	Lake Zone	**Started:**	2008-08-19		
Easting_GPS:	416,525	**Finished:**	2008-08-24	**Summary:**	
Northing_GPS:	6,886,365	**Core Size:**	NQ2		
Elev_GPS:	-999	**Surveyed?:**	☐		
East_Plot:	416,525.00	**Logged By:**	Angela Martin		
North_Plot:	6,886,365.00	**Length (m):**	198.25		
Elev_Plot:	-999.00	**Note: Collar Coords in NAD83 / Zone 12**			

Hole No. L08-130

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
0.00	8.80	9	27' casing, overburden.													
8.80	59.35	4a	Albitized Syenite Predominantly medium to coarse grained. Subhedral to euhedral aegirine is commonly replaced by hematite, magnetite and chlorite. Kspar is coarse to pegmatitic, commonly ablitized. Matrix is composed mainly of white/grey cleavelandite. Syenitic textures well preserved. Sporadic, medium grained silver zircon partially overgrowing mafics, usually in clusters. Mineralized: 1.2 Nb, 0.1 Ce, 0.1 Ta. Becoming finer grained downhole from 10cm band of massive purple fluorite at 57.95.													
59.35	153.60	1ac	Altered Nepheline Aegirine Foyaite Upper boundary defined by foyaitic texture, abruptly gradational. Bands of massive purple fluorite ~ 10cm wide @ ~60m, abruptly grading into weakly altered, coarse grained foyaite. Mafics replaced with chlorite, hematite, magnetite and sometimes fluorite. Minor and sporadic medium grained pseudomorphs composed of fine grained tan zircon. Matrix strongly hematized or ablitized throughout. 90.9-91.3: amorphous, megacrystic, deep orange mineral (nepheline? or hematite													

Hole No.		L08-130																			
Depth (m)				Samp_id	From	To	Length	TREO	HREO	Y	Ce	Nd	Dy	Nb	Ta	P2O5					
From	To	Lithocode	Description		(m)	(m)	(m)	%	%	ppm	ppm	ppm	ppm	ppm	ppm	%					
			stained Kspar?) with intersertal fluorite. Often partially replacing or pseudomorphing kspar. Multiple short aegirine-rich sections 10-75 cm wide. Aegirine is predominantly medium grained, densely packed, prismatic and pristine green (yet altered). 130.95-131: aegirine-rich (as described above) with megacrystic and coarse grained kspar. Kspar is partially pseudomorphed by very fine grained tan zircon? and minor fluorite. Mineralized: 1.08 Ce, 0.3 Pr, 0.5 Nd, 0.6 Nb. These pseudomorphs become quite abundant from 177 down. Kspar megacrysts are commonly poililitic, with medium grained, black and dark red aegirine needles. Some replaced by specular hematite. @133.8-134.2: pegmatitic; kspar albitized, rounded and resorbed. Pegmatitic aegirine is replaced by chlorite, hematite and partially pseudomorphed by silver zircon. Vuggy after 134, mafics sercitized with bright red hematite blebs. Minor fluorite and albite replacement.																			
153.60	198.25	1a	Nepheline Aegirine Syenite Medium to coarse grained, prismatic, green, pristine yet altered aegirine with minor white and/or pink Fd, anhedral, medium to coarse grained. Matrix predominantly white (primary?) albite (crystalline, translucent). Darker pink/brown interval from 153.6-160.4 and 163-168.4 due to abundant dark pink kspar and dark green aegirine. Minor, coarse grained amorphous, orange/red nepheline throughout. Strongly albitized 189.8-192.15: predominantly white cleavelandite with minor medium grained aegerine needles and aggregates of buff, medium grained feldspar (?). Becoming very coarse grained after 194; both kspar and pristine green aegirine. EOH																			

AVALON VENTURES LTD. / THOR LAKE PROJECT

Diamond Drill Log

Hole_id:	L09-152	**Drilled By:**	Foraco Drilling	**Objective:**	Define Basal Zone
Zone:	Lake Zone	**Started:**	2009-03-22	**Summary:**	Packer hole
Easting_GPS:	417,133	**Finished:**	2009-03-26		
Northing_GPS:	6,886,271	**Core Size:**	NQ		
Elev_GPS:	242	**Surveyed?:**	☑		
East_Plot:	417,133.77	**Logged By:**	JC Pedersen		
North_Plot:	6,886,268.78	**Length (m):**	193.85		
Elev_Plot:	241.05	**Note: Collar Coords in NAD83 / Zone 12**			

Downhole Survey Tests

Depth	Dip	Azimuth	Type
0	-90	0	Collar
193.85	-90	0	Acid

Hole No. L09-152

Page 1 of 5

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
0.00	4.20	9	Overburden; Organics, sand, boulders (greywacke).													
4.20	28.00	4a	Albitized Syenite/Feldspathite; Light pink with partially preserved porphyritic to sub-pegmatitic textures. Strongly albitized, with pervasive interstitial alteration and replacement, consisting of chlorite, clay, and calcite, with sporadic bastnaesite, trace zircon and pyrite. Occasional finely porous intervals. Local intervals with increased interstitial mafics (3cd).	591562	4.20	5.85	1.65	**1.18**	**0.12**	480	4300	2020	101	669	67	0.10
				591563	5.85	8.00	2.15	**0.75**	**0.06**	215	2790	1310	57	947	65	0.07
				591564	8.00	10.00	2.00	**0.77**	**0.07**	278	2830	1310	61	581	51	0.05
				591565	10.00	12.00	2.00	**0.77**	**0.07**	239	2850	1350	55	494	43	0.06
				591566	12.00	14.00	2.00	**0.87**	**0.07**	250	3250	1515	58	953	53	0.03
				591567	14.00	16.00	2.00	**0.98**	**0.06**	161	3760	1760	52	844	54	0.08
				591568	16.00	17.00	1.00	**1.27**	**0.10**	351	4740	2280	85	1320	73	0.03
				591569	17.00	19.00	2.00	**0.84**	**0.06**	154	3160	1565	47	709	40	0.12
				591570	19.00	21.00	2.00	**0.72**	**0.04**	92	2790	1245	33	612	26	0.08
				591571	21.00	23.00	2.00	**0.44**	**0.03**	103	1660	801	28	321	21	0.03
				591572	23.00	25.00	2.00	**0.54**	**0.04**	124	2060	925	33	644	39	0.03
				591573	25.00	27.00	2.00	**0.52**	**0.03**	94	2010	858	28	446	24	0.04
				591574	27.00	28.00	1.00	**1.00**	**0.06**	159	3880	1650	57	1195	72	0.01
28.00	52.00	3c; 2	Heterogeneous Syenite/MRZ; Dark green-grey, heterogeneous textures and assemblages, all with mafic metasomatic overprint. Precursor assemblages include	591576	28.00	30.00	2.00	**2.54**	**0.15**	386	9810	4310	131	1955	149	0.08

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
			medium grained syenite, porphyritic syenite, and syenite pegmatite with variable primary mafic minerals now completely replaced. Alteration minerals include abundant fine to patchy chlorite, hematite, magnetite, bastnaesite, zircon, and trace fluorite and pyrite. Zircon varies from fine disseminated chalky grains to irregular tan to bronze coloured masses and coarse skeins up to 5 cm in size. Local intense zircon-REE enrichment in numerous intervals at 32.0; 28.4-39.0; 44.0-44.5; 50.7-50.9. Intermittently strongly magnetic, particularly in zircon-enriched sections.	591577	30.00	32.00	2.00	**2.13**	**0.11**	271	8180	3550	97	1955	146	0.07
				591578	32.00	34.00	2.00	**1.19**	**0.07**	176	4580	2030	60	1045	64	0.08
				591579	34.00	36.00	2.00	**1.32**	**0.08**	218	5080	2370	66	1285	67	0.07
				591581	36.00	38.30	2.30	**1.27**	**0.11**	354	4760	2190	96	1210	85	0.13
				591582	38.30	39.00	0.70	**2.65**	**0.20**	443	9880	4720	226	3420	179	0.73
				591583	39.00	41.00	2.00	**0.42**	**0.03**	77	1590	674	27	400	26	0.01
				591584	41.00	43.00	2.00	**0.68**	**0.05**	146	2530	1175	46	678	45	0.11
				591585	43.00	45.00	2.00	**2.60**	**0.21**	656	9530	4680	168	3670	228	0.10
				591586	45.00	47.00	2.00	**1.76**	**0.11**	256	6630	3100	90	2560	146	0.12
				591587	47.00	49.00	2.00	**1.70**	**0.10**	231	6430	2990	92	1655	103	0.16
				591588	49.00	51.00	2.00	**2.01**	**0.16**	450	7340	3650	125	3670	224	0.20
				591589	51.00	52.00	1.00	**3.39**	**0.45**	1770	11650	5840	448	5540	319	0.10
52.00	88.50	5ab; 4b	Feldspathite/Albitized Syenite; Light pink, medium to coarse grained intensely albitized and altered. Various degrees of albitization with resultant partially preserved relict textures. Predominant texture/lithology is light pink albitized syenite with coarse red-brown aegirine (?) pseudomorphs imparting distinct coarse brown spotted texture, commonly in association with finely miarolitic groundmass. Minor interlayered altered mafic syenite and fine grained pseudo-foyaitic intervals. Uniqe interval from 65.2-67.5 with massive aphanitic fluorite and fluorite-clay-sericite replacement.	591590	52.00	54.00	2.00	**1.62**	**0.16**	518	5680	2970	134	3820	223	0.21
				591591	54.00	56.00	2.00	**1.10**	**0.11**	398	4080	1760	122	1440	99	0.13
				591592	56.00	59.00	3.00	**0.54**	**0.05**	166	2030	888	40	1135	62	0.02
				591593	59.00	60.50	1.50	**0.12**	**0.05**	226	295	129	39	1205	95	0.01
				591594	60.50	62.00	1.50	**0.30**	**0.05**	184	1065	454	45	1420	88	0.04
				591595	62.00	64.00	2.00	**0.98**	**0.08**	206	3720	1635	86	2630	168	0.17
				591596	64.00	65.20	1.20	**0.66**	**0.09**	403	2380	949	85	3530	237	0.07
				591597	65.20	67.50	2.30	**0.15**	**0.02**	65	564	215	13	200	9	0.02
				591598	67.50	69.00	1.50	**0.14**	**0.03**	122	425	230	28	238	13	0.02
				591599	69.00	71.00	2.00	**0.18**	**0.04**	214	552	254	48	277	17	0.03
				591601	71.00	73.00	2.00	**0.18**	**0.03**	139	646	277	33	227	13	0.02
				591602	73.00	75.00	2.00	**0.43**	**0.02**	59	1725	714	23	623	30	0.02
				591603	75.00	77.00	2.00	**0.66**	**0.03**	59	2630	1200	24	472	18	0.04
				591604	77.00	79.00	2.00	**0.42**	**0.02**	61	1675	668	24	873	30	0.03
				591605	79.00	81.00	2.00	**0.40**	**0.02**	54	1580	631	20	377	17	0.02
				591606	81.00	83.00	2.00	**1.05**	**0.04**	100	4220	1580	37	498	21	0.01

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
				591607	83.00	85.00	2.00	**0.57**	**0.02**	48	2360	849	18	795	22	0.01
				591608	85.00	87.00	2.00	**0.40**	**0.02**	70	1605	619	20	729	26	0.01
				591609	87.00	88.50	1.50	**0.52**	**0.02**	61	2110	823	22	554	20	0.01
88.50	105.50	3d	Altered/Albitized syenite; Dark grey, medium to coarse grained, fairly homogeneous with strong earlier albitizing event producing weakly developed coarse net-textture. Likely originally an aegirine syenite. Pervasive hematization, strongly magnetic. Common interstitial medium grained chalky mineralmay be pseudomorph, and now comprised of calcite (at least in part). Generally only trace zircon and REE mineralization.	591610	88.50	91.00	2.50	**0.53**	**0.04**	147	2110	806	42	1605	61	0.05
				591611	91.00	93.00	2.00	**0.83**	**0.07**	270	3190	1185	80	2240	117	0.10
				591612	93.00	95.00	2.00	**0.35**	**0.03**	99	1320	551	34	464	19	0.01
				591613	95.00	97.00	2.00	**0.54**	**0.05**	163	2090	811	52	909	44	0.03
				591614	97.00	99.00	2.00	**0.51**	**0.05**	187	1885	758	55	902	59	0.09
				591615	99.00	101.00	2.00	**0.24**	**0.01**	39	909	354	17	534	21	0.10
				591616	101.00	103.00	2.00	**0.45**	**0.03**	67	1675	708	39	752	16	0.11
				591617	103.00	105.50	2.50	**0.61**	**0.05**	132	2280	1005	62	1875	87	0.18
105.50	112.00	5b	Feldspathite; Light pink and vuggy, as previous.	591618	105.50	107.00	1.50	**2.05**	**0.19**	654	7670	3450	184	3830	256	0.54
				591619	107.00	109.00	2.00	**1.10**	**0.09**	309	4220	1795	83	1730	144	0.11
				591621	109.00	111.00	2.00	**0.19**	**0.04**	171	671	263	36	771	73	0.01
				591622	111.00	112.00	1.00	**0.51**	**0.03**	115	2090	770	28	523	54	0.01
112.00	128.10	3d	Altered/Albitized Syenite As previous, farily heterogeneous, highly albitic to 120.9. After 120.9, increasing mafics, but only trace zircon and REE's. Basal Zone commences with abrupt appearance of zircon. Section is weakly to moderately magnetic.	591623	112.00	114.00	2.00	**0.32**	**0.11**	508	910	341	108	1970	178	0.01
				591624	114.00	116.00	2.00	**0.57**	**0.06**	209	2180	858	62	1960	147	0.16
				591626	116.00	118.00	2.00	**0.53**	**0.07**	265	1980	786	66	935	69	0.09
				591627	118.00	120.90	2.90	**0.40**	**0.06**	270	1400	558	61	1305	102	0.04
				591628	120.90	123.00	2.10	**0.12**	**0.02**	82	443	164	17	1085	55	0.03
				591629	123.00	125.00	2.00	**0.08**	**0.02**	78	273	102	16	1260	36	0.01
				591630	125.00	127.00	2.00	**0.11**	**0.02**	84	401	160	19	749	51	0.06
				591631	127.00	128.10	1.10	**0.06**	**0.01**	26	202	81	7	312	5	0.03
128.10	152.95	2b/1c	MRZ (Basal Zone)/Foyaitic Syenite; Abrupt appearance of zircon and REE's, with progressively developed foyaitic textures. Strongly magnetic. Heterogeneous textures, from finely foyaitic to coarse foyaitic, and porphyritic to sub-pegmaititic syenite, all with heterogeneous alteration overprint. Ubiquitous tan zircon, as fine disseminated grains, skeins, irregular masses with chlorite/biotite, coarse	591632	128.10	130.00	1.90	**1.42**	**0.24**	1030	4870	2140	234	2000	168	0.06
				591633	130.00	131.00	1.00	**1.83**	**0.50**	2330	5440	2450	462	2490	268	0.02
				591634	131.00	133.00	2.00	**1.45**	**0.28**	1240	4810	2090	270	2330	254	0.05
				591635	133.00	134.00	1.00	**0.93**	**0.19**	882	3080	1310	191	1230	121	0.16

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
			pseudomorphs after unknow mineral, and local narrow cumulate assemblages. Broad patches of hematite alteration. 130-131 Strong zircon replacement, possible cumulate. 131-133 Fine grained layered foyaite with common disseminated bands of fine grained zircon. 133-134 Coarser grained, decreasing zircon. 134-135.5 Strong chloritic and hematitic alteration, coarse patches of very fine zircon, with 15cm aggregate of zircon-hematite-chlorite with Niton reading of 2%Sm/2.9%Nd/4.7%Ce/2.7%La/.62Gd/.12Eu/1.8%Nb/.3%Ta. 135.5-137 Feldspathic, foyaitic with minor zircon. 137-139 Altered porphyritic syenite, may be weakly banded, with patchy zircon replacement. 139-141.4 As above. 141.4-143.7 Very strong alteration and zircon-REE enrichment. Coarse zircon pseudomorphs in aegirine (nepheline) syenite precursor. Strongly magnetic, hematitic, Niton spot reading with 1.3%y/.22Ta. 143.7-145.1 Coarse foyaite, likely nepheline foyaite with significant interstitial hematite. Local fine patches of zircon-REE enrichment. 145.1-147 Coarse grained, strongly mineralized with localized coarse cumulate textures. 147-149 As above, less cumulate. 149-150.6 As above, becoming more leucocratic. 150.6-152.95 Mafics decreasing, more feldspathic, medium grained, decreasing zircon mineralziation.	591636	134.00	135.50	1.50	**2.62**	**0.20**	491	9570	4680	145	3550	347	0.04
				591637	135.50	137.00	1.50	**0.16**	**0.02**	85	560	268	24	333	13	0.01
				591638	137.00	139.00	2.00	**1.16**	**0.13**	391	4110	1975	115	2140	215	0.03
				591639	139.00	141.40	2.40	**1.97**	**0.41**	1570	6100	3080	492	3070	341	0.15
				591640	141.40	143.70	2.30	**4.41**	**1.27**	5540	12100	6370	1175	6350	689	0.12
				591641	143.70	145.10	1.40	**2.71**	**0.64**	2840	7980	4480	673	2010	266	0.24
				591642	145.10	147.00	1.90	**2.66**	**0.75**	3170	7390	3800	834	3990	504	0.07
				591643	147.00	149.00	2.00	**2.75**	**0.82**	3690	7430	3860	811	3430	446	0.13
				591644	149.00	150.60	1.60	**3.20**	**0.92**	3870	8780	4530	935	4860	672	0.13
				591645	150.60	152.95	2.35	**1.40**	**0.33**	1410	4190	2070	365	2990	406	0.26
152.95	193.85	1ac	Aegirine Syenite/Foyaitic Syenite; Transitional to aegirine syenite. Heterogeneous textures and assemblages. Little or no zircon. Mafics chloritized, also altered to illite, sericite, hematite, and magnetite. Magnetite decreasing after 173. Local interstitial and patchy fluorite, particularly 173-178. Aegirine increasing downhole, locally with characteristic green colour. Well developed intermittent coarse graained aegirine nepheline foyaite. 154.3 Hydrothermal breccia directly below pegmatitic interval.	591646	152.95	155.00	2.05	**0.36**	**0.05**	208	1315	531	44	1085	142	0.10
				591647	155.00	157.00	2.00	**0.41**	**0.06**	263	1485	554	52	1060	122	0.16
				591648	157.00	159.00	2.00	**0.26**	**0.03**	121	956	410	25	637	54	0.03
				591649	159.00	160.90	1.90	**0.23**	**0.03**	136	838	359	25	363	27	0.03
				591651	160.90	163.00	2.10	**0.24**	**0.02**	66	903	411	20	874	25	0.01
				591652	163.00	165.40	2.40	**1.07**	**0.05**	171	4250	1600	46	707	51	0.09
				591653	165.40	166.85	1.45	**0.08**	**0.02**	85	260	114	18	467	20	0.05
				591654	166.85	169.00	2.15	**0.08**	**0.01**	27	299	133	8	210	7	0.02
				591655	169.00	171.00	2.00	**0.07**	**0.01**	53	241	111	13	318	16	0.01
				591656	171.00	173.00	2.00	**0.24**	**0.03**	132	823	394	33	490	44	0.18
				591657	173.00	175.00	2.00	**0.19**	**0.03**	100	622	306	37	389	45	0.01

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
				591658	175.00	177.00	2.00	**0.20**	**0.02**	52	737	344	22	231	13	0.01
				591659	177.00	179.00	2.00	**0.15**	**0.02**	53	545	257	16	188	13	0.01
				591661	179.00	181.00	2.00	**0.07**	**0.01**	28	273	122	7	265	19	0.01
				591662	181.00	183.00	2.00	**0.11**	**0.01**	58	386	178	14	227	11	0.01
				591663	183.00	185.00	2.00	**0.19**	**0.02**	84	664	334	25	410	24	0.01
				591664	185.00	187.00	2.00	**0.51**	**0.05**	131	1900	916	50	288	22	0.02
				591665	187.00	189.00	2.00	**0.13**	**0.01**	48	457	208	16	216	12	0.01
				591666	189.00	191.00	2.00	**0.10**	**0.02**	102	319	150	22	246	15	0.01
				591667	191.00	193.85	2.85	**0.23**	**0.07**	293	643	327	74	386	51	0.06

AVALON VENTURES LTD. / THOR LAKE PROJECT

Diamond Drill Log

Hole_id:	L09-151	**Drilled By:**	Foraco Drilling	**Objective:**	Define Basal Zone
Zone:	Lake Zone	**Started:**	2009-03-18	**Summary:**	Packer hole
Easting_GPS:	417,423	**Finished:**	2009-03-21		
Northing_GPS:	6,886,298	**Core Size:**	NQ		
Elev_GPS:	241	**Surveyed?:**	☑		
East_Plot:	417,423.03	**Logged By:**	JC Pedersen		
North_Plot:	6,886,295.40	**Length (m):**	215.19		
Elev_Plot:	240.55	**Note: Collar Coords in NAD83 / Zone 12**			

Downhole Survey Tests

Depth	Dip	Azimuth	Type
0	-90	0	Collar
215.19	-90	0	Acid

Hole No. L09-151

Depth (m) From	Depth (m) To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
0.00	6.70	9	Overburden; organics, clay, boulders.													
6.70	37.40	5b	Feldspathite; Pink, homogeneous, very porous and vuggy. Almost completely albitized, with fine-medium grained cleavelandite. Minor local partially preserved white Kspar phenocrysts. Very common irregular to ovoid calcite pods to 6cm. Locally to 20% , commonly miarolitic with fine sulphide crystals including chalcopyrite, pyrite, and galena (</=1%). Calcite also commonly intersertal to cleavelandite plates: CO2, CaCO3 and NaO coeval. Vugs and cavities commonly with well developed cleavelandite, and locally quartz. Random sulphide crystal overgrowths. Section is very high level and late stage. Negligible fracture fill or vein development.	591449	6.70	9.00	2.30	**0.15**	**0.01**	12	598	249	5	428	4	0.03
				591451	9.00	11.00	2.00	**0.10**	**0.00**	12	418	163	4	630	7	0.03
				591452	11.00	13.00	2.00	**0.12**	**0.01**	25	460	176	8	651	8	0.03
				591453	13.00	15.00	2.00	**0.09**	**0.00**	9	345	139	3	257	3	0.02
				591454	15.00	17.00	2.00	**0.09**	**0.00**	9	366	153	3	143	2	0.01
				591455	17.00	19.00	2.00	**0.17**	**0.01**	13	676	297	6	187	2	0.03
				591456	19.00	21.00	2.00	**0.25**	**0.01**	18	951	390	9	203	2	0.01
				591457	21.00	23.00	2.00	**0.37**	**0.01**	23	1455	623	11	287	4	0.04
				591458	23.00	25.00	2.00	**0.29**	**0.01**	18	1175	458	8	264	4	0.03
				591459	25.00	27.00	2.00	**0.30**	**0.01**	20	1185	447	9	154	2	0.02
				591461	27.00	29.00	2.00	**0.31**	**0.01**	22	1215	504	10	139	2	0.02
				591462	29.00	31.00	2.00	**1.20**	**0.04**	59	4780	2000	30	321	4	0.05
				591463	31.00	33.00	2.00	**0.45**	**0.02**	30	1775	783	16	151	5	0.03
				591464	33.00	35.00	2.00	**0.54**	**0.02**	38	2100	942	19	121	2	0.03
				591465	35.00	37.40	2.40	**0.29**	**0.01**	19	1115	545	8	122	2	0.01

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
37.40	51.20	5a	Abrupt change from vuggy section. Strongly megacrystic, with decreasing albite. Strong intersertal clay alteration, in patches to 10cm, olive-green, softe and waxy, often with late fluorite. Relict medium grained syenite textures after 148. Trace REE's (Niton) average 0.15% Ce.	591466	37.40	39.00	1.60	**0.58**	**0.02**	32	2300	1055	13	227	3	0.01
				591467	39.00	41.00	2.00	**0.29**	**0.01**	21	1095	541	8	401	6	0.01
				591468	41.00	43.00	2.00	**0.12**	**0.01**	22	456	200	7	1010	20	0.02
				591469	43.00	45.00	2.00	**0.34**	**0.01**	27	1315	640	11	558	13	0.02
				591470	45.00	47.00	2.00	**0.43**	**0.02**	56	1695	671	21	321	10	0.02
				591471	47.00	49.00	2.00	**0.72**	**0.03**	71	2730	1270	29	614	27	0.02
				591472	49.00	51.20	2.20	**0.95**	**0.05**	103	3690	1535	38	450	18	0.02
51.20	55.60	3cd	Altered Syenite; Abruptly gradational with increasing mafic/chloritic content. Heterogeneous textures and assemblages, but precursor generally coarsely porphyritic to sub-pegmatitic syenite. Mafic sections magnetic. Local finely disseminated bastnaesite in chloritic interstices and aggregates. Trace fine grained chalky zircon.	591473	51.20	53.00	1.80	**1.08**	**0.06**	146	4060	1850	59	1125	52	0.05
				591474	53.00	55.60	2.60	**1.21**	**0.06**	152	4650	2040	60	922	42	0.04
55.60	67.90	2,3d	MRZ/Altered Chlorite Syenite; Much more mafic alteration and replacement. Common medium grained grey cleavelandite replacement, appears earlier than mafic replacement. Common sub-perpendicular skein-like fractures and replacement stringers. Fine grained zircon dissemniated throughout, generally dispersed and non-aggregated. Localpegmatitic interval at 64.5-65.4 which is less mafic. Moderately to strongly magnetic, ubiquitous subordinate hematite.	591476	55.60	57.00	1.40	**1.45**	**0.10**	274	5440	2500	96	1095	68	0.21
				591477	57.00	59.00	2.00	**1.03**	**0.05**	99	3990	1695	40	990	60	0.03
				591478	59.00	61.00	2.00	**2.33**	**0.11**	214	9020	3730	89	1315	95	0.12
				591479	61.00	63.00	2.00	**1.77**	**0.14**	425	6490	3180	130	1960	127	0.19
				591480	63.00	64.50	1.50	**2.00**	**0.11**	212	7650	3450	88	1585	123	0.18
				591481	64.50	65.40	0.90	**1.34**	**0.07**	184	5130	2260	52	525	37	0.02
				591482	65.40	67.90	2.50	**1.45**	**0.09**	232	5480	2570	74	936	80	0.18
67.90	82.70	4a	Albitized Syenite; Abruptly pinker, albitized and preserved syenitc textures. Locally pegmatitic. Interstitial mafics completely chloritized/illitized. Common interstitial calcite. Ubiquitous minor disseminated zircon grains, trace bastnaesite. Erratic intervals with increasing interstitial mafics.	591483	67.90	70.00	2.10	**0.64**	**0.04**	99	2400	1175	33	202	15	0.04
				591484	70.00	72.00	2.00	**0.65**	**0.04**	97	2430	1150	38	239	17	0.04
				591485	72.00	74.00	2.00	**0.89**	**0.06**	172	3300	1550	61	410	31	0.09
				591486	74.00	76.00	2.00	**0.85**	**0.06**	158	3150	1490	49	632	36	0.04
				591487	76.00	78.00	2.00	**0.87**	**0.07**	188	3190	1560	63	519	44	0.08
				591488	78.00	80.00	2.00	**0.62**	**0.04**	80	2340	1135	34	87	5	0.01
				591489	80.00	82.70	2.70	**0.78**	**0.05**	98	2900	1430	46	412	23	0.02
82.70	98.30	3d	Altered Syenite; Gradational from previous with decrease in albite and increase in mafics, and decrease in grain size. Section precursor fairly homogeneous. Medim to caorse grained, with increase in interstitial mafics and mific replacement, mainly	591490	82.70	84.00	1.30	**0.55**	**0.04**	94	2040	1020	35	133	11	0.05
				591491	84.00	86.00	2.00	**0.66**	**0.09**	367	2200	1140	91	487	53	0.10

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
			chloritic, biotite (?), and very minor magnetite. Common fine white interstitial calcite, trace pyrite. Precursor porphyritic syenite. Minor ubiquitous fine chalky zircon graains. Section hs moderately elevated REE mineralization, average </= 1% (Niton).	591492	86.00	88.00	2.00	**1.27**	**0.09**	197	4720	2350	83	701	62	0.11
				591493	88.00	90.00	2.00	**1.03**	**0.07**	178	3760	1930	64	1020	82	0.07
				591494	90.00	92.00	2.00	**0.87**	**0.06**	153	3210	1610	56	953	74	0.07
				591495	92.00	94.00	2.00	**1.10**	**0.09**	263	4020	2080	68	970	79	0.12
				591496	94.00	96.00	2.00	**1.01**	**0.07**	183	3700	1950	64	640	60	0.13
				591497	96.00	98.30	2.30	**0.87**	**0.11**	418	2990	1540	104	647	65	0.11
98.30	112.15	3d,2	Increasing mafics with increase in tan coloured zircon, possibly minor fine grained interstitial bastnaesite. Section continuous from previous, but becoming more heterogenous, with minor local pegmatitic feldspar. Local intervals with salmon red feldspar may in part be altered nepheline. Moderately to strongly magnetic. Fine grained reddish foyaitic intervals after 108, with similar moderate REE-mineralization (.3Nd/.5Ce/.1Y).	591498	98.30	100.00	1.70	**2.41**	**0.21**	593	8670	4540	160	3110	197	0.38
				591499	100.00	102.00	2.00	**1.36**	**0.16**	547	4720	2420	144	2640	162	0.20
				591502	102.00	104.00	2.00	**1.14**	**0.11**	348	4040	2060	99	1210	120	0.16
				591503	104.00	106.00	2.00	**1.11**	**0.11**	335	3940	2000	93	1060	115	0.20
				591504	106.00	108.00	2.00	**1.18**	**0.11**	322	4220	2150	87	1500	135	0.11
				591505	108.00	110.00	2.00	**1.56**	**0.35**	1540	4730	2420	374	2560	202	0.07
				591506	110.00	112.15	2.15	**2.77**	**0.58**	2520	8540	4460	580	3640	309	0.14
112.15	120.25	3e	Altered Foyaitic Syenite Abrupt transition from previous, suggesting layer/horizon boundary. Coarse grained, light pink, heterogeneous textures. Ubiquitous fine chalky zircon dusting. Increasing mafic alteration toward bottom of section.	591507	112.15	114.00	1.85	**0.72**	**0.13**	504	2310	1180	132	827	86	0.03
				591508	114.00	116.00	2.00	**0.91**	**0.12**	405	3050	1515	112	1235	94	0.10
				591509	116.00	118.00	2.00	**0.77**	**0.09**	323	2590	1370	82	1030	83	0.06
				591510	118.00	120.25	2.25	**1.55**	**0.14**	405	5610	2710	135	1690	156	0.34
120.25	125.40	2	MRZ; Abrupt transtion from previous. Coarse porphyritic syenite precursor. Very dark green-tan colour imparted by abundant fine grained chlorite-biotit with associated fine grained tan-coloured skeins of zircon. REE values surprisingly low for this section, suggesting REE's may not be confined to zircon. Possible brittle (healed) fault offsets at 125.4 with sub-vertical contact between finer grained MRZ and coarser albitized altered syenite. Note that fine zircon overgrowths occur in MRZ but do not carry over to albitized section along sharp fault(?) stoped block(?) boundary.	591511	120.25	122.30	2.05	**2.52**	**0.25**	852	8840	4590	223	4230	380	0.26
				591512	122.30	124.00	1.70	**1.82**	**0.47**	2150	5270	2700	481	2340	251	0.10
				591513	124.00	125.40	1.40	**2.79**	**0.63**	2770	8480	4320	621	3880	408	0.16
125.40	131.40	3c	Heterogeneous Altered Albitized Syenite/MRZ Coarse grained, heterogeneous textures, with subvertical shears/offsets to 128, commonly finely anastomosing. Appear healed and suggest late stage co-eval internal displacement/movement. Highly albitized with common zones of medium grained grey-white cleavelandite masses, often with interstitial mafic replacement.	591514	125.40	127.00	1.60	**0.22**	**0.02**	82	790	378	23	285	31	0.02
				591515	127.00	129.00	2.00	**1.24**	**0.12**	316	4450	2180	124	1765	152	0.30
				591516	129.00	131.40	2.40	**1.12**	**0.11**	308	3990	1900	123	2330	176	0.40

Depth (m) From	To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
131.40	167.00	3ec;2b	Altered Foyaitic/Heterogeneous Syenite/ MRZ; Predominantly altered foyaitic syenite with non-foyaitic porphyritic syenite intervals. Ubiquitous interstitial chloritic alteration and disseminated fine overgrowing tan zircon. Common local accumulation of zircon. Moderately to strongly magnetic. Minor intermittent finer pink-red foyaitic intervals. Very local random disseminated pyrite. Possible salmon-red altered nepheline throughout. 155-167 Basal Zone enrichment. No obvious boundaries, interpreted mainly from local accumulation of zircon and moderate Niton readings.	591517	131.40	133.00	1.60	**0.39**	**0.06**	233	1300	630	63	447	49	0.07
				591518	133.00	135.00	2.00	**0.82**	**0.18**	772	2550	1240	201	1000	111	0.19
				591519	135.00	137.00	2.00	**1.03**	**0.11**	346	3620	1765	98	1625	144	0.28
				591520	137.00	139.00	2.00	**1.42**	**0.15**	460	5000	2430	144	2230	206	0.46
				591521	139.00	141.00	2.00	**1.04**	**0.15**	522	3510	1740	141	1690	178	0.01
				591522	141.00	143.00	2.00	**1.77**	**0.50**	2220	4990	2500	526	2680	315	0.07
				591523	143.00	145.00	2.00	**1.03**	**0.19**	726	3280	1665	187	1785	221	0.06
				591524	145.00	147.00	2.00	**0.57**	**0.09**	358	1870	950	100	974	102	0.12
				591526	147.00	149.00	2.00	**0.51**	**0.07**	249	1740	897	72	880	87	0.20
				591527	149.00	151.00	2.00	**1.19**	**0.13**	434	4210	2050	145	1510	147	0.44
				591528	151.00	153.00	2.00	**1.15**	**0.17**	604	3810	1910	174	3070	279	0.20
				591529	153.00	155.00	2.00	**1.13**	**0.16**	593	3750	1900	171	2390	249	0.14
				591530	155.00	157.00	2.00	**1.15**	**0.25**	979	3440	1785	303	2220	270	0.08
				591531	157.00	159.00	2.00	**1.56**	**0.31**	1180	4900	2460	319	2720	331	0.10
				591532	159.00	161.00	2.00	**2.50**	**0.55**	2020	7580	3860	661	4210	589	0.12
				591533	161.00	163.00	2.00	**1.88**	**0.60**	2640	4910	2600	639	3140	407	0.08
				591534	163.00	165.00	2.00	**2.01**	**0.57**	2290	5480	2930	725	4330	582	0.21
				591535	165.00	167.00	2.00	**1.23**	**0.22**	733	3890	1980	272	2610	343	0.04
167.00	189.50	3cd	Altered Porphyritic Syenite; Somewhat heterogeneous, with abrupt decrease in disseminated zircon. Local fine disseminated grains. reserved porphyritic to local sub-pegmatitic textures with albitic overprint. Local primary silvery zircon. occasional grains or aggregates of pyrite, <1%. Interstitial mafics completely altered. Local altered salmon-red nepheline. Moderately to strongly magnetic. Increasingly pegmatitic downhole, grading to more peralkaline aegirine-bearing syenite. 183-189 Subvertical fracturing, filled with carbonate and chlorite.	591536	167.00	169.00	2.00	**1.59**	**0.37**	1410	4700	2400	474	3650	463	0.28
				591537	169.00	171.00	2.00	**1.41**	**0.26**	905	4510	2240	289	2830	403	0.29
				591538	171.00	173.00	2.00	**1.14**	**0.31**	1390	3250	1600	345	2460	365	0.38
				591539	173.00	175.00	2.00	**0.29**	**0.04**	162	1005	478	36	921	117	0.04
				591541	175.00	177.00	2.00	**0.28**	**0.03**	88	1040	482	23	674	57	0.03
				591542	177.00	179.00	2.00	**0.19**	**0.02**	52	691	313	15	397	23	0.01
				591543	179.00	181.00	2.00	**0.19**	**0.02**	51	696	323	17	359	22	0.03
				591544	181.00	183.00	2.00	**0.14**	**0.01**	44	490	237	14	226	13	0.04
				591545	183.00	185.00	2.00	**0.11**	**0.03**	114	337	158	25	429	28	0.05
				591546	185.00	187.00	2.00	**0.08**	**0.01**	55	281	133	12	163	9	0.01

Depth (m) From	Depth (m) To	Lithocode	Description	Samp_id	From (m)	To (m)	Length (m)	TREO %	HREO %	Y ppm	Ce ppm	Nd ppm	Dy ppm	Nb ppm	Ta ppm	P2O5 %
				591547	187.00	189.50	2.50	**0.15**	**0.02**	72	541	253	18	230	11	0.02
189.50	215.19	1a	Altered Aegirine Syenite; Gradational and subjective boundary with previous, with appearance of locally abundant medium to coarse grained altered and replaced aegirine. Section heterogeneous and coarse grained to sub-pegmaititic. Strong interstitial hematization. Mafic minerals commonly altered to olive-green clay. Local patchy fluorite, generally associated with clay alteration. Erratically moderately to strongly magnetic	591548	189.50	191.00	1.50	**0.33**	**0.03**	94	1190	554	33	370	26	0.03
				591549	191.00	193.00	2.00	**0.08**	**0.01**	50	264	124	15	225	15	0.03
				591551	193.00	195.00	2.00	**0.10**	**0.02**	65	330	162	19	346	29	0.01
				591552	195.00	197.00	2.00	**0.13**	**0.02**	63	427	211	20	186	14	0.01
				591553	197.00	199.00	2.00	**0.18**	**0.02**	76	654	304	21	570	48	0.01
				591554	199.00	201.00	2.00	**0.09**	**0.01**	34	320	149	11	149	8	0.11
				591555	201.00	203.00	2.00	**0.14**	**0.01**	42	510	256	14	135	5	0.02
				591556	203.00	205.00	2.00	**0.17**	**0.02**	67	607	257	20	679	35	0.01
				591557	205.00	207.00	2.00	**0.32**	**0.03**	102	1175	535	31	812	65	0.09
				591558	207.00	209.00	2.00	**0.11**	**0.01**	38	367	188	12	191	13	0.01
				591559	209.00	211.00	2.00	**0.15**	**0.02**	50	535	274	18	213	12	0.01
				591560	211.00	213.00	2.00	**0.04**	**0.01**	43	124	61	12	282	13	0.02
				591561	213.00	215.19	2.19	**0.07**	**0.01**	49	215	114	13	399	25	0.02

APPENDIX C

Tables

Table 1: Monitoring Well Location Summary

Well	Date of Well Completion	UTM NAD83		Ground Elevation (m asl)	Screen Interval (m)
		Northing	Easting		
L08-123	1-Aug-08	6,886,674.93	417,404.22	238.46	open corehole
L08-124	4-Aug-08	6,886,571.71	417,400.08	241.59	open corehole
MW08-127	13-Aug-08	6,886,671.67	417,235.41	238.04	6.9 - 16.4
MW08-128	16-Aug-08	6,885,963.61	417,228.73	240.28	8.0 - 10.3
MW08-130	24-Aug-08	6,886,370.61	416,518.77	246.04	7.6 - 13.7
MW09-151	21-Mar-09	6,886,295.40	417,423.03	240.55	81.2 - 95.2
MW09-152	26-Mar-09	6,886,268.78	417,133.77	241.05	84.7 - 99.7

NOTE:
masl - meters above sea level

Table 2: Monitoring Well Summary

MWID	Date	UTM NAD83		Elevation (masl)	Screened Length (m)	Stick up (m)	EOH (mb TOC)	DTW (mb TOC)	Groundwater Elevation (masl)
		Northing	Easting						
MWL08-123	10-Aug-08	6,886,674.93	417,404.22	238.46	open corehole	0.50	207.00	0.997	237.46
	7-Oct-08							0.82	237.64
	23-Mar-09							2.93	235.54[1]
	2-Oct-09							0.70	237.76[2]
								3.79	234.68[1]
MWL08-124	9-Aug-08	6,886,571.71	417,400.08	241.59	open corehole	0.12	198.00	1.55	240.04
	23-Sep-08							2.37	239.22
	7-Oct-08							2.11	239.48
	23-Mar-09							3.32	238.27[1]
	2-Oct-09							1.93	239.66
MWL08-127	13-Aug-08	6,886,671.67	417,235.41	238.04	6.9 – 16.4	0.50	17.37	0.94	237.10
	20-Sep-08							1.00	237.04
	7-Oct-08							0.91	237.13
	23-Mar-09							0.99	237.05[1]
	23-Jun-09							1.10	236.94[2]
								4.18	233.86[1]
	2-Oct-09							0.94	237.10

MWID	Date	UTM NAD83		Elevation (masl)	Screened Length (m)	Stick up (m)	EOH (mb TOC)	DTW (mb TOC)	Groundwater Elevation (masl)
		Northing	Easting						
MWL08-128	23-Sep-08	6,885,963.61	417,228.73	240.28	8.0 – 10.3	0.54	10.81	1.44	238.85
	7-Oct-08							0.92	239.36
	23-Mar-09							0.92	239.36[1]
	23-Jun-09							1.36	238.92[2]
								1.52	238.76[1]
	2-Oct-09							0.80	239.48
MWL08-130	23-Sep-08	6,886,370.61	416,518.77	246.04	7.6 – 13.7	0.09	8.16	1.18	244.87
	7-Oct-08							0.68	245.36
	23-Mar-09							1.18	244.86[1]
	23-Jun-09							1.22	244.82[1]
	2-Oct-09							1.53	244.52[2]
								3.33	242.71[1]
MWL09-151	22-Mar-09	6,886,295.40	417,423.03	240.55	81.2 – 95.2	0.65	96.21	1.88	238.67
	23-Jun-09							2.26	238.29[2]
								2.45	238.10[1]
	2-Oct-09							0.92	239.63
MWL09-152	26-Mar-09	6,886,268.78	417,133.77	241.05	84.7 – 99.7	0.40	99.66	1.54	239.51
	23-Jun-09							2.47	238.58[1]
	2-Oct-09							3.72	237.33[2]
								4.47	236.57[1]

NOTES:
masl - meters above sea level
mb TOC - meters below top of casing
[1] - Elevation of ice
EOH - end of hole
DTW - depth to water
[2] - Elevation of water on ice

Table 3: Summary of Hydraulic Properties from Packer Tests

Well	Interval Tested				Hydraulic Conductivity*		
	From	To	Midpoint	Length of Interval	Min	Max	Average
	m bgs			m	m/s		
MWL09-152	20.01	23.29	21.65	3.28	1.26E-06	2.02E-06	1.66E-06
	59.37	62.65	61.01	3.28	2.13E-07	4.48E-07	3.84E-07
	69.21	208.61	138.91	139.40	3.45E-08	5.36E-08	4.10E-08
	102.01	208.61	155.31	106.60	1.86E-08	5.30E-08	2.90E-08
	134.48	208.61	171.54	74.13	2.96E-08	5.43E-08	3.82E-08

NOTES:
mbgs - meters below ground surface
m/s - meters per second
* - method from Theim

Table 4: Recovery Test Summary

Monitoring Well	Screened Interval (m)	Screen Length (m)	Hydraulic Conductivity (m/s)	Calculation Method
L08-123	open corehole	207.0	6.06 x 10-8	Cooper, *et al.*
			8.35 x 10-8	Hvorslev
L08-124	open corehole	198.0	5.17 x 10 -7	Cooper, *et al.*
			6.88 x 10-7	Hvorslev
MW08-127	6.9 – 16.4	9.5	1.03 x 10-5	Bouwer & Rice
			7.56 x 10-7	Cooper, *et al.*
			1.56 x 10-5	Hvorslev
MW08-128	8.0 – 10.3	2.3	2.30 x 10 -5	Bouwer & Rice
			3.08 x 10 -5	Hvorslev
			2.72 x 10-6	Cooper, *et al.*
MW08-130	7.6 – 13.7	6.1	8.09 x 10-6	Bouwer & Rice
			1.04 x 10-5	Hvorslev
			1.55 x 10-6	Cooper, *et al.*

NOTE:
Bouwer and Rice – Bouwer and Rice (1976), Bouwer (1989)
Cooper – Cooper, *et al.* (1969)

Table 5: Groundwater General Chemistry

Parameter	Units	D.L.	Sample Stations													
			MWL08-124		MWL08-127			MWL08-128			MWL08-130		MWL08-152			
			8-Oct-08	08-Oct-09	20-Sep-08	9-Oct-08	08-Oct-09	20-Sep-08	8-Oct-08	08-Oct-09	21-Sep-08	7-Oct-08	26-Jun-09	Dup 26-Jun-09	08-Oct-09	Dup 08-Oct-09
Physicals																
Hardness (as $CaCO_3$)	mg/L	0.7	469	365	142	72.6	74.5	261	166	147	282	304	71.4	71.3	95.9	96.5
Conductivity	uS/cm	2	738	460	878	405	404	482	382	367	557	558	717	721	592	587
pH	pH	0.01	8.25	8.10	8.15	8.16	6.86	7.59	7.9	7.41	8.1	8.21	8.52	8.56	8.17	8.24
Total Dissolved Solids	mg/L	10	422	274	487	291	240	335	258	230	331	335	446	464	388	399
Total Suspended Solids	mg/L	3	110	28.8	33	213	56.8	49.5	29.20	17.8	14.50	3.20	110.00	116.00	23.3	35.8
Turbidity	NTU	0.1	171	70.6	13	1150	42.7	79.3	42.2	20.0	4.05	2.69	35.1	34.1	22.6	19.8
Anions																
Alkalinity, Total (as $CaCO_3$)	mg/L	2	442	265	287	144	121	251	202	173	266	276	287	282	278	289
Bromide (Br)	mg/L	0.05	<0.050	<0.050	0.358	<0.25	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	0.188	0.193	<0.050	<0.050
Chloride (Cl)	mg/L	0.5	1.55	0.84	108	43.2	36.9	3.6	3.5	11.4	3.48	3.68	61.8	62	20.8	21.0
Fluoride (F)	mg/L	0.02	2.41	2.19	2.54	1.37	0.720	1.29	397	1.16	1.05	1.04	4.37	4.38	2.76	2.79
Sulfate (SO_4)	mg/L	0.5	24.5	7.80	1	4	25.1	4.8	7.7	6.88	14.9	14.4	12.6	12.6	8.40	7.08
Nutrients																
Nitrate as N	mg/L	0.005	0.475	0.125	<0.0050	<0.025	0.0063	<0.025	<0.025	<0.0050	5.07	5.5	4.37	4.38	<0.0050	<0.0050
Nitrite as N	mg/L	0.001	0.0254	<0.0010	<0.0010	0.0079	<0.0010	0.0137	0.0078	<0.0010	0.227	0.237	<0.0050	<0.0050	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	0.05	0.47	0.481	0.477	2.19	0.508	1.88	1.79	1.14	0.813	0.872	0.705	0.681	0.716	0.769
Ortho Phosphate as P	mg/L	0.001	<0.0010	<0.0010	<0.0010	0.0087	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010
Total Phosphate as P	mg/L	0.20	<0.020	0.019	0.024	0.066	0.060	0.030	0.163	0.041	0.0062	0.0044	-	-	0.0078	0.0148
Organics																
Total Organic Carbon (TOC)	mg/L	0.5	7.78	11.9	10.4	28.7	11.8	30.9	25.5	14.9	16	15.8	9.32	8.78	19.7	18.5

Table 6: Groundwater Total Metals

Total Metals	Units	D.L.	CCME FAL	BC CSR AW	Sample Stations						
					MWL08-124	MWL08-127		MWL08-128		MWL08-130	
					8-Oct-08	20-Sep-08	9-Oct-08	20-Sep-08	8-Oct-08	21-Sep-08	7-Oct-08
Aluminum (Al)	mg/L	0.005*	0.1[6]	-	**1.14**	**0.566**	**37.0**	**0.552**	**0.302**	**0.811**	**0.178**
Antimony (Sb)	mg/L	0.0005*	-	0.20	<0.00050	<0.0010	<0.0025	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)	mg/L	0.0005*	0.005	0.05	0.00067	0.0017	0.0067	**0.0231**	**0.00512**	0.00102	0.00054
Barium (Ba)	mg/L	0.02	-	10	0.160	0.044	0.473	0.179	0.156	0.440	0.407
Beryllium (Be)	mg/L	0.001*	-	0.053	<0.0010	<0.0020	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010
Boron (B)	mg/L	0.1	-	50	<0.10	0.67	0.33	<0.10	<0.10	<0.10	<0.10
Cadmium (Cd)	mg/L	0.000017*	0.000017	0.00001 - 0.00006[7]	**0.000254**	**0.000316**	**0.000287**	**0.000430**	**0.000282**	**0.000156**	**0.000060**
Calcium (Ca)	mg/L	0.1	-	-	30.9	24.3	17.6	49.1	29.1	48.3	50.5
Chromium (Cr)	mg/L	0.001*	-	-	0.0104	<0.0020	0.0489	0.0013	0.0010	0.0071	<0.0010
Cobalt (Co)	mg/L	0.003*	-	0.04	0.00439	<0.00060	0.0143	0.00146	0.00138	0.00316	0.00349
Copper (Cu)	mg/L	0.001*	0.002-0.004[9]	0.002 - 0.009[8]	**0.0256**	**0.0276**	**0.0804**	0.0033	0.0029	**0.0402**	**0.0272**
Iron (Fe)	mg/L	0.03	0.3	-	**32.1**	**0.837**	**37.4**	**8.89**	**14.5**	**2.69**	**0.303**
Lead (Pb)	mg/L	0.0005*	0.001 - 0.007[11]	0.004 - 0.016[10]	0.00069	<0.0010	**0.0146**	0.00253	0.00103	0.00360	<0.00050
Lithium (Li)	mg/L	0.005	-	-	0.0208	0.051	0.075	0.0161	0.0147	0.0154	0.0126
Magnesium (Mg)	mg/L	0.1	-	-	94.1	19.8	17.2	33.6	22.1	39.1	43.0
Manganese (Mn)	mg/L	0.0003*	-	-	0.188	0.190	0.619	0.490	0.552	0.123	0.100
Mercury (Hg)	mg/L	0.00002	-	0.001	<0.000020	<0.000020	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum (Mo)	mg/L	0.001*	0.073	10	0.0215	0.0286	0.0359	0.0241	0.0177	0.0559	0.0456
Nickel (Ni)	mg/L	0.001*	0.025 - 0.15[13]	0.025 - 0.15[13]	0.0075	0.0020	0.0396	0.0035	0.0036	0.0108	0.0115
Potassium (K)	mg/L	2	-	-	3.9	5.9	10.5	7.8	4.1	3.9	3.1
Selenium (Se)	mg/L	0.001*	0.001	0.01	<0.0010	<0.0020	<0.0050	<0.0010	<0.0010	**0.0011**	<0.0010
Silver (Ag)	mg/L	0.00002*	0.0001	0.0005 - 0.01514	**0.00470**	**0.000396**	**0.00229**	**0.000332**	**0.000171**	**0.00351**	**0.00377**

Total Metals	Units	D.L.	CCME FAL	BC CSR AW	Sample Stations						
					MWL08-124	MWL08-127		MWL08-128		MWL08-130	
					8-Oct-08	20-Sep-08	9-Oct-08	20-Sep-08	8-Oct-08	21-Sep-08	7-Oct-08
Sodium (Na)	mg/L	2	-	-	10.6	131	74.5	11.8	22.3	16.6	13.8
Thallium (Tl)	mg/L	0.002*	0.0008	0.003	<0.00020	<0.00040	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020
Tin (Sn)	mg/L	0.0005*	-	-	0.00196	<0.0010	<0.0025	<0.00050	0.00176	0.00053	0.00106
Titanium (Ti)	mg/L	0.01	-	1	0.018	<0.010	0.696	0.010	0.010	0.016	<0.010
Uranium (U)	mg/L	0.0002*	-	0.30	0.0197	0.0132	0.0035	0.0266	0.00382	0.00273	0.00235
Vanadium (V)	mg/L	0.001*	-		0.0013	<0.0020	0.0642	0.0021	0.0012	<0.0010	<0.0010
Zinc (Zn)	mg/L	0.005	0.03	0.075 - 2.415	0.0188	0.0091	0.0987	0.0140	0.0139	0.0118	0.0052
Chromium (VI)	mg/L	0.001			--	<0.001	--	<0.001	--	<0.001	--

Table 7: Groundwater Dissolved Metals

Dissolved Metals	Units	D.L.	CCME FAL	BC CSR AW	Sample Stations										
					MWL08-124		MWL08-127		MWL08-128		MWL08-130	MWL09-152			
					08-Oct-08	08-Oct-09	09-Oct-08	08-Oct-09	08-Oct-08	08-Oct-09	07-Oct-08	26-Jun-09	Dup 26-Jun-09	08-Oct-09	Dup 08-Oct-09
Aluminum (Al)	mg/L	0.005*	0.1_{6}	-	0.0065	0.0037	**15.3**	0.0108	0.0338	0.0084	0.0077	0.0178	0.0181	0.0066	0.0245
Antimony (Sb)	mg/L	0.0005*	-	0.20	<0.00050	<0.00010	<0.0025	0.00013	<0.00050	0.00011	<0.00050	0.00032	0.00029	0.00011	0.00012
Arsenic (As)	mg/L	0.0005*	0.005	0.05	<0.00050	0.00038	0.0027	0.00066	0.00233	0.00404	0.00065	0.0018	0.00174	0.00084	0.00090
Barium (Ba)	mg/L	0.02	-	10	0.084	0.0874	0.257	0.0496	0.143	0.107	0.401	0.016	0.0164	0.0212	0.0217
Beryllium (Be)	mg/L	0.001*	-	0.053	<0.0010	<0.00050	<0.0050	<0.00050	<0.0010	<0.00050	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050
Boron (B)	mg/L	0.1	-	50	<0.10	0.050	0.31	0.067	<0.10	0.021	<0.10	0.806	0.817	0.690	0.725
Cadmium (Cd)	mg/L	0.000017*	0.000017	$0.00001 - 0.00006_{7}$	<0.000017	**<0.000080**	**0.000206**	**<0.000080**	**0.000249**	**<0.00020**	0.000018	**<0.00020**	**<0.0020**	**<0.00010**	**<0.00020**
Calcium (Ca)	mg/L	0.1	-	-	29.5	26.7	14.9	17.1	29.3	29.8	50.4	15.7	15.6	20.4	20.5
Chromium (Cr)	mg/L	0.001*	-	-	0.0013	<0.0030	0.0179	<0.0060	<0.0010	<0.0030	<0.0010	<0.003	<0.0030	<0.0020	<0.0030
Cobalt (Co)	mg/L	0.003*	-	0.04	0.00178	0.00138	0.0057	0.00045	0.00126	0.00043	0.00328	<0.00020	<0.00020	0.00017	0.00017
Copper (Cu)	mg/L	0.001*	$0.002\text{-}0.004_{9}$	$0.002 - 0.009_{8}$	**0.0046**	**0.00408**	**0.0474**	0.00102	<0.0010	**0.00046**	**0.0182**	<0.00020	0.00021	0.00040	0.00062
Iron (Fe)	mg/L	0.03	0.3	-	0.133	**0.324**	**8.85**	**1.09**	**10.8**	**5.96**	<0.030	0.083	0.093	0.098	0.094
Lead (Pb)	mg/L	0.0005*	$0.001 - 0.007_{11}$	$0.004 - 0.016_{10}$	<0.00050	<0.000050	**0.0066**	0.000141	<0.00050	<0.000050	<0.00050	<0.00010	<0.00010	<0.000050	0.000052
Lithium (Li)	mg/L	0.005	-	-	0.0194	0.0189	0.043	0.0188	0.0152	0.0139	0.0127	0.063	<0.061	0.0580	0.0586
Magnesium (Mg)	mg/L	0.1	-	-	96.1	72.6	8.59	7.73	22.5	17.5	43.3	7.79	7.83	10.9	11.0
Manganese (Mn)	mg/L	0.0003*	-	-	0.0506	0.0508	0.260	0.222	0.544	0.336	0.0888	0.0255	0.0254	0.0294	0.0304
Mercury (Hg)	mg/L	0.00002	-	0.001	<0.000020	--	<0.00010	--	<0.000020	--	<0.000020	<0.000050	<0.000050	--	--
Molybdenum (Mo)	mg/L	0.001*	0.073	10	0.0119	0.0281	0.0345	0.0230	0.0194	0.0627	0.0466	0.0497	0.0497	0.0382	0.0403
Nickel (Ni)	mg/L	0.001*	$0.025 - 0.15_{13}$	$0.025 - 0.15_{13}$	0.0024	0.00208	0.0151	0.00663	0.0027	0.00371	0.0108	<0.0010	<0.0010	0.00054	0.00071
Potassium (K)	mg/L	2	-	-	3.4	3.5	6.6	2.7	4.2	3.0	3.0	3.2	3.2	3.2	3.2
Selenium (Se)	mg/L	0.001*	0.001	0.01	<0.0010	<0.0010	**<0.0050**	<0.0010	<0.0010	<0.0010	<0.0010	**<0.0020**	**<0.0020**	<0.0010	<0.0010
Silver (Ag)	mg/L	0.00002*	0.0001	0.0005 - 0.01514	<0.000020	0.000010	**0.00133**	<0.000010	0.000031	0.000013	<0.000020	<0.000020	<0.000020	<0.000010	<0.000010
Sodium (Na)	mg/L	2	-	-	10.5	8.1	72.9	58.8	23.3	36.0	13.9	147	148	112	112
Thallium (Tl)	mg/L	0.002*	0.0008	0.003	<0.00020	<0.00010	<0.0010	<0.00010	<0.00020	<0.00010	<0.00020	<0.00020	<0.00020	<0.00010	<0.00010
Tin (Sn)	mg/L	0.0005*	-	-	<0.00050	0.00014	0.0027	0.00036	0.00071	0.00048	0.00333	<0.00020	<0.00020	0.00022	0.00022
Titanium (Ti)	mg/L	0.01	-	1	<0.010	<0.010	0.354	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)	mg/L	0.0002*	-	0.30	0.0199	0.0175	0.0027	0.000918	0.00324	0.00428	0.00230	0.00662	0.00658	0.00764	0.00765
Vanadium (V)	mg/L	0.001*	-		<0.0010	<0.0010	0.0229	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010	<0.0010
Zinc (Zn)	mg/L	0.005	0.03	0.075 - 2.415	<0.0050	0.0022	**0.0327**	0.0076	0.0090	0.0063	0.0061	<0.0020	<0.0020	0.0018	0.0031
Chromium (VI)	mg/L	0.001	-	-	--	<0.0010	--	<0.0010	--	<0.0010	--	0.0032	0.0015	<0.0010	<0.0010

Notes:

1. **Bolded** and/or Underlined result implies a guideline exceedance, **Blue i**ndicates guidelines less than detection limits available
2. D.L. = laboratory detection limit
3. ** implies detection limit varied - '<' (less than) value implies detection limit
4. **CCME FAL -** Canadian Council of Ministers of the Environment Freshwater Aquatic Life guidelines (December 2007)
5. BC CSR AW - British Columbia Contaminated Sites Regulation Aquatic Life Guidelines; provided for comparison only
6. Aluminum guideline is 100 µg/L when pH ≥ 6.5
7. Cadmium guideline: 0.1 µg/L when [CaCO3] is 0 - 30 mg/L
   0.3 µg/L when [CaCO3] is 30 - 90 mg/L
   0.5 µg/L when [CaCO3] is 90 - 150 mg/L
   0.6 µg/L when [CaCO3] is > 150 mg/L
8. Copper guideline: 2 µg/L when [CaCO3] is 0 - 50 mg/L
   3 µg/L when [CaCO3] is 50 - 75 mg/L
   4 µg/L when [CaCO3] is 75 - 100 mg/L
   5 µg/L when [CaCO3] is 100 - 125 mg/L
   6 µg/L when [CaCO3] is 125 - 150 mg/L
   7 µg/L when [CaCO3] is 150 - 175 mg/L
   8 µg/L when [CaCO3] is 175 - 200 mg/L
   9 µg/L when [CaCO3] is > 200 mg/L
9. Copper guideline: 2 µg/L when [CaCO3] is 0 - 120 mg/L
   3 µg/L when [CaCO3] is 120 - 180 mg/L
   4 µg/L when [CaCO3] is > 180 mg/L
10. Lead guideline: 4 µg/L when [CaCO3] is 0 - 50 mg/L
    5 µg/L when [CaCO3] is 50 - 100 mg/L
    6 µg/L when [CaCO3] is 100 - 200 mg/L
    110 µg/L when [CaCO3] is 200 - 300 mg/L
    160 µg/L when [CaCO3] is > 300 mg/L
11. Lead guideline: 1 µg/L when [CaCO3] is 0 - 60 mg/L
    2 µg/L when [CaCO3] is 60 - 120 mg/L
    4 µg/L when [CaCO3] is 120 - 180 mg/L
    7 µg/L when [CaCO3] is > 180 mg/L
12 Manganese guideline: 1 µg/L when [CaCO3] is 0 - 60 mg/L
    1 µg/L when [CaCO3] is 0 - 60 mg/L
    2 µg/L when [CaCO3] is 60 - 120 mg/L
    4 µg/L when [CaCO3] is 120 - 180 mg/L
    7 µg/L when [CaCO3] is > 180 mg/L
13 Nickel guideline: 25 µg/L when [CaCO3] is 0 - 60 mg/L
    65 µg/L when [CaCO3] is 60 - 120 mg/L
    110 µg/L when [CaCO3] is 120 - 180 mg/L
    150 µg/L when [CaCO3] is > 180 mg/L
14 Silver guidline: 0.5 µg/L when [CaCO3] < 100 mg/L
    15 µg/L when [CaCO3] > 100 mg/L
15 Zinc guideline: 7.5 µg/L when [CaCO3] is 0 - 90 mg/L
    15 µg/L when [CaCO3] is 90 - 100 mg/L
    90 µg/L when [CaCO3] is 100 - 200 mg/L
    165 µg/L when [CaCO3] is 200 - 300 mg/L
    240 µg/L when [CaCO3] is > 300 mg/L

Table 8: Summary of Groundwater Parameters

Monitoring Well	TDS (mg/L)	EC (µS/cm)	pH	Hydrogeochemical Facies	Exceeds CSR and/or CCME Guidelines
L08-124	274 – 422	460 – 738	8.10 – 8.25	Magnesium-Calcium-Carbonate	Aluminum, Cadmium, Copper, Iron, Silver
MWL08-127	240 – 487	404 – 878	6.86 – 8.16	Sodium -Calcium-Carbonate-Sulphate	Aluminum, Cadmium, Copper, Iron, Lead, Silver
MWL08-128	230 – 335	367 – 482	7.41 – 7.90	Sodium/Magnesium-Calcium-Magnesium/Sodium-Carbonate	Aluminum, Arsenic, Cadmium, Iron, Silver
MWL08-130	331 – 335	557 – 558	8.10 - 8.21	Magnesium-Calcium-Carbonate	Aluminum, Cadmium, Copper, Iron, Silver
MWL09-152	388 – 464	587 – 721	8.17 – 8.56	Sodium -Calcium-Carbonate-Chlorate	n.a.

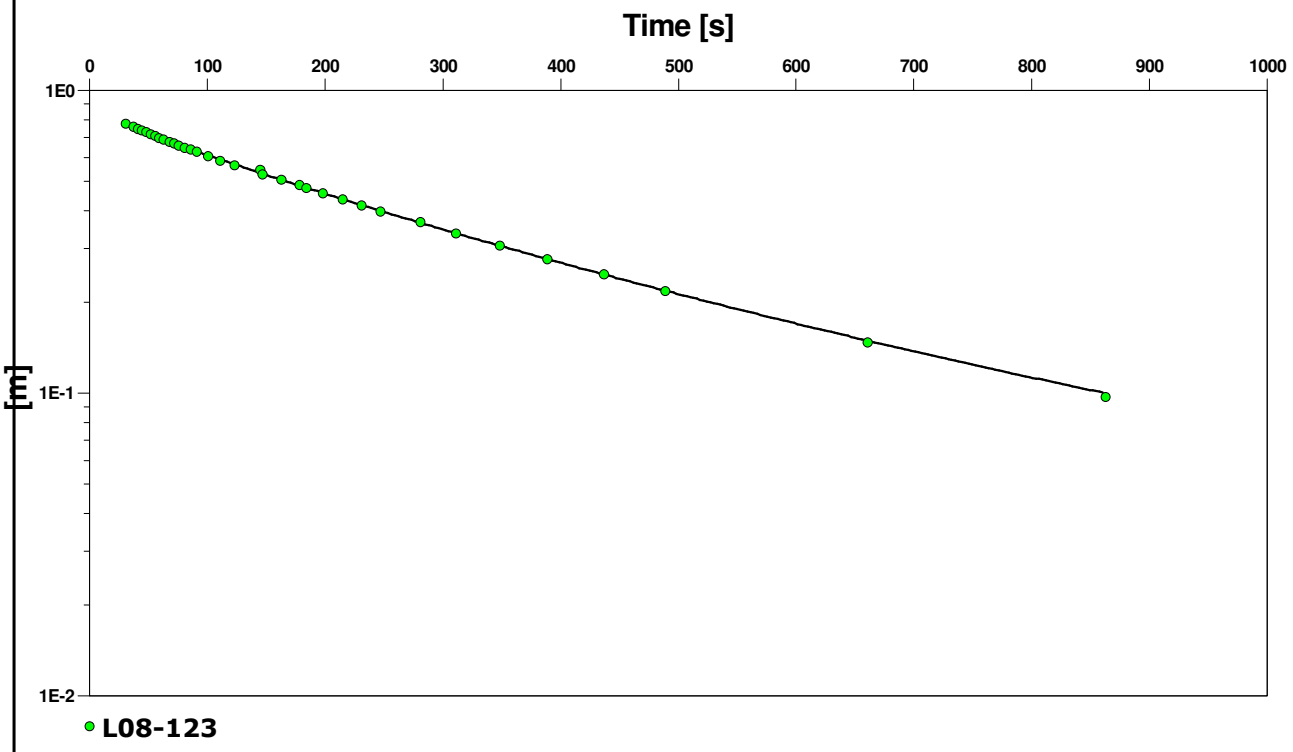
NOTES:
TDS – Total Dissolved Solids
EC – Electrical Conductivity
mg/L – milligram per liter
µS/cm – microsiemen pre centimetre
n.a. –data not available (total metals not collected)

APPENDIX D

Results from Hydraulic Tests

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: L08-123	Test Well: L08-123
Test conducted by: JT		Test date: 8/10/2008
Analysis performed by: JT	MW08-128 Cooper et al.	Date: 11/26/2009
Aquifer Thickness: 207.00 m		

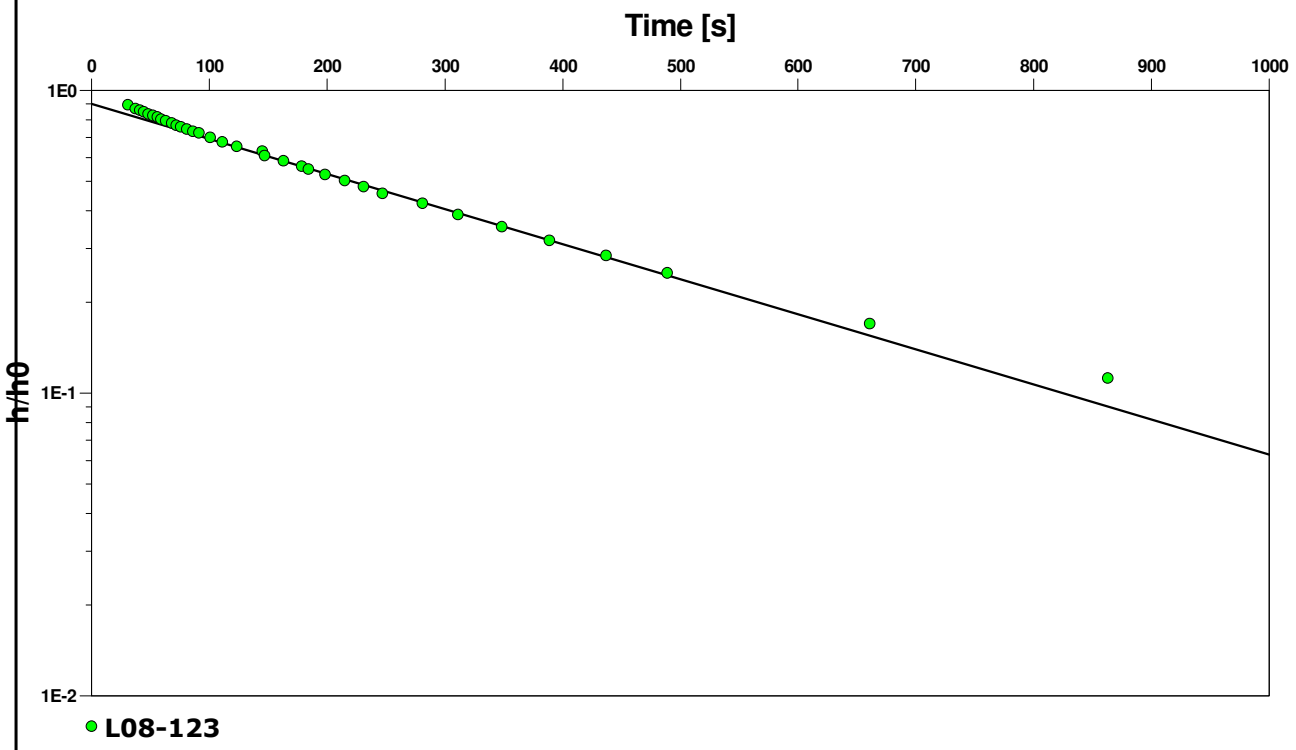


Calculation after Cooper-Bredehoeft-Papadopulos

Observation well	Transmissivity [m²/s]	K [m/s]	Well-bore storage coefficient	
L08-123	1.25×10^{-5}	6.06×10^{-8}	4.28×10^{-5}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: L08-123	Test Well: L08-123
Test conducted by: JT		Test date: 8/10/2008
Analysis performed by: JT	MW08-128 Hvorslev	Date: 12/1/2009
Aquifer Thickness: 207.00 m		

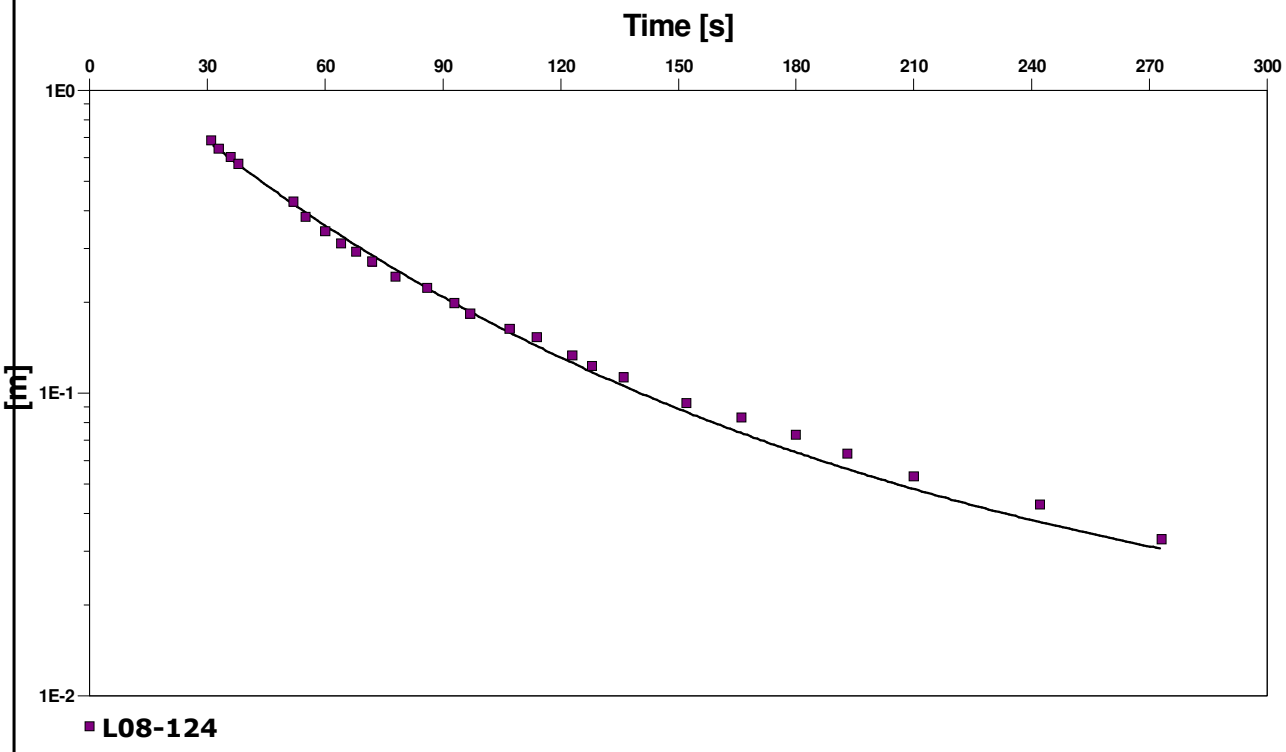


Calculation after Hvorslev

Observation well	K [m/s]	
L08-123	8.35×10^{-8}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: L08-123	Test Well: L08-124
Test conducted by: JT		Test date: 8/10/2008
Analysis performed by: JT	MW08-128 Cooper et al.	Date: 11/26/2009
Aquifer Thickness: 198.00 m		

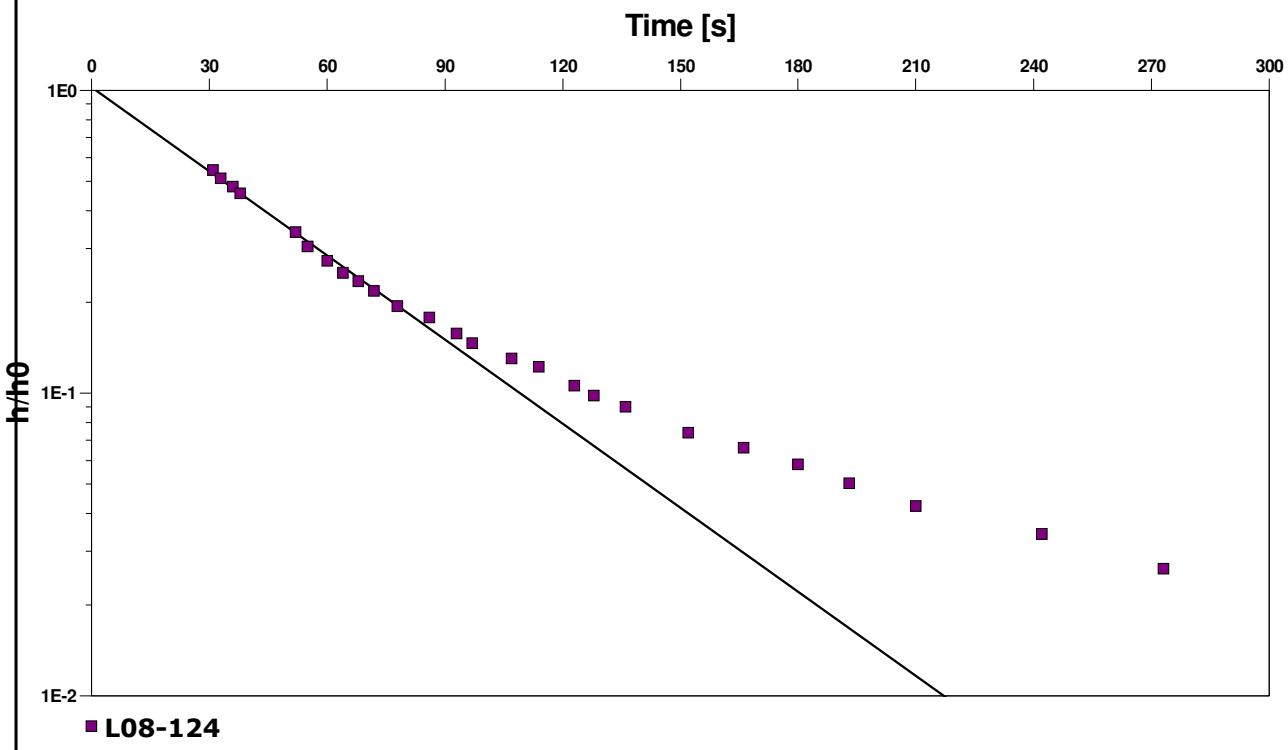


Calculation after Cooper-Bredehoeft-Papadopulos

Observation well	Transmissivity [m²/s]	K [m/s]	Well-bore storage coefficient	
L08-124	1.02×10^{-4}	5.17×10^{-7}	9.73×10^{-5}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: L08-123	Test Well: L08-124
Test conducted by: JT		Test date: 8/10/2008
Analysis performed by: JT	MW08-128 Hvorslev	Date: 12/1/2009
Aquifer Thickness: 198.00 m		

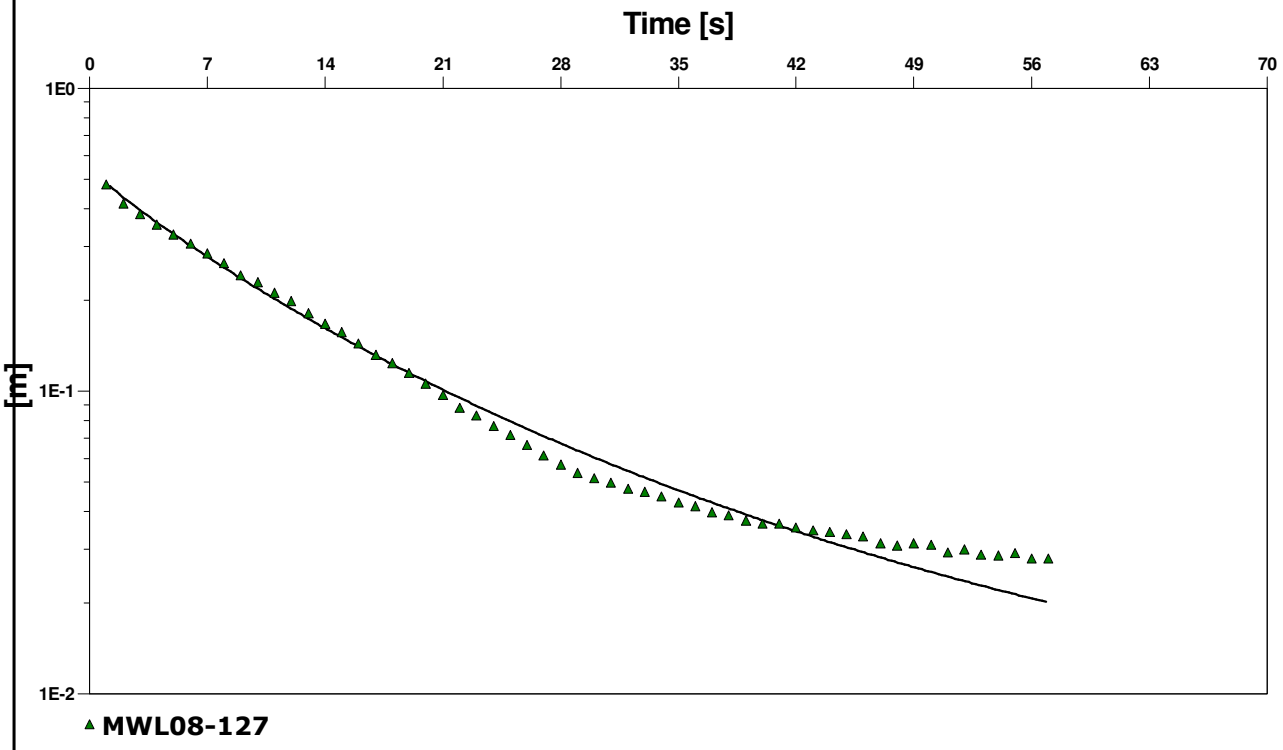


Calculation after Hvorslev

Observation well	K [m/s]	
L08-124	6.88×10^{-7}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-127	Test Well: MWL08-127
Test conducted by: JT		Test date: 8/13/2008
Analysis performed by: JT	MW08-128 Cooper et al.	Date: 11/26/2009
Aquifer Thickness: 200.00 m		

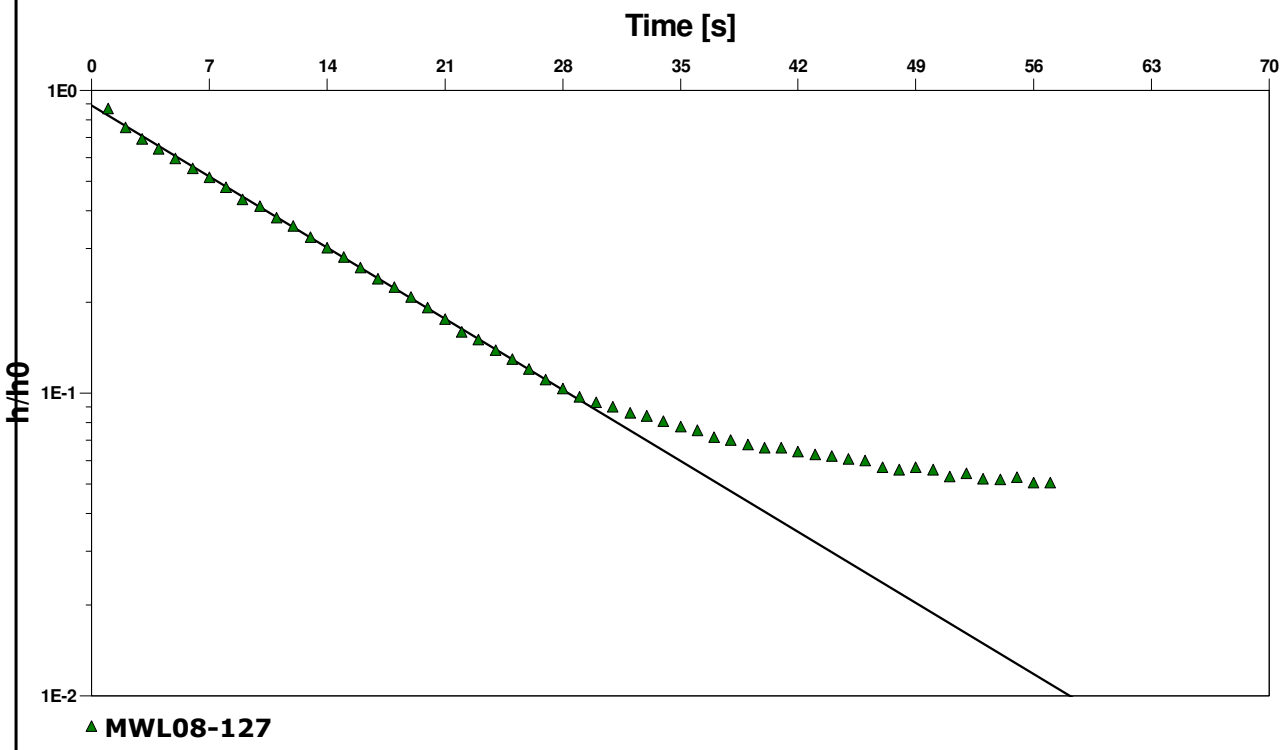


Calculation after Cooper-Bredehoeft-Papadopulos

Observation well	Transmissivity [m²/s]	K [m/s]	Well-bore storage coefficient	
MWL08-127	1.51×10^{-4}	7.56×10^{-7}	1.63×10^{-4}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-127	Test Well: MWL08-127
Test conducted by: JT		Test date: 8/13/2008
Analysis performed by: JT	MW08-128 Hvorslev	Date: 12/1/2009
Aquifer Thickness: 200.00 m		

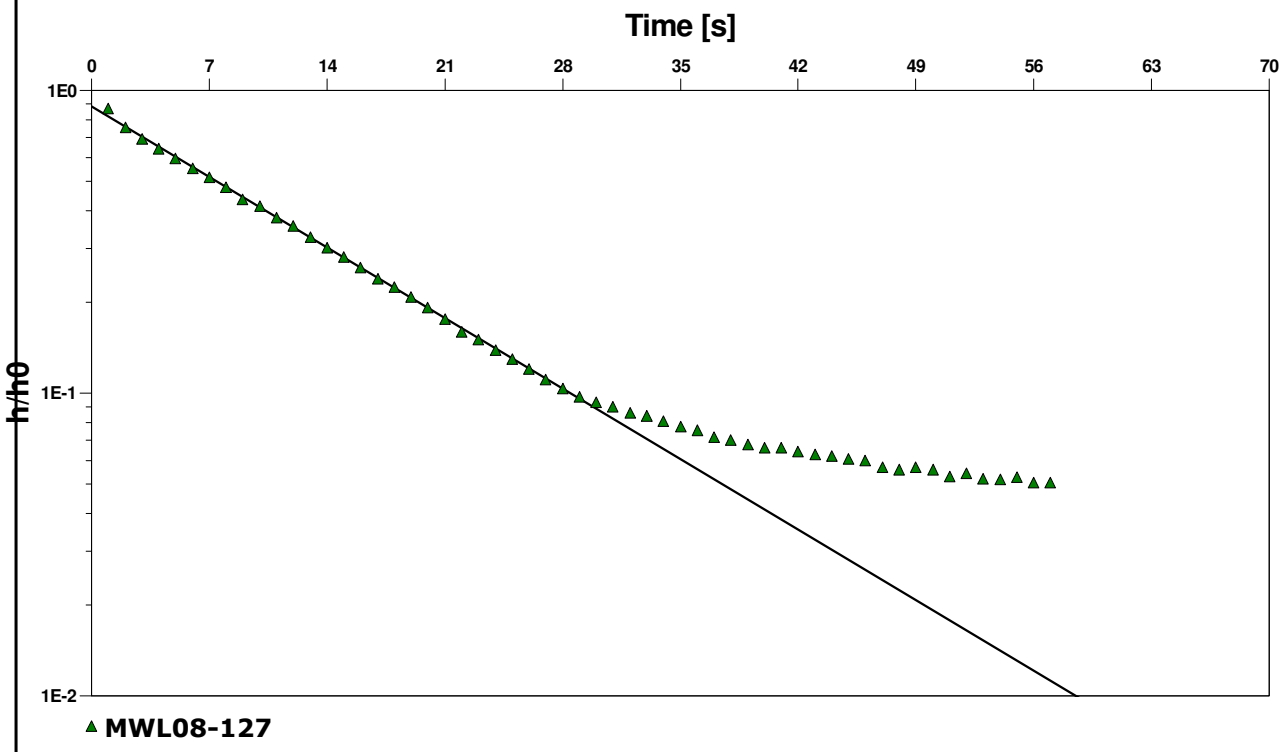


Calculation after Hvorslev

Observation well	K [m/s]	
MWL08-127	1.56×10^{-5}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-127	Test Well: MWL08-127
Test conducted by: JT		Test date: 8/13/2008
Analysis performed by: JT	MW08-128 B&R	Date: 12/1/2009
Aquifer Thickness: 200.00 m		

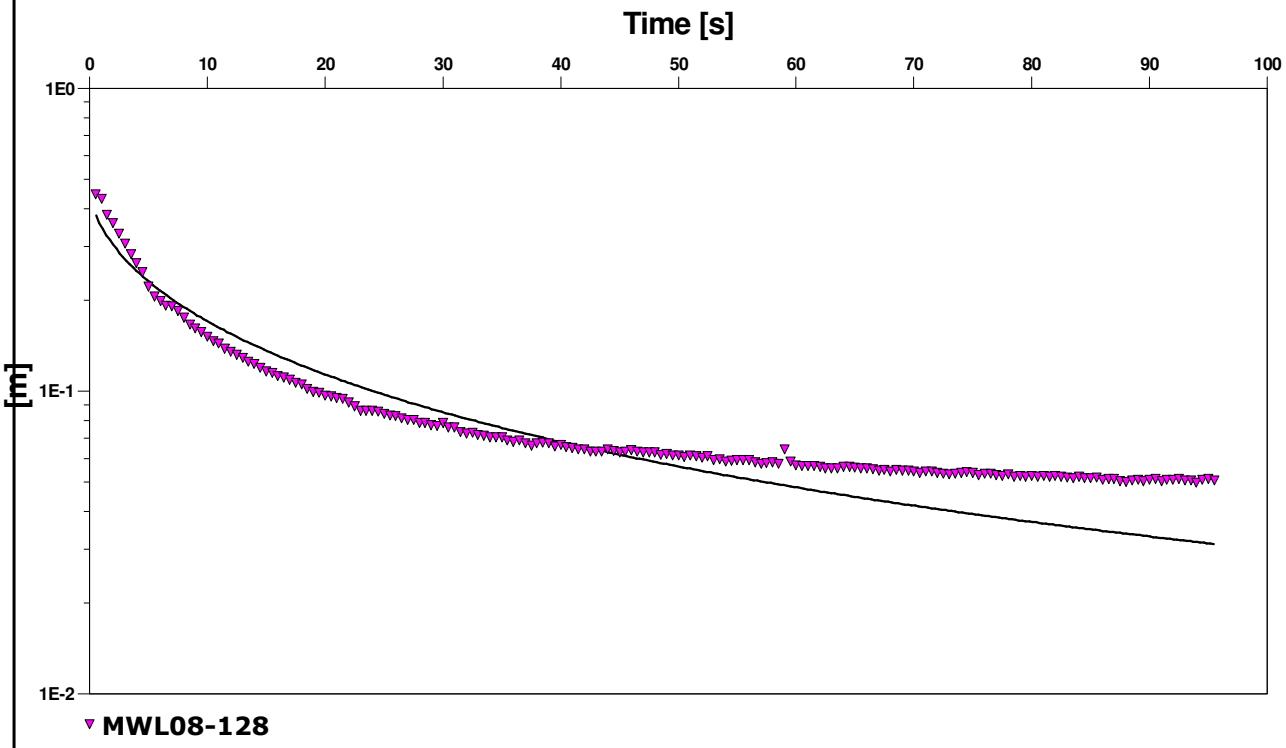


Calculation after Bouwer && Rice

Observation well	K [m/s]	
MWL08-127	1.03×10^{-5}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-128	Test Well: MWL08-128
Test conducted by: JT		Test date: 9/23/2008
Analysis performed by: JT	MW08-128 Cooper et al.	Date: 11/26/2009
Aquifer Thickness: 10.30 m		

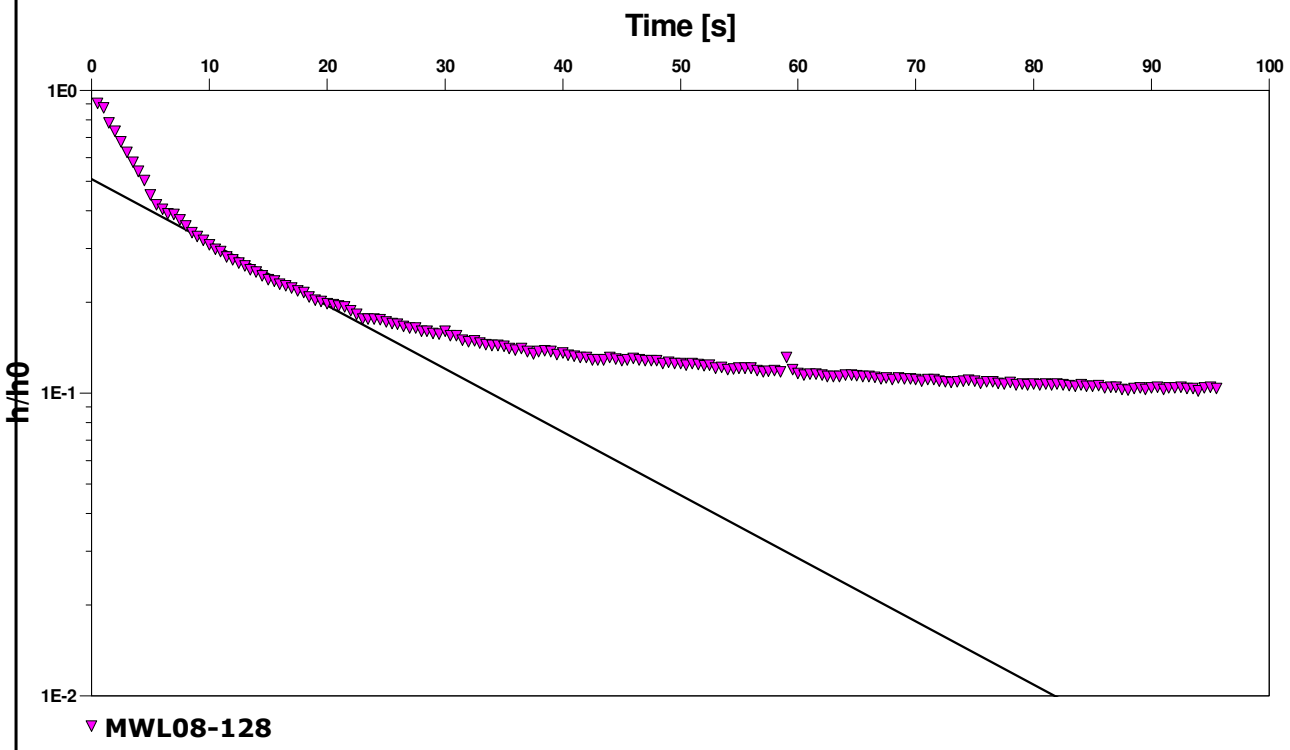


Calculation after Cooper-Bredehoeft-Papadopulos

Observation well	Transmissivity [m²/s]	K [m/s]	Well-bore storage coefficient	
MWL08-128	2.72×10^{-5}	2.64×10^{-6}	5.00×10^{-1}	

Stantec 4370 Dominion St Burnaby, BC	Slug Test Analysis Report
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-128	Test Well: MWL08-128
Test conducted by: JT		Test date: 9/23/2008
Analysis performed by: JT	MW08-128 Hvorslev	Date: 12/1/2009
Aquifer Thickness: 10.30 m		

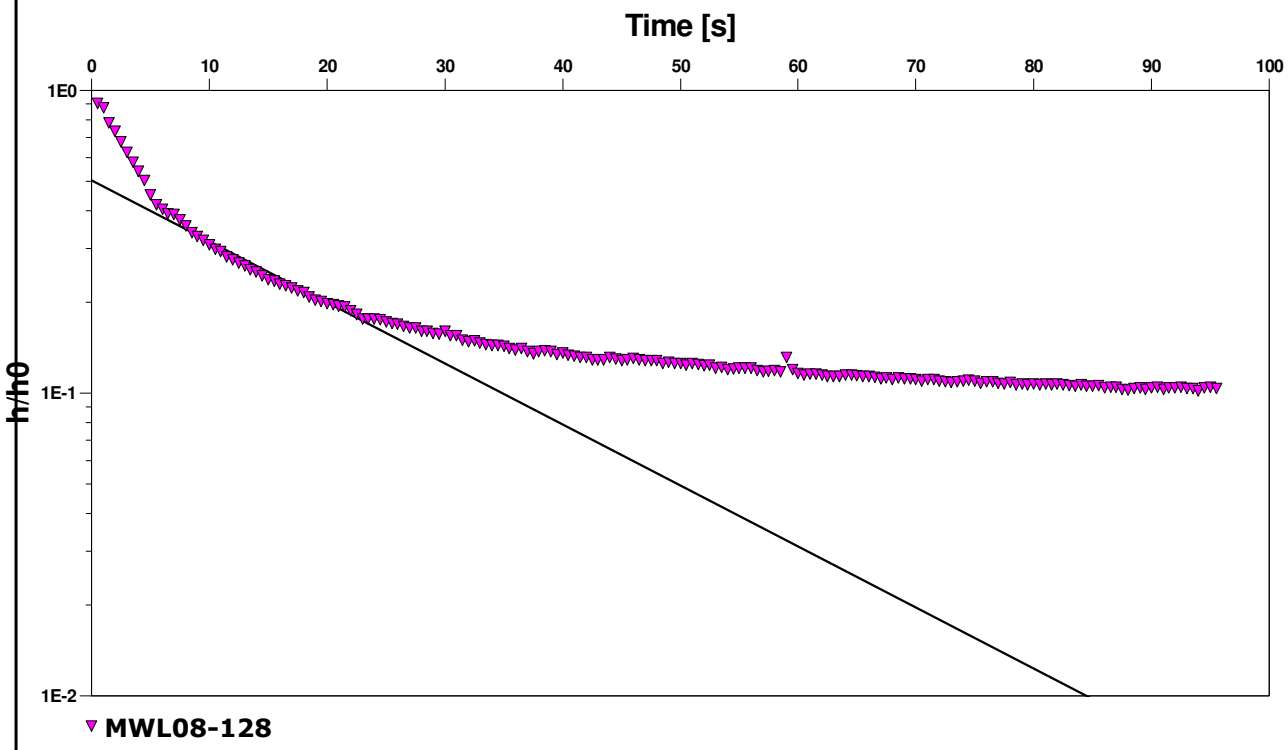


Calculation after Hvorslev

Observation well	K [m/s]	
MWL08-128	3.08×10^{-5}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-128	Test Well: MWL08-128
Test conducted by: JT		Test date: 9/23/2008
Analysis performed by: JT	MW08-128 B&R	Date: 12/1/2009
Aquifer Thickness: 10.30 m		

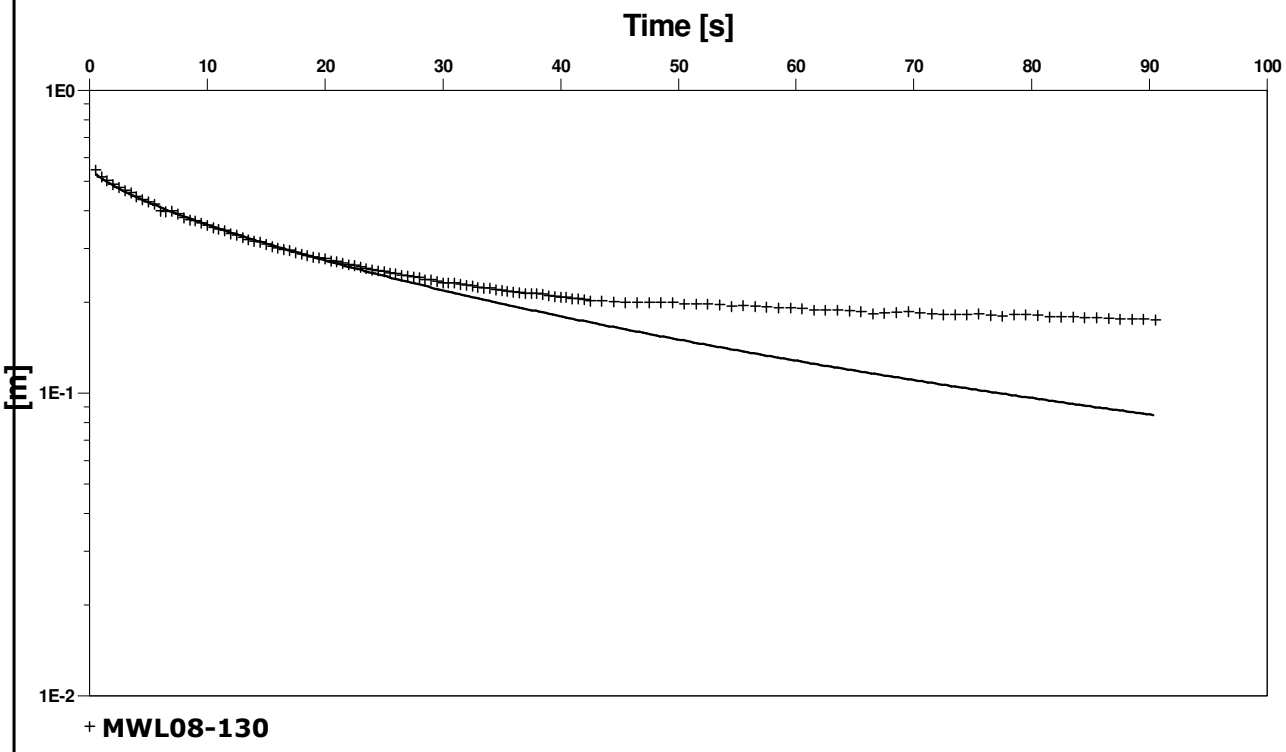


Calculation after Bouwer && Rice

Observation well	K [m/s]	
MWL08-128	2.30×10^{-5}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-130	Test Well: MWL08-130
Test conducted by: JT		Test date: 9/23/2008
Analysis performed by: JT	MW08-128 Cooper et al.	Date: 11/26/2009
Aquifer Thickness: 13.70 m		

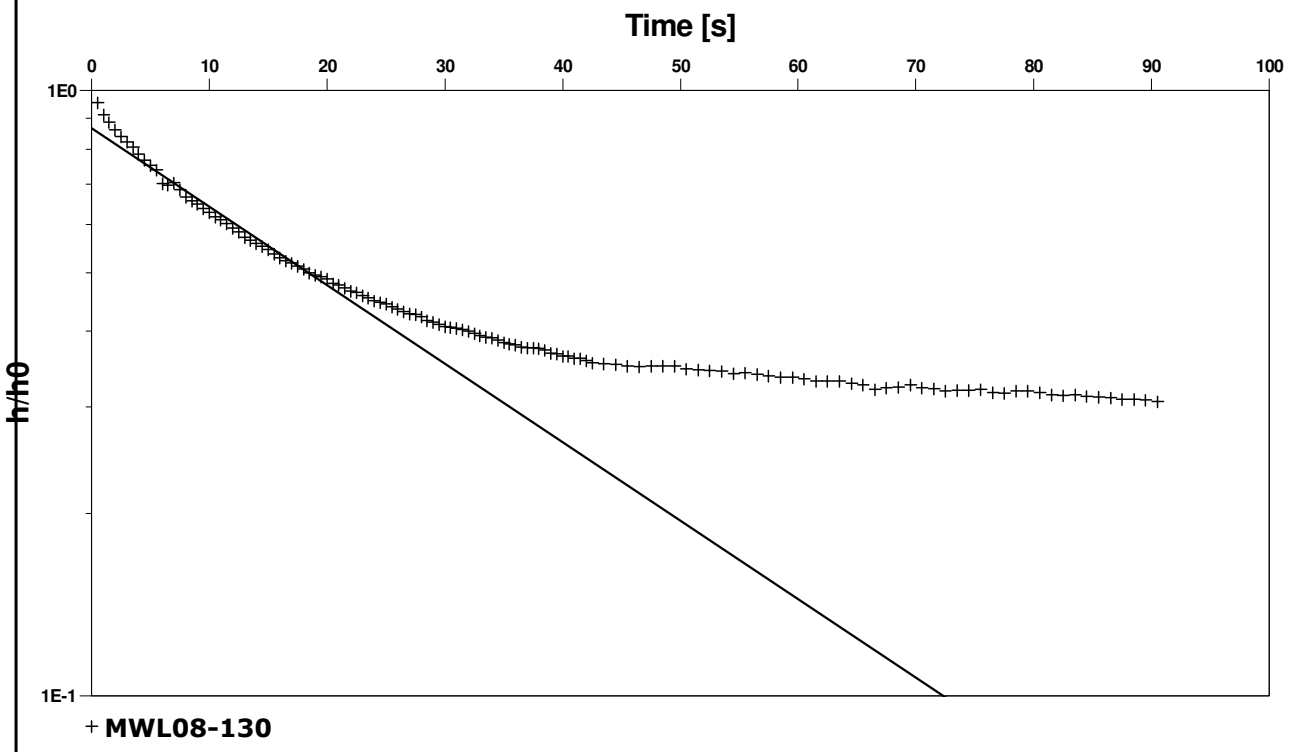


Calculation after Cooper-Bredehoeft-Papadopulos

Observation well	Transmissivity [m²/s]	K [m/s]	Well-bore storage coefficient	
MWL08-130	2.12×10^{-5}	1.55×10^{-6}	3.57×10^{-2}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-130	Test Well: MWL08-130
Test conducted by: JT		Test date: 9/23/2008
Analysis performed by: JT	MW08-128 Hvorslev	Date: 12/1/2009
Aquifer Thickness: 13.70 m		

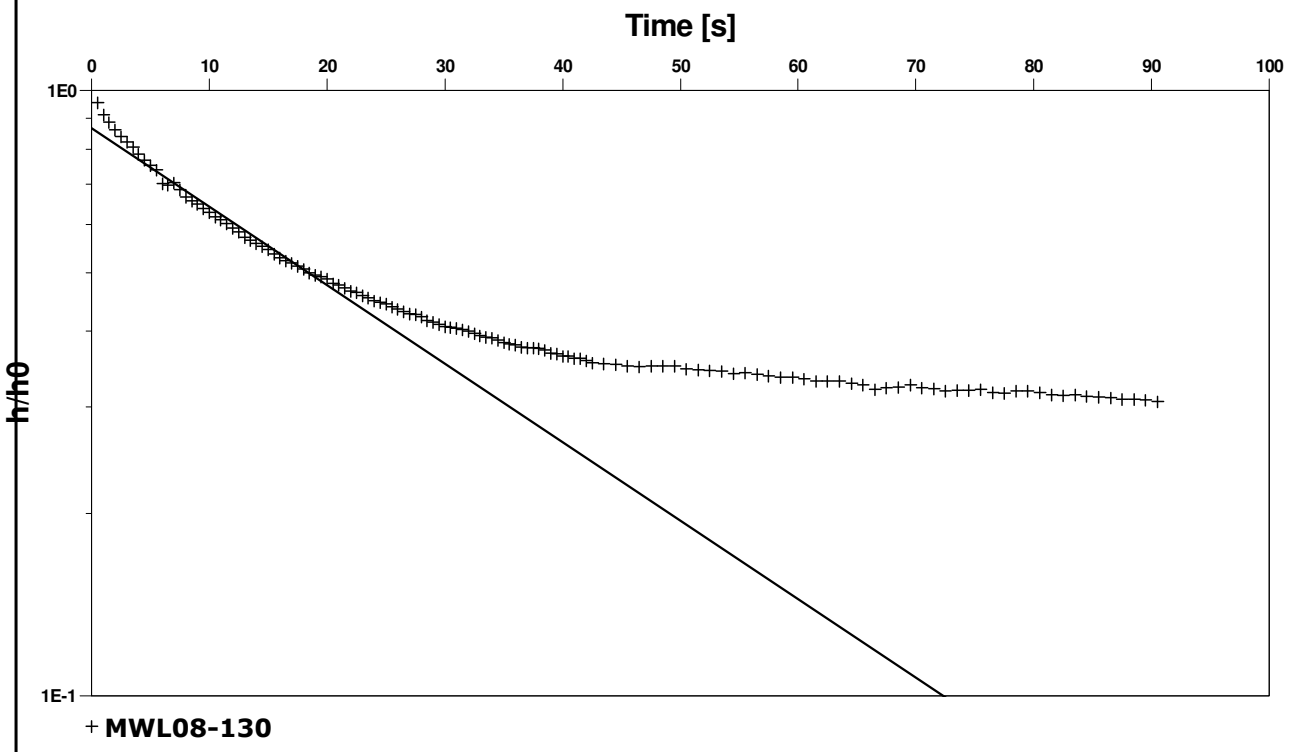


Calculation after Hvorslev

Observation well	K [m/s]	
MWL08-130	1.04×10^{-5}	

Stantec 4370 Dominion St Burnaby, BC	**Slug Test Analysis Report**
	Project: Thor Lake
	Number: 1036222.02
	Client: Avalon Ventures

Location: Thor Lake, NT	Slug Test: MWL08-130	Test Well: MWL08-130
Test conducted by: JT		Test date: 9/23/2008
Analysis performed by: JT	MW08-128 B&R	Date: 12/1/2009
Aquifer Thickness: 13.70 m		



Calculation after Bouwer && Rice

Observation well	K [m/s]	
MWL08-130	8.09×10^{-6}	

Client: Avalon
Project: Thor Lake
Project #: 1036222
Personnel: JT

Collar E.I. 1.06 m
Trend:
Plunge:
Date: 25-Mar-09

Hole # L09-152
Design Test Interval: 410' - 636' = 225'
Test #: 1

Measurements:
Depth to WT: 3.5 m b T.O.P
Top of Packer Interval: 411'
Bottom of Packer Interval (or Bottom of hole): 636'
Packer Int. Midpoint (double packer): //
Water Flushed: (Vol./Time/Until Clean):
Packer Inflation Pressure: 500 psi
Stickup Height:
Borehole Outside Diametric: NQ 3"
Packer Pipe ID / or Drill Rod ID:

Measurement Units
Volume: gal
Pressure: psi
Length: ft

Time
Start Packer Testing: 1230pm
Start Flushing: 7am
End Flushing: 1230pm
End Packer Testing: 1430am

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	25	0	-
1	25	3.1	3.1
2	25	5.3	2.2
3	25	7.1	1.8
4	25	9	1.9
5	25	10.9	1.9
6	25		
7	25	14.3	3.4
8	25	15.9	1.6
9	25	17.4	1.5
10	25	19	1.6

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	95	0	-
1	95	3.6	3.6
2	95	7.1	3.5
3	95	10.6	3.5
4	95	14.8	4.2
5	95	17.5	2.7
6	95	21	3.5
7	95	24.3	3.3
8	95	27.6	3.3
9	95	30.9	3.3
10	95	34.3	3.4

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	50	0	-
1	50	2.8	2.8
2	50	5.3	2.5
3	50	7.9	2.6
4	50	10.4	2.5
5	50	12.9	2.5
6	50	15.2	2.3
7	50	17.7	2.5
8	50	20	2.3
9	50	22.4	2.4
10	50	24.7	2.3

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	75	0	-
1	75	2.6	2.6
2	75	5.1	2.5
3	75	7.7	2.6
4	75	10.2	2.5
5	75	12.6	2.4
6	75	15.2	2.6
7	75	17.6	2.4
8	75	20.1	2.5
9	75	22.5	2.4
10	75	25	2.5

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	75	0	-
1	75	3.2	3.2
2	75	6.3	3.1
3	75	9.3	3
4	75	12.3	3
5	75	15.4	3.1
6	75		
7	75	21.4	6
8	75	24.4	3
9	75	27.4	3
10	75	30.4	3

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	50	0	-
1	50	1.6	1.6
2	50	3.2	1.6
3	50	4.8	1.6
4	50	6.5	1.7
5	50	8.1	1.6
6	50	9.7	1.6
7	50	11.3	1.6
8	50	13	1.7
9	50	14.6	1.6
10	50	16.2	1.6

Calculations

Pi = Pg + hg + hs - hf

Pg = gauge pressure (m)
hg = height of gauge above ground level (m)
hs = depth to pre-test water level (m)
hf = frictional losses (m)

Step	P (psi)	Pi (m)	gal/min	Q (m3/s)	R (m)	rb (m)	T (m2/d)	K = T/b 68.5
1	25	18.635	1.6	0.000101	5	0.038	4.21E-06	6.15E-08 m/s
2	50	36.21	2.4	0.000151	5	0.038	3.25E-06	4.74E-08 m/s
3	75	53.785	3	0.000189	5	0.038	2.73E-06	3.99E-08 m/s
4	100	71.36	3.3	0.000208	5	0.038	2.27E-06	3.31E-08 m/s
3b	75	53.785	2.4	0.000151	5	0.038	2.19E-06	3.19E-08 m/s
2b	50	36.21	1.6	0.000101	5	0.038	2.17E-06	3.16E-08 m/s

Client: Avalon
Project: Thor Lake
Project #: 1036222
Personnel: JT

Collar E.I.: 1.06 m
Trend:
Plunge:
Date: 25-Mar-09

Hole # L09-152
Design Test Interval: 300'
Test #: 3

Measurements:
Depth to WT: 3.3 m.b. t.o.p
Top of Packer Interval:
Bottom of Packer 311'
Interval (or Bottom of hole): 626'
Packer Int. Midpoint
(double packer): //
Water Flushed:
(Vol./Time/Until Clean): clean
Packer Inflation Pressure: 500 psi
Stickup Height:
Borehole Outside Diametric: NQ 3"
Packer Pipe ID / or
Drill Rod ID:

Measurement Units
Volume: gal
Pressure: psi
Length: ft

Time
Start Packer Testing:
Start Flushing:
End Flushing:
End Packer Testing:

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	20	0	-
1	20	2	2
2	20	3	1
3	20	4.8	1.8
4	20	7.7	2.9
5	20	9.5	1.8
6	20	11.3	1.8
7	20	13.1	1.8
0	40	0	-
1	40	2.9	2.9
2	40	5.8	2.9
3	40	8.7	2.9
0	60	0	-
1	60	3.7	3.7
2	60	7.3	3.6
3	60	10.9	3.6
4	60	14.3	3.4
5	60	17.8	3.5
6	60	20.8	3
7	60	23.8	3
8	60	26.8	3
0	80	0	-
1	80	3.7	3.7
2	80	7.3	3.6
3	80	10.8	3.5
4	80	14.3	3.5
5	80	17.8	3.5
0	100	0	-
1	100	3.7	3.7
2	100	7.5	3.8
3	100	11	3.5
4	100	14.7	3.7
5	100	18.4	3.7
6	100	22	3.6
7	100	25.6	3.6
8	100	29.2	3.6

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	120	0	-
1	120	4	4
2	120	7.9	3.9
3	120	11.7	3.8
4	120	15.2	3.5
5	120	18.7	3.5
6	120	22.2	3.5
7	120		
8	120	29.1	6.9
0	180	0	-
1	180	5.3	5.3
2	180	10.6	5.3
3	180	15.9	5.3
0	120	0	-
1	120	4	4
2	120	7.3	3.3
3	120	10.6	3.3
4	120	14.1	3.5
5	120	17.3	3.2
6	120	20.5	3.2
7	120	23.7	3.2
0	100	0	-
1	100	2.9	2.9
2	100	5.6	2.7
3	100	8.4	2.8
4	100	11.2	2.8
5	100	14	2.8
0	80	0	-
1	80	2.5	2.5
2	80	4.9	2.4
3	80	7.4	2.5
4	80	9.9	2.5
5	80	12.4	2.5

Pi = Pg + hg + hs - hf

Pg = gauge pressure (m)
hg = height of gauge above ground level (m)
hs = depth to pre-test water level (m)
hf = frictional losses (m)

Step	P (psi)	Pi (m)	gal/min	Q (m3/s)	R (m)	rb (m)	T (m2/d)	K = T/b 96
1	20	15.12	1.8	0.000114	5	0.038	5.84E-06	6.08E-08
2	40	29.18	2.9	0.000183	5	0.038	4.87E-06	5.08E-08
3	60	43.24	3	0.000189	5	0.038	3.40E-06	3.54E-08
4	80	57.3	3.5	0.000221	5	0.038	2.99E-06	3.12E-08
5	100	71.36	3.6	0.000227	5	0.038	2.47E-06	2.58E-08
6	120	85.42	3.5	0.000221	5	0.038	2.01E-06	2.09E-08
7	180	127.6	5.3	0.000334	5	0.038	2.04E-06	2.12E-08
6a	120	85.42	3.2	0.000202	5	0.038	1.84E-06	1.91E-08
5a	100	71.36	2.8	0.000177	5	0.038	1.92E-06	2.00E-08
4a	80	57.3	2.5	0.000158	5	0.038	2.14E-06	2.23E-08

Client: Avalon
Project: Thor Lake
Project #: 1036222
Crew: JT

Collar E.I.: 1.06 m
Date: 25-Mar-09

ID L09-152
Test Interval: 415 ft
Test #: 4

Measurements:
Depth to WT: 3.3 m
Top of Packer Interval: 211'
Bottom of Packer Interval (or Bottom of hole): 626'
Packer Int. Midpoint (double packer): //
Water Flushed (Vol./Time/Until Clean): clean
Borehole Outside Diametric: NQ 3"

Measurement Units
Volume: gal
Pressure: psi
Length: ft

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	20	0	-
1	20	2.7	2.7
2	20	5.3	2.6
3	20	7.8	2.5
4	20	10.2	2.4
5	20	12.6	2.4
6	20	14.9	2.3
7	20	17.3	2.4
0	40	0	-
1	40	3.8	3.8
2	40	7.5	3.7
3	40	11.3	3.8
4	40	15	3.7
5	40	18.7	3.7
6	40	22.4	3.7
0	60	0	-
1	60	4.8	4.8
2	60	9.7	4.9
3	60	14.6	4.9
4	60	19.5	4.9
0	80	0	-
1	80	6.3	6.3
2	80	12.5	6.2
3	80	18.7	6.2
4	80	24.9	6.2
0	100	0	-
1	100	8.4	8.4
2	100	16.5	8.1
3	100	24.6	8.1
4	100	32.7	8.1

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	120	0	-
1	120	9.2	9.2
2	120	18.3	9.1
3	120	26.8	8.5
4	120	34.9	8.1
5	120	42.9	8
6	120	50.9	8
7	120	59	8.1
0	100	0	-
1	100	6.9	6.9
2	100	13.8	6.9
3	100	20.6	6.8
4	100	27.5	6.9
0	80	0	-
1	80	5.3	5.3
2	80	10.7	5.4
3	80	16.1	5.4
4	80	21.4	5.3
0	60	0	-
1	60	4.6	4.6
2	60	9.2	4.6
3	60	13.7	4.5
4	60	18.3	4.6

Pi = Pg + hg + hs - hf

Pg = gauge pressure (m)
hg = height of gauge above ground level (m)
hs = depth to pre-test water level (m)
hf = frictional losses (m)

Step	P (psi)	Pi (m)	gal/min	Q (m3/s)	R (m)	rb (m)	T (m2/d)	K = T/b 126.5
1	20	15.12	2.4	0.000151	5	0.038	7.78E-06	6.15E-08
2	40	29.18	3.7	0.000233	5	0.038	6.22E-06	4.91E-08
3	60	43.24	4.9	0.000309	5	0.038	5.56E-06	4.39E-08
4	80	57.3	6.2	0.000391	5	0.038	5.31E-06	4.19E-08
5	100	71.36	8.1	0.000511	5	0.038	5.57E-06	4.40E-08
6	120	85.42	8	0.000505	5	0.038	4.59E-06	3.63E-08
6a	100	71.36	6.9	0.000435	5	0.038	4.74E-06	3.75E-08
5a	80	57.3	5.3	0.000334	5	0.038	4.53E-06	3.58E-08
4a	60	43.24	4.6	0.00029	5	0.038	5.22E-06	4.12E-08

Client:	Avalon		Collar E.I.:	1.06 m		Hole #	L09-152
Project:	Thor Lake		Trend:			Design Test Interval:	10 ft
Project #:	1036222		Plunge:			Test #:	5
Personnel:	JT		Date:	25-Mar-09			

Measurements:

Depth to WT:	2.64
Top of Packer Interval:	181'
Bottom of Packer Interval (or Bottom of hole):	191'
Packer Int. Midpoint (double packer):	186'
Water Flushed: (Vol./Time/Until Clean):	clean
Packer Inflation Pressure:	
Stickup Height:	
Borehole Outside Diametric:	NQ 3"
Packer Pipe ID / or Drill Rod ID:	

Measurement Units

Volume:	gal
Pressure:	psi
Length:	ft

Time

Start Packer Testing:	
Start Flushing:	
End Flushing:	
End Packer Testing:	

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	20	0	-
1	20	0	0
2	20	0	0
0	40	0	-
1	40	0.7	0.7
2	40	1.2	0.5
3	40	1.8	0.6
4	40	2.3	0.5
5	40	2.7	0.4
6	40	3.1	0.4
7	40	3.5	0.4
0	60	0	-
1	60	1.3	1.3
2	60	2.5	1.2
3	60	3.7	1.2
4	60	4.9	1.2
0	80	0	-
1	80	1.4	1.4
2	80	2.8	1.4
3	80	4.2	1.4
0	100	0	-
1	100	2	2
2	100	4	2
3	100	6	2

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	80	0	-
1	80	1.5	1.5
2	80	2.9	1.4
3	80	4.4	1.5
4	80	5.8	1.4
0	60	0	-
1	60	1.2	1.2
2	60	2.4	1.2
3	60	3.6	1.2
0	40	0	-
1	40	0.7	0.7
2	40	1.4	0.7
3	40	2.2	0.8
4	40	2.9	0.7

Pi = Pg + hg + hs - hf

Pg = gauge pressure (m)
hg = height of gauge obove ground level (m)
hs = depth to pre-test water level (m)
hf = frictional losses (m)

Step	P (psi)	Pi (m)	Q (gal/min)	Q (m3/s)	R (m)	rb (m)	T (m2/d)	K = T/b 3
1	20	15.12	0	0	5	0.038	0	0.00E+00
2	40	29.18	0.4	2.52E-05	5	0.038	6.72E-07	2.24E-07
3	60	43.24	1.2	7.57E-05	5	0.038	1.36E-06	4.54E-07
4	80	57.3	1.4	8.83E-05	5	0.038	1.2E-06	3.99E-07
5	100	71.36	2	1.26E-04	5	0.038	1.37E-06	4.58E-07
4a	80	57.3	1.4	8.83E-05	5	0.038	1.2E-06	3.99E-07
3a	60	43.24	1.2	7.57E-05	5	0.038	1.36E-06	4.54E-07
2a	40	29.18	0.7	4.42E-05	5	0.038	1.18E-06	3.92E-07

Client: Avalon
Project: Thor Lake
Project #: 1036222
Personnel: JT

Collar E.I.: 1.06 m
Trend:
Plunge:
Date: 25-Mar-09

Hole # L09-152
Design Test Interval: 10 ft
Test #: 6

Measurements:

Depth to WT:	3.3	2.24
Top of Packer Interval:	61'	
Bottom of Packer Interval (or Bottom of hole):	71'	
Packer Int. Midpoint (double packer):	66'	
Water Flushed: (Vol./Time/Until Clean):	clean	
Packer Inflation Pressure:		
Stickup Height:		
Borehole Outside Diametric:	NQ 3"	
Packer Pipe ID / or Drill Rod ID:		

Measurement Units

Volume: gal
Pressure: psi
Length: ft

Time

Start Packer Testing:
Start Flushing:
End Flushing:
End Packer Testing:

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	20	0	-
1	20	1.4	1.4
2	20	2.6	1.2
3	20	3.7	1.1
4	20	4.9	1.2
5	20	6	1.1
0	40	0	-
1	40	3.2	3.2
2	40	6.3	3.1
3	40	9.4	3.1
4	40	12.3	2.9
5	40	15.1	2.8
6	40	18	2.9
7	40	20.8	2.8
0	60	0	-
1	60	5	5
2	60	9.6	4.6
3	60	13.3	3.7
4	60	17	3.7
5	60	20.7	3.7
0	80	0	-
1	80	6.5	6.5
2	80	13	6.5
3	80	19.4	6.4
4	80	25.8	6.4
0	100	0	-
1	100	8.7	8.7
2	100	16.5	7.8
3	100	24.7	8.2
4	100	32.7	8
5	100	40.8	8.1
6	100	48.8	8
7	100	56.8	8

Pressure Interval

Minutes	Pressure	Volume	Δ Volume
0	80	0	-
1	80	3.4	3.4
2	80	8.7	5.3
3	80	14.6	5.9
4	80	20.2	5.6
5	80	25.3	5.1
6	80	30.3	5
7	80	35.4	5.1
8	80	40.5	5.1
0	60	0	-
1	60	1.8	1.8
2	60	5.6	3.8
3	60	9.5	3.9
4	60	13.4	3.9
5	60	17.1	3.7
6	60	20.8	3.7
7	60	24.6	3.8

Pi = Pg + hg + hs - hf

Pg = gauge pressure (m)
hg = height of gauge above ground level (m)
hs = depth to pre-test water level (m)
hf = frictional losses (m)

K = T/b b = length of test interval

Step	P (psi)	Pi (m)	Gal/Min	Q (m3/s)	R (m)	rb (m)	T (m2/d)	3	
1	20	17.8	1.2	0.00007572	10	0.0379	3.78E-06	1.26E-06	m/s
2	40	31.86	2.9	0.00018299	10	0.0379	5.10E-06	1.70E-06	m/s
3	60	45.92	3.7	0.00023347	10	0.0379	4.51E-06	1.50E-06	m/s
4	80	59.98	6.4	0.00040384	10	0.0379	5.98E-06	1.99E-06	m/s
5	100	74.04	8	0.0005048	10	0.0379	6.05E-06	2.02E-06	m/s
4a	80	59.98	5.1	0.00032181	10	0.0379	4.76E-06	1.59E-06	m/s
3a	60	45.92	3.8	0.00023978	10	0.0379	4.64E-06	1.55E-06	m/s

APPENDIX E

Hydrogeochemical Plots

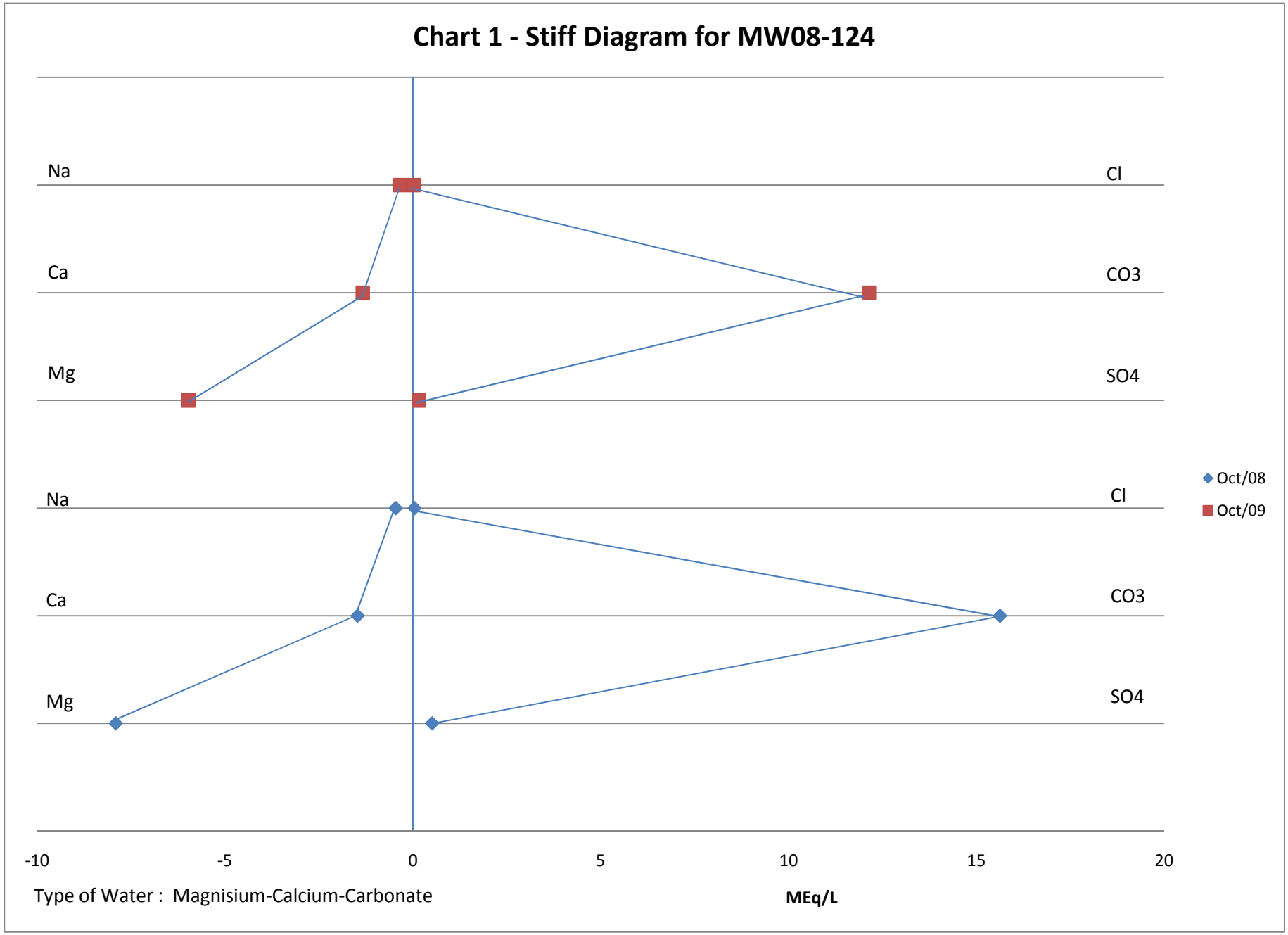


Chart 1 - Stiff Diagram for MW08-124
Na
Ca
Mg
Cl
CO3
SO4
Na
Ca
Mg
Cl
CO3
SO4
Oct/08
Oct/09
-10
-5
0
5
10
15
20
Type of Water : Magnisium-Calcium-Carbonate
MEq/L

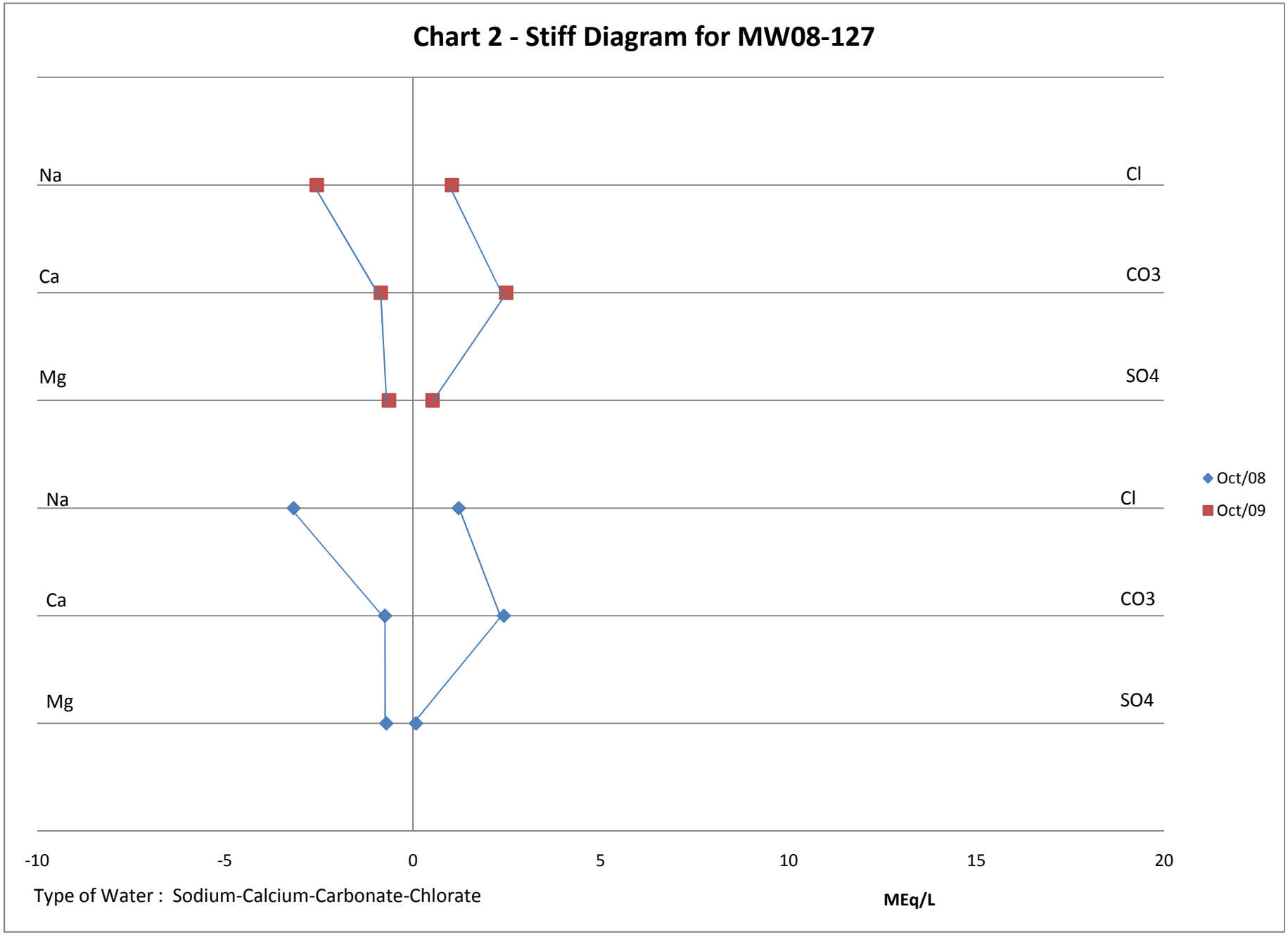


Chart 2 - Stiff Diagram for MW08-127
Na
Ca
Mg
Cl
CO3
SO4
Na
Ca
Mg
Cl
CO3
SO4
Oct/08
Oct/09
-10
-5
0
5
10
15
20
Type of Water : Sodium-Calcium-Carbonate-Chlorate
MEq/L

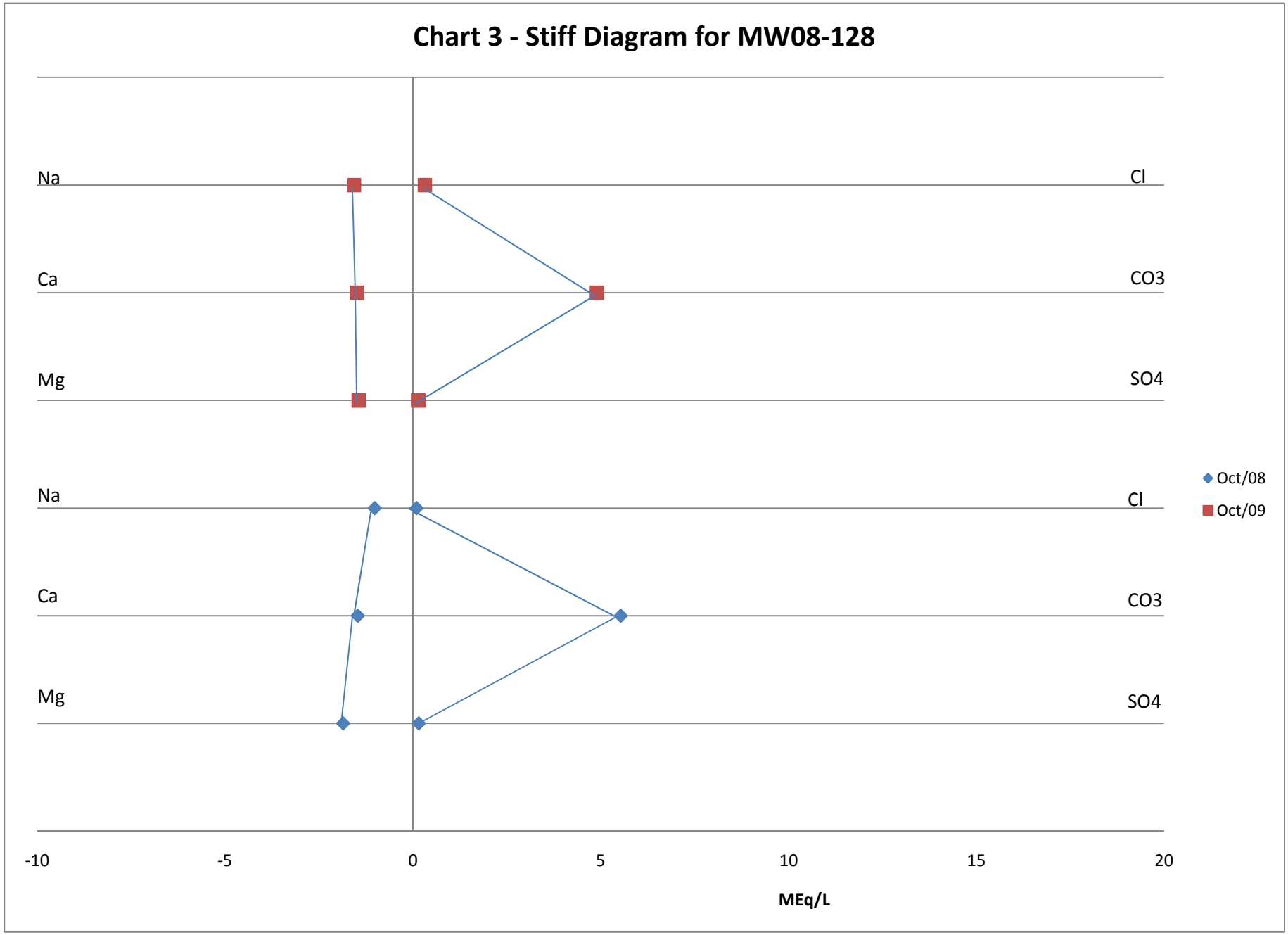
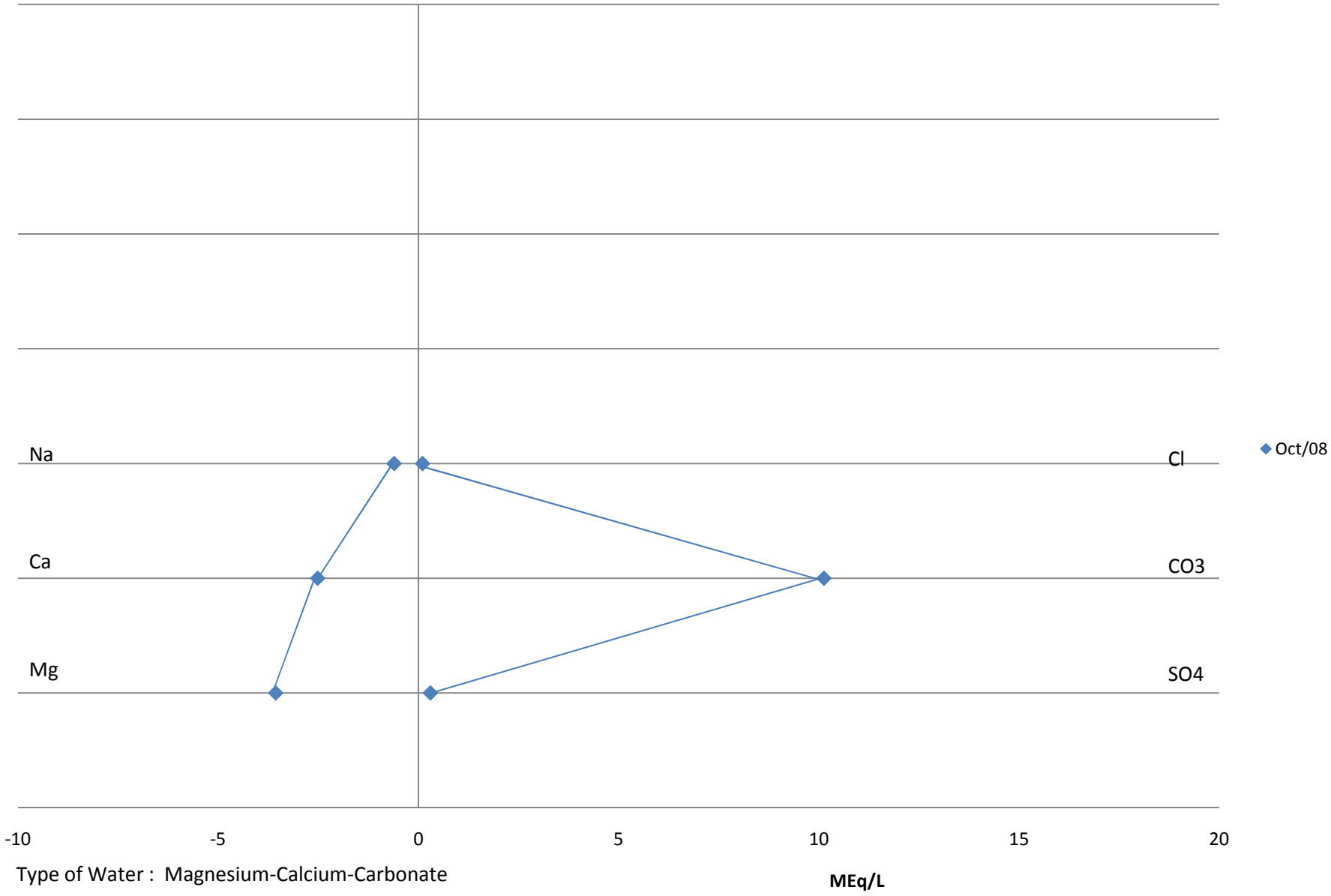


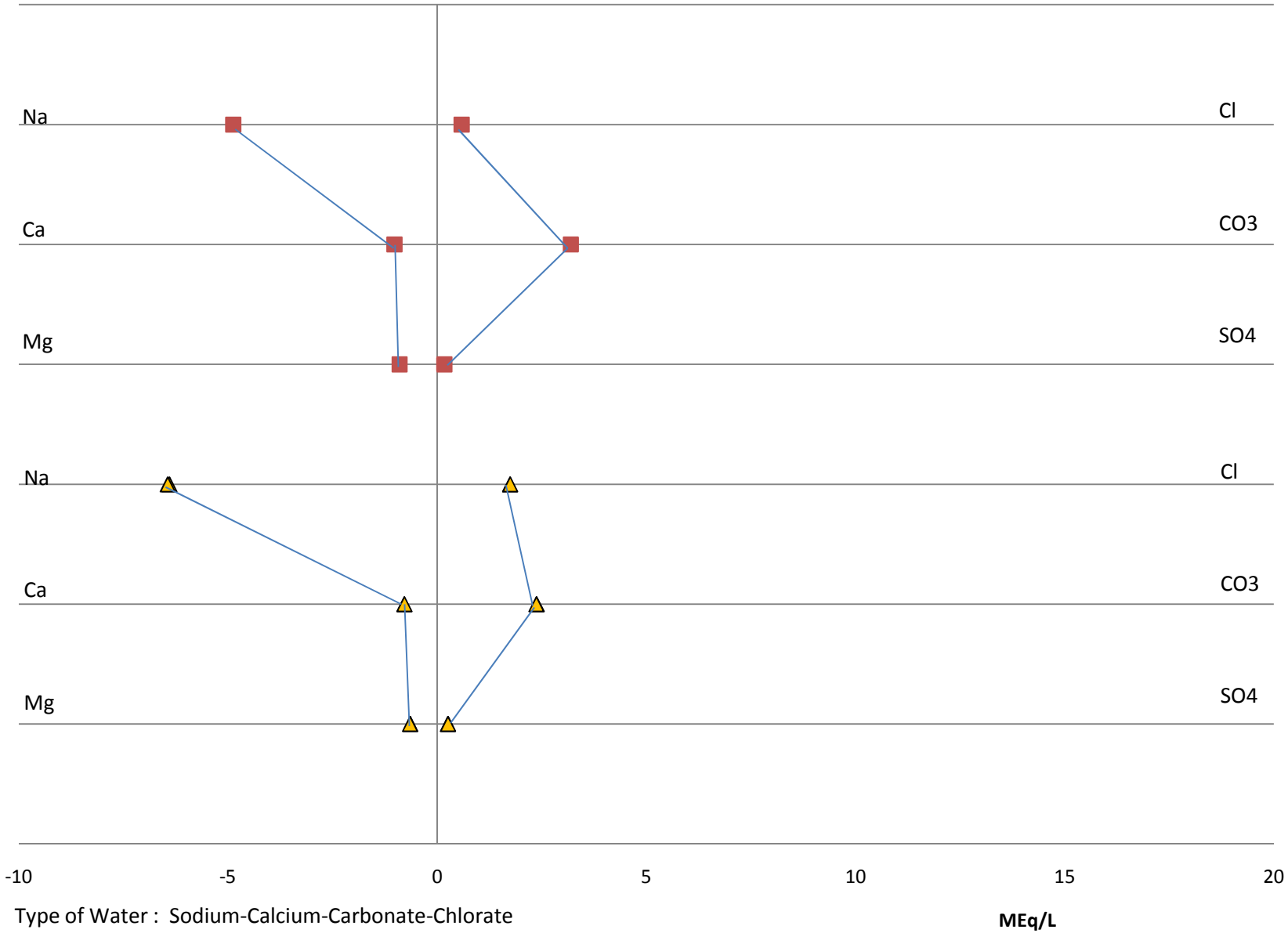
Chart 3 - Stiff Diagram for MW08-128
Na
Ca
Mg
Cl
CO3
SO4
Na
Ca
Mg
Cl
CO3
SO4
Oct/08
Oct/09
-10
-5
0
5
10
15
20
MEq/L

Chart 4- Stiff Diagram for MW08-130

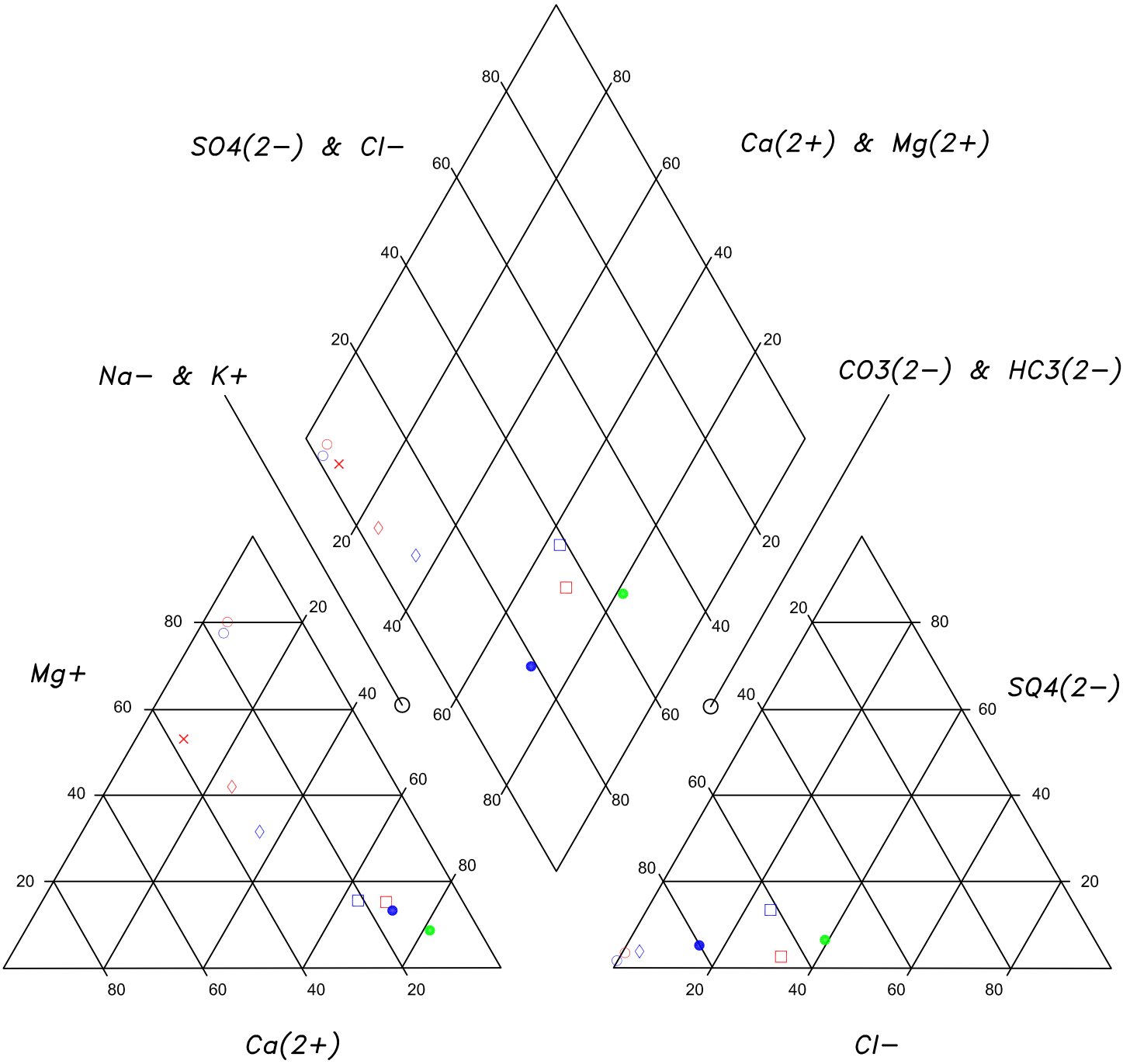


Type of Water : Magnesium-Calcium-Carbonate

Chart 5 - Stiff Diagram for MW09-152



Type of Water : Sodium-Calcium-Carbonate-Chlorate



LEGEND

- L08-124
- MW08-127
- MW08-128
- MW08-130
- MW09-152
- OCT 2008
- JUNE 2009
- OCT 2009

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A JACQUES WHITFORD STANTEC LIMITED REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

PIPER PLOT

THOR LAKE ENVIRONMENTAL BASELINE
THOR LAKE

Client:	AVALON VENTURES

Job No.:	1036222
Scale:	N.T.S.
Date:	18-Dec-09
Dwn. By:	NP
App'd By:	

Chart No.: 6

Stantec

R:\2009Fiscal\1036222\CAD\PiperPlots\1036222 D01 R0.dwg PRINTED: Jan 14, 2010

APPENDIX F

Laboratory Certificates

Certificate of Analysis

JACQUES WHITFORD AXYS LTD.

ATTN: JENNIFER TODD

4370 DOMINION ST 5TH FLOOR

BURNABY BC V5G 4L7

Reported On: 10-OCT-08 04:33 PM

Lab Work Order #: **L688290** **Date Received:** **26-SEP-08**

Project P.O. #: 1036222.OD / Z9100
Job Reference: 1036222.OD / Z9100
Legal Site Desc: AVALON VENTURES - THOR LAKE
CofC Numbers: C048742

Other Information:

Comments: The detection limits for some metals have been increased due to high levels of metals in the samples or interferences encountered during analysis.

Bryan Mark
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L688290-1	L688290-2	L688290-3		
	Description					
	Sampled Date	20-SEP-08	20-SEP-08	21-SEP-08		
	Sampled Time					
	Client ID	MWL08-127	MWL08-128	MWL08-130		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	878	482	557		
	Hardness (as CaCO3) (mg/L)	142	261	282		
	pH (pH)	8.15	7.59	8.10		
	Total Suspended Solids (mg/L)	33.0	49.5	14.5		
	Total Dissolved Solids (mg/L)	487	335	331		
	Turbidity (NTU)	13.0	79.3	4.05		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	287	251	266		
	Ammonia as N (mg/L)	<0.020	0.581	0.066		
	Bromide (Br) (mg/L)	0.358	<0.25	<0.050		
	Chloride (Cl) (mg/L)	108	3.6	3.48		
	Fluoride (F) (mg/L)	2.54	1.29	1.05		
	Nitrate (as N) (mg/L)	<0.0050	<0.025	5.07		
	Nitrite (as N) (mg/L)	<0.0010	0.0137	0.227		
	Total Kjeldahl Nitrogen (mg/L)	0.477	1.88	0.813		
	Ortho Phosphate as P (mg/L)	<0.0010	0.0016	<0.0010		
	Total Phosphate as P (mg/L)	0.024	0.030	0.0062		
	Sulfate (SO4) (mg/L)	1.00	4.8	14.9		
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	10.4	30.9	16.0		
Total Metals	Aluminum (Al)-Total (mg/L)	0.566	0.552	0.811		
	Antimony (Sb)-Total (mg/L)	<0.0010	<0.00050	<0.00050		
	Arsenic (As)-Total (mg/L)	0.0017	0.0231	0.00102		
	Barium (Ba)-Total (mg/L)	0.044	0.179	0.440		
	Beryllium (Be)-Total (mg/L)	<0.0020	<0.0010	<0.0010		
	Boron (B)-Total (mg/L)	0.67	<0.10	<0.10		
	Cadmium (Cd)-Total (mg/L)	0.000316	0.000430	0.000156		
	Calcium (Ca)-Total (mg/L)	24.3	49.1	48.3		
	Chromium (Cr)-Total (mg/L)	<0.0020	0.0013	0.0071		
	Cobalt (Co)-Total (mg/L)	<0.00060	0.00146	0.00316		
	Copper (Cu)-Total (mg/L)	0.0276	0.0033	0.0402		
	Iron (Fe)-Total (mg/L)	0.837	8.89	2.69		
	Lead (Pb)-Total (mg/L)	<0.0010	0.00253	0.00360		
	Lithium (Li)-Total (mg/L)	0.051	0.0161	0.0154		
	Magnesium (Mg)-Total (mg/L)	19.8	33.6	39.1		
	Manganese (Mn)-Total (mg/L)	0.190	0.490	0.123		
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020		
	Molybdenum (Mo)-Total (mg/L)	0.0286	0.0241	0.0559		
	Nickel (Ni)-Total (mg/L)	0.0020	0.0035	0.0108		
	Potassium (K)-Total (mg/L)	5.9	7.8	3.9		

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L688290-1	L688290-2	L688290-3		
	Description					
	Sampled Date	20-SEP-08	20-SEP-08	21-SEP-08		
	Sampled Time					
	Client ID	MWL08-127	MWL08-128	MWL08-130		
Grouping	**Analyte**					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	<0.0020	<0.0010	0.0011		
	Silver (Ag)-Total (mg/L)	0.000396	0.000332	0.00351		
	Sodium (Na)-Total (mg/L)	131	11.8	16.6		
	Thallium (Tl)-Total (mg/L)	<0.00040	<0.00020	<0.00020		
	Tin (Sn)-Total (mg/L)	<0.0010	<0.00050	0.00053		
	Titanium (Ti)-Total (mg/L)	<0.010	0.010	0.016		
	Uranium (U)-Total (mg/L)	0.0132	0.0266	0.00273		
	Vanadium (V)-Total (mg/L)	<0.0020	0.0021	<0.0010		
	Zinc (Zn)-Total (mg/L)	0.0091	0.0140	0.0118		
Speciated Metals	Chromium, Hexavalent (mg/L)	<0.001	<0.001	<0.001		

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CR-CR6-ED	Water	Chromium, Hexavalent (Cr +6)	APHA 3500-Cr C (Ion Chromatography)
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

HG-TOT-CCME-CVAFS-VA Water Total Mercury in Water by CVAFS (CCME) EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-TOT-CCME-ICP-VA Water Total Metals in Water by ICPOES (CCME) EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-CCME-MS-VA Water Total Metals in Water by ICPMS (CCME) EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-SIE-VA Water Ammonia by SIE APHA 4500-NH3 "Nitrogen (Ammonia)"

This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

PO4-DO-COL-VA Water Dissolved ortho Phosphate by Color APHA 4500-P "Phosphorous"

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.

PO4-T-COL-VA Water Total Phosphate P by Color APHA 4500-P "Phosphorous"

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.

TDS-VA Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-SIE-VA Water Total Kjeldahl Nitrogen by SIE APHA 4500-Norg (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-VA Water Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA	VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

CANADA TOLL FREE 1-800-668-9878

www.alsenviro.com

COC # C048742

L 688290

Page 1 of 1

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: Jacques Whitford AXYS	STANDARD ✓ OTHER ____	REGULAR SERVICE (DEFAULT)
CONTACT: Jennifer Todd	PDF ✓ EXCEL ✓ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS: 4370 Dominion St 5th Floor	EMAIL 1: jennifer.todd@jacqueswhitford.com	PRIORITY SERVICE (1 DAY or ASAP)
Burnaby, BC, V5G 4L7	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: 604 436 3014 FAX: 604 436 3752		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? (YES) NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	F / P / NA
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #: 1036222.0R / 79100	
ADDRESS:	PO /AFE: "	
	Legal Site Description: Avalon Ventures - Thor Lake	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only):	SAMPLER (Initials): JT.	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals (250 Plastic)	Cr (VI) (125 Plastic)	Anions, IDs, Alk, Turb, pH, cond.	TSS, T-P&A (1L Plastic) O-PO4	TKN, Ammonia	TOC	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
1	MWL08-127	Sept 20, 08		Groundwater	✓	✓	✓		✓	✓			5
2	MWL08-128	Sept 20 08		"	✓	✓	✓		✓	✓			5
3	MWL-08-130	Sept 21, 08		"	✓	✓	✓		✓	✓			5
	* TKN, Ammonia All Sampled Sept 24, 2008												

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS
CCME	QA/QC - EDT.

Failure to complete all portions of this form may delay analysis. Please fill in this form *LEGIBLY*.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
		R. Fournier 1Pook	Sept 26/08
R Fournier 10:15	Sept 27/08	HD 08/09/29	1.49

SAMPLE CONDITION (lab use only)	
TEMPERATURE: 13°	SAMPLES RECEIVED IN GOOD CONDITION? YES / NO (If no provide details)

REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

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Page 1 of 1

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
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CONTACT: Jennifer Todd	PDF ✓ EXCEL ✓ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS: 4370 Dominion St 5th Floor	EMAIL 1: jennifer.todd@jacqueswhitford.com	PRIORITY SERVICE (1 DAY or ASAP)
Burnaby, BC, V5G 4L7	EMAIL 2:	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: 604 436 3014 FAX: 604 436 3752		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? (YES) NO	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	F / P / NA
COMPANY:	CLIENT / PROJECT INFORMATION:	
CONTACT:	JOB #: 1036222.0R / 79100	
ADDRESS:	PO /AFE: "	
	Legal Site Description: Avalon Ventures - Thor Lake	
PHONE: FAX:	QUOTE #:	
Lab Work Order # (lab use only):	SAMPLER (Initials): JT.	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals (250 Plastic)	Cr (VI) (125 Plastic)	Anions, IDs, Alk, Turb, pH, cond.	TSS, T-P&A (1L Plastic) O-PO4	TKN, Ammonia	TOC	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
1	MWL08-127	Sept 20, 08		Groundwater	✓	✓	✓		✓	✓			5
2	MWL08-128	Sept 20 08		"	✓	✓	✓		✓	✓			5
3	MWL-08-130	Sept 21, 08		"	✓	✓	✓		✓	✓			5
	* TKN, Ammonia All Sampled Sept 24, 2008												

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS
CCME	QA/QC - EDT.

Failure to complete all portions of this form may delay analysis. Please fill in this form *LEGIBLY*.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
		R. Fournier 1Pook	Sept 26/08
R Fournier 10:15	Sept 27/08	HD 08/09/29	1.49

SAMPLE CONDITION (lab use only)	
TEMPERATURE: 13°	SAMPLES RECEIVED IN GOOD CONDITION? YES / NO (If no provide details)

REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

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Part of the ALS Laboratory Group
Toll Free: 1-800-668-9878 Manitoba: 1-800-607-7555
1988 Triumph Street, Vancouver, BC V5L 1K5
Phone: +1 604 253 4188 Fax: +1 604 253 6700 www.alsglobal.com

ALS LABORATORY GROUP SAMPLE RECEIPT CONFIRMATION

Company:	JACQUES WHITFORD AXYS LTD.
ATTN:	JENNIFER TODD
Fax Number:	604-436-3752
Account Manager:	NATASHA MARKOVIC-MIROVIC
Job Reference:	1036222.OD / Z9100
Project P.O. #:	1036222.OD / Z9100
Date Sampled:	20-SEP-08
Date Received:	26-SEP-08
Estimated Completion Date:	09-OCT-08
Sampled By:	JT
Workorder #:	**L688290**
Chain of Custody #:	C048742

Sample #/SampleID/DateSampled/DateDue: L688290-1/MWL08-127/20-SEP-08/09-OCT-08

Matrix	Product Description	Product Due*
Water	Alkalinity by Colourimetric (Automated)	
Water	Anions by Ion Chromatography	
	Bromide by Ion Chromatography	
	Chloride by Ion Chromatography	
	Fluoride by Ion Chromatography	
	Nitrite by Ion Chromatography	
	Nitrate by Ion Chromatography	
	Sulfate by Ion Chromatography	
Water	Total organic carbon by combustion	
Water	Chromium, Hexavalent (Cr +6)	
Water	Conductivity (Automated)	
Water	Total Metals in Water (CCME/BCWQG)	
	Hardness	
	Total Mercury in Water by CVAFS (CCME)	
	Total Metals in Water by ICPOES (CCME)	
	Total Metals in Water by ICPMS (CCME)	
Water	Ammonia by SIE	
Water	pH by Meter (Automated)	
Water	Dissolved ortho Phosphate by Color	
Water	Total Phosphate P by Color	
Misc.	Handling/Disposal Fee	

ALS Laboratory Group strives to deliver on-time results to our clients at all times. However, there are times when, due to capacity issues or other unforeseen circumstances, we are unable to meet our expected TATs. The information above is related to a recent workorder you have submitted to our laboratory. We have also included a summary on the parameters of interest for this workorder. In the event that you have an inquiry, please refer to the Work Order # (L+6 digits) when calling your Account Manager.

Sample #/SampleID/DateSampled/DateDue: L688290-1/MWL08-127/20-SEP-08/09-OCT-08

Matrix	Product Description	Product Due*
Water	Total Dissolved Solids by Gravimetric	
Water	Total Kjeldahl Nitrogen by SIE	
Water	Solids by Gravimetric	
Water	Turbidity by Meter	

Sample #/SampleID/DateSampled/DateDue: L688290-2/MWL08-128/20-SEP-08/09-OCT-08

Matrix	Product Description	Product Due*
Water	Alkalinity by Colourimetric (Automated)	
Water	Anions by Ion Chromatography	
	Bromide by Ion Chromatography	
	Chloride by Ion Chromatography	
	Fluoride by Ion Chromatography	
	Nitrite by Ion Chromatography	
	Nitrate by Ion Chromatography	
	Sulfate by Ion Chromatography	
Water	Total organic carbon by combustion	
Water	Chromium, Hexavalent (Cr +6)	
Water	Conductivity (Automated)	
Water	Total Metals in Water (CCME/BCWQG)	
	Hardness	
	Total Mercury in Water by CVAFS (CCME)	
	Total Metals in Water by ICPOES (CCME)	
	Total Metals in Water by ICPMS (CCME)	
Water	Ammonia by SIE	
Water	pH by Meter (Automated)	
Water	Dissolved ortho Phosphate by Color	
Water	Total Phosphate P by Color	
Misc.	Handling/Disposal Fee	
Water	Total Dissolved Solids by Gravimetric	
Water	Total Kjeldahl Nitrogen by SIE	
Water	Solids by Gravimetric	
Water	Turbidity by Meter	

Sample #/SampleID/DateSampled/DateDue: L688290-3/MWL08-130/21-SEP-08/09-OCT-08

Matrix	Product Description	Product Due*
Water	Alkalinity by Colourimetric (Automated)	

ALS Laboratory Group strives to deliver on-time results to our clients at all times. However, there are times when, due to capacity issues or other unforeseen circumstances, we are unable to meet our expected TATs. The information above is related to a recent workorder you have submitted to our laboratory. We have also included a summary on the parameters of interest for this workorder. In the event that you have an inquiry, please refer to the Work Order # (L+6 digits) when calling your Account Manager.

Sample #/SampleID/DateSampled/DateDue: L688290-3/MWL08-130/21-SEP-08/09-OCT-08

Matrix	Product Description	Product Due*
Water	Anions by Ion Chromatography	
	Bromide by Ion Chromatography	
	Chloride by Ion Chromatography	
	Fluoride by Ion Chromatography	
	Nitrite by Ion Chromatography	
	Nitrate by Ion Chromatography	
	Sulfate by Ion Chromatography	
Water	Total organic carbon by combustion	
Water	Chromium, Hexavalent (Cr +6)	
Water	Conductivity (Automated)	
Water	Total Metals in Water (CCME/BCWQG)	
	Hardness	
	Total Mercury in Water by CVAFS (CCME)	
	Total Metals in Water by ICPOES (CCME)	
	Total Metals in Water by ICPMS (CCME)	
Water	Ammonia by SIE	
Water	pH by Meter (Automated)	
Water	Dissolved ortho Phosphate by Color	
Water	Total Phosphate P by Color	
Misc.	Handling/Disposal Fee	
Water	Total Dissolved Solids by Gravimetric	
Water	Total Kjeldahl Nitrogen by SIE	
Water	Solids by Gravimetric	
Water	Turbidity by Meter	

* INDICATES ESTIMATED COMPLETION DATE OF REQUESTED PRODUCT IF DIFFERENT THAN THE ESTIMATED COMPLETION DATE.

Notice of Sub-contract Laboratory Service

Please be advised that the following tests will be subcontracted to the corresponding laboratory:

Chromium, Hexavalent (Cr +6) Subcontracted to: ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA

Please contact your Account Manager immediately should you have questions or concerns regarding this arrangement. Approval of this arrangement shall be implied unless otherwise notified by you.

ALS Laboratory Group strives to deliver on-time results to our clients at all times. However, there are times when, due to capacity issues or other unforeseen circumstances, we are unable to meet our expected TATs. The information above is related to a recent workorder you have submitted to our laboratory. We have also included a summary on the parameters of interest for this workorder. In the event that you have an inquiry, please refer to the Work Order # (L+6 digits) when calling your Account Manager.

Certificate of Analysis

JACQUES WHITFORD

ATTN: JENNIFER TODD

4370 DOMINION STREET, 5TH FLOOR
PO BOX 21
BURNABY BC V5G 4L7

Reported On: 30-OCT-08 04:38 PM

Lab Work Order #: **L694303** **Date Received:** **10-OCT-08**

Project P.O. #:
Job Reference: 1036222.02./79100
Legal Site Desc:
CofC Numbers: 08-011347

Other Information:

Comments: For some of the submitted water samples, the measured concentration of specific dissolved parameters is greater than the corresponding total parameters concentration. The explanation for these findings is one or a combination of the following:
- laboratory method variability;
- field sampling method variability;
- bias introduced during general handling, filtering, storage, transportation and/or analysis of the sample;
- field sample grab bias - where separate grab samples are processed to produce total and dissolved samples;
- field sample split bias - where total and dissolved parameters samples are produced from the same grab sample.

For further clarification on any of the above information, please contact your ALS account manager.

Bryan Mark
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L694303-1	L694303-2	L694303-3	L694303-4	
	Description	WATER	WATER	WATER	WATER	
	Sampled Date	08-OCT-08	09-OCT-08	08-OCT-08	07-OCT-08	
	Sampled Time		10:00			
	Client ID	MWL08-124	MWL08-127	MWL08-128	MWL08-130	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	738	405	382	558	
	Hardness (as CaCO3) (mg/L)	469	72.6	166	304	
	pH (pH)	8.25	8.16	7.90	8.21	
	Total Suspended Solids (mg/L)	110	213	29.2	3.2	
	Total Dissolved Solids (mg/L)	422	291	258	335	
	Turbidity (NTU)	171	1150	42.2	2.69	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	442	144	202	276	
	Ammonia as N (mg/L)	<0.020	0.024	0.610	0.070	
	Bromide (Br) (mg/L)	<0.050	<0.25	<0.25	<0.050	
	Chloride (Cl) (mg/L)	1.55	43.2	3.5	3.68	
	Fluoride (F) (mg/L)	2.41	1.37	0.97	1.04	
	Nitrate (as N) (mg/L)	0.475	<0.025	<0.025	5.55	
	Nitrite (as N) (mg/L)	0.0254	0.0079	0.0078	0.237	
	Total Kjeldahl Nitrogen (mg/L)	0.470	2.19	1.79	0.872	
	Ortho Phosphate as P (mg/L)	<0.0010	0.0087	<0.0010	<0.0010	
	Total Phosphate as P (mg/L)	<0.020	0.066	0.163	0.0044	
	Sulfate (SO4) (mg/L)	24.5	4.0	7.7	14.4	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	7.78	28.7	25.5	15.8	
	Total Organic Carbon (mg/L)	14.4	48.9	26.9	15.6	
Total Metals	Aluminum (Al)-Total (mg/L)	1.14	37.0	0.302	0.178	
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.0025	<0.00050	<0.00050	
	Arsenic (As)-Total (mg/L)	0.00067	0.0067	0.00512	0.00054	
	Barium (Ba)-Total (mg/L)	0.160	0.473	0.156	0.407	
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0050	<0.0010	<0.0010	
	Boron (B)-Total (mg/L)	<0.10	0.33	<0.10	<0.10	
	Cadmium (Cd)-Total (mg/L)	0.000254	0.000287	0.000282	0.000060	
	Calcium (Ca)-Total (mg/L)	30.9	17.6	29.1	50.5	
	Chromium (Cr)-Total (mg/L)	0.0104	0.0489	0.0010	<0.0010	
	Cobalt (Co)-Total (mg/L)	0.00439	0.0143	0.00138	0.00349	
	Copper (Cu)-Total (mg/L)	0.0256	0.0804	0.0029	0.0272	
	Iron (Fe)-Total (mg/L)	32.1	37.4	14.5	0.303	
	Lead (Pb)-Total (mg/L)	0.00069	0.0146	0.00103	<0.00050	
	Lithium (Li)-Total (mg/L)	0.0208	0.075	0.0147	0.0126	
	Magnesium (Mg)-Total (mg/L)	94.1	17.2	22.1	43.0	
	Manganese (Mn)-Total (mg/L)	0.188	0.619	0.552	0.100	
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.00010	<0.000020	<0.000020	
	Molybdenum (Mo)-Total (mg/L)	0.0215	0.0359	0.0177	0.0456	
	Nickel (Ni)-Total (mg/L)	0.0075	0.0396	0.0036	0.0115	

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L694303-1	L694303-2	L694303-3	L694303-4	
	Description	WATER	WATER	WATER	WATER	
	Sampled Date	08-OCT-08	09-OCT-08	08-OCT-08	07-OCT-08	
	Sampled Time		10:00			
	Client ID	MWL08-124	MWL08-127	MWL08-128	MWL08-130	
Grouping	**Analyte**					
WATER						
Total Metals	Potassium (K)-Total (mg/L)	3.9	10.5	4.1	3.1	
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0050	<0.0010	<0.0010	
	Silver (Ag)-Total (mg/L)	0.00470	0.00229	0.000171	0.00377	
	Sodium (Na)-Total (mg/L)	10.6	74.5	22.3	13.8	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.0010	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	0.00196	<0.0025	0.00176	0.00106	
	Titanium (Ti)-Total (mg/L)	0.018	0.696	0.010	<0.010	
	Uranium (U)-Total (mg/L)	0.0197	0.0035	0.00382	0.00235	
	Vanadium (V)-Total (mg/L)	0.0013	0.0642	0.0012	<0.0010	
	Zinc (Zn)-Total (mg/L)	0.0188	0.0987	0.0139	0.0052	
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0065	15.3	0.0338	0.0077	
	Antimony (Sb)-Dissolved (mg/L)	<0.00050	<0.0025	<0.00050	<0.00050	
	Arsenic (As)-Dissolved (mg/L)	<0.00050	0.0027	0.00233	0.00065	
	Barium (Ba)-Dissolved (mg/L)	0.084	0.257	0.143	0.401	
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0050	<0.0010	<0.0010	
	Boron (B)-Dissolved (mg/L)	<0.10	0.31	<0.10	<0.10	
	Cadmium (Cd)-Dissolved (mg/L)	<0.000017	0.000206	0.000249	0.000018	
	Calcium (Ca)-Dissolved (mg/L)	29.5	14.9	29.3	50.4	
	Chromium (Cr)-Dissolved (mg/L)	0.0013	0.0179	<0.0010	<0.0010	
	Cobalt (Co)-Dissolved (mg/L)	0.00178	0.0057	0.00126	0.00328	
	Copper (Cu)-Dissolved (mg/L)	0.0046	0.0474	<0.0010	0.0182	
	Iron (Fe)-Dissolved (mg/L)	0.133	8.85	10.8	<0.030	
	Lead (Pb)-Dissolved (mg/L)	<0.00050	0.0066	<0.00050	<0.00050	
	Lithium (Li)-Dissolved (mg/L)	0.0194	0.043	0.0152	0.0127	
	Magnesium (Mg)-Dissolved (mg/L)	96.1	8.59	22.5	43.3	
	Manganese (Mn)-Dissolved (mg/L)	0.0506	0.260	0.544	0.0888	
	Mercury (Hg)-Dissolved (mg/L)	<0.000020	<0.00010	<0.000020	<0.000020	
	Molybdenum (Mo)-Dissolved (mg/L)	0.0119	0.0345	0.0194	0.0466	
	Nickel (Ni)-Dissolved (mg/L)	0.0024	0.0151	0.0027	0.0108	
	Potassium (K)-Dissolved (mg/L)	3.4	6.6	4.2	3.0	
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0050	<0.0010	<0.0010	
	Silver (Ag)-Dissolved (mg/L)	<0.000020	0.00133	0.000031	<0.000020	
	Sodium (Na)-Dissolved (mg/L)	10.5	72.9	23.3	13.9	
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.0010	<0.00020	<0.00020	
	Tin (Sn)-Dissolved (mg/L)	<0.00050	0.0027	0.00071	0.00333	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	0.354	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.0199	0.0027	0.00324	0.00230	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	0.0229	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	<0.0050	0.0327	0.0090	0.0061	

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 "Determination of Anions by IC

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

HG-DIS-CCME-CVAFS-VA	Water	Diss. Mercury in Water by CVAFS (CCME)	EPA 3005A/245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-DIS-CCME-ICP-VA	Water	Diss. Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-DIS-CCME-MS-VA	Water	Diss. Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500-NH3 "Nitrogen (Ammonia)"

This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Color	APHA 4500-P "Phosphorous"

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.

PO4-T-COL-VA Water Total Phosphate P by Color APHA 4500-P "Phosphorous"

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.

TDS-VA Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-SIE-VA Water Total Kjeldahl Nitrogen by SIE APHA 4500-Norg (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-VA Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

L694303

COC # 08-011347
Page ___ of ___

Report to:	**Report Format / Distribution**
Company: Jacques Whitford.	Standard: ✓ Other:
Contact: Jennifer Todd	Select: PDF ✓ Excel ✓ Digital
Address: 4370 Dominion St. Suite 600 Burnaby BC V5G 4L7	Email 1: jennifer.todd@jacqueswhitford.com
Phone: Fax: 604 436 3752	Email 2:
Invoice To: Same as Report ? (Yes) No ?	**Client / Project Information:**
Company:	Job #: 1036222.02 / 79100.
Contact:	PO / AFE:
Address:	Legal Site Description:
Phone: Fax:	Quote #:
Lab Work Order # (lab use only)	ALS Contact: Sampler:

Service Requested: (rush - subject to availability)
- (Regular (Default))
- Priority (2-3 Business Days) - 50% Surcharge
- Emergency (1 Business Day) - 100% Surcharge
- For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request
(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	DOC	TOC	Dissolved Metals	Total Metals	TKN - Ammonia	Anions TDS, Alk.	Turb, pH, Cond	TSS, T-PO4	O-PO4	Number of Containers
1	MWL08-124	Oct 8		GW	✓	✓	✓	✓	✓	✓				
2	MWL08-127	Oct 9/08	10 am.	"	✓	✓	✓	✓	✓	✓				
3	MWL08-128	Oct 8/08		"	✓	✓	✓	✓	✓	✓				
4	MWL08-130	Oct 7/08		"	✓	✓	✓	✓	✓	✓				

Preserved + Filtered in Yellowknife →

* Note: for MWL08-127 could not filter or preserve. DOC / Dissolved Metals samples, please close in lab! fx

Special Instructions / Regulations / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
	Oct 9/08	RVS	Oct 9/08	1500				

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY. PINK - FILE COPY. YELLOW - CLIENT COPY

Oct 14.0

GENF 18.00 Front

Certificate of Analysis

JACQUES WHITFORD

ATTN: JENNIFER TODD

4370 DOMINION STREET, 5TH FLOOR
PO BOX 21
BURNABY BC V5G 4L7

Report Date: 10-JUL-09 16:19 (MT)
Version: FINAL

Lab Work Order #: L784443 **Date Received:** 26-JUN-09

Project P.O. #: THOR LAKE
Job Reference: 1036222.02
Legal Site Desc:
CofC Numbers: 08-011419

Other Information:

Comments:

LINDSAY JONES
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L784443-1	L784443-2			
	Description	WATER	WATER			
	Sampled Date	26-JUN-09	26-JUN-09			
	Sampled Time	10:00	10:00			
	Client ID	152	163			
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	717	721			
	Hardness (as CaCO3) (mg/L)	71.4	71.3			
	pH (pH)	8.52	8.56			
	Total Suspended Solids (mg/L)	110	116			
	Total Dissolved Solids (mg/L)	466	464			
	Turbidity (NTU)	35.1	34.1			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	287	282			
	Ammonia as N (mg/L)	0.100	0.103			
	Bromide (Br) (mg/L)	0.188	0.193			
	Chloride (Cl) (mg/L)	61.8	62.0			
	Fluoride (F) (mg/L)	4.37	4.38			
	Nitrate (as N) (mg/L)	<0.0050	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	0.705	0.681			
	Sulfate (SO4) (mg/L)	12.6	12.6			
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	9.32	8.78			
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0176	0.0181			
	Antimony (Sb)-Dissolved (mg/L)	0.00032	0.00029			
	Arsenic (As)-Dissolved (mg/L)	0.00180	0.00174			
	Barium (Ba)-Dissolved (mg/L)	0.0160	0.0164			
	Beryllium (Be)-Dissolved (mg/L)	<0.0010	<0.0010			
	Bismuth (Bi)-Dissolved (mg/L)	<0.0010	<0.0010			
	Boron (B)-Dissolved (mg/L)	0.806	0.817			
	Cadmium (Cd)-Dissolved (mg/L)	<0.00020	<0.00020			
	Calcium (Ca)-Dissolved (mg/L)	15.7	15.6			
	Chromium (Cr)-Dissolved (mg/L)	<0.0030	<0.0030			
	Cobalt (Co)-Dissolved (mg/L)	<0.00020	<0.00020			
	Copper (Cu)-Dissolved (mg/L)	<0.00020	0.00021			
	Iron (Fe)-Dissolved (mg/L)	0.083	0.093			
	Lead (Pb)-Dissolved (mg/L)	<0.00010	<0.00010			
	Lithium (Li)-Dissolved (mg/L)	0.063	0.061			
	Magnesium (Mg)-Dissolved (mg/L)	7.79	7.83			
	Manganese (Mn)-Dissolved (mg/L)	0.0255	0.0254			
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.0497	0.0497			
	Nickel (Ni)-Dissolved (mg/L)	<0.0010	<0.0010			
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30			
	Potassium (K)-Dissolved (mg/L)	3.2	3.2			
	Selenium (Se)-Dissolved (mg/L)	<0.0020	<0.0020			
	Silicon (Si)-Dissolved (mg/L)	4.09	4.02			

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L784443-1	L784443-2			
	Description	WATER	WATER			
	Sampled Date	26-JUN-09	26-JUN-09			
	Sampled Time	10:00	10:00			
	Client ID	152	163			
Grouping	**Analyte**					
WATER						
Dissolved Metals	Silver (Ag)-Dissolved (mg/L)	<0.000020	<0.000020			
	Sodium (Na)-Dissolved (mg/L)	147	148			
	Strontium (Sr)-Dissolved (mg/L)	0.270	0.269			
	Thallium (Tl)-Dissolved (mg/L)	<0.00020	<0.00020			
	Tin (Sn)-Dissolved (mg/L)	<0.00020	<0.00020			
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.00662	0.00658			
	Vanadium (V)-Dissolved (mg/L)	<0.0020	<0.0020			
	Zinc (Zn)-Dissolved (mg/L)	<0.0020	<0.0020			
Speciated Metals	Hexavalent Chromium (mg/L)	0.0032	0.0015			

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorance and not conductivity.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CR-CR6-ED	Water	Chromium, Hexavalent (Cr +6)	APHA 3500-Cr C (Ion Chromatography)
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

HG-DIS-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS	EPA SW-846 3005A & EPA 245.7

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-DIS-ICP-VA Water Dissolved Metals in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-DIS-LOW-MS-VA Water Dissolved Metals in Water by ICPMS(Low) EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures involves preliminary sample treatment by filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-SIE-VA Water Ammonia by SIE APHA 4500 D. - NH3 NITROGEN (AMMONIA)

This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

TDS-VA Water Total Dissolved Solids by Gravimetric APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-SIE-VA Water Total Kjeldahl Nitrogen by SIE APHA 4500-Norg (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.

TSS-VA Water Total Suspended Solids by Gravimetric APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA	ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

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ANALYTICAL CHEMISTRY & TESTING SERVICES

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COC # 08-011419

Page ___ of ___

Report to: STANTEC	**Report Format / Distribution**	**Service Requested:** (rush - subject to availability)
Company:	Standard: ✓ Other:	(Regular) (Default)
Contact: JENNIFER TODD	Select: PDF ✓ Excel ✓ Digital	Priority (2-3 Business Days) - 50% Surcharge
Address: 4370 DOMINION ST	Email 1: JENNIFER.TODD@JACOBSWHITFORD.COM	Emergency (1 Business Day) - 100% Surcharge
BURNABY BC V5G 4L7	Email 2:	For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone: 604 436 3014 Fax:		**Analysis Request**
Invoice To: Same as Report ? (Yes) / No ?	**Client / Project Information:** THOR LAKE	(Indicate Filtered or Preserved, F/P)
Company: STANTEC	Job #: 1836222.02	
Contact:	PO / AFE:	
Address: P.O. Box 38212 B3B 1W8	Legal Site Description:	
DARTMOUTH N.S		
Phone: Fax:	Quote #:	
Lab Work Order # (lab use only)	ALS Contact: Sampler:	

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	F/P	F/P	F/P	F/P									Number of Containers
					DISS METALS	CrVI	TKN/NH3	TOC	pH, CONDUCTIVITY, TURB	TDS TSS	TOTAL ALKALITY	ANION SCAN					
1	152	JUNE 26/09	10:00AM	GRD. WATER	X	X	X	X	X	X	X	X					5
2	163	JUNE 26/09	10:00 AM	GRD. WATER	X	X	X	X	X	X	X	X					5

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SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

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ALS Canada Ltd.
Part of the ALS Laboratory Group
Toll Free: 1-800-668-9878 Manitoba: 1-800-607-7555
1988 Triumph Street, Vancouver, BC V5L 1K5
Phone: +1 604 253 4188 Fax: +1 604 253 6700 www.alsglobal.com

ALS LABORATORY GROUP SAMPLE RECEIPT CONFIRMATION

Company:	JACQUES WHITFORD
ATTN:	JENNIFER TODD
Fax Number:	604-436-3752
Account Manager:	NATASHA MARKOVIC-MIROVIC
Job Reference:	
Project P.O. #:	
Date Sampled:	26-JUN-09
Date Received:	26-JUN-09
Estimated Completion Date:	11-JUL-09
Sampled By:	JT
Workorder #:	**L784443**
Chain of Custody #:	08-011419

Sample #/SampleID/DateSampled/DateDue: L784443-1/152/26-JUN-09/11-JUL-09

Matrix	Product Description	Product Due*
Water	Alkalinity by Colourimetric (Automated)	
Water	Anions by Ion Chromatography	
	Bromide by Ion Chromatography	
	Chloride by Ion Chromatography	
	Fluoride by Ion Chromatography	
	Nitrite by Ion Chromatography	
	Nitrate by Ion Chromatography	
	Sulfate by Ion Chromatography	
Water	Total organic carbon by combustion	
Water	Chromium, Hexavalent (Cr +6)	
Water	Conductivity (Automated)	
Water	Dissolved Mercury in Water by CVAFS	
Water	Diss. Metals in Water by ICPOES & ICPMS	
	Hardness	
	Dissolved Metals in Water by ICPOES	
	Dissolved Metals in Water by ICPMS(Low)	
Water	Ammonia by SIE	
Water	pH by Meter (Automated)	
Misc.	Handling/Disposal Fee	
Water	Total Dissolved Solids by Gravimetric	
Water	Total Kjeldahl Nitrogen by Auto. Colour	

ALS Laboratory Group strives to deliver on-time results to our clients at all times. However, there are times when, due to capacity issues or other unforeseen circumstances, we are unable to meet our expected TATs. The information above is related to a recent workorder you have submitted to our laboratory. We have also included a summary on the parameters of interest for this workorder. In the event that you have an inquiry, please refer to the Work Order # (L+6 digits) when calling your Account Manager.

Sample #/SampleID/DateSampled/DateDue: L784443-1/152/26-JUN-09/11-JUL-09

Matrix	Product Description	Product Due*
Water	Total Suspended Solids by Gravimetric	
Water	Turbidity by Meter	

Sample #/SampleID/DateSampled/DateDue: L784443-2/163/26-JUN-09/11-JUL-09

Matrix	Product Description	Product Due*
Water	Alkalinity by Colourimetric (Automated)	
Water	Anions by Ion Chromatography	
	Bromide by Ion Chromatography	
	Chloride by Ion Chromatography	
	Fluoride by Ion Chromatography	
	Nitrite by Ion Chromatography	
	Nitrate by Ion Chromatography	
	Sulfate by Ion Chromatography	
Water	Total organic carbon by combustion	
Water	Chromium, Hexavalent (Cr +6)	
Water	Conductivity (Automated)	
Water	Dissolved Mercury in Water by CVAFS	
Water	Diss. Metals in Water by ICPOES & ICPMS	
	Hardness	
	Dissolved Metals in Water by ICPOES	
	Dissolved Metals in Water by ICPMS(Low)	
Water	Ammonia by SIE	
Water	pH by Meter (Automated)	
Misc.	Handling/Disposal Fee	
Water	Total Dissolved Solids by Gravimetric	
Water	Total Kjeldahl Nitrogen by Auto. Colour	
Water	Total Suspended Solids by Gravimetric	
Water	Turbidity by Meter	

* INDICATES ESTIMATED COMPLETION DATE OF REQUESTED PRODUCT IF DIFFERENT THAN THE ESTIMATED COMPLETION DATE.

Notice of Sub-contract Laboratory Service

Please be advised that the following tests will be subcontracted to the corresponding laboratory:

Chromium, Hexavalent (Cr +6) Subcontracted to: ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA

Please contact your Account Manager immediately should you have questions or concerns regarding this arrangement. Approval of this arrangement shall be implied unless otherwise notified by you.

ALS Laboratory Group strives to deliver on-time results to our clients at all times. However, there are times when, due to capacity issues or other unforeseen circumstances, we are unable to meet our expected TATs. The information above is related to a recent workorder you have submitted to our laboratory. We have also included a summary on the parameters of interest for this workorder. In the event that you have an inquiry, please refer to the Work Order # (L+6 digits) when calling your Account Manager.

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ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

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COC # 08-011419

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Report to: STANTEC	**Report Format / Distribution**	**Service Requested:** (rush - subject to availability)
Company:	Standard: ✓ Other:	(Regular) (Default)
Contact: JENNIFER TODD	Select: PDF ✓ Excel ✓ Digital	Priority (2-3 Business Days) - 50% Surcharge
Address: 4370 DOMINION ST	Email 1: JENNIFER.TODD@JACOBSWHITFORD.COM	Emergency (1 Business Day) - 100% Surcharge
BURNABY BC V5G 4L7	Email 2:	For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone: 604 436 3014 Fax:		**Analysis Request**
Invoice To: Same as Report ? (Yes) / No ?	**Client / Project Information:** THOR LAKE	(Indicate Filtered or Preserved, F/P)
Company: STANTEC	Job #: 1836222.02	
Contact:	PO / AFE:	
Address: P.O. Box 38212 B3B 1W8	Legal Site Description:	
DARTMOUTH N.S		
Phone: Fax:	Quote #:	
Lab Work Order # (lab use only)	ALS Contact: Sampler:	

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	F/P	F/P	F/P	F/P									Number of Containers
					DISS METALS	CrVI	TKN/NH3	TOC	pH, CONDUCTIVITY, TURB	TDS TSS	TOTAL ALKALITY	ANION SCAN					
1	152	JUNE 26/09	10:00AM	GRD. WATER	X	X	X	X	X	X	X	X					5
2	163	JUNE 26/09	10:00 AM	GRD. WATER	X	X	X	X	X	X	X	X					5

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Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

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Certificate of Analysis

JACQUES WHITFORD

ATTN: JENNIFER TODD

4370 DOMINION STREET, 5TH FLOOR
PO BOX 21
BURNABY BC V5G 4L7

Report Date: 26-OCT-09 14:03 (MT)
Version: FINAL

Lab Work Order #: **L829174** **Date Received:** **13-OCT-09**

Project P.O. #: THOR LAKE
Job Reference: 1036222.02/Z9100
Legal Site Desc: GROUNDWATER SAMPLES
CofC Numbers: 09-020378

Other Information:

Comments:

Lindsay Jones
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L829174-1	L829174-2	L829174-3	L829174-4	L829174-5
	Description					
	Sampled Date	08-OCT-09	08-OCT-09	08-OCT-09	08-OCT-09	08-OCT-09
	Sampled Time					
	Client ID	MW08-127	MW08-128	MW09-152	L08-124	DUP1
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	404	367	592	460	587
	Hardness (as CaCO3) (mg/L)	74.5	147	95.9	365	96.5
	pH (pH)	6.86	7.41	8.17	8.10	8.24
	Total Suspended Solids (mg/L)	56.8	17.8	23.3	28.8	35.8
	Total Dissolved Solids (mg/L)	240	230	388	274	399
	Turbidity (NTU)	42.7	20.0	22.6	70.6	19.8
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	121	173	278	265	289
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Alkalinity, Total (as CaCO3) (mg/L)	121	173	278	265	289
	Ammonia as N (mg/L)	0.063	0.575	0.106	0.046	0.067
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Chloride (Cl) (mg/L)	36.9	11.4	20.8	0.84	21.0
	Fluoride (F) (mg/L)	0.720	1.16	2.76	2.19	2.79
	Nitrate (as N) (mg/L)	0.0063	<0.0050	<0.0050	0.125	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.508	1.14	0.716	0.481	0.769
	Ortho Phosphate as P (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Total Phosphate as P (mg/L)	0.060	0.041	0.0078	0.019	0.0148
	Sulfate (SO4) (mg/L)	25.1	6.88	8.40	7.80	7.08
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	11.8	14.9	19.7	11.9	18.5
Dissolved Metals	Aluminum (Al)-Dissolved (mg/L)	0.0108	0.0084	0.0066	0.0037	0.0245
	Antimony (Sb)-Dissolved (mg/L)	0.00013	0.00011	0.00011	<0.00010	0.00012
	Arsenic (As)-Dissolved (mg/L)	0.00066	0.00404	0.00084	0.00038	0.00090
	Barium (Ba)-Dissolved (mg/L)	0.0496	0.107	0.0212	0.0874	0.0217
	Beryllium (Be)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	0.067	0.021	0.690	0.050	0.725
	Cadmium (Cd)-Dissolved (mg/L)	<0.000080	<0.00020	<0.00010	<0.000080	<0.00020
	Calcium (Ca)-Dissolved (mg/L)	17.1	29.8	20.4	26.7	20.5
	Chromium (Cr)-Dissolved (mg/L)	<0.0060	<0.0030	<0.0020	<0.0030	<0.0030
	Cobalt (Co)-Dissolved (mg/L)	0.00045	0.00043	0.00017	0.00138	0.00017
	Copper (Cu)-Dissolved (mg/L)	0.00102	0.00046	0.00040	0.00408	0.00062
	Iron (Fe)-Dissolved (mg/L)	1.09	5.96	0.098	0.324	0.094
	Lead (Pb)-Dissolved (mg/L)	0.000141	<0.000050	<0.000050	<0.000050	0.000052
	Lithium (Li)-Dissolved (mg/L)	0.0188	0.0139	0.0580	0.0189	0.0586
	Magnesium (Mg)-Dissolved (mg/L)	7.73	17.5	10.9	72.6	11.0
	Manganese (Mn)-Dissolved (mg/L)	0.222	0.336	0.0294	0.0508	0.0304
	Molybdenum (Mo)-Dissolved (mg/L)	0.0230	0.0627	0.0382	0.0281	0.0403
	Nickel (Ni)-Dissolved (mg/L)	0.00663	0.00371	0.00054	0.00208	0.00071

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L829174-1	L829174-2	L829174-3	L829174-4	L829174-5
	Description					
	Sampled Date	08-OCT-09	08-OCT-09	08-OCT-09	08-OCT-09	08-OCT-09
	Sampled Time					
	Client ID	MW08-127	MW08-128	MW09-152	L08-124	DUP1
Grouping	**Analyte**					
WATER						
Dissolved Metals	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	2.7	3.0	3.2	3.5	3.2
	Selenium (Se)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Silicon (Si)-Dissolved (mg/L)	1.88	3.52	4.36	4.78	4.37
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000013	<0.000010	0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	58.8	36.0	112	8.1	112
	Strontium (Sr)-Dissolved (mg/L)	0.110	0.122	0.375	0.0932	0.388
	Thallium (Tl)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	0.00036	0.00048	0.00022	0.00014	0.00022
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000918	0.00428	0.00764	0.0175	0.00765
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0076	0.0063	0.0018	0.0022	0.0031
Speciated Metals	Hexavalent Chromium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Aggregate Organics	COD (mg/L)	35	23	64	94	59

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
ALK-SCR-VA	Water	Alkalinity by colour or titration	EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.
OR
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-BR-IC-VA	Water	Bromide by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-CL-IC-VA	Water	Chloride by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-F-IC-VA	Water	Fluoride by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

ANIONS-NO2-IC-VA	Water	Nitrite by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrite detection is by UV absorbance and not conductivity.

ANIONS-NO3-IC-VA	Water	Nitrate by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Specifically, the nitrate detection is by UV absorance and not conductivity.

ANIONS-SO4-IC-VA	Water	Sulfate by Ion Chromatography	APHA 4110 B.

This analysis is carried out using procedures adapted from APHA Method 4110 B. "Ion Chromatography with Chemical Suppression of Eluent Conductivity" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography".

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 "TOTAL ORGANIC CARBON (TOC)"

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

COD-COL-VA	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

CR-CR6-ED	Water	Chromium, Hexavalent (Cr +6)	APHA 3500-Cr C (Ion Chromatography)
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

MET-DIS-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-DIS-LOW-MS-VA	Water	Dissolved Metals in Water by ICPMS(Low)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures involves preliminary sample treatment by filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

MET-DIS-ULTRA-MS-VA	Water	Diss. Metals in Water by ICPMS (Ultra)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures involves preliminary sample treatment by filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

NH3-SIE-VA	Water	Ammonia by SIE	APHA 4500 D. - NH3 NITROGEN (AMMONIA)

This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P "Phosphorous"

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.

PO4-DO-COL-VA	Water	Dissolved ortho Phosphate by Colour	APHA 4500-P Phosphorous

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.

PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P "Phosphorous"

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.

PO4-T-COL-VA	Water	Total Phosphate P by Color	APHA 4500-P Phosphorous

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
		This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.	
TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC
		This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.	
TKN-SIE-VA	Water	Total Kjeldahl Nitrogen by SIE	APHA 4500-Norg (TKN)
		This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total kjeldahl nitrogen is determined by sample digestion at 367 celcius with analysis using an ammonia selective electrode.	
TSS-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC
		This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.	
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
		This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.	
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
		This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.	

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA	ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

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Company:	Stantec	Standard: ✓	Other (specify):	(Regular) (Standard Turnaround Times))
Contact:	Jennifer Todd	Select: PDF ✓	Excel ✓ Digital	Fax	Priority, Date Req'd: _____ (Surcharges apply)
Address:	4370 Dominion St. Burnaby, B.C.	Email 1:	jennifer.todd@stantec.com	Emergency (1 Business Day) - 100% Surcharge
Phone:	604 436 3014 Fax:	Email 2:	billing info to cindy@andersenco.ca bmercer@avalonrareMetals.com	For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Invoice To	Same as Report ? (circle) Yes or (No) (if No, provide details)	**Client / Project Information**		**Analysis Request**
	Copy of Invoice with Report? (circle) Yes or No	Job #:	036222.02 / Z9100	(Indicate Filtered or Preserved, F/P)
Company:	Avalon Rare Metals Inc	PO / AFE:	Thor Lake	
Contact:	Bill Mercer / Cindy Hu	LSD:	Groundwater Samples	
Address:	130 Adelaide St. W, Toronto, ON, M5H 3P5	Quote #:		
Phone:	416 364.4938 Fax: 416 364.5162	ALS Contact:	Natash Markovic-Milovanovic	Sampler: Jennifer Todd
Lab Work Order # (lab use only)	L829174			

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Metals F	Cr VI F	TOC F	COD/TKN/Nitrate F	General	Ca/Mg/Na/TDS/Alk/Turbidity/pH	Conductivity/TSS	TPO4/DPO4	Specified Anions				Number of Containers
	MW08-127	Oct 8/09		gw	✓	✓	✓	✓	✓								5
	MW08-128	Oct 8/09		gw	✓	✓	✓	✓	✓								5
	MW09-152	Oct 8/09		gw	✓	✓	✓	✓	✓								5
	LOB-124	Oct 8/09		gw	✓	✓	✓	✓	✓								5
	Dup 1	Oct 8/09		gw	✓	✓	✓	✓	✓								5

Special Instructions / Regulations / Hazardous Details

CCME / CSR EDT / QA/QC

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

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SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
Mee Todd.	Oct 9/09		HD	09/10/13	1156	5 °C				

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